



## .Addictions

- resources
  - Meta Phi - Clinical best practices in addiction medicine: A guide for RAAM clinicians
    - [http://www.metaphi.ca/wp-content/uploads/Guide\\_AddictionBestPractices.pdf](http://www.metaphi.ca/wp-content/uploads/Guide_AddictionBestPractices.pdf)
  - Meta Phi - Primary care management of substance use
    - [http://www.metaphi.ca/wp-content/uploads/Guide\\_PrimaryCareManagement.pdf](http://www.metaphi.ca/wp-content/uploads/Guide_PrimaryCareManagement.pdf)
- Detox vs rehab
- Detox: to help with withdrawal. 5-7 days living at the center.
  - Rehab: working on long term recovery. Counseling. Living there usually 3-6 months.
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## .Addictions Alcohol.Alcohol Addiction.alcoholism.alcohol use disorder

- Diagnosis
  - has impaired control over drinking
  - ongoing drinking despite knowledge of consequences
  - neglect of responsibilities
- complications
  - CNS: Wernicke encephalopathy, Korsakoff
  - CV: hypertension, cardiomyopathy, Afib
  - GI: cirrhosis, PUD, gastritis, pancreatitis, carcinoma
  - psych: depression, anxiety
  - withdrawal
- investigation
  - CBC, lytes, Cr, ECG, LFTs
- Management
  - first line: Naltrexone 25mg qhs x 3 days. Then 50mg daily
  - second line: Acamprosate 666mg tid
  - third line: gabapentin 300mg tid
  - Thiamine 100mg po daily
  - acamprosate more effective for abstinence, while naltrexone more effective for reducing cravings
- Contraindications
  - Naltrexone contraindications
    - Opioids, LFTs 4x upper limit of normal, pregnant, hepatic impairment (e.g. cirrhosis)
  - Acamprosate contraindications
    - Renal impairment
- AUD: reduce cravings
- Refer to addiction counselling at Pinewood
- pregnancy
  - Although they have not been extensively studied, naltrexone and acamprosate appear to be safe in pregnancy, and they may be prescribed in pregnant patients who are unable to maintain abstinence (33). Gabapentin use in late pregnancy has been associated with preterm labour and small for gestational age (34) so it should be used with caution.
- anxiety and AUD
  - If anxiety/depression predates the alcohol use, if patient unable to reduce drinking, or if psychiatric symptoms persist after 4 weeks of abstinence, consider antidepressant medication.
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## [.Addictions Alcohol](#).[Alcohol Addiction](#).[alcoholism](#).[alcohol use disorder - other info](#).[drinks](#).[standard drinks](#).[alcohol](#).[alcohol guidelines](#)

- Alcohol drinking limits
  - old guidelines
    - 10 drinks per week for women. max 2 drinks per day
    - 15 drinks per week for men. max 3 drinks per day
  - new alcohol guidelines
    - negligible to low risk: 2 standard drinks or less
    - moderate risk: 3-6 drinks per week
    - high risk: more than 6 drinks per week
- harms of drinking alcohol
  - cardiovascular, cancer
  - cancer: breast, colon. Rectum, mouth, throat, liver, esophagus, larynx
  - heart disease: at low amounts, neither decreases nor increases risk of heart disease. At higher levels, it is a risk factor for CAD, MI, HF, HTN, afib, stroke
  - violence: associated with violent and aggressive behavior
- definition of 1 drink
  - beer: 341mL (12 oz). 5% alcohol
  - cider/cooler: 341mL (12oz). 5% alcohol
  - wine: 142mL (5oz). 12% alcohol
  - distilled alcohol (e.g. rye, gin, rum): 43mL (1.5oz). 40% alcohol

## [.Alcohol withdrawal](#)

- definition
  - decrease in alcohol use that has been heavy/prolonged
  - $\geq 2$ : autonomic hyperactivity, hand tremor, insomnia, n/v, hallucination, agitation, anxiety seizures
- timeline
  - 12-24h after last drink: elevated HR, tremors, anorexia, insomnia
  - 24-72h: generalized seizures
  - 3-5d: delirium tremens: disorientation, fever, hallucinations
- Management of withdrawal
  - PAWSS. Predictive alcohol withdrawal scale
    - If PAWSS  $\geq 4$ 
      - should be managed as inpatient
      - Benzos: diazepam 10mg qid
      - Thiamine 100mg x4d
    - If PAWSS 3 or less, may manage as outpatient if able to attend daily appointments
      - Gabapentin
        - Day 1: 300 tid with 600 qhs
        - Day 2: 600 tid with 900 qhs
        - Then taper off.
        - Call every other day or every day.
          - Tremors, headaches, hallucinations
  - provide following instructions
    - On your quit date, once you're experiencing withdrawal symptoms like tremor, nausea, sweating, and headache, start taking Gabapentin 300mg q4-5h. Max 1200mg per day. For 5 days. Don't take it if you're feeling sedated or dizzy.
    - You need to go to the hospital immediately if your tremor and sweating gets worse despite gabapentin, or if you become agitated, start experiencing hallucinations, or can't stop vomiting or sweating.

- Apparently, gabapentin doesn't prevent seizures; only benzos prevent seizures. So if you use gabapentin, you have to be sure they won't seize.
- other Medications
  - OR Carbamazepine 200mg qid. taper by 200mg/day
  - OR clonidine 0.1-0.2mg bid. titrate to max 0.1-0.6mg bid
- daily appointments for 3-5 days
- no driving
- other resources
  - Refer to RACE line
  - Refer to RAAM SPH. tell patient to go to RAAC at SPH; is a walk in. 9-4 daily.
  - Vancouver detox is also self referral, but 7 day waitlist.
  - Avoid benzos as a family doctor
- Assessment
  - How much drinking daily. Are you a daily drinker?
  - Drinking daily?
  - How much drink?
  - Last drink?
- Worried if:
  - Daily drinker, been to detox in past
  - Positive alcohol level and going through withdrawal
- If binge drinker, less worried about seizure
- Worst withdrawal symptoms at 24-48h. But DTs can occur up to 3-5 days, but most often by day 2-3.
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## [.Addictions consult](#)

- Consult headers
  - ID
  - HPI, PMHx, Meds, Allergies,
  - SocHx, Substance Use History, Vitals, Physical exam, Investigations
  - Investigations
- Substance History:
  - Treatment (detox, programs, meds)
  - Route
  - Amount (frequency, money spent)
  - Pattern (binge, daily, solitary heaviest use)
  - Prior abstinence (duration, what helped)
  - Effects (legal, withdrawal, physical)
  - Duration (age of first use, most recent use)
  - DUI
  - other drugs (benzos, hallucinogens)
  - daily max
  - last use
  - family history
- Physical exam:
  - CV, Abdo, Resp
  - Tremor, rhinorrhea, asterixis, sweating

## [.Alcohol consumption](#)

- Moderate drinking (low risk for alcohol problems)
  - Females age <65      ≤1 drink per day and <7 per week
  - Males age <65        ≤2 drinks per day and <14 per week

- People age  $\geq 65$   $\leq 1$  drink per day and  $< 7$  per week
- Heavy drinking (at risk for alcohol problems)
  - Females  $> 3$  drinks per day or  $> 7$  per week
  - Males  $> 4$  drinks per day or  $> 14$  per week
- Binge drinking
  - Females  $\geq 4$  or more drinks in 1 drinking occasion
  - Males  $\geq 5$  or more drinks in 1 drinking occasion
- Risks
  - Cancer: oral and pharyngeal, esophageal, and laryngeal

## • .Alcohol withdrawal 2

- ask patient to contact Pinewood
- <https://www.lakeridgehealth.on.ca/en/ourservices/pinewood-addiction-services.asp>
  - at Pinewood, they have counsellors and psychiatrists who can help with managing alcohol withdrawal
- if severe symptoms:
  - go to ER to be assessed.
- Management as inpatient
  - IV NS 100mL/h, CIWA, thiamine 100mg po x3 days
  - Diazepam 10-20mg q1h prn for CIWA  $> 10$  to max dose of 200mg in 24hours
  - OR Lorazepam 1-2mg q1h prn for CIWA  $> 10$  to max dose of 20mg in 24hours
- Management in ER. after withdrawal seizure
  - CBC, CHEM7, INR, LFTs, extended lytes, ECG
  - report to MTO
  - refer to RAAM

## • .Overdose

- S:
  - ROS: chest pain, SOB, tremor, seizures
  - determine suicidal ideation. intent.
  - time of overdose. what was overdosed and how much.
- management
  - contact poison control
    - charcoal?
    - telemonitoring? if so, how long?
    - ECGs
  - certify under mental health act
  - have patient be assessed by psychiatry.

## • .Smoking Cessation

- Pharmacotherapy
  - varenicline and NRT are suggested first line therapy. Bupropion is less effective than NRT or varenicline
  - combination of varenicline and nicotine patch is also an option
  - Nicotine replacement therapy (NRT): suggest long and short acting NRT. e.g. patch plus gum or lozenges
  - specific medications
    - Champix rx
      - side effect: nausea. take with food
    - Prescription
      - Day 1-3: 0.5mg daily
      - Day 4-7: 0.5mg bid

- Day 8 onwards: 1mg bid
- Treat for at least 12 weeks. May continue for another 12 weeks to prevent relapse.
- Quit smoking after 1 week of taking the medication
- nicotine patch
  - > 10 cig per day: 21mg/day patch
  - ≤ 10 cig per day: 14mg/day patch
  - rotate site daily to avoid skin irritation. HC 1% can relieve skin irritation
  - if gets vivid dreams and insomnia: remove patch at bedtime and replace with new one in morning.
- nicorette gum
  - 2mg dose if smoke half pack per day. 4mg for 1 pack per day
  - chew and park.
  - 1st month: q1h
  - 2nd month: q2-4h
  - 3rd month: q6-8h
- Zyban
  - contraindication: seizure disorder, anorexia/bulimia, wellbutrin use, benzo/EtOH withdrawal
  - be aware of seizure risk. counsel patient and document
- counselling
  - quitnow.ca
    - free helpline for smoking cessation
  - VGH smoking cessation clinic.
- after quitting
  - counsel patient to carry sugarless gum/candy to prevent increased calories and weight gain to substitute the hand to mouth motor addiction
- follow-up after initiating pharmacotherapy
  - schedule follow-up visit 1-2 weeks to monitor for adverse effects, reinforce adherence to medication
  - if not stopped smoking after 2-4 weeks of pharmacotherapy. May be: incorrect use of medications, intolerance of side effects, persistent nicotine withdrawal symptoms
- management of persistent withdrawal symptoms
  - suggest adding short acting NRT.
- Duration of therapy
  - pharmacotherapy recommended for at least 3 months
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## .Opioid use disorder.OUD

- Chronic pain vs OUD
  - Chronic pain: no cravings. No impact on social productivity. Not going out of way to get opioid
  - OUD: ongoing cravings even after pain optimization. Other substances seen in UDS. Frequently running out of rx.
- Pregnancy
  - Suboxone safe in pregnancy
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## .Suboxone

- Bernese method for microdose induction
  - Day 1: 0.5mg bid. Day 2: 1mg bid. Day 3: 2mg bid. Day 4: 4mg bid. Day 5: 6mg bid. Day 6: 12mg.
- no reason to prefer daily over weekly dispense.
  - typically give blister packs to carry home for the induction, since witnessed dispense in the pharmacy is a hassle for BID dosing
  - then daily dispense when on maintenance, mainly for logistical reasons in case the patient loses the prescription.
- harm reduction techniques
  - Naloxone kit
  - use with a friend

- 12 mg dose is when usually get withdrawal with fentanyl.
- Unless miss 5 days of suboxone, do not need a dose decrease, since risk of OD is low.

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### .Marijuana.Cannabis

- Cannabis abuse screening test (CAST)
  - smoked cannabis before midday
  - smoked cannabis alone
  - memory problems with smoked cannabis
  - problems as a result of cannabis use (argument, fight, accident, school)
  - friends/family told you to reduce cannabis use
  - tried to stop or reduce cannabis use without success
- recommended time before driving:
  - inhalation: 4h
  - oral ingestion: 6h
  - if experienced euphoria: 8h
- indications for medical marijuana
  - neuropathic pain
  - palliative and end of life pain
  - chemo induced nausea/vomiting
  - spasticity due to Multiple sclerosis or spinal cord injury
  -
- withdrawal
  - Cannabis withdrawal is characterized by insomnia, anxiety, fatigue, craving for cannabis, and physical symptoms which in some patients can be intensely uncomfortable (41). Controlled trials have found that nabiximols (Sativex) and CBD oil relieve cannabis withdrawal symptoms and reduce cannabis use
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### .Benzo use disorder

- Benzodiazepine use disorder
  - For benzo use disorder, the treatment of choice is counselling, management of underlying psychiatric conditions, and gradual benzodiazepine tapering, often over many months.
- Tapering benzos
  - Good idea to taper if using for more than 12 weeks daily, due to long term effects.
  - Make sure to be on something else for anxiety if patient is taking benzos due to anxiety.
  - Use scheduled doses during taper. Taper by maximum of 5mg equivalent per week, can be as slow as 1-2mg diazepam equivalent per month.
  - Hold taper if worse daily functioning due to rebound anxiety.
  - Benzo equivalence: diazepam 10mg = alprazolam 0.5mg = clonazepam 0.5mg = lorazepam 1mg = oxazepam 20mg = triazolam 0.5mg
  - Patient education
    - You haven't done anything wrong. Longer you take benzos, the more you develop tolerance until you don't get benefit anymore. This medication probably not helping with anxiety/insomnia any longer and putting you at risk of harms.

### .substances - Other

- Stimulant use disorder
  - There is no evidence yet to support the routine use of medications to treat stimulant withdrawal or stimulant use disorder.

## .Allergy

### .penicillin allergy

- For patients with mild penicillin allergy such as rash (maculopapular eruption, or record lists penicillin allergy but patient does not recall the reaction) without other obvious features of IgE mediated reactions (urticaria, angioedema, bronchospasm)
  - may give third, fourth, or fifth generation cephalosporin, carbapenem, or non beta-lactam antibiotic
  - OR first or second generation cephalosporin given by test dose procedure
- test dose procedure
- PEN-FAST score
  - five years or less since reaction
    - yes → 2 points
  - anaphylaxis or angioedema OR severe cutaneous adverse reaction
    - yes → 2 points
  - treatment required for reaction
    - yes → 1 point
  - scoring
    - 0 points: low risk <1%
    - 1 points: moderate risk

### .SCIT

- Schedules
  - one to three injections per week during a build-up phase that lasts a number of weeks, followed by a maintenance phase, during which injections are given every two to four weeks over a period of years.
- Moderately sensitive schedule
  - Example schedule. Moderately sensitive
    - 1:100: 0.05 mL, 0.10 mL, 0.20 mL, 0.40 mL, 0.70 mL
    - 1:10: 0.10 mL, 0.20 mL, 0.30 mL, 0.50 mL, 0.70 mL
    - 1:1: 0.10 mL, 0.15 mL, 0.20 mL, 0.30 mL, 0.40 mL, 0.50 mL, 0.40 mL, 0.50 mL
- more conservative schedule
  - more conservative schedules are appropriate for patients with any of the following characteristics:
    - Multiple large reactions during allergen skin testing [2]
    - Systemic symptoms during skin testing
    - Persistent asthma
    - A history of systemic allergic reactions to previous immunotherapy
- maintenance
  - usually every 2-4 weeks
- dose adjustments
  - local reaction
    - if large local reaction (>2.5cm, alternatively greater than palm): no evidence for decreasing dose. However, may clinicians opt to repeat the same dose or decrease it slightly
    - local reactions are not immediate harbingers of systemic reactions and that adjusting immunotherapy doses based on local reactions did not impact the incidence of systemic reactions
  - missed doses. No good evidence. Some sample regimens.
    - build up phase:
      - Up to 7 days late: Continue build-up as scheduled
      - 8 to 13 days late: Repeat previous dose
      - 14 to 21 days late: Reduce dose 25%
      - 21 to 28 days late: Reduce dose 50%
    - maintenance phase



- 2 to 4 weeks late: Reduce dose 75%
- >4 weeks late: Reduce by one or more dilutions depending on length of time and patient sensitivity

### .Allergic reaction

- Rupall 10mg once daily prn
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### .Allergic conjunctivitis

- Pataday 0.2% 1 drop 1 time daily. Prn for 1 month. 1 bottle. 3 refills. May use opticrom for cost.
- signs/symptoms
  - itchy
  - often bilateral

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### .Hives.Urticaria - new onset - acute

- Acute urticaria are periodic outbreaks of urticarial lesions that resolve within 6 weeks
- triggers, causes:
  - viral/bacterial infection, medications, food ingestion, insect sting
  - viral infection is a common cause
    - amoxicillin rash is usually maculopapular. a reaction would usually occur on first dose of 2nd course.
- prognosis
  - two thirds of cases are self limited. Resolving in days to a few weeks.
- Management
  - mild symptoms: non-sedating H1 antihistamine alone.
    - Cetirizine 10mg bid
  - persistent symptoms or prominent angioedema. Brief course of oral glucocorticoids. Continue antihistamines
    - adults: Prednisone 30-60mg daily. Tapered over 5-7 days
    - Children: prednisolone 0.5 to 1mg/kg/day.

### .hives.urticaria - chronic

- Management
  - step 1: start with second generation H1 antihistamines
  - step 2: one or more of following
    - next increase dose of second generation H1 antihistamine up to 4 times standard dose
    - add a different second generation antihistamine
    - add an H2 antagonist
    - add a leukotriene receptor antagonist
    - add a first generation H1 antihistamine at bedtime.
  - Step 3:
    - dose advancement of potent antihistamine (e.g. hydroxyzine or doxepin) as tolerated
  - step 4: add alternative agent
    - omalizumab or cyclosporine
    - other anti-inflammatories agents, immunosuppressants, biologics
- systemic glucocorticoids for short term control. Example regimens
  - Prednisone 40mg for 2-3 days. Once symptoms controlled, taper down dose in increments of 10mg
  - Prednisone 35-40mg for 5-7 days. Then taper by 5mg every 2-3 days.
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## .Angioedema

- typically affects skin and mucosal tissues of face, lips, mouth, throat, larynx, extremities, genitalia
- two types: mast cell mediated, bradykinin mediated (ACEi, hereditary)
- may be life threatening
  - if causes airway obstruction or if part of anaphylaxis
- treat with antihistamines, glucocorticoids. epinephrine if severe
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## .Food allergy

- risk factors for severe peanut allergy
  - severe eczema
  - egg allergy
- introducing foods
  - may start introducing allergenic foods at 6 months, as this is associated with a significant reduction in risk of these food allergies
    - e.g.: egg, fish, milk, peanut
  - introduce foods one at a time
  - if foods tolerated, then should be offered 2-3 times per week.
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## .Cardiology

### .pericarditis

- most commonly idiopathic (most probably viral in etiology). Other etiologies include bacterial infections, malignancy, and autoimmune disorders
- Clinical features
  - chest pain (typically pleuritic), pericardial friction rub, characteristic ECG changes (diffuse ST elevation and PR depression), and pericardial effusion. Pericarditis should also be suspected in a patient with persistent fever and pericardial effusion or new unexplained cardiomegaly
- Investigation
  - Trop
  - CXR
  - ECG, echo
- Diagnosis. 2 of following
  - Typical chest pain (sharp and pleuritic, improved by sitting up and leaning forward).
  - Pericardial friction rub (a superficial scratchy or squeaking sound best heard with the diaphragm of the stethoscope over the left sternal border)
  - Characteristic changes on the ECG (typically widespread ST-segment elevation)
  - New or worsening pericardial effusion.

### .PVC.premature ventricular complexes

- Common rhythm in patients with and without structural heart disease
- presentation
  - most patients asymptomatic
  - if symptomatic: palpitations most common. Dizziness less common. Rarely cause true hemodynamic compromise, except when occur frequently in patient with severely depressed LV function or if underlying bradycardia
- evaluation
  - ECG for any patient with suspected PVCs. Most patients get Holters if unable to catch rhythm on ECG
  - labs: no routine lab testing
  - echocardiogram should be done if:
    - high risk symptoms

- frequent PVCs
- suspicion of underlying or new structural heart disease
- further testing: may consider:
  - exercise testing
  - cardiac MRI
  - electrophysiologic testing

## .CHEST PAIN:

- DDX:
  - MI, PE, pneumothorax, aortic dissection, stable/unstable angina, pericarditis,
  - costochondritis, GERD, peptic ulcer disease, asthma, MSK chest wall pain
- S:
  - Onset, location, quality (sharp, dull, squeezing) , severity, radiation, duration of episode,
  - context (exertional, postprandial, positional, cocaine use, trauma);
  - associated symptoms (sweating, nausea, dyspnea, palpitations, sense of doom, fever);
  - exacerbating and alleviating factors (especially medications);
  - history of similar symptoms; known heart or lung disease or history of diagnostic testing;
  - cardiac risk factors (hypertension, hyperlipidemia, smoking, family history of early MI);
  - pulmonary embolism risk factors (history of DVT, coagulopathy. malignancy. recent immobilization, pregnancy).
- O: Vital signs ± BP in both arms; complete cardiovascular exam (JVD, PMI, chest wall tenderness to palpation, heart sounds, pulses, edema); lung and abdominal exams; lower extremity exam (inspection for signs of DVT).
- P:
  - cardiac assessment: ECG, stress test,
  - if thinking ACS, PE: send to ER
    - think to self: if you saw this person in the ER, would you order a cardiac panel?
  - if no risk factors for PE and low risk for ACS: send for cardiac workup

## .PE.Pulmonary embolism

- Wells score
  - signs and symptoms of DVT
  - PE is most likely
  - HR > 100
  - immobilization OR surgery in past 4 weeks
  - previous PE or DVT
  - hemoptysis
  - malignancy with treatment
- PERC score
  - age ≥ 50
  - HR ≥ 100
  - O2 < 95%
  - unilateral leg swelling
  - Hemoptysis
  - recent surgery or trauma
  - prior PE or DVT
  - hormone use: OCP, estrogenic hormones

## .Dyslipidemia.lipids

- Screening:
  - screen patients age > 40
  - if triglycerides > 1.5, use non-HDL/apoB instead of LDL

- recommend getting Lp(a) level once per person lifetime.
- lifestyle modifications
  - exercise >20-30 min per day or 150 min per week.
  - weight loss
  - diet:
    - Mediterranean diet: fruits, vegetables, whole grains, beans, nuts, seeds. low to moderate fish, poultry, dairy. little red meat.
    - DASH diet: fruits, vegetables, fiber. moderate low fat dairy products. low animal protein. lots of plant based protein legumes, nuts.
  - other diet changes
    - eat chicken/fish instead of red meat,
    - high fiber whole grains instead of refined grain products
    - water instead of soft drinks, fruit juices
    - soy based products (tofu, tempeh) instead of meat
  - supplements: omega 3 fatty acids, berberine, green tea extracts, red yeast rice
- When to initiate statin
  - Low risk FRS <10%
    - consider if FRS 5-9.9%. see additional criteria for intermediate risk group.
  - Intermediate risk (10-19%): AND
    - LDL > 3.5 OR non HDL > 4.2 OR apoB > 1.05,
    - OR male ≥ 50 or female ≥ 60 with 1 additional risk factor (smoking, impaired fasting glucose, waist circumference, HTN)
    - OR other risk factors: hsCRP ≥ 2.0mg/L, CAC >0 AU, family history of premature CAD, Lp(a) ≥ 500mg/L
  - High risk (>20%): consider in all patients
  - statin indicated condition
    - atherosclerotic cardiovascular disease
      - MI, ACS, documented CAD
      - stroke, TIA, documented carotid disease
      - PAD, claudication, ABI <0.9
      - AAA > 3cm
    - DM > 40yo OR (30yo and DM for >15y) OR microvascular disease
    - CKD: age ≥ 50y and eGFR <60 OR ACR >3mg/mmol
    - Familial hypercholesterolemia: LDL > 5.0 OR non-HDL ≥ 5.8
- treatment targets: first start patient on maximally tolerated statin therapy.
  - familial hypercholesterolemia
    - target LDL < 2.5 or non-HDL < 3.2. else max statin and add ezetimibe or PCSK9i
  - diabetes or CKD or high FRS
    - target LDL < 2.0 or non-HDL < 2.6. else max statin and add ezetimibe
  - ASCVD (MI, stroke, PAD, AAA)
    - target LDL < 1.8 or non-HDL <2.4. else max statin and add ezetimibe or PCSK9i
- lipid monitoring
  - if FRS <5%, q5 years
  - if FRS >5% q1 year
  - if on treatment: check q6-12 months
- statin induced myalgias
  - CK normal: stop statin, resume when asymptomatic. repeat CK 6-12 weeks after restarting
  - CK < 10x ULN: stop statin, follow CK until normal
  - CK > 10x ULN: stop statin, assess renal function, urine myoglobin, consider rehydration, follow CK until normal
  - consider restarting at lower dose/different statin/alternative medication or referral depending on severity
- pharmacotherapy: low, moderate, high
  - Atorvastatin: 5mg, 10-20mg, 40-80mg
  - Rosuvastatin: 2.5mg, 5-10mg, 20-40mg

- when to use ezetrol or bile acid sequestrants
  - if not tolerating statins, or not on target even with maximally tolerated statins

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#### .hypertriglyceridemia

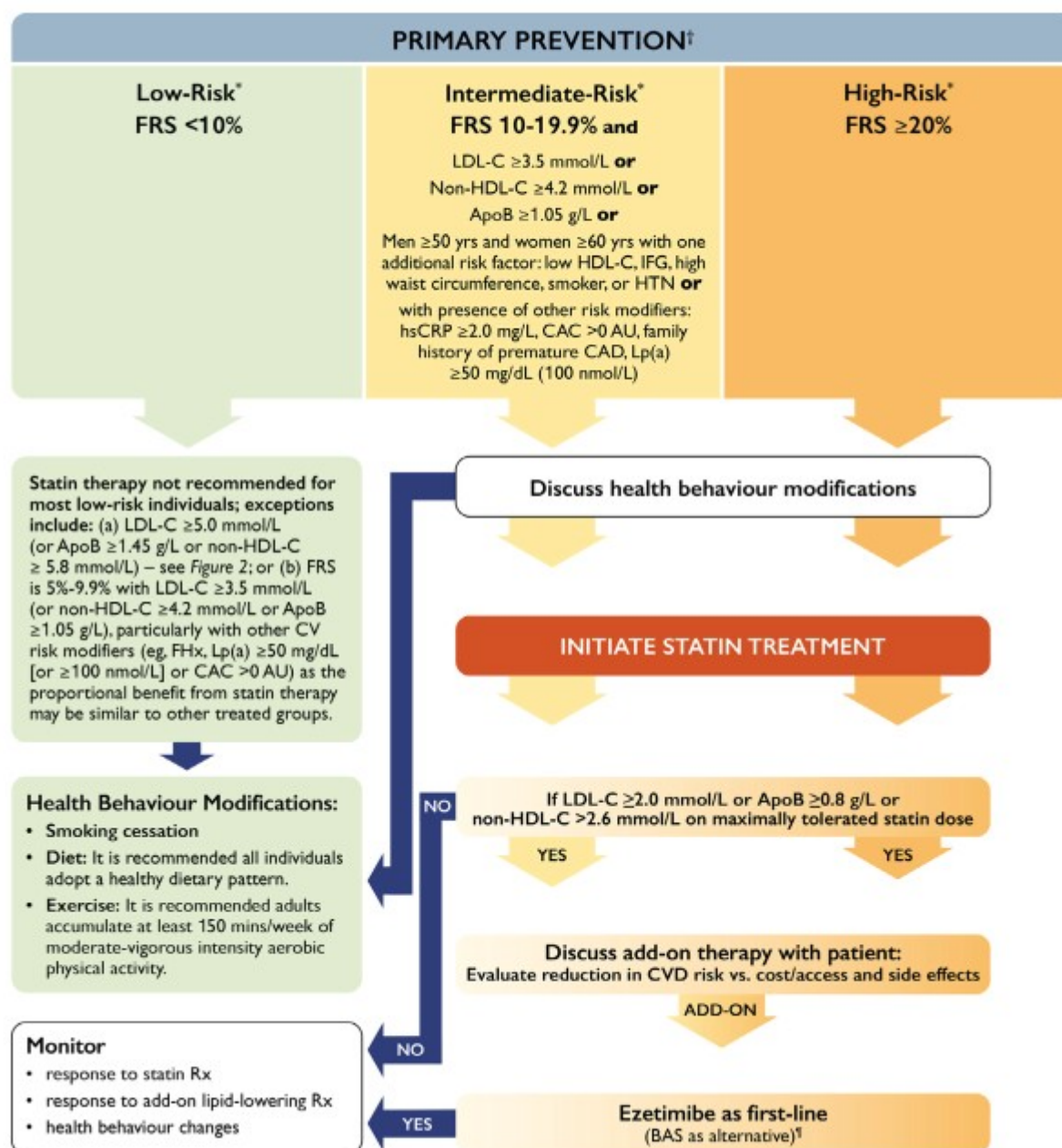
- diabetes with additional risk factor or secondary prevention for patients with ASCVD
  - if fasting triglycerides > 1.5
  - ensure on maximum tolerated statin therapy
  - treat with icosapent ethyl (IPE); this is similar to omega 3 fatty acids.
    - evidence that IPE reduces major CVD events in statin-treated patients with elevated triglyceride levels. no evidence for over the counter omega 3 fatty acids
- when IPE not indicated, but TG  $\geq$  10, add fenofibrate to reduce risk for pancreatitis

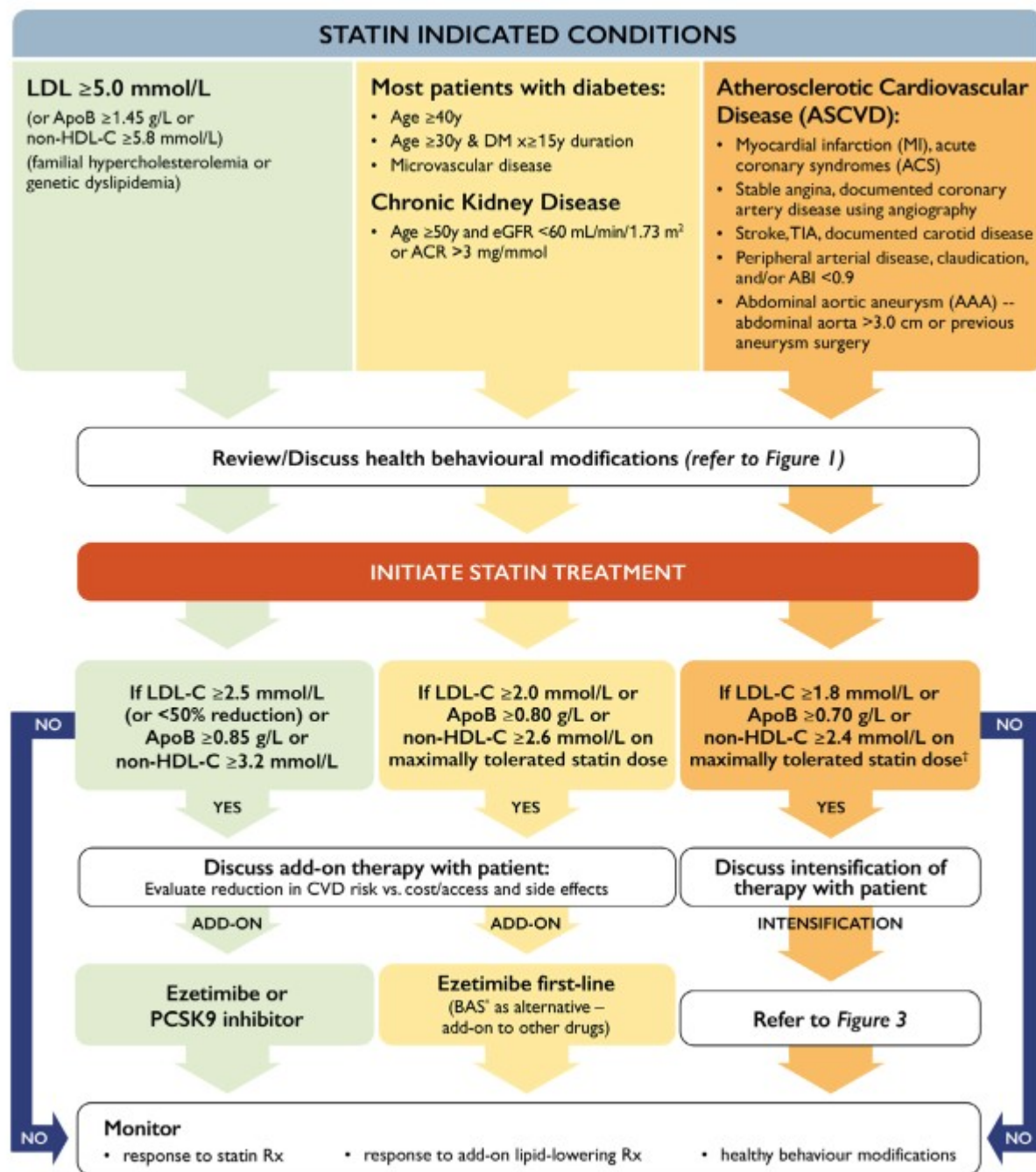
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#### .Dyslipidemia guidelines 2021

- [https://www.onlinecjc.ca/article/S0828-282X\(21\)00165-3/fulltext](https://www.onlinecjc.ca/article/S0828-282X(21)00165-3/fulltext)





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.familial hypercholesteremia

- consider diagnosis:
  - age  $\geq 40$ : LDL  $\geq 5.0$
  - age 18-39: LDL  $\geq 4.5$
  - age  $< 18$ : LDL  $\geq 4$
- diagnosis
  - DNA mutation
  - tendon xanthoma
  - LDL  $\geq 8.5$  mmol/L
- probable diagnosis
  - first degree relative with elevated LDL level

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## .Hypertension - inpatient

- Parameters to hold BP meds. BP < 100/50

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## .Hypertension – diagnosis, targets.HTN

- [https://guidelines.hypertension.ca/wp-content/uploads/2022/09//2020-22-HT-Guidelines-E-WEB\\_v3b.pdf](https://guidelines.hypertension.ca/wp-content/uploads/2022/09//2020-22-HT-Guidelines-E-WEB_v3b.pdf)

- if high in office
  - advise patient to measure BP at home everyday, and follow-up in a few weeks
  - if no home BP cuff: advise patient to buy own cuff, or to do it at the pharmacy.
    - recommended BP cuffs: <https://hypertension.ca/bpdevices>
      - should say: "Recommended by Hypertension Canada"
  - if BP > 180/110. can diagnose with hypertension
- home BP measuring to diagnose.
  - 2 in morning, 2 in evening. everyday for 7 days. discard first day
- BP threshold to diagnose
  - Automated office BP: BP ≥ 135/85
  - home BP: BP ≥ 135/85
  - ambulatory 24h BP: mean 24h BP ≥ 130/80 OR mean daytime BP ≥ 135/85
- BP thresholds targets
  - High risk:
    - defined as: age ≥ 50 AND SBP 130-180 AND one of following:
      - clinical CVD OR CKD ( proteinuria <1g/d, eGFR 20-59) OR FRS > 15% OR age ≥ 75
    - start med: SBP ≥ 130. target SBP < 120
  - Diabetes:
    - start med: BP ≥ 130/80. target BP < 130/80
  - Moderate risk: multiple cardiovascular risk factors and FRS 10-14%
    - start med: BP ≥ 140/90. target BP < 140/90
  - Low risk: no target organ damage or cardio risk factors, and FRS <10%
    - start med: BP ≥ 160/100. target BP < 140/90
  -
- Note: threshold to diagnose and threshold to start medication aren't the same. Encourage lifestyle modifications.
- 

## .Hypertension - investigation, management

- initial investigations
  - Urinalysis, Cr to assess renal function and for proteinuria
  - Electrolytes to get baseline as antihypertensives can affect this
  - A1c, Cholesterol to assess for comorbidities: DM, dyslipidemia
  - ECG to assess for cardiovascular disease. e.g. LVH, ischemia
  - not included
    - no indication for echo initially unless compelling clinical indication.
- Follow-up investigations
  - electrolytes, creatinine, fasting lipids, diabetes screening
- Initial, Lifestyle management
  - weight loss,
  - dietary changes: DASH, mediterranea diet
  - exercise,
  - reduce alcohol, stop NSAIDs
  - smoking cessation
  - stress reduction
- 
- medications:



- small dose of multiple medications better than high dose of a few
  - if combination considered: ACE plus CCB is preferable to ACE plus thiazide
  - example medications
    - Coversyl (perindopril)
    - perindopril/amlodipine
  - refer if BP still not controlled after treatment with three antihypertensive medication
  - follow-up investigations after medication adjustment
    - recheck Electrolytes and Creatinine:
      - after starting/adjusting ACEi, ARB
      - after starting/adjusting diuretics.
      - when to monitor potassium for ACE/ARB
        - At treatment initiation
        - 1–2 weeks after initiation
        - 1–4 weeks after final dose titration
        - At regular intervals thereafter based on the patient's individual risk
        - tolerate 20% drop in GFR, then recheck in 2 weeks. if continues to drop, stop the ACE/ARB, switch to CCB and refer to nephrology.
    - Patients being considered for treatment with mineralocorticoid receptor antagonists:
      - 1 and 2 weeks after initiating or increasing dose
      - At 8 and 12 weeks after initiation or increasing dose
      - At 6, 9, and 12 months after initiation or increasing dose
      - At regular intervals thereafter based on the patient's individual risk
- Follow-up
  - if no hypertension: yearly
  - if lifestyle modifications: in 3-6 months. or 1-2 months if BP not on target
  - if on antihypertensives: q1-2 months until 2 consecutive readings on target. q3-6 months when target reached
  - home monitoring: 1 week every 3 months.

●

### .Hypertension - resistant

- BP above target despite 3 or more BP lowering drugs at optimal doses: preferably including diuretic, ACEi/ARB, CCB
  - consider 24h BP monitor
  - review adherence
- refer to specialist with expertise in hypertension
- secondary hypertension
  - renal insufficiency, renovascular disease, primary hyperaldosteronism, cushings syndrome, pheochromocytoma, thyroid disease, obstructive sleep apnea
- investigations
  - Cr, Lytes, UA, ACR
  - renal doppler, assess for renovascular disease
  - renin:aldosterone ratio r/o hyperaldosteronism
  - sleep study r/o sleep apnea

●

### .Hypertension - other info

- target organ damage
  - CV: CAD, HF, LVH
  - Cerebrovascular: ICH, stroke, SAH
  - hypertensive retinopathy
  - PAD
  - renal disease
  -

●

- 
- 

## .NSTEMI

- Acute management
  - ABCs, oxygen, IV, monitor
  - nitro 0.3mg SL q4min x3
    - contraindications: hypotension, PDEi use, right ventricular infarct
  - ASA 162-325mg chewed
  - antiplatelet: clopidogrel, ticagrelor
    - Ticagrelor 90mg bid
  - statin: atorvastatin 80mg
  - heparin, LMWH, fondaparinux
    - Fondaparinux 2.5mg sc q24h
  - consider
    - Beta blocker. only if no signs of CHF, hemodynamic compromise, bradycardia, or severe reactive airway disease
    - ACEi within 24 hours
  - reperfusion therapy
    - NSTEMI: consider if high TIMI risk
    - STEMI: PCI within 90 min. thrombolytics if PCI unavailable within 120min, symptoms <12h and no contraindications
- investigations
  - echocardiogram, troponin q8h until peak, tele for 24-48h
  - speak with cardiology: order Persantine or angiogram
- long term management
  - nitrates: alleviate ischemia. don't improve outcome. use with caution with right sided MI
  - ECASA 81 mg daily
  - ticagrelor 90mg bid OR prasugrel 10mg daily OR clopidogrel 75mg daily. for 1 month. up to 9-12 month. 12 month if stent
  - beta blocker: metoprolol 25-50mg bid OR atenolol 50-100 mg daily
    - CCB alternative, but not first line
  - ACEi: prevent adverse remodelling
  - statins: atorvastatin 80mg daily

- 

## .PALPITATIONS:

- S: Onset, gradual versus acute onset/offset, context (exertion, caffeine, energy drinks or supplements, anxiety); duration of episodes; associated symptoms (light-headedness, loss of consciousness, chest pain, dyspnea, fever, sweating, pale skin, flushing, diarrhea); hyperthyroid symptoms; history of bleeding or anemia; history of heart disease, hypertension, or diabetes.
  - ask about caffeine, sleep, hyperthyroid symptoms
- O: Vital signs; endocrine/thyroid exam, including exophthalmos, lid retraction, lid lag, gland size, bruit, and tremor; complete cardiovascular exam (JVP, PMI, heart sounds, lower extremities, distal pulses).
- DDX: cardiac arrhythmia, angina, hyperthyroidism, hypoglycemia, mitral valve prolapse, panic attack, pheochromocytoma, carcinoid syndrome,
- investigations
  - ECG
  - limited laboratory testing to rule out anemia and hyperthyroidism.
  - Consider Holter monitor
- Ambulatory monitoring
  - For patients who are at low risk of concerning arrhythmias (eg, those whose palpitations are unsustained and well tolerated and who do not have evidence of heart disease by history, physical examination, or 12-lead ECG), we generally do not obtain ambulatory rhythm monitoring.

- We obtain ambulatory cardiac rhythm monitoring for all patients whose initial diagnostic evaluation suggests the possibility of a disorder known to be associated with the development of ventricular tachycardia (VT):
  - Palpitations that are sustained, poorly tolerated, or associated with syncope or presyncope
  - Organic heart disease (eg, scar formation from myocardial infarction, dilated cardiomyopathy of any cause, clinically significant valvular heart disease, hypertrophic cardiomyopathy)
  - A personal or family history of arrhythmia, syncope, sudden death, cardiomyopathy, or long QT syndrome.
- An inpatient evaluation may be more appropriate for those patients with frequent symptoms and associated syncope.
- management
  - may refer to cardiology
  - may prescribe PRN metoprolol for palpitations. or routine metoprolol.

## [.Hypertensive urgency.Hypertensive emergency.Hypertension urgency](#)

- Send to ER if symptomatic (headache, CP, SOB) or systolic BP > 200.
- Management
  - Amlodipine 10mg
  - Labetalol 10-20mg iv q10 min prn for BP > 180/100
  -

## [.CHF exacerbation.Congestive heart failure exacerbation - inpatient](#)

- Etiology
  - Cardiac: ischemia, infarction, arrhythmia
  - Medication: non-compliance
  - Dietary: increased sodium or water intake
  - High output: anemia, infection, pregnancy, hyperthyroid
  - Other: renal failure, hypertensive crisis
- for patients <50, 50 to 75, and >75 years of age, the optimal plasma NT-proBNP cutoffs for diagnosing HF are 450, 900, and 1800 pg/mL, respectively.
- Monitoring
  - daily monitoring of weight, fluid intake and output, symptoms and signs of congestion, serum electrolytes, blood urea nitrogen, serum creatinine, and oxygen saturation until stable
    - Serum potassium and magnesium levels should be monitored at least daily, and more frequent monitoring may be required when diuresis is rapid.
    - Telemetry is usually continued for at least 24 to 48 hours. This may be discontinued once the patient's hemodynamics, medication regimen, and electrolytes are stable.
    - monitor creatinine daily when on IV Furosemide
- General management
  - initial orders
    - Lasix 40mg iv (bid), Fluid restrict to 1.5L, monitor ins/outs, daily weights, cardiac diet. Echocardiogram (if not done recently)
    - Start ACEi and beta blocker once euvolemic. If already on beta blocker, continue.
  - while still on supplemental oxygen, continue IV Lasix. Can switch to oral Lasix once off oxygen.
- Management details
  - Oxygen
    - Nasal prongs -> non-rebreather -> Optiflow → NIV -> intubation
    - If fail to respond to NIV for 30-120 minutes, then intubate
  - Diuretic
    - If no previous loop diuretic: 20-40mg iv
    - If chronic loop diuretic: iv dose should be equal or greater (e.g. 2.5 times) than po dose.
    - Note IV dose equals double PO dose
  - Renal failure and diuretic

- Look for other causes of kidney injury (nephrotoxic medications, urinary obstruction)
- If severe signs of congestion: continue removing fluid. If there is elevated central venous pressure, renal function may improved with diuresis
- If BUN rises and creatinine is stable: continue diuresis
- If creatinine rises are due to intravascular volume depletion, then reduce or temporarily discontinue diuretic and/or ACEi/ARB.
- If substantial congestion persist and adequate diuresis cannot be achieved, then dialysis, or inotropes.
- Vasodilators should not be used routinely
  - Nitroprusside to reduce afterload if severe hypertension, acute mitral regurg, acute aortic regurg.
  - Nitroglycerin causes decreased venous tone. Reduce LV filling pressure. Can be used as adjunct to diuretics if lack of adequate response to diuretics alone, despite optimization.
- Fluid restriction to 1.5-2L
- Don't add beta blockers during exacerbation. May consider holding it.
- Self-management
  - Salt restriction <2-3g per day
  - fluid restriction (eg, 1.5 to 2 L/d)
  - Daily weight monitoring
- Discharge criteria
  - Recommended for all HF patients
    - On baseline oxygen requirements
    - Exacerbating factors addressed
    - Near optimal volume status observed
    - Transition from intravenous to oral diuretic successfully completed
    - Patient and family education completed, including clear discharge instructions
    - Left ventricular ejection fraction (LVEF) documented
    - Smoking cessation counseling initiated
    - Near optimal pharmacologic therapy achieved, including ACE inhibitor and beta blocker (for patients with reduced LVEF), or intolerance documented
    - Follow-up clinic visit scheduled, usually for 7 to 10 days
  - Should be considered for patients with advanced HF or recurrent admissions for HF
    - Oral medication regimen stable for 24 hours
    - No intravenous vasodilator or inotropic agent for 24 hours
    - Ambulation before discharge to assess functional capacity after therapy
    - Plans for post-discharge management (scale present in home, visiting nurse or telephone follow up generally no longer than three days after discharge)
    - Referral for disease management, if available

## CHF exacerbation - outpatient

- Management
  - Lasix 80mg x3 days, then 40mg daily
  - check electrolytes, Cr in 1-2 weeks
  - check echo if not done recently

## CHF - chronic

- NT-proBNP
  - <300 pg/mL: HF unlikely
  - age 50-75: >900 pg/mL: HF likely
  - age >75: >1800 pg/mL: HF likely
- echocardiogram
  - decreased LVEF, increased LV end systolic and end-diastolic diameter, LVH, wall motion abnormalities, diastolic dysfunction, increased RV size, RV dysfunction, valve dysfunction, elevated pulmonary arterial pressures
- Investigations when suspect HF.

- CBC, Electrolytes, Cr, urinalysis, glucose, TSH
- CXR
- ECG
- next investigations if still suspect HF
  - BNP, Echocardiogram
- Investigations for Etiology for HF
  - CBC, Cr, ferritin, TSH, BNP,
  - Echo, ECG
- initial referral
  - routine: within 12 weeks, ideally 6 weeks
    - no symptoms:
  - semiurgent: within 6 weeks, ideally 4 weeks
    - new diagnosis of HF, but stable, compensated. OR worsening HF with therapy
  - urgent: within 2 weeks
    - new diagnosis of HF, not improving with therapy (unstable, decompensated). OR post-hospitalization or ER visit for HF. OR post MI HF.
- Management of LVEF <40%
  - ARNI or ACEi/ARB
  - Beta blocker
  - MRA
  - SGLT2i
  - individualized therapies
    - HR >70 and sinus rhythm: consider ivabradine
    - recent HF hospitalization: consider vericiguat
    - black patients on optimal pharmacotherapy or unable to tolerate ARNI/ACEi/ARB: consider H-ISDN
    - suboptimal rate control for Afib, or persistent symptoms despite optimized pharmacotherapy: consider digoxin
  - LVEF <35%
    - refer
- management of HfpEF
  - minimum effective diuretic dose to maintain euvolemia
  - most cases, there is indication for ACEi/ARB and/or beta blocker
  - if K < 5.0 and GFR>30, MRA should be considered
  - MRA and SGLT2i shown to reduce HF hospitalization, but nothing shown to reduce death.
- switching to ARNI
  - fromACEi: stop ACEi, wait 36h after last dose, then start ARNI
  - from ARB: stop ARB, no washout period necessary
- 

## .CHF - other info

- indications of advanced heart failure
  - ≥2 hospitalizations/ER visits for HF in past year
  - deterioration in renal function
  - weight loss without other cause (e.g. cardiac cachexia)
  - intolerance of beta blockers due to worsening HF or hypotension
  - frequent SBP of <90
  - persistent dyspnea
  - inability to walk 1 block on level ground due to dyspnea/fatigue
  - escalating diuretics
- NYHA classification
  - class 1: no symptoms or limitations
  - class 2: slight limitation of physical activity. ordinary physical activity results in mild symptoms such as fatigue shortness of breath and agina

- class 3: marked limitation of physical activity. less than ordinary physical activity leads to symptoms
- class 4: severely limited. experiences symptoms even at rest.

- 

## .Arrhythmia

### • Tachycardia

- Narrow complex
  - Regular
    - SVT
      - No p waves
      - Above 130s-140s
      - Management: cardiovert if unstable. Diltiazem
    - Sinus tachycardia
      - Causes: alcohol withdrawal, PE,
    - A flutter
  - Irregular
    - MAT: can be seen in COPD
    - Afib
      - Anti-coagulated.
      - Rate control
        - Beta blockers, CCB,
      - Rhythm control
        - Amiodarone.
        - Chemical cardioversion: procainamide
      - Cardiovert if unstable
    - Aflutter
- Wide complex
  - Regular
    - V tach
      - Procainamide
      - Amiodarone
      - Lidocaine
    - LBBB with aberrancy
  - Irregular
    - V fib
      - Defibrillate
- Bradycardia
  - Heart block
  - Sinus bradycardia

- 

- 

## .Syncope

### • Etiology

- Vasovagal, orthostatic hypotension
- Cardiovascular:
  - arrhythmia: AV block, ventricular tachyarrhythmias
  - structural: aortic stenosis, hypertrophic cardiomyopathy
- Neurologic: stroke
- not syncope: Seizure, hypoxia, hypoglycemia
- S:
  - Precipitating factor: exertion, positional, stress, fatigue
  - Prodrome: greater or less than 5 s. Diaphoresis, nausea, blurry vision

- Associated symptoms: chest pain, palpitations
- seizure related: bowel or bladder incontinence, tongue biting, post-ictal state
- O:
  - Orthostatic vitals: positive if supine->standing results in >20 SBP or >10 DBP drop, or >10-20 HR increase
- P:
- Investigations
  - ECG, glucose, CBC, beta HCG
  - Holter if occurs frequently
    - Consider event recorder if there is a prodrome.
  - Echocardiogram: Rule out structural heart disease or valvular disease
  - Low yield
    - Carotid doppler: Vertigo and syncope are not generally caused by carotid stenosis.
    - EEG or CT head. Could consider if abnormal neuro exam.
    - Consider tilt table for vasovagal. Poor sensitivity/specificity.

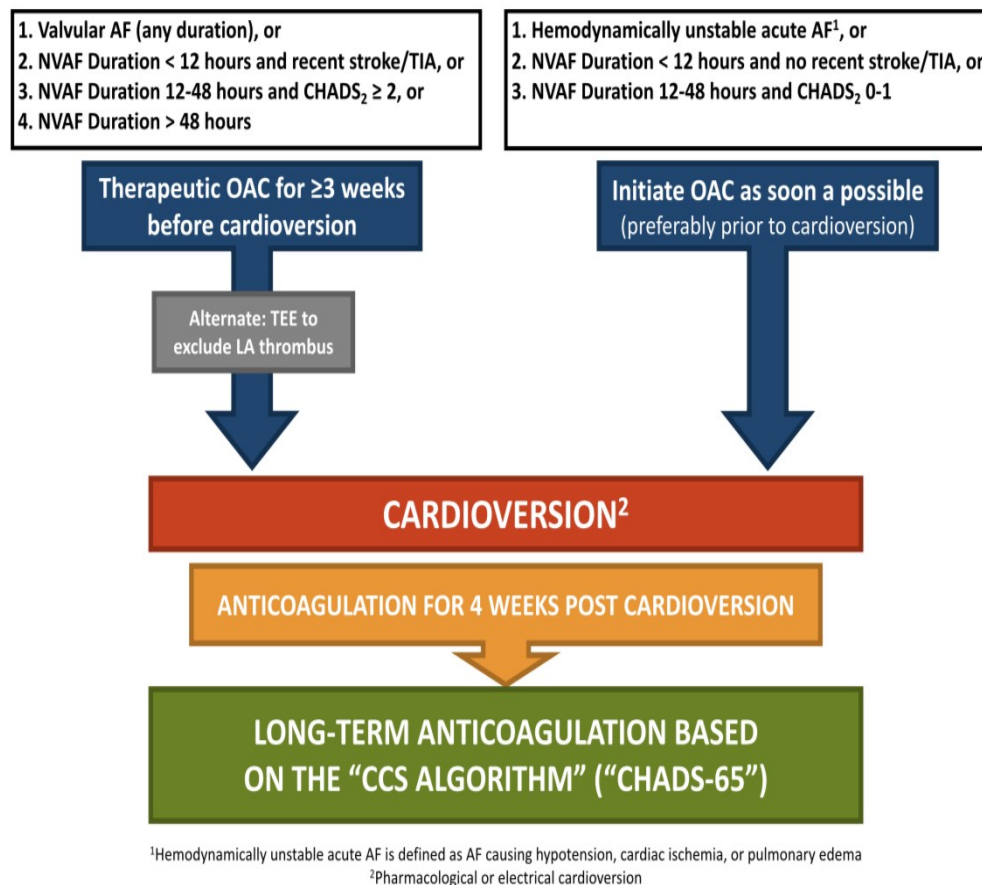
## SVT

- in ER
  - cardioversion
  - adenosine
- management
  - check TSH to rule out hyperthyroid
  - vagal maneuvers
    - valsalva maneuver
  - consider beta blockers
    - as needed or low dose continuous

## Atrial fibrillation.Afib

- DDx: multifocal atrial tachycardia, atrial flutter, Mobitz type II
- Routine investigations
  - CBC, Electrolytes, Ca, Mg, Cr, TSH, lipids, HbA1c, urinalysis, ALT, GGT, (UDAS), INR/PTT
  - ECG, CXR, echo
- paroxysmal Afib: common to see short runs of afib on holter (5-6 minutes). no indication for anticoagulation in these patients.
- symptomatic atrial fibrillation
  - try rate control with beta-blocker, CCB
- patients that benefit from rhythm control
  - CHF, paroxysmal AF, highly symptomatic patients, age <65, no hypertension, first episode AF
- refer to cardiology to decide to start rhythm control agents. they may also consider ablation
- young patient with very fast wide complex irregular rhythm, consider WPW. no AV nodal blocking agents. use procainamide or cardioversion if unstable
- ER management
  - unstable patient: cardioversion
  - stable patient
    - Afib <12h: may use DC or pharmacologic cardioversion
- indication for OAC: CHADS2
  - Heart failure
  - Hypertension
  - age ≥ 65
  - Diabetes
  - Stroke/TIA

- Cardioversion criteria
  - may cardiovert without anticoagulation (or TEE) if:
    - non-valvular AF with onset within 12 hours without recent stroke or TIA
    - non-valvular AF and CHADS<sub>2</sub> < 2 and between 12 and 48 hours of onset.
    - hemodynamically unstable acute AF
  - anticoagulation for at least 3 weeks before elective cardioversion
  - may use TEE as alternative to anticoagulation to exclude cardiac thrombus
- valvular afib
  - AF in presence of mechanical heart valve, or in presence of moderate/severe mitral stenosis



**Figure 11.** Oral anticoagulation pathway in the context of cardioversion for atrial fibrillation (AF) or flutter. CHADS<sub>2</sub>, Congestive Heart Failure, Hypertension, Age, Diabetes, Stroke/Transient Ischemic Attack; LA, left atrial; NVAF, nonvalvular atrial fibrillation; OAC, oral anticoagulant; TEE, transesophageal echocardiogram; TIA, transient ischemic attack.

- if patient would benefit from OAC, but refuses: use ASA plus clopidogrel
- 

#### .Atrial fibrillation.Afib - other info

- causes/risk factors of Afib
  - alcohol
  - hyperthyroidism
  - PE
  - cardiovascular disease: cardiomyopathy, valvular disease, CAD, HF
  - OSA
  - diabetes
- 
-



## .AAA

- screening
  - men aged 65-80
  - one time abdominal ultrasound
- monitoring
  - ultrasound or CT every 6-12 months
- watchful waiting if infrarenal AAA <5.5cm
- indications for elective repair
  - rapidly expanding >1cm per year or >0.5cm in 6 months
- management
  - smoking cessation
  - statins
  - ASA
  -
- 

## .orthostatic hypotension.orthostasis

- definition
  - systolic BP drop of 20
  - diastolic BP drop of 10
  - within 3 minutes of standing
- measurement
  - get supine BP after 5 minutes of lying down
  - standing BP after 1 minute and 3 minutes of standing
- causes of orthostasis with compensatory tachycardia
  - deconditioning
  - dysfunctional heart: aortic stenosis
  - dehydration: diarrhea, adrenal insufficiency, dialysis, drugs
  - drugs: antihypertensives, anti-anginals, anti-parkinsonian, anti-depressants, anti-psychotics, anti-BPH medication
- causes of orthostasis without compensatory tachycardia
  - autonomic dysfunction: diabetic, low B12, hypothyroid, parkinsonism, ethanol abuse
  - drugs: beta blocker
- 

## .aortic dissection

- risk factors
  - hypertension
  - trauma
  - Marfan/Ehlers Danlos
  - giant cell arteritis
  - SLE
  - trauma
- peak incidence
  - age 60-70 years old
  - age 30-40 years in Marfan/Ehlers-Danlos
- 

## .prolonged QTc.Torsades de pointes

- definition
  - QTc > 450ms in men
  - QTc > 460ms in women
- risk factors for Torsade de pointes
  - congenital long QT syndrome

- prior torsades de pointes
- electrolyte abnormalities (low K, Mg, or Ca)
- older age
- bradycardia
- female
- medications that have links to Torsades de pointes
  - <https://www.uptodate.com/contents/image?imageKey=CARD%2F57431>
  - domperidone
  - citalopram
  - macrolides
  - quinolones
  - antiarrhythmic drugs: amiodarone, procainamide, sotalol
  - antipsychotics: chlorpromazine, haloperidol

## ● Cardiovascular disease risk factors

- modifiable
  - sedentary lifestyle
  - poor dietary habits
  - abdominal obesity
  - diabetes
  - dyslipidemia
  - smoking
  - stress
- non-modifiable
  - age  $\geq 55$ y
  - male
  - family hx of premature CVD: age  $<55$  in men and  $<65$  in women
- conservative measures to reduce risk
  - stop smoking
  - exercise
  - DASH diet
  - weight loss
  - stress reduction

## ● Dermatology

### ● eyelash – thin.hypotrichosis of eyelashes

- Bimatoprost 0.03 % drops with applicator, eyelash base
  - Place one drop on applicator and apply evenly along the skin of the upper eyelid at base of eyelashes once daily at bedtime
  - adverse reactions
    - Ophthalmic: Conjunctival hyperemia (Latisse:  $<4\%$ ; Lumigan:  $\leq 45\%$ ), eye pruritus (Latisse, Lumigan 0.01%:  $\leq 4\%$ ; Lumigan 0.03%: 15% to 45%), hypertrichosis of eyelid (Lumigan 0.01%: 1% to 4%; Lumigan 0.03%: 15% to 45%)

### ● Pigmented purpuric dermatoses.capillaritis.Schamberg disease

- uncommon benign cutaneous disorders that are clinically characterized by petechiae or purpura (secondary to erythrocyte extravasation) and localized hyperpigmentation (secondary to hemosiderin deposition in the skin).
- chronic, benign, cutaneous eruptions characterized by the presence of petechiae, purpura, and increased skin pigmentation.

- Pathogenesis: poorly understood. Factors such as venous hypertension, systemic diseases, drugs, and contact allergens may contribute to the development of PPDs. Vascular abnormalities, cell-mediated immunity, and humoral immunity have been proposed as pathogenic mechanisms.
- DDx
  - Stasis dermatitis – Stasis dermatitis shares both clinical and pathologic features with PPD. Stasis dermatitis usually presents on the lower extremities with insidious onset of eczematous patches that progress to red-brown or brawny colored irregular patches
  - Cutaneous vasculitis – Cutaneous leukocytoclastic vasculitis presents with the acute onset of palpable purpura, often primarily involving the lower extremities and other dependent areas of the body.
    - The palpable nature of this disorder is useful for distinguishing it from Schamberg disease and purpura annularis telangiectodes, which present with nonpalpable petechiae and/or purpura.
- Management
  - Most patients with PPD do not require treatment. Treatment is considered for patients who desire treatment due to associated symptoms or patients who are bothered by the cosmetic appearance of lesions.
  - UpToDate's initial approach:
    - elimination of drugs or contact allergens that appear to have induced PPD
    - use of supportive stockings for patients with concomitant signs of venous stasis.
    - For patients who desire further treatment, we suggest a four to six week course of a medium or high potency topical corticosteroid applied to affected areas
  - if fail to respond to topical corticosteroid therapy (and patient still desires treatment): suggest phototherapy

## .acutane.isotretinoin oral for acne

- Mechanism
  - thought to improve acne through reducing sebum production, inhibiting the growth of Cutibacterium (formerly Propionibacterium) acnes, inhibiting comedogenesis, and altering the inflammatory response.
- Adverse effects
  - teratogenicity, mucocutaneous disorders, myalgias, visual changes, idiopathic intracranial hypertension, hepatotoxicity, and hyperlipidemia
  - contraindications
    - pregnant individuals
- precautions
  - drug interactions
    - may cause idiopathic intracranial hypertension. Avoid use with tetracyclines that also share this side effect
  - cutaneous procedures:
    - historically cutaneous procedures are delayed until 6 months after completion of oral isotretinoin therapy due to concern for increased abnormal scarring.
  - children: safety not established in children under age 12
- counselling
  - discuss contraception in patients of childbearing potential
- Baseline investigations
  - Our typical pretreatment tests include:
    - Alanine aminotransferase (ALT) and triglyceride levels within one month prior to the start of therapy
    - Urine or serum pregnancy test in individuals of childbearing potential (note that two tests are required prior to the start of therapy for the iPLEDGE program) (see 'iPLEDGE program' above)
- Dosing
  - start at 0.5mg/kg per day during first month. Increase to 1mg/kg per day.
  - If patient has severe inflammatory acne (eg, acne conglobata, acne fulminans), consider a lower initial dose and/or concomitant treatment with systemic glucocorticoids starting before or at the initiation of oral isotretinoin therapy
  - Treatment duration is 20-24 weeks or until acne is clear. The treatment goal is a cumulative dose of 120 to 150 mg/kg of isotretinoin to decrease the risk of acne recurrence
  - other acne treatments typically discontinued. In particular, avoid combining accutane with tetracyclines

- Isotretinoin causes temporary xerosis, cutaneous atrophy, and skin fragility, and topical acne medications may be poorly tolerated
- stopping therapy
  - isotretinoin is usually discontinued after achievement of the goal cumulative dose of 120 to 150 mg/kg and acne clearance. The drug can be stopped abruptly; tapering is not necessary.
- outcomes
  - Most patients improve after isotretinoin therapy, although the majority of patients will continue to require the use of other acne therapies.
  - Continued improvement may occur for several months after isotretinoin therapy; therefore, subsequent courses of isotretinoin should not be initiated until at least five months after completion of the previous treatment period
- Teratogenicity
  - Among pregnant women exposed to isotretinoin, the risk of spontaneous abortion is approximately 20 percent; among pregnancies that progress, approximately 20 to 30 percent of neonates have evidence of embryopathy (craniofacial, cardiac, thymic, and central nervous system malformations ). Although data are limited, children who appear physically normal may still have a higher rate of intellectual disability and impaired neuropsychologic function.

### .accutane.isotretinoin oral for acne

- Follow-up
  - reassess:
    - worsening/improvement of acne
    - dryness of skin
    - nosebleeds
    - Vision changes
    - Headaches
    - Abdominal pain
    - Joint, muscle, or bone pain
    - Bowel symptoms
    - Mood changes, symptoms of depression, or suicidality
  - laboratory monitoring
    - historically, monthly checkin of full liver function and lipid panels was routine
    - up to date's approach
      - Monthly pregnancy tests in individuals who can become pregnant.
      - If baseline alanine aminotransferase (ALT) and triglyceride levels were normal: repeat these tests after the peak isotretinoin dose is reached
        - one month after starting the peak dose, which is usually after completion of a total of two months of isotretinoin therapy
      - If the results of testing after reaching the peak dose are normal and the dose of isotretinoin is not increased, then further monitoring is not required. If the results of testing are abnormal or if the patient has a known lipid abnormality, then periodic monitoring should be continued.
      - Development of new symptoms (eg, abdominal pain), the initiation of new medications or supplements, or an increase in the dose of isotretinoin may warrant retesting.
- Management of complications
  - Exacerbation of acne: Transient worsening of acne may occur during the first month of treatment, particularly in patients with severe disease. Significant flares may require adjustments to therapeutic approach. For mild flares, no adjustment in treatment is needed.
    - See Acne fulminans
  - mucocutaneous
    - Dry skin: this is common during treatment. Cheillis requires liberal use of topical emollients.
    - Nasal crusting or dryness or with epistaxis: saline nasal spray. Petroleum jelly to nostrils
    - dry eyes: artificial tears. May need to stop contact lens use if not tolerated

- Sun protection: need to use sun screen
- myalgias
  - checking CK not indicated in absence of severe muscle pain. CK levels typically elevated 15-50% in patients with isotretinoin induced myalgias
  - mild-moderate pain: manage with anti-inflammatory drugs
  - discontinue if severe or cannot be improved with anti-inflammatory drugs
- laboratory abnormalities
  - hypertriglyceridemia
    - Minor or moderate elevations in triglyceride levels (300 to 500 mg/dL, 3.39 to 5.65 mmol/L) do not necessitate alteration of the isotretinoin dose and can be managed with lifestyle modification
    - 5.65 to 9.04 mmol/L (500 and 800 mg/dL): reduce isotretinoin dose and/or the addition of a lipid-lowering agent
    - Severe hypertriglyceridemia (> 9.04 mmol/L): consider stopping isotretinoin therapy due to risk of acute pancreatitis
    - hypertriglyceridemia usually resolves with stopping isotretinoin. But patients may need ongoing monitoring since one report suggests that they may be at increased risk for future hyperlipidemia and metabolic syndrome
  - hepatic transaminase elevations
    - Mild, transient elevations in hepatic transaminases occur early in the course of therapy in approximately 15 to 20 percent of patients; levels typically normalize within a few weeks [2]. Discontinuation of isotretinoin is recommended if hepatic transaminase levels reach more than three times greater than normal values.
- pregnancy
  - isotretinoin should be stopped immediately
  - refer to OBGYN with experience in reproductive toxicity for management and counseling

## [.acne fulminans](#)

- rare, severe form of acne vulgaris characterized by the abrupt development of large, inflammatory nodules and friable plaques with erosions, ulcers, and hemorrhagic crusts, with or without associated systemic findings.
- Systemic symptoms: fever, malaise, bone pain, arthralgias, erythema nodosum, leukocytosis
- Management
  - if induced by isotretinoin. Discontinue it
  - start oral corticosteroid (e.g. prednisone 0.5-1mg/kg daily) for at least 2-4 weeks and until lesions heal over
    - 2 weeks if no systemic symptoms
    - 4 weeks if systemic symptoms were present
  - then start low dose oral isotretinoin at 0.1mg/kg. Continue oral corticosteroid for 4 weeks
    - if no crusts or erosions: continue isotretinoin for 4 more weeks. Begin tapering oral corticosteroid.
      - If still no crusts or erosions. Slowly increase dose of isotretinoin while monitoring.
      - If flares: maintain oral steroid and do not taper. Discontinue isotretinoin temporarily if needed.
    - if flares with crusts/erosions: increase oral prednisone to 1mg/kg daily. Discontinue isotretinoin temporarily.
      - If no more flares. Restart isotretinoin at 0.1mg/kg and oral corticosteroid for 4 weeks.

## [.impetigo](#)

- Impetigo is a contagious, superficial bacterial infection that typically involves the face and extremities with lesions that progress from papules to vesicles, pustules, and crusts
- The most common pathogen is Staphylococcus aureus.
- Treatment
  - Patients with limited lesions – For management of impetigo with a small number of lesions, we recommend treatment with topical therapy rather than oral therapy.
    - Topical mupirocin and topical retapamulin are options for topical therapy. Mupirocin is applied three times daily and retapamulin is applied twice daily. The recommended duration of treatment for these medications is five days.
  - Patients with numerous lesions – For patients with numerous impetigo lesions, we recommend treatment with oral antibiotic therapy

- The antibiotic selected should be effective for the treatment of both *S. aureus* and streptococcal infections; dicloxacillin and cephalexin are appropriate treatments. Oral antibiotic therapy should be given for seven days. In the setting of suspected CA-MRSA, appropriate choices include trimethoprim-sulfamethoxazole or clindamycin; doxycycline can be also used.
- Follow-up
  - Crusted lesions can be washed gently. Handwashing is important for reducing spread among children, and other preventive measures employed in reducing the spread of staphylococci may also be helpful.
  - Improvement in impetigo should be noted within a single course of appropriate antibiotic treatment. The possibility of resistant pathogens or an incorrect diagnosis should be considered when lesions fail to respond to antibiotic therapy
- Return to school — Children can return to school 24 hours after beginning an effective antimicrobial therapy. Draining lesions should be kept covered.
- 

### .insect sting

- Management
  - uncomplicated local reaction: Local reactions usually do not require treatment. Application of cold compresses can be helpful.
  - Large local reaction: exaggerated swelling lasting a few days
    - Cold compresses are soothing acutely. The limb should be elevated if the sting is on an extremity.
    - Oral prednisone 40 to 60 mg given as a single dose or rapidly tapered over two to five days may help reduce significant swelling.
    - Nonsteroidal anti-inflammatory drugs (NSAIDs) can reduce pain.
    - Pruritus can be treated with oral antihistamines (eg, cetirizine, 10 mg once daily) and high potency topical corticosteroids (eg, fluocinonide 0.05 percent or clobetasol 0.05 percent ointment, applied every four hours) until the itching subsides.

### .perioral dermatitis

- Patients with classic POD typically present with small, inflammatory papules, papulovesicles, or papulopustules and scaling surrounding the mouth, nose, or eyes
- treatment
  - discontinuation of topical corticosteroids and the avoidance of skin irritants.
  - Mild disease:
    - topical pimecrolimus, topical erythromycin, and topical metronidazole. Topical tacrolimus is an additional option for therapy.
  - Moderate to severe disease
    - oral tetracycline (doxycycline, tetracycline, doxycycline)
      - typical course of treatment is eight weeks
    - in children under age 8: should avoid tetracyclines due to the potential for adverse effects on tooth and bone development
      - may use oral erythromycin. Oral azithromycin is an alternative

### .acanthosis nigricans

- common, benign disorder that typically presents with velvety, hyperpigmented plaques on the skin.
- Etiology
  - Obesity, Endocrine and metabolic disorders, particularly disorders associated with insulin resistance, Genetic syndromes with acanthosis nigricans, Familial acanthosis nigricans, Malignancy, Drug reactions
- clinical presentation
  - thickened, velvety to verrucous, grey-brown hyperpigmented plaques on the skin
  - most commonly on: neck, sides of the neck, and axillae. Intertriginous areas

- typically develops in a symmetrical distribution
- Malignancy-associated acanthosis nigricans. Consider if following features:
  - Rapid onset of skin lesions
  - Additional paraneoplastic findings (eg, rapid growth or inflammation of seborrheic keratoses [the sign of Leser-Trélat] or the presence of tripe palms)
  - Extensive involvement
  - Lesions in atypical sites (eg, mucous membranes, palms, or soles)
  - Unexplained weight loss
  - Older adult
- management: only for cosmetics
  - treat underlying disorder: e.g. diabetes, obesity
  - topical treatments
    - Topical tretinoin 0.05% to 0.1% gel/cream (Retin A) apply once daily
    - calcipotriol 0.005% ointment/cream Apply a thin film to the affected skin or scalp twice daily.
  - Systemic retinoids may lead to clinical improvement in patients with extensive or severe disease, but relapse is common after treatment discontinuation

### .post inflammatory hyperpigmentation

- Medical therapy for PIH is not required for all patients because the natural history of PIH is to improve slowly over time. The goal of medical treatment is to accelerate resolution.
- If medical treatment desired
  - suggest topical hydroquinone as initial treatment
  - other options: topical retinoids, triple-agent topical therapy, azelaic acid, and chemical peels.

### .dermatofibroma

- Clinical feature
  - solitary, firm, often hyperpigmented nodule 0.3 to 1 cm in diameter
  - most commonly located on the lower extremities.
  - Lesions are usually asymptomatic but may be pruritic.
  - On palpations, dermatofibromas are fixed to the subcutaneous tissues and characteristically dimple when pinched
- DDX
  - intradermal nevi
  - nodular basal cell carcinoma
  - Keratoacanthoma
- Treatment
  - Usually, no treatment is required unless the lesion is symptomatic.
  - Excision for histopathologic examination is indicated for any changing or bleeding lesion or when the lesion is suspicious for malignancy.
  - Liquid nitrogen cryotherapy may be an alternative treatment option for lesions that protrude above the skin surface and are irritated from repeated trauma.

### .pityriasis rosea

- acute, self-limited, exanthematous skin disease characterized by the appearance of slightly inflammatory, oval, papulosquamous lesions on the trunk and proximal areas of the extremities
- clinical features
  - begins with herald patch: single round or oval, rather sharply delimited pink or salmon-colored lesion on the chest, neck, or back, 2 to 5 cm in diameter.

- A few days or a week or two later, oval lesions similar in appearance to the herald patch, but smaller, appear in crops on the trunk and proximal areas of the extremities
- Patients with classic pityriasis rosea present with inflammatory macules and small patches in a "Christmas tree-like" distribution on the trunk. A larger herald patch that precedes the widespread eruption is often noted. Lesions are erythematous and exhibit a collarette of scale. In dark-skinned individuals, hyperpigmentation can be prominent
- 
- management
  - Most patients do not require therapy. For patients with mild itching who desire therapy, we suggest treatment with medium-potency topical corticosteroids

### [.tinea versicolor.pityriasis versicolor](#)

- risk factors and pathogenesis
  - Due to malassezia yeast that is a component of normal skin flora
  - External factors suspected of contributing to this conversion include exposure to hot and humid weather, hyperhidrosis, and the use of topical skin oils. Tinea versicolor is not related to poor hygiene.
- clinical features
  - hypopigmented, hyperpigmented, or erythematous macules and patches
  - most common areas of involvement include the upper trunk and proximal upper extremities
  - Tinea versicolor presents with hypopigmented or hyperpigmented macules that are most commonly located on the neck and trunk. Unlike in pityriasis rosea, erythema is absent or minimal. The scale in tinea versicolor is fine, and lesions lack the peripheral rim of scale that is often seen in pityriasis rosea. A KOH preparation easily confirms a diagnosis of tinea versicolor
- first line management.
  - topical azole antifungals. For 4 weeks
    - Clotrimazole 1% bid
    - ketoconazole 2% cream once daily
    - miconazole 2% cream bid
  - selenium sulfide
  - zinc pyrithione
- management of severe disease
  - oral therapy: itraconazole or fluconazole
- treatment failure
  - Hypopigmentation and hyperpigmentation can persist for months following successful treatment of tinea versicolor, and may cause patients to assume incorrectly that treatment has failed.
  - The presence of scale plus a positive potassium hydroxide (KOH) preparation is considered indicative of active infection.
- prognosis
  - pigmentary changes may take months to resolve

### [.granulation tissue](#)

- new connective tissue and microscopic blood vessels that form on the surfaces of a wound during the healing process.
- Appearance
  - red, bumpy tissue. "cobblestone-like" in appearance

### [.heat rash](#)

- DDx
  - viral infection
  - fungal infection
  - eczema



- common, transient skin disorder caused by blockage within the eccrine sweat duct.
- most commonly seen in the neonatal period and in hot environments
- types
  - crystallina: clear vesicles at orifices of eccrine sweat ducts
  - rubra: most common. Erythematous, nonfollicular papules
  - profunda: blockage deep within the duct causes asymptomatic skin colored papules
- management
  - minimize exposure to factors that stimulate sweating and occlusion of eccrine sweat glands. The following measures are recommended:
    - Movement of the patient to a cooler environment, if possible
    - Wearing of breathable clothing (such as cotton) that does not occlude the skin
    - removal of occlusive bandages in the affected area and use of more porous alternatives, if needed
    - Treatment of fever with antipyretics.

## .scabies

- Presentation
  - intense pruritus and multiple small, erythematous papules
  - burrows may be visible. 2-15mm thin, serpiginous lines
  - common areas: fingers, wrists, elbows, axilla, areolae, periumbilical skin, waist, male genitalia, knees, buttocks, feet
  - history
    - widespread itching. Worse at night
    - other household members with similar symptoms
- management
  - Permethrin 5% (Nix). apply from head to soles of feet. Leave for 8-14 hours before removing. May repeat if living mites observed 14 days after first treatment.
  - Ivermectin PO: 200mcg/kg once. Repeat dose in 7-14 days.
- Close contacts
  - close personal contacts and cohabitants should be treated simultaneously. Because symptoms of scabies may be delayed for up to 6 weeks.
  - Items used in preceding several days should be machine washed and dried. (e.g. clothing, linens, stuffed animals)

## .seborrheic dermatitis

- Occurs in areas rich in sebaceous glands (scalp, face, upper trunk, intertriginous areas). It is a chronic, relapsing condition
- presentation
  - well demarcated erythematous plaques with greasy-looking, yellowing scales
  - scalp: dandruff
- DDx
  - psoriasis
  - rosacea
  - allergic contact dermatitis
  - tinea versicolor, pityriasis, rosea, tinea corporis
- management
  - scalp: if mild. Dandruff. Antifungal shampoo
    - ketoconazole 2% shampoo. Apply 5-10mL to wet scalp. Leave for 3-5 minutes, then rinse
      - apply q1-2 weeks for prophylaxis. Apply twice weekly for 2-4 weeks for treatment
    - ciclopirox 1% shampoo. Apply 5-10mL to wet hair. Leave for 3 minutes then rinse.
      - Apply twice weekly for 4 weeks
  - scalp: if moderate to severe. Antifungal shampoo with high potency topical steroid (as lotion, spray, foam). Apply topical steroid once daily for 2-4 weeks
  - face:

- low potency topical steroids or topical antifungal agents
- trunk/intertriginous areas
- maintenance
  - Ketoconazole 2% shampoo or ciclopirox 1% shampoo once per week for seborrheic dermatitis of the scalp
  - Ketoconazole 2% shampoo (as facial or body wash) or ketoconazole 2% cream, other azole cream, or ciclopirox 1% cream once per week for seborrheic dermatitis of the face, trunk, and intertriginous areas

## .folliculitis - infectious

- Presentation
  - folliculocentral papules and pustules
- management
  - bacterial: staphylococcal most common
    - if mild, with a few pustules, usually resolves spontaneously. May use benzoyl peroxide
    - if extensive or persistent:
      - mupirocin tid for 5-7 days
      - topical clindamycin bid for 7-10 days
      - fusidic acid (fucidin)

## .pruritus.itch

- Potential causes
  - derm: xerosis (dry, scaly skin), eczema, infections (tinea, folliculitis, scabies), bug bites, burn scars
  - systemic:
    - renal: uremic pruritus
    - liver: cholestatic pruritus
    - endocrine: thyrotoxicosis
    - malignancy: associated with hematologic malignancies (Hodgkin lymphoma, non-hodgkin lymphoma, polycythemia vera, leukemias)
    - infections: varicella, HIV infection
    - rheumatologic: dermatomyositis, scleroderma, Sjogren's
    - drug reactions:
      - neurologic: neuropathic itch, postherpetic neuralgia, multiple sclerosis
      - psychogenic
- evaluation
  - pruritus without primary skin lesions
    - investigations
      - CBC: assess for malignancy, myeloproliferative disease, iron deficiency
      - bilirubin, ALT/AST, ALP: assess for liver disease
      - TSH: assess for thyroid disorder
      - BUN, Cr: assess for renal disease
      - CXR: assess for adenopathy
      - other tests
        - HIV testing, hep B and C
        - stool O&P
        - SPEP/UPEP

## .blister.friction blister

- 
- Management
  - Heal spontaneously when frictional forces removed
  - symptomatic blister. Consider drainage of blister with sterile needle
  - asymptomatic blister. Leave intact and allow to resolve spontaneously

- topical or oral antibiotic therapy not necessary in absence of infection
- wound care for ruptured blister
  - gently cleansed daily. Covered with clean, dry dressing
  - if signs of infection: topical or systemic antibiotic therapy
  - if patient continuing physical activity that may irritate blister site: apply hydrocolloid dressing for cushioning

#### [.nail peeling.onychoschizia.brittle nails.nail brittleness](#)

- often caused by exposure to external factors that alter the intercellular adhesive factors of the nail plate (wet work, chemicals, trauma).
- Causes of nail brittleness include
  - Aging
  - Pregnancy
  - Associated dermatoses (eg, eczema, lichen planus, alopecia areata)
  - Systemic disorders (eg, peripheral arterial disease, iron deficiency anemia, endocrine disorders)
  - Environmental exposures (eg, wet work occupational exposure to chemicals [solvents, alkalis, acids], use of nail cosmetics [nail polish, nail polish removers, nail sculpturing, application of acrylic gels])
  - Repeated microtrauma (occupational, onychotillomania, onychophagia)
  - Drugs (eg, retinoids, chemotherapeutic agents)
  - Idiopathic

#### [.nail psoriasis.nail pitting](#)

- Nail pitting seen in psoriasis, alopecia areata, eczema
- DDx
  - onychomycosis, lichen planus, alopecia areata
- clinical presentation
  - signs of psoriasis
  - nail findings: nail pitting, distal onycholysis, oil drop discoloration, subungual hyperkeratosis
- treatment
  - first line: topical calcipotriol with high potency topical steroid
  - second line: topical tacrolimus
  - refractory to topical therapy: biologics

#### [.anogenital warts.condylomata acuminata](#)

- usually develops on the vulva, penis, groin, perineum, perianal skin, and/or suprapubic skin. The warts may be flat, dome-shaped, cauliflower-shaped, filiform, fungating, pedunculated, cerebriform, plaque-like, smooth
  - The color is usually white, skin-colored, erythematous, violaceous, or brown.
- Usually due to HPV6 and HPV 11. associated with low risk for HPV related malignancy. Malignant transformation of anogenital warts is rare.
- May resolve after several months. Treatment should be offered to all patients
- management
  - patient applied
    - imiquimod
      - 3.75% cream: Apply a thin layer once daily (using up to 1 packet or 1 full actuation of pump) prior to bedtime; leave on skin for ~8 hours, then remove with mild soap and water. Continue treatment until there is total clearance of the warts or for a maximum duration of therapy of 8 weeks. Maximum to be prescribed: 56 packets or 2 x 7.5 g pumps per course of treatment.
  - clinician applied
    - cryotherapy
    - surgical excision
    - electrosurgery

- A common option for combination therapy is the use of a patient-applied topical therapy in-between treatment sessions for a clinician-administered treatment.

### .Angular cheilitis

- etiology
  - fungal, bacterial, viral, irritation
  - caused by excessive moisture and maceration from saliva and secondary infection with candida or staph aureus.
- Predisposing local factors:
  - wearing orthodontic appliances or ill-fitting dentures, sicca symptoms (dry mouth), intraoral fungal infection, poor oral hygiene, and age-related anatomic changes of the mouth due to reduced vertical facial dimensions
- P
  - Canesten cream with Fucidin-H. 15G
  - mupirocin if suspect staph infection
  - maintain oral hygiene. Use barrier cream

### .molluscum contagiosum

- caused by molluscum contagiosum virus. member of poxvirus family
- transmission
  - often spread by skin to skin contact. can spread by scratching or touching lesion
- usually spontaneously resolve within 2 months. and infection often clears completely in 6- 12 months
- decision to treat
  - reduce transmission to others, prevention of scarring if becomes inflamed or infected.
  - treatment optional for immunocompetent children
  - adults: if sexually transmitted, should treat to avoid spread of disease
  - periocular lesions: if symptomatic, should refer to ophthalmologist.
- treatment
  - cryotherapy
    - risk of hypopigmentation, especially if patient has dark skin
  - curettage
    - painful. risk of small, depressed scars
  - waiting it out. will resolve without scarring in a few weeks.
- other first line options
  - cantharidin
    - causes blistering, followed by disappearance of the lesion without scarring.
    - common adverse effects: transient burning, pain, erythema
    - should avoid in genital area
    - application
      - apply with wooden end of cotton swab.
      - then apply with bandage to avoid inadvertent spread to other areas
      - should wash off with soap and water 2-6 hours after application or at first sign of blistering.
      - can be repeated every 2-4 weeks until lesion resolved
  - podophyllotoxin: podofilox 0.5% bid for 3 days, hold 4 days. repeat for 4 weeks.
    - can be applied by patient at home.
    - not studied in children.
- Other options with poor evidence
  - Imiquimod
    - favorable response seen in uncontrolled studies. Not more effective than placebo in randomized trials
      - therefore, this drug not routinely recommended
    - usually applied at night and washed off in morning
  - no steroids. consider referral

## .Rosacea

- general measure for management
  - avoid flushing and triggers
    - sunlight, temperature extremes, spicy foods, alcohol
  - use skin moisturizers
  - use gentle skin cleansers to wash face daily
  - use sunscreen
- Management
  - redness:
    - topical brimonidine gel
    - laser treatment
  - mild/mod papulo-pustular:
    - topical metronidazole 0.75% gel/ointment bid to affected area.
    - topical azaleic acid 20% cream or lotion
    - topical ivermectin
  - severe:
    - tetracycline 100mg po bid x4-12 weeks
    - doxycycline
    - minocycline
  - refractory papules or pustules
    - oral isotretinoin

- 
- 

## .Scaly scalp

- DDx:
  - fungal infection, psoriasis, seborrheic dermatitis
- P:
  - Cicloprox (brand: Stieprox) shampoo - antifungal
  - Betnovate - betamethasone lotion
  - get fungal scraping

- 

## .Psoriasis

- scalp psoriasis
  - Dovobet (Calcipotriol-betamethasone) 50mcg- 0.5mg gel daily. up to 4 weeks
  - change shampoo to hypoallergenic, fragrance-free
  - tar shampoo
- facial or intertriginous areas
  - Tacrolimus (Protopic) 0.1% to affected area bid.
  - low potency corticosteroids (class 6, 7)
    - Hydrocortisone
    - Betamethasone valerate lotion
  - topical calipotriene
- Topical steroid plus calcipotriol for flares.
  - Dovonex (Calcipotriol) bid for maintenance.
- moderate to severe disease
  - refer to dermatology
  - phototherapy
  - systemic therapy: methotrexate, cyclosporine, biologics

- 

## .Acne

- counselling

- no good evidence regarding diet and acne. based on anecdotal evidence, some say milk or spicy foods make it worse.  
can tell patient they can avoid foods if they notice triggers.
- At least 2-3 months of consistent adherence to regimen to assess treatment efficacy
- long term maintenance treatment is often necessary. Most acne therapies are suppressive and not curative
- P:
  - no bloodwork unless thinking PCOS. if so, can get PCOS bloodwork
- Treatment
  - Benzoyl peroxide 5%. initially q2-3d, then qhs
  - THEN topical retinoids ± BPO
    - Adapalene 0.1%
  - THEN Clindoxyl (BPO + abx) qhs to BID
    - OR Tactupump (BPO + retinoid)
  - THEN Clinda/Tretinoin Biacna (Clinda 1% and tretinoin 0.025% gel)
  - THEN OCP
- Moderate to severe:
  - in female patients
    - OCP
    - spironolactone
      - start: 25-50mg daily
      - effective dose: 50-100mg per day
      - adverse effects: menstrual irregularity, minor GI symptoms, orthostasis
        - Hyperkalemia: monitor potassium at baseline, during therapy and after dose increases
  - Antibiotics
    - Minocycline 100mg, then 50mg po x 12 weeks
    - Oral antibiotics should always be used in conjunction with topical benzoyl peroxide to reduce risk for the development of antibiotic resistance. Treatment courses should be limited to 3 months whenever feasible.
    - other antibiotics
      - Doxycycline 100mg daily
      - tetracycline 400mg bid then 250-500mg daily
      - erythromycin 500mg bid then 250-500mg daily
      - trimethoprim 200-300mg bid
      - efficacy: Min > Dox > Tet
    - if not improving, combine these agents (combine spironolactone and OCP or add tetracycline to OCP or spironolactone), switch agents or escalate to oral isotretinoin.
  - pregnant patients
    - avoid: oral isotretinoin, oral tetracyclines, oral contraceptives, spironolactone
    - may try: erythromycin, topical clindamycin, topical azelaic acid. maybe topical benzoyl peroxide
  -

## .Wart.Corn

- Wart vs Corn
  - wart:
    - viral
    - warts disrupt skin markings so that skin lines no longer evident
    - has thrombosed capillaries that appear as black or red dots
  - corn
    - due to mechanical cause. from torsion and pressure
    - hyperkeratotic central core
    - skin lines more prominent in corns
    - no black spots
- virus that causes plantar warts
  - human papillomavirus (HPV)
- management of warts

- watchful waiting
  - warts will resolve on their own
- liquid nitrogen treatment. cryotherapy
  - apply for 10 seconds x 3.
  - in practice, hold for less than 10s according to blanching
  - pare down hyperkeratotic wart before treatment.
  - every 2-3 weeks until wart resolution. If not better by 6 treatments, try other treatments.
  - May combine with salicylic acid treatment to augment efficacy. But this approach is not proven
- at home topical treatment
  - apply dr. Scholl's freeze away (dimethyl ether) once per week
  - all other days use Compound W liquid (salicylic acid)
- other treatment for warts
  - duct tape treatment: conflicting evidence regarding efficacy
    - apply duct tape to wart
    - leave on for 4-7 days
    - remove tape
    - clean and remove dead skin with emery board
    - re-apply new duct tape 12 hours later
    - repeat for 4-6 weeks

## [.Corn.calluses](#)

- Clinical features
  - often on plantar aspect of prominent metatarsals, between toe clefts or on dorsal aspect of toe joints
- Management
  - treat with keratolytics such as salicylic acid or urea based creams. Avoid in patients with peripheral neuropathies
    - salicylic acid plaster available OTC. Similar as wart treatment
      - leave in place 48h. Pare down white, dead skin with pumice stone or metal nail file. Then apply another patch.
  - may use scalpel debridement
- prevention
  - avoid ill fitting shoes. Avoid pressure points on feet.

●

## [.eczema](#)

- Epidemiology
  - onset is before age 5 in vast majority of cases
  - onset in first 6 months is associated with severe disease
  - adult onset eczema is still possible. Peak time is in one's 50s.
    - Often around the eyes.
- keep skin moisturized
  - daily moisturizing cream. 2-3 times per day.
- topical steroids until clear,
  - then topical calcineurin inhibitors daily for a few weeks, then 3 days per week for maintenance.
  - can use for protopic or mid-potency topical corticosteroids for small bumps/roughness
  - resume topical steroids for flares
- it's ok to use topical corticosteroids on the whole body
- if not responding to steroids and affecting the patient's life, consider referral to dermatology for systemic medications.
- Eczema on face
  - can try protopic, eucrisa, hydroval, desonide
- Infected skin
  - patients with eczema are almost always colonized with staph aureus
  - signs: weeping, pustules, honey colored crusting

- if localized clinical infection: suggest topical mupirocin bid for 1-2 weeks
- if more extensive infection, suggest oral antibiotic therapy

## eczema 2

- stamp from Gordon
- Patient education on prevention and skin care
  - - Atopic dermatitis is a chronic disease with no cure, but it can be managed - «advised»«not discussed»
  - - Shower/bathe (target of 5-10 minutes) daily in warm water. Gently towel dry - «advised»«not discussed»
  - - Apply moisturizer after exiting shower/bath - «advised»«not discussed»
  - - Apply moisturizer throughout the day whenever skin feels dry or itchy, or after contact with water - «advised»«not discussed»
  - - Moisturizer should be applied 1-2 times daily to prevent skin dryness and irritation - «advised»«not discussed»
  - - Moisturizer should be as oily as tolerated. Have patient try a number of moisturizers and choose the one that they like the best. A list of recommended moisturizers can be found on [www.eczemahelp.ca/seal-products/](http://www.eczemahelp.ca/seal-products/) - «advised»«not discussed»
- 
- Patient education on prescription medication use
  - - Continue prescription medication until skin is clear and itchiness is gone. Do not stop treatment before this - «advised»«not discussed»
  - - Amount of TCS (topical corticosteroid) needed is based on the fingertip unit, where 2 hand sized area of skin requires 1 fingertip units for one application - «advised»«not discussed»
  - - After rash cleared, continue applying moisturizer at least 2 times a day to entire body - «advised»«not discussed»
  - - Restart prescription medications when eczema flares again - «advised»«not discussed»
  - - One application of a moderately potent TCS 1-2 times a week as maintenance in areas of frequent flaring may be recommended - «advised»«not discussed»
  - - Contact us if skin has not cleared after 2 weeks of regular medication use - «advised»«not discussed»
  - - Contact us immediately if signs of infection (e.g. oozing fluid, yellow crusts, blisters and/or red swelling) - «advised»«not discussed»
- 
- Prescription medications
  - - Location/characteristic of flare
    - «Face, neck, skin folds, groin - low potency TCS recommended (classes VI and VII)»
    - «Trunk and extremities - moderate potency TCS recommended (class III, IV, V)»
    - «Lichenified or refractory eczema - high potency TCS recommended (class I and II) and consider referral to dermatologist»
  - - TCS potency classes examples
    - «Class VII - Hydrocortisone 0.5%-2.5% cream/ointment»
    - «Class VI - Desonide 0.05% cream»
    - «Class V - Desonide 0.05% ointment, Hydrocortisone valerate 0.2% cream»
    - «Class IV - Hydrocortisone valerate 0.2% ointment, Betamethasone valerate 0.1% cream»
    - «Class III - Betamethasone valerate 0.1% ointment, Betamethasone dipropionate 0.05% cream»
    - «Class II - Betamethasone dipropionate 0.05% ointment, Clobetasol propionate 0.025% cream»
    - «Class I - Clobetasol 0.05% cream»
  - - Amount of TCS to be prescribed
    - «Estimated amount for adults (BID for 2 weeks):
    - «15g - one hand (both sides) or one foot»
    - «30g - face and neck, one arm, both hands, or both feet»
    - «60g - one leg or two arms»
    - «120g - two legs or trunk»
    - «360g - entire body»»
    - «Estimated amount for paed (BID for 2 weeks):



- «7.5g - one hand (both sides) or one foot»
- «15g - face and neck, one arm, both hands, or both feet
- «30g - one leg or two arms»
- «60g - two legs or trunk»
- «180g - entire body»»
- 
- «Adjunctive therapies
- «Bleach baths - limited therapeutic benefit over plain water, but may have utility in some patients with frequent skin infections or severe eczema with presumed bacterial overgrowth
- - When indicated: bleach baths 1-2 per week. Add 120 mL (½ cup) of regular strength household bleach (6% sodium hypochlorite) to full standard-size bathtub in warm water (~150L) OR 1 teaspoon (5mL) of regular bleach for every 5 L or water for smaller tubs»
- «Sedating antihistamines - (e.g. Benadryl) can be used at bedtime to prevent nighttime scratching»»
- 
- «Follow up in 2 weeks if not improved»
- «Failure of therapy after 2 week trial
- - Review adherence to TCS, including duration of use and amount used - «completed»
- - Consider using ointment formulation for superior hydrating effects - do not use in intertriginous folds or in open/oozing lesions - «considered» «n/a»
- - Increase potency of TCS - «considered»«n/a»
- - For eyelids, consider topical calcineurin inhibitor (e.g. Tacrolimus 0.1% ointment) as alternative therapy. Advised initial local burning/stinging sensation with initial applications which improves over time - «considered»«n/a»
- - Consider alternative diagnosis if previously successful TCS no longer works:
- «Infection - topical antimicrobial (e.g. topical mupirocin 2% cream bid for 1-2 weeks) for local infection, oral antibiotics (e.g. PO Keflex 50-100 mg/kg/day divided qid) for extensive infection. Avoid culture unless recurrent infection»
- «Allergic contact dermatitis - referral to dermatologist for patch testing»
- «n/a»»
- 
- 

### .Hidradenitis suppurativa

- chronic follicular occlusive disease. involvement of intertriginous skin areas of axillary, groin, perianal, perineal, inframammary regions. misdiagnosis of furunculosis is common. recurrent, painful, inflamed nodules
- for anyone with abscess in axilla: consider HS
- Management
  - refer to dermatology
  - initial therapy
    - topical clindamycin 1% bid for 3 months
  - failed initial therapy
    - doxycycline 100mg bid po for 3 months
    - Antiandrogenic agents
    - Metformin. Initial 500mg. Max 1500mg
  - if not responding to above, may be prescribed biologics like Humira.
- conservative measures
  - lifestyle
    - smoking cessation
    - weight loss
    - loose clothing
  - hygiene
    - topical antiseptics
    - antibacterial soap
    - warm compresses
- other management

- oral retinoids
- biologics
- corticosteroid injections
- surgery
- 

- 
- 

#### .post inflammatory hyperpigmentation

- sun protection, avoid scratching
- medical therapy: hydroquinone
  - should improve in weeks to months.

- 

#### .Toenail fungus.Fungus of toenail.onychomycosis

- DDx: traumatic nail changes, nail psoriasis
- 
- Diagnosis
  - No need to get a sample before treating.
  - Histopathology
    - get nail clippings, send for pathology.
    - nail plate along with attached subungual debris is clipped just distal to its attachment to the nail bed and placed in 10% formalin
- Note: nail bed vs nail plate
  - The nail bed is an area rich in blood vessels and nerve endings that the nail plate sits on (i.e. the skin beneath the nail plate). The nail plate is the hard structure of keratinised cells that protects the end of the finger and toes.
- indications to treat: Treatment of onychomycosis is not mandatory in all patients
  - history of cellulitis in lower extremity
  - diabetes and risk factors for cellulitis
  - pain/discomfort with the infected nail
  - cosmetic reasons
- use topical antifungals:
  - Jublia (Efinaconazole) 1 applicatorful every evening x100days. 3 bottles. 3 refills
    - 25% effectiveness
  - Vicks Vaporub: menthol and petroleum jelly. apparently an effective treatment.
    - need to spread and rub in the ointment. don't glob it on.
    - 10% effectiveness
  - need to apply to base of nail.
  - topicals work better if filed down. a thickened nail prevents absorption of topical antifungal, especially if base of nail is thickened
- oral antifungal
  - consider this if Jublia fails or if more than 3 nails.
  - Terbinafine 250mg daily. 6 weeks for finger nails, 12 weeks fo toenails
    - 70% effective
    - monitor LFTs at initiation and 4-6 weeks
      - if abnormal, discontinue and follow-up in 4 weeks. if not improving, refer to GI
    - terbinafine induced liver injury risk: 1 in 50 000
  - second line: itraconazole. If cannot tolerate terbinafine or fail to respond.
    - Pulse therapy:
      - Fingernail onychomycosis – 200 mg twice daily for one week per month for two months
      - Toenail onychomycosis – 200 mg twice daily for one week per month for three months
    - Continuous therapy:
      - Fingernail onychomycosis – 200 mg per day for 6 weeks

- Toenail onychomycosis – 200 mg per day for 12 weeks
- with treatment, the diseased nail will not return to normal. The goal is to treat the fungus so that new nail is healthy. Toenails grow at 1mm per month, so can take 16 months to regrow completely.
- Management of thick nails
  - use topical urea
    - Apply a generous, protective layer of petrolatum to the periungual skin
    - Apply a thick layer of topical urea 40% cream or ointment to the nail
    - Occlude the nail with a bandage or tape and leave on overnight
    - Wash the topical urea off with soap and water in the morning
    - Repeat this procedure nightly until the nail softens and can be easily clipped or debrided

## • .Tinea pedis

- complications of tinea pedis
  - eczema, asthma flares
  - bacterial cellulitis
- management
  - topical antifungals. e.g. terbinafine
  - indications for oral agents
    - failed topical treatment
    - severe disease
    - immunocompromised

## • .Seborrheic Keratosis

- can do liquid N2 treatments in office, if it bothers the patient.
  - may take 3-6 visits.
  - can do once per week.
  - May cause hypopigmentation
- Pathogenesis
  - not well understood
  - possibly genetic, possibly UV exposure
- other treatments
  - electrodesiccation
  - no topical therapies

## • .Burn

### • Classification

• Depth	• Cause	• Appearance	• Sensation	• Healing time
• Superficial (epidermal)	<ul style="list-style-type: none"> <li>• Ultraviolet exposure (eg, sunburn)</li> <li>• Very short flash</li> </ul>	<ul style="list-style-type: none"> <li>• Dry, red</li> <li>• Blanches with pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Painful</li> </ul>	<ul style="list-style-type: none"> <li>• 3 to 6 days</li> </ul>
• Superficial partial-thickness	<ul style="list-style-type: none"> <li>• Scald (spill or splash)</li> <li>• Short flash</li> </ul>	<ul style="list-style-type: none"> <li>• Blisters</li> <li>• Moist, red, weeping</li> <li>• Blanches with</li> </ul>	<ul style="list-style-type: none"> <li>• Painful to temperature and air</li> </ul>	<ul style="list-style-type: none"> <li>• 7 to 20 days</li> </ul>

		pressure		
• Deep partial-thickness	<ul style="list-style-type: none"> <li>• Scald (spill)</li> <li>• Flame</li> <li>• Oil</li> <li>• Grease</li> </ul>	<ul style="list-style-type: none"> <li>• Blisters (easily unroofed)</li> <li>• Wet or waxy dry</li> <li>• Variable color (patchy to cheesy white to red)</li> <li>• Does not blanch with pressure</li> </ul>	• Painful, perceptive of pressure	• >21 days
• Full-thickness	<ul style="list-style-type: none"> <li>• Scald (immersion)</li> <li>• Flame</li> <li>• Steam</li> <li>• Oil</li> <li>• Grease</li> <li>• Chemical</li> <li>• Electrical</li> </ul>	<ul style="list-style-type: none"> <li>• Waxy white to leathery gray to charred and black</li> <li>• Dry and inelastic</li> <li>• No blanching with pressure</li> </ul>	• Deep pressure only	• Never (if >2% total body surface area)
• Deeper injury (ie, fourth degree)	•	• Extends into fascia and/or muscle	• Deep pressure	• Never, unless surgically treated

- 
- if partial or full thickness burn
  - fucidin ointment
  - consider non-stick dressing
  - refer to wound care nurse or home care
  - consider plastics referral.
- Initial care
  - Cooling: avoid direct application of ice or iced water. May apply cool water or wet gauze for pain relief and limit tissue injury
  - Pain management NSAIDs, acetaminophen, +/- opioids.
  - Cleaning: mild soap and tap water. Wash burns daily with soap/water
  - Debridement: sloughed, necrotic skin, ruptured blisters should be debrided before dressing. Small intact blisters <2cm in diameter may be left alone. Avoid needle aspiration of intact blisters, as may increase risk of infection.
  - Chemoprophylaxis: should apply topical antibiotics (e.g. mupirocin. Apparently can also use honey) to partial or full thickness burns. Superficial burns (e.g. sun burns) can be treated with just moisturizer.
  - No role for topical steroids. as this may increase the risk of infection and impair healing.
  - Dressings: nonadherent first layer for partial and full thickness burns. Superficial burns do not require dressings
    - topical antibiotic ointment and nonadherent gazue change once daily
    - minor burns to face or hands do not need dressings
- indications for referral
  - if wound epithelization not begun after 1 week
  - if full thickness burn greater than 2 cm
  - full thickness wound
- follow-up
  - follow-up next day. Then once weekly
  - monitor for infection. Consider infection if rim of hyperemia extends more than 2 cm of burn. Cellulitis has less distinct borders. Burn infections are more susceptible to blood invasion and sepsis. Warrant aggressive management including admission and parenteral antibiotics

## .Subungual hematoma

- DDx: fracture, infection
- S: numbness, movement of DIP joint, tetanus status
- O: vascular exam
- P:
  - pierce with needle (multiple holes with 23 gauge, one hole with 18 gauge),
    - X-ray of distal phalanx,
    - antibiotics if fractured (Keflex 500mg qid x7days)
- Counselling:
  - complications (separation of nail plate from nail bed, nail deformity, nail loss, infection)
  - Follow-up care: keep digit clean and dry.
  - Seek medical attention if: signs of infection, reaccumulation of hematoma with pain
- 

## .Onycholysis

- Management
  - Trim off the detached part. No need to completely remove nail
  - Cover the nail with tape or an adhesive bandage until the nail has grown out enough to protect the finger or toe.
  - Apply a thin layer of petroleum jelly, such as Vaseline, and cover the area with a non-stick bandage.
  - Use of antimicrobial soaks, such as dilute vinegar, to minimise the risk of secondary infection.
- Counseling
  - Minimise activities that traumatise the nail and nailbed.
  - Avoid potential irritants such as nail enamel, enamel remover, solvents, and detergents.
  - Wear gloves, including light cotton gloves under vinyl gloves for wet work.
- 

## .Contact dermatitis

- Management
  - if widespread
    - can use topical corticosteroids all over the body.
  - if severe
    - Prednisone 50mg x5 days
    - if recurs after prednisone stopped, use Prednisone taper. Taper by 5mg every 4-5 days.
- 

## .Hair loss alopecia

- Hair Pull Test (Shapiro (2000) Can Fam Physician 46:1469)
  - Preparation: Do not Shampoo hair 24 hours before test
  - Technique:
    - Grasp small clump (60 hairs) in index, middle and thumb
    - Pull hairs gently but with firm pressure
  - Interpretation: Count hairs shed with maneuver
    - Normal shedding: 6 or fewer hairs shed
    - Active shedding: More than 6 hairs shed
- investigations
  - CBC
  - iron studies,
  - liver function testing,
  - thyroid-stimulating hormone level,
  - syphilis testing
  - PCOS workup
- Treatment for men
  - Finasteride 5mg 1/4 tab daily (or 1mg daily)

- multivitamins
  - sometimes Biotin
- or oral minoxidil
- Treatment options for women
  - Androgenetic Alopecia
    - minoxidil 5% solution - apply daily
  - Biotin 1000-2000 mcg po daily (note Costco has a 10,000mcg pill)
  - Nizoral shampoo once weekly.
  - Spironolactone 50-200 mg/day (in 1-2 divided doses) Dosage - 25 mg, 50 mg, 100 mg
  - multivitamins

•

## .alopecia areata

- chronic relapsing disorder with nonscarring hair loss. likely autoimmune mediated
- presentation
  - smooth, circular, discrete areas of complete hair loss
  - exclamation point hairs, where proximal end of hair is narrower than distal end
- epidemiology:
  - may occur in both adults and children. mean age of diagnosis in 32y in males and 36y in females.
- management
  - intralesional corticosteroids:
    - Triamcinolone 2.5-5mg/mL. inject 0.1mL into multiple sites 1cm apart.
    - new growth visible in 6-8 weeks
    - side effects: local skin atrophy, telangiectasias, hypopigmentation
  - if doesn't tolerate intralesional therapy, then topical corticosteroids.
  - if extensive disease, refer to dermatology for topical immunotherapy
    - diphenylcyclopropenone (DPCP) or squaric acid dibutyl ester (SADBE)
- refractory disease
  - azathioprine
  - cyclosporine
- other therapies
  - minoxidil
  - PRP injections

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## .Ear dermatitis.Dermatitis of ear

- dermotic oil 5 drops bid for 1-2 weeks
- Elocon 1% lotion 2 drops bid for 1-2 weeks

•

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## .Melasma

- [https://www.uptodate.com/contents/image?imageKey=DERM%2F126140&topicKey=DERM%2F6621&search=melasma&rank=1~66&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=DERM%2F126140&topicKey=DERM%2F6621&search=melasma&rank=1~66&source=see_link)
- treatment
  - mild melasma
    - Hydroquinone 4% daily
  - moderate/severe
    - triple combination: hydroquinone, tretinoin, fluocinolone acetate

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## .Melanoma

- ABCDE
  - asymmetric shape
  - border irregularity
  - colour variation (white, red, brown, blue-gray, black\_
  - diameter > 6mm
  - evolution in appearance

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## .benign melanocytic nevus.Mole.Nevus

- overall structural symmetry
- pigment as a network or cobblestone-like pattern
- gradual fading, thinning toward outer edges
- light brown to very dark brown
- no blue or scarlike white areas

## .amelanotic melanoma.pink papule

- Ddx: dermal nevus, spitz nevus, inflamed seborrheic keratosis, ruptured hair follicle or cyst, hemangioma, pyogenic granuloma
- Amelanotic melanomas are often clinically confused with benign lesions (eg, dermal nevus, inflamed seborrheic keratosis, ruptured hair follicle or cyst, hemangioma, pyogenic granuloma)
- may present as pink or red macules, papules, or nodules, often with well-defined borders
- management
  - if see a pink papule and suspect amelanotic melanoma:
    - may refer to derm, especially if a skin check type of patient
    - if patient has no reason to see derm, may just follow and observe

## .skin lesion NYD

- if not sure between inflammatory or resolving infection vs concerning lesion
  - just wait for the inflammation to settle. follow-up in a few weeks.

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## .Endocrinology

### .acromegaly

- The diagnosis of acromegaly should be suspected in individuals who present with the typical clinical features of growth hormone (GH) excess, which include an enlarged jaw (macrognathia) and enlarged hands and feet, which result in increasing shoe and glove size and the need to enlarge rings. The facial features become coarse, with enlargement of the nose and frontal bones as well as the jaw, and the teeth become spread apart.
- UpToDate suggests testing in patients who present with a cluster of the following conditions, even if they do not have the typical manifestations of acromegaly (eg, acral and facial features):
  - sleep apnea, uncontrolled diabetes, carpal tunnel syndrome, colon polyps, and cardiac failure with hypertension.
  - Advise against testing if patients have only one of the above conditions.
- Investigation
  - IGF1 concentration
    - if elevated and clinical manifestations: confirms diagnosis
    - if normal serum IGF1: patient likely does NOT have acromegaly
    - if equivocal: order serum GH after oral glucose administration
- Once the biochemical diagnosis is made, pituitary magnetic resonance imaging (MRI) should be performed; a pituitary adenoma is found in the majority of cases. If the MRI is normal, then studies to identify a growth hormone-releasing hormone (GHRH)- or GH-secreting tumor should be undertaken.

## .Cushings

- Cause
  - glucocorticoid administration (most common), pituitary corticotropin
- Symptoms
  - proximal muscle weakness, facial plethora, wasting of the extremities with increased fat in the abdomen and face, wide purplish striae, bruising with no obvious trauma, and supraclavicular fat pads
  - some symptoms common in individuals who do not have adrenal hyperfunction: obesity, hypertension, glucose intolerance

## .hypogonadotropic hypogonadism.Kallmann

- Idiopathic hypogonadotropic hypogonadism with anosmia, referred to as Kallmann syndrome
- pathogenesis: inherited as autosomal dominant, autosomal recessive or X-linked condition
  - primarily in males. Male:female ratio is 4:1.
- diagnosis
  - measurement of prepubertal serum concentration of sex steroid hormones
    - male: serum testosterone <3.5nmol/L
    - female: serum estradiol < 73 pmol/L
  - inappropriately low serum LH, FSH. Rather than high concentration expected with primary gonadal failure
  - normal anterior pituitary function
  - normal hypothalamus and pituitary on MRI
- DDx
  - constitutional delay of growth and puberty. Difficult to make diagnosis until patient is at least 18 years old, unless other suggestive features present (prior micropallus and/or cryptorchism, anosmia, renal agenesis, skeletal defects, etc.)
- management
  - goals: induction of puberty/maintain sexual maturation. Induction or restoration of fertility
  - puberty induction
    - women:
      - exogenous estrogens. Oral or transdermal
        - usually start at 0.08 to 0.12mcg estradiol per kg/day. Dose is then gradually increased.
      - Eventually add progestin to prevent endometrial hyperplasia. Adding it prematurely before completed breast development reduces ultimate breast size
    - men:
      - may induce puberty with testosterone, exogenous gonadotropins or pulsatile GnRH. The latter two induce spermatogenesis, but testosterone does not.
      - testosterone therapy suggested for pubertal induction, as spermatogenesis not important at this age. Testosterone therapy is continued indefinitely
  - fertility
    - women: ovulation induction
      - may administer gonadotropins or pulsatile GnRH to trigger ovulation. Should evaluate tubal patency and semen analysis first.
    - Men: inducing spermatogenesis
      - may administer hCG. Other options include pulsatile GnRH

## .testosterone replacement therapy.TRT

- Candidate for treatment



- clinical presentation consistent with testosterone deficiency: low libido, decreased morning erections, loss of body hair, gynecomastia, small testes
  - non-specific signs: fatigue, depression, anemia
- subnormal morning (8-10AM) serum testosterone concentration on three separate occasions. Ideally done fasting
- inappropriate candidates
  - for men with vague symptoms and a single, but not repeatedly low serum testosterone, recommend strongly against testosterone use.
- Contraindications
  - prostate cancer, breast cancer
  - severe LUTS symptoms
  - erythrocytosis (hematocrit >50%)
  - sleep apnea
  - uncontrolled heart failure
- treatment
  - transdermal testosterone
    - testosterone 1% gel 50mg applied daily to shoulders/arms. Max dose 100mg/day
  - testosterone enanthate 100-200mg q2 weeks IM
    - can be administered by patient or someone in household
- monitoring
  - fluctuations in energy, mood, libido
    - if using IM testosterone, can offer transdermal route, or increase the frequency of injections from q2 weeks to q1 week.
  - testosterone
    - monitor serum testosterone 2-3 months after initiation or changing dose. When stable, q6-12 months
    - if gel/transdermal: testosterone can be measured at any time
    - if IM: should be measured mid-way between injections.
  - Prostate
    - should be screened with PSA for prostate cancer at 3 months and 12 months after starting treatment
  - hematocrit: common adverse effect of testosterone administration. Increases risk of VTE.
    - measure before starting treatment. If elevated, should find out the cause.
    - measure again after 3-6 months, then yearly. If rises above ULN, should find out cause. If no cause found, should decrease testosterone or stopped.

## .B12 deficiency

- B12 level normal ranges
  - above 221 pmol/L: normal. Deficiency unlikely
  - 148-221 pmol/L: borderline. Deficiency possible
  - below 148pmol/L: low. Consistent with deficiency.
- Management
  - oral: 1000 to 2000mcg daily
  - IM: 1000mcg once weekly for one month, then 1000mcg once per month
- monitoring
  - if concerning neurologic findings: may repeat CBC, vit B12 q1-2 days for admitted patients
  - pregnant woman: recheck within a few days to ensure vitamin has been absorbed
  - incidental finding of deficiency: repeat CBC and vit B12 in 2-4 weeks
- prognosis
  - neuropsych symptoms improve within 3 months
  - some neurologic symptoms may be irreversible if long standing

## .Diabetes

- S:

- recent blood glucose: any lows
- end organ: numbness or tingling in hands/feet, vision changes, chest pain, shortness of breath
- home BP:
- lifestyle: diet, exercise, smoking, weight loss
- P:
  - if new diagnosis: f/u visit and bloodwork in 4-6 weeks for compliance
  - if not at target: increase metformin. if metformin maxed, consider SGLT2 or DPP4 or long acting sulfonylurea.
  - if maxed all of metformin, glimepiride, Jardiance, consider starting insulin. Maybe refer to endocrinology.
- Assessment
  - investigations
    - HbA1c q3 months
    - ACR, eGFR q1y r/o CKD
    - ECG q3-5y r/o CAD
    - lipid profile q1-3y. q6-12 months if on treatment r/o dyslipidemia
  - clinical assessment
    - BP q visit
    - optometrist q1y r/o diabetic retinopathy
    - foot exam, 10g monofilament test q1y r/o diabetic neuropathy
- specific medications
  - Ozempic start:
    - Ozempic 0.25mg once weekly for 4 weeks, then 0.5mg weekly for 12 weeks.
    - refer to diabetes educator
  - metformin
    - 250mg bid x7 days, then 500mg bid x7 days, then 1g bid
  - Jardiance
    - 10mg x28 days, then 25mg
- driving: reportable reasons in diabetes
  - diabetic retinopathy, peripheral nervous system impairment, hypoglycemia

●

## [.Diabetes. Insulin dosing](#)

- Insulin titration
  - Start with 10 units of NPH or long acting insulin (e.g. lantus, basaglar, levemir) at bedtime
  - Check fingerstick glucose pre-breakfast
  - Increase dose 1 unit per day until pre-breakfast FBG level 4-7
  - If hypoglycemia: Reduce bedtime dose by 4 units or 10%, whichever is greater
  - Check a1c after 2-3 months
    - If on target: continue regimen
    - If A1c not on target, but morning fasting glucose on target.
      - Check glucose pre lunch, pre dinner, pre-bedtime
      - If glucose high, add rapid acting insulin at the prior meal.
      - May start at 2-4u of fast acting. Titrate by 1 unit every few days.
- Insulin titration 2
- Basal
  - target fasting BG 4-7
  - start dose: at 10 units at bedtime.
  - titration: increase by 1 unit every 1 night until fasting blood glucose has reached target of 4-7.
    - for Tresiba: adjust 2 units per week
  - metformin and secretagogues are usually maintained
  - if daytime hypoglycemia, reduce oral antihyperglycemic agents
- Basal + bolus
  - when bolus added, stop secretagogues but can continue metformin

- start dose:
  - maintain basal dose. add bolus insulin each meal at 10% of basal dose
    - e.g. 50 units basal. add 5 units bolus with each meal
  - if starting both basal and bolus. total daily insulin = 0.5u/kg. split 40% basal, 60% bolus (divided over meals)
- titration:
  - adjust basal dose to achieve target fasting BG
  - adjust by 1 unit daily to targets: 2h post meal glucose of <8. pre-meal glucose of next meal of 4-7.
    - e.g. if 2h post dinner glucose >8, increase dinner insulin. if pre-dinner glucose >7, increase lunch insulin.
- administration:
  - rapid acting (Humalog, NovoRapid) given 0-10 minutes before eating
  - short acting (Humulin R, Novolin ge Toronto) 30 min before eating
- correction factor. whether this is accurate is controversial
  - how much 1 unit of rapid acting insulin will lower glucose
  - correction factor = 100/total daily dose
- prescribing
  - insulin. e.g. Lantus 10u qhs
  - lancets x100, test strips x100
  - glucometer x1
  - injection pen, needles, alcohol swabs
  -
- Hypoglycemia
  - If low blood glucose at night or in morning: decreased bedtime dose by 4 units or 10 percent
  - If hypoglycemia during day, decrease rapid acting insulin at previous meal
    - If ≤ 10 units: decrease by 2 units
    - If 11-20u: decrease by 4u
    - If >20u: decrease by 6-10u or 50%
    - If severe hypoglycemia: reduce dose by 20-50%
- Non-insulin treatment
  - Continue metformin. May stop secretagogue.

•  
•

### .Freestyle Libre prescription

- 1 freestyle libre device. 28 supply of 14 day sensors (2 sensors)
- 

### .Prediabetes

- 100% predictive of progression to DM2 without active intervention (this risk can be modified)
- consider treating with metformin to prevent progression to DM2.
- BP, lipid targets
  - no evidence to treat to diabetes targets, but some staff do so anyway.
- Monitoring
  - no evidence, but may monitor A1c every 6-12 months.

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### .Diabetes Guidelines

- <https://guidelines.diabetes.ca/docs/CPG-quick-reference-guide-web-EN.pdf>
- Screening:
  - age ≥ 40 or high risk (CANRISK > 33%). screen q3years
  - very high risk (CANRISK > 50%). screen q6-12 months
- Pre-diabetes:
  - FPG 6.1-6.9. IFG
  - A1C 6.0-6.4. Prediabetes
- Diagnosis

- criteria
  - FPG  $\geq 7$ . no caloric intake for  $>8$  hours
  - HbA1C  $\geq 6.5\%$
  - 2hPG in a 75g OGTT  $\geq 11.1\text{mmol/L}$
  - Random PG  $\geq 11.1\text{mmol/L}$
- if symptoms present (polyuria, polydipsia, polyphagia, weight loss, blurry vision), confirmatory test not required
- if no symptoms, then repeat confirmatory test (FPG, A1C, 2hPG in a 75g OGTT) on another day for diagnosis
- gestational diabetes
  - 50g glucose challenge test + 1hPG
  - $<7.8$  is normal
  - $\geq 11.1$  is gestational diabetes. refer to endo
  - 7.8-11: go for 75g OGTT for 0hPG, 1hPG, 2hPG
    - 0hPG  $\geq 5.3$
    - 1hPG  $\geq 10.6$
    - 2hPG  $\geq 9.0$
- A1C Targets:
  - $\leq 6.5$  if low risk of hypoglycemia
  - $\leq 7.0$  for most adults
  - 7.1-8.0: functionally dependent
  - 7.1-8.5: recurrent hypoglycemia, limited life expectancy, frail elderly, dementia
- Starting medications:
  - A1C  $< 1.5\%$  above target: start diet exercise  $\pm$  metformin. if not at target within 3 months, start metformin
  - A1C  $\geq 1.5\%$  above target: start metformin immediately. consider second agent
  - symptomatic hyperglycemia: start insulin  $\pm$  metformin.
- Cardiovascular protection:
  - if has cardiovascular disease (cardiac ischemia, peripheral arterial disease, cerebrovascular/carotid disease):
    - then statin + ACEi/ARB + ASA
  - if CVD AND patient not at glycemia target:
    - liraglutide, empagliflozin, canagliflozin
  - if has microvascular disease (retinopathy, kidney disease (ACR  $\geq 2.0$ ), neuropathy:
    - then statin + ACEi/ARB
- ABCDES:
  - A1C  $\leq 7.0\%$  (or 6.5%)
  - BP:  $< 130/80$ . Recommend ACEi/ARB, then dhp CCB.
  - cholesterol targets LDL-C  $<2$
  - Drugs: ACEi/ARB, Statin, ASA, SGLT2i/GLP1ra
  - Exercise and healthy eating: 150 min / week and resistance training 2-3 /week.
  - Screening for complications: Cardiac: ECG q3-5years. Foot: vibration yearly. Kidney: eGFR, ACR yearly. Retinopathy. yearly
  - Smoking cessation
- 
- 

## .Diabetes - other info

- risk factors for DM2
  - family history
  - obesity, hypertension,
  - schizophrenia
  - medications: prednisone, atypical antipsychotics, statins
  - ethnicity
- antglycemic medication classes
  - biguanides                      metformin

- DPP4i                      sitagliptin
- GLP1 a                    liraglutide
- SGLT2i                    empagliflozin
- sulfonylurea              glyburide
- insulin
- glucosidase inhibitors      acarbose
- thiazolidinediones
- meglitinide
- Diabetes medications when sick or admitted to hospital
  - may hold outpatient meds in case of AKI or CKD. may switch to insulin in this case
  - hold SADMANS medications. medications that reduce kidney function and increased risk for adverse effects
    - sulfonylureas, ACEi, diuretics, metformin, ARBs, NSAIDs, SGLT2i
- CKD
  - ACR screens for CKD
  - Remember that ACR is not a diagnostic test – many unrelated things can elevate ACR and it should be used as a longitudinal marker and followed for variation more frequently when found elevated
  - potential causes for transient albuminuria
    - recent major exercise
  - repeat ACR in a few months. optimize BP and A1c. consider starting ACEi/ARB, then CCB.

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### .ketogenic diet

- diabetes
  - can be effective for diabetes: improve HbA1c, improve weight loss
- side effects
  - GI: nausea/vomiting, GERD, diarrhea,
  - dyslipidemia
  - hypoglycemia
  - osteopenia
  -
- epilepsy
  - ketogenic diet is an effective treatment for epilepsy
  - valid treatment for patients who failed  $\geq$  two antiseizure medications
  - should be supervised by trained dietitian and neurologist

- 

### .Hypoglycemia

- symptoms
  - tachycardia, sweating, tremor, nausea/vomiting, confusion, stupor
- management
  - ingestion of 15-20g fasting acting carbohydrate q15min until glucose  $> 3.9$

- 

### .Hyperglycemia

- symptoms
  - polydipsia, polyuria, polyphagia, weight loss, blurry vision
- management
  - see DKA, if applicable

- 
-

## .Low Testosterone.Testosterone Replacement Therapy.TRT

- investigation
  - morning serum total testosterone concentration between 8 and 10 AM.
  - If low: repeat total testosterone. Get LH, FSH
    - If LH, FSH not elevated: secondary hypogonadism. Get prolactin, T4, 8am cortisol, Fe, transferrin, MRI imaging
    - If LH, FSH elevated: karyotype
- TRT
  - TRT harmful? check HCT/PSA, screen for LUTS. stop if: HCT > 54%, PSA > 3-4. Consider stopping if LUTS. Screen for OSA
  - TRT necessary? stop testosterone for 1-2 months. Then check AM total and free testosterone. if low, repeat with FSH/LH to determine primary or secondary.
  - Check prolactin to rule out hyperprolactinemia.

## .Low libido.Libido low

- DDx: testosterone deficiency, SSRIs, alcoholism, fatigue, Hyperprolactinemia, TSH
- Investigations
  - A1c, CBC, liver function, Cr, TSH, lipid, serum total testosterone
  - If testosterone low, measure prolactin

## .High prolactin level.Prolactinemia.Hyperprolactinemia

- S: nipple discharge. headaches, loss of peripheral vision
- possible causes: pituitary adenoma, stalk compression, medication, chronic kidney disease, hypothyroidism, macroprolactin, pregnancy
- indications to treat: neurologic symptoms due to large size of lactotroph adenoma, hypogonadism, difficulty conceiving
- indications to check prolactin level
  - women: oligomenorrhea, amenorrhea, galactorrhea
  - men: symptoms of hypogonadism, impotence, gynecomastia
- if prolactin slightly high (21-40 mcg/L)
  - repeat the level
- investigations
  - ask lab to rule out macroprolactin when repeating prolactin level
  - pituitary MRI,
    - if mass found:
      - IGF 1
      - ACTH
      - LH
      - FSH
      - TSH
  - fasting morning prolactin, TSH, macroprolactin

## .hypothyroid - diagnosis, screening

- symptoms
  - fatigue, weight gain, constipation
  - dry skin, cold intolerance, peri-orbital edema
  - depression/memory loss, paresthesias/carpal tunnel syndrome
  - menorrhagia, erectile dysfunction, hypercholesterolemia
  - bradycardia, CHF
- screening:
  - only get TSH in patients who are symptomatic

- may consider in pregnant women
- TSH vs free T4
  - TSH is more sensitive and specific than serum free T4 in primary hypothyroidism
  - cases where TSH not useful to diagnose hypothyroidism
    - pituitary or hypothalamic disease suspected
    - hospitalized patient: acute and chronic illness affect thyroid
    - drugs or underlying diseases that affect TSH secretion:
      - decrease TSH secretion: dopamine, glucocorticoids, somatostatin analogues
      - increase: domperidone, metoclopramide, amiodarone
- if TSH elevated, repeat TSH with free T4.
- overt hypothyroidism
  - TSH is high and free T4 is low,
  - start replacement therapy
- subclinical hypothyroidism
  - see notes on Subclinical hypothyroidism
- pregnancy
  - treat even if subclinical hypothyroid
  - ensure TSH < 2.5 prior to conception
- 
- Initial diagnosis
  - Get TSH if patient has symptoms. If TSH elevated, repeat TSH with T4
- We suggest not performing population-based screening for hypothyroidism. The universal screening of asymptomatic pregnant women for hypothyroidism during the first trimester of pregnancy is controversial.

#### .hypothyroid - management, monitoring

- Initial dose:
  - 1.6 mcg/kg body weight per day in adults.
  - if older adults (>60), coronary artery disease, cardiopulmonary disease, start at 25-50mcg per day
- 
- If in normal range: repeat yearly and if:
  - New symptoms of hyper/hypo
  - Pregnancy
  - menopause/HRT
  - Switch in thyroid hormone manufacturer
  - Weight loss/gain >10%
- If >ULN
  - Between ULN and 10
    - Increase by 12-25
  - Between 10 to 20
    - Increase by 25-50
  - > 20
    - Free T4 to guide increase
  - Repeat TSH in 6-8 weeks
- Lower limit of reference range
  - Reduce dose by 12-25
  - Repeat TSH in 6-8 weeks
- For patients on thyroid medication but diagnosis is uncertain. Some patients have been prescribed thyroid hormone for questionable indications
  - If high TSH: patient is hypothyroid and T4 dose should be adjusted accordingly
  - If normal/low TSH: reduce T4 dose by half. Recheck TSH in 4-6 weeks. If normal on recheck, reduce dose further.

- Most patients with hypothyroidism have symptoms and a high serum TSH concentration within one month after discontinuing therapy.

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### .subclinical hypothyroidism

- definitions
  - normal free T4, but elevated TSH. no symptoms or mild symptoms of hypothyroidism
- diagnosis
  - TSH is initial screening test.
  - if TSH elevated, repeat TSH with serum T4 before making diagnosis of subclinical hypothyroidism
    - if non-pregnant: repeat TSH, T4 in 1-3 months
    - if pregnant or wanting to conceive: repeat immediately
- management in non-pregnant patients
  - <https://www.uptodate.com/contents/image?imageKey=ENDO%2F108867>
  - treat if TSH  $\geq 10$  or symptomatic
  - if TSH 5-7
    - if age  $> 65$ -70: observe
    - if age  $< 65$ : treat if symptoms of hypothyroid
  - if TSH 7-10
    - if age  $> 65$ : treat if symptoms of hypothyroid
    - age  $< 65$ : treat
- monitoring untreated patients:
  - may repeat in 6-12 months

### .Tapering Hypothyroid medication

- not evidence based. only would do this on patient request
- advise patient not to take iodine supplements. iodine deficiency is unlikely in North America due to iodized table salt.
- just slowly taper thyroid medication. reduce by 25-50mcg every 6 weeks. follow TSH.

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### .compression fracture

- Imaging
  - X-rays
  - Consider CT scan if concerned about retropulsion and impact on spinal cord. If anterior wedge fracture, less worried about spinal cord, especially if neurologically intact.
- osteoporosis workup
  - neuro exam
  - CBC, electrolytes, Cr
  - Ca, Phos, albumin, liver enzymes, ALP, vit D
  - if suspect malignancy
    - CBC, ALP, SPEP, UPEP, ESR, CRP
    - bone scan
- management
  - conservative measures
    - physiotherapy, exercise
  - pain control
    - acetaminophen 1g tid, naproxen 500mg bid, ibuprofen 400-600mg qid
    - opioids: oxycodone 5mg with acetaminophen 325mg
      - also give laxative
    - calcitonin nasal. 200 units daily alternating nostrils. 2-4 weeks.
    - NO muscle relaxants.



- treat osteoporosis
  - bisphosphonates
  - Ca, Vit D supplementation
  - stop smoking.
  - get DEXA
- Vertebral augmentation
  - procedure: percutaneous injection of bone cement under image guidance into fractured vertebra
    - performed as outpatient with sedation. usually done by interventional radiology
- patients to consider for vertebral augmentation
  - severe incapacitating pain unable to transition to oral opioids within 7 days or intolerable sedation, constipation or delirium from opioids
  - without improvement of pain despite 4-6 weeks of conservative managements
  - consider referral to ortho who can then consider vertebral augmentation

## • .compression fracture - other info

- physical exam findings
  - kyphosis
  - height loss
  - tenderness to palpation

## • .Osteoporosis

- risk stratification
  - FRAX
  - CAROC
  - 10 year fracture risk
    - <10%, don't treat with medicine.
    - 10-20%: consider medication treatment if higher risk
      - long term systemic glucocorticoids
      - recurrent falls
      - rapid bone loss
      - if no treatment: repeat BMD in 1-3 years
    - >20% or prior fragility fracture of hip or spine or more than one fragility fracture
      - treatment recommended.
- Secondary causes for osteoporosis to consider
  - medical disease: diabetes, malabsorption, hyperPTH, hypogonadism, RA, hyperthyroid, IBD, multiple myeloma
  - drugs: anti-epileptic drugs, aromatase inhibitors, chemo/immunosuppressants, glucocorticoids, lithium, PPI, SSRI, SGLT2i, TAD, supraphysiological thyroid medication
- Workup if found to have osteoporosis
  - CBC, corrected Ca with Albumin, Phos, Cr, ALP, ALT, TSH
  - Vit D 3-4 months after supplementation
  - if clinically indicated:
    - PTH if hypercalcemia, hypercalciuria, a history of renal stones, or osteopenia
    - anti-TTG if unexplained anemia, vit D deficiency, low urinary calcium
    - SPEP if hypercalcemia, vertebral fracture, otherwise unexplained anemia, weight loss, or proteinuria
- indication for BMD
  - age > 65: all patients
  - age 50-64
    - fragility fracture after age 40
      - fall from standing height

- prolonged glucocorticoid
- parental hip fracture
- vertebral fracture or osteopenia on Xray
- high alcohol intake or current smoking
- low body weight (<60kg)
- age <50
  - fragility fractures
  - malabsorption syndrome
  - primary hyperparathyroid
  - hypogonadism or premature menopause (<45 yo)
- monitoring:
  - low risk patients: every 5 years
  - moderate/high risk: BMD every 1-3 years until stable. don't repeat DEXA more than q2 years unless high risk or new risk factors.
- non pharmacologic treatment
  - exercise: including weight bearing exercise (e.g. walking, jogging, aerobics) and resistance training
    - The most effective type of exercise intervention on BMD for the neck of femur appears to be non-weight bearing high force exercise such as progressive resistance strength training for the lower limbs. The most effective intervention for BMD at the spine was combination exercise programmes
  - adequate Ca intake
  - vit D intake
  - smoking cessation
  - decrease alcohol intake
- 
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## [.Osteoporosis pharmacotherapy treatment. Bisphosphonates](#)

- criteria for initiating treatment
  - high risk
    - 10 yr fracture risk >20%
    - OR frag Hip fracture risk >3%
    - OR prior fragility fracture of hip/spine
    - OR ≥ non-vertebral fragility fracture
    - OR prior fragility fracture and currently on corticosteroids
  - moderate risk
    - 10 year fracture risk 10-20%
    - consider pharmacologic therapy if risk factors
      - rapid bone loss, androgen deprivation therapy, recurrent falls,
  - History of hip or vertebral fracture.
  - T-score ≤ -2.5 (DXA) at the femoral neck or spine, after appropriate evaluation to exclude secondary causes.
  - T-score between -1 and -2.5 at the femoral neck or spine, and a 10-year probability of hip fracture ≥3 percent or a 10-year probability of any major osteoporosis-related fracture ≥20 percent based upon the United States-adapted WHO algorithm.
- treatment
  - Weekly: Alendronate 70mg
  - Monthly Risedronate 150mg
  - IV: Zoledronic acid: for patients with esophageal disorders (achalasia, varices), GI intolerance
- Monitoring
  - if low risk: no more than q5y
  - if on chronic steroid: q6-12 months
  - if on treatment
    - check BMD after 1-3 years of starting therapy.
    - if BMD stable or increased: continue therapy

- if BMD decreased by <5 percent: ensure adherence. continue therapy. repeat BMD in 2 years
- if BMD decreased by >5 percent: consider switch to IV bisphosphonate, or denosumab
- if fracture while on bisphosphonate: stop bisphosphonate and switch to denosumab or teriparatide.
- duration of therapy
  - low risk for fracture: discontinue after 3 years of zoledronic acid, 5 years of alendronate/risedronate
  - high risk of fracture (history of osteoporotic fracture, T-score below -3.0): continue alendronate /risedronate for 10 years. continue zoledronic acid for 6 years.
- drug holiday for bisphosphonates
  - continue to monitor BMD
  - if low or moderate risk, consider 3-5 year drug holiday. if high risk, keep on medication
    - hip and vertebral fractures are considered high risk and are not candidates for drug holidays
  - restart bisphosphonate when bone loss (~5%) on two DEXA measurements 2 years apart.
- Taking the medication:
  - Administer on empty stomach with plain water >30 minutes before any food, drink, medications
  - Remain sitting/standing upright for >30 minutes after taking.
- Side effects
  - common
    - GI mucosal irritation: common. but decreased risk if follow instruction
      - esophagitis, GERD
  - atypical femur fractures: rare
    - but benefits of therapy generally outweigh risk of AFFs.
    - typically have prodromal symptoms including dull or aching pain in groin or thigh
    - most fractures have occurred after receiving bisphosphonates for 3-5 years
  - osteonecrosis of the jaw: rare
    - typically with IV bisphosphonates
    - risk factors include dental extractions
    - commonly reversible and not life threatening

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## osteoporosis - other info

- drug classes for treatment of osteoporosis
  - RANKL inhibitor: Prolia
  - bisphosphonates
  - PTH analog: Teriparatide
  - others
    - SERMs
- T-score
  - the standard deviation difference between a patient's BMD and that of a young adult reference population
    - T score: < -2.5. 2.5 SD below the young adult mean. Defined as osteoporosis
    - T score: -1 to -2.5. osteopenia.
- Z-score
  - comparison of the patient's BMD to an age-matched population
- Different bone densities at different sites
  - Some studies suggest that the risk for fracture at a particular site is best estimated by measuring bone density at that site
    - Other studies, however, have found that measurement of BMD at any site predicts fracture risk at all sites equally well
  - suggest DXA measurements of the spine and hip because fractures at these sites have the greatest impact on patients' health. Measurement of hip BMD also has the highest predictive value for hip fracture.

## .Obesity

- Medical conditions associated with weight gain
  - hypothyroidism
  - Cushing's syndrome
  - growth hormone deficiency
  - medications: antipsychotics, antidepressants, antiseizure medications, hypoglycemic medications, progesterone
- medication options
  - Contrave (bupropion, naltrexone)
    - one tablet (naltrexone 8mg/bupropion 90mg) qAM for 1 week
    - week 2: 1 tablet bid
    - week 3: 2 tablets qAM and 1 tablet qHS
    - week 4: 2 tablets bid
  - Saxenda:
    - week 1: 0.6mg once daily. increase by 0.6mg daily at weekly intervals to target 3mg once daily
    - week 2: 1.2mg daily
    - week 3: 1.8mg daily
    - week 4: 2.4mg daily
    - week 5: 3.0mg daily
- refer to diabetic educator/pharmacist to show how to inject and discuss pros/cons
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## .Hypomagnesium.Hypomagnesemia

- outpatient:
  - OTC supplement: Mg 500mg bid. X2 weeks. check levels in 2 weeks
  - will need to stay on supplement until patient is no longer losing, either through vomiting, diarrhea
  - start at 250mg po daily. titrate up to 2g bid.
- inpatient
  - Mgso4 2g iv x1 over 4 hours
  - Mg elemental 250 - 500 mg po daily to bid

## .Graves disease

- Caused by TSH receptor antibodies (TRAb) that activate the receptor, stimulating thyroid hormone synthesis
- management
  - treating symptoms:
    - use betablocker for hyperadrenergic symptoms until euthyroid achieved (by thionamides, radioiodine, or surgery)
    - start with atenolol 25-50mg daily. Increase to max 200mg daily. To reduce pulse to under 90 bpm.
  - Treatment to reduce thyroid hormone synthesis
    - three treatment options for Graves' disease: antithyroid drugs (thionamides), radioiodine, or surgery.
    - If significant symptoms of hyperthyroid or higher risk (older age, cardiovascular disease):
      - start thionamide in addition to beta blockers to achieve euthyroidism quickly
      - use methimazole
    - mild to moderate symptoms or lower risk
      - may offer either thionamides or radioiodine
    - large goitery
      - suggest surgery
- monitoring treatment
  - periodic clinical assessment
  - measure free T4, total T3 levels. TSH can be misleading in early follow-up period. TSH suppression can persist several months after free T4 and T3 are normal.
  - thionamides:
    - see notes on Thionamides for Graves disease

- radioiodine:

- 4-6 weeks after treatment: measure free T4, total T3, TSH
- every 4-6 weeks for up to 6 months. or until hypothyroid and on stable doses of levothyroxine
  - measure free T4 and TSH.

- surgery:

- euthyroid patient: thyroid hormone should be initiated prior to discharge in a euthyroid patient. Measure TSH 6-8 weeks later and adjust dose to maintain TSH in normal range.
- Hyperthyroid at time of surgery: delay thyroid hormone replacement until levels fall into normal range

## .Graves disease thionamides.thionamides for Graves disease

- Thionamides do not cause hypothyroidism after treatment, unlike radioiodine or surgery.
  - Methimazole blocks the enzyme thyroperoxidase, which is a key step in the synthesis in T3 and T4.
- Monitoring
  - assess free T4 and total T3 every 4-6 weeks until stabilized on maintenance thionamide therapy
  - Once the patient has a normal free T4 and total T3, the dose of methimazole can be decreased by 30 to 50 percent.
    - Typical maintenance dose: methimazole 5-10 mg daily
  - measure TSH free T4 4-6 weeks after dose adjustment
  - When a stable maintenance dose is achieved, thyroid tests (TSH, free T4) can be performed every six months.
- Stopping therapy
  - duration of therapy
    - methimazole as primary therapy
      - should be continued for 12 to 18 months. Methimazole can be stopped at any time to allow patients to proceed with radioiodine or surgery
  - evaluation prior to stopping therapy
    - if normal thyroid function, measure serum thyrotropin receptor antibodies (TRAbs)
      - if normal level, good chance of remission once thionamides discontinued
        - may stop thionamides if TRAbs and TSH are normal at 12 to 18 months.
    - Persistently high levels of TRAbs: associated with high relapse rates. Should continue methimazole or proceed with definitive therapy (radioiodine or surgery)

## .Hyperthyroid

- presentation
  - anxiety, weakness, tremor, palpitations, heat intolerance, sweating, weight loss
  - exophthalmos, periorbital edema, limitation of eye movement
- initial Investigations
  - TSH, T3, T4
- other investigations
  - radioactive iodine uptake scan with I-123
    - note: contraindicated in pregnancy and breastfeeding
  - thyrotropin receptor antibody
- causes
  - graves disease, subacute thyroiditis, toxic multinodular goiter, hyperfunctioning nodule, painful thyroiditis
- thyrotoxicosis vs hyperthyroid
  - thyrotoxicosis: too much thyroid hormone in body
  - hyperthyroid: making too much thyroid hormone
- initial management as family doctor
  - beta blocker to control adrenergic symptoms
    - metoprolol 25-50mg bid
    - atenolol 25 to 50mg daily

- urgent referral to endocrinology for overt hyperthyroidism
- if comfortable, get nuclear test. don't start tapazole unless comfortable.
  - anti-thyroid medication after thyroid scan done
    - tapazole 5-20mg daily to help decrease fT4 while patient waits to see endocrinology
      - onset in 2-4 weeks
      - adverse effect: agranulocytosis, LFT abnormality, rash, joint pains. go to ER if fever, sore throat.
- Graves vs thyroiditis
  - Graves: high uptake on radioactive iodine uptake. thyrotropin receptor antibody positive
  - thyroiditis: low uptake on radioactive iodine test
- note: I-123 is for investigations. I-131 kills the thyroid and is for treatment.

### .hyperthyroid - other

- Thyroid storm
  - tachycardia, hyperpyrexia, central nervous system dysfunction (agitation, delirium, psychosis, stupor, or coma), and gastrointestinal symptoms (nausea, vomiting, abdominal pain)

### .hyperthyroid subclinical.subclinical hyperthyroidism

- Defined as normal free T4 with low TSH
- cause: exogenous T4 for hypothyroidism, autonomously functioning thyroid adenomas
- associated with increased risk of Afib, decreased BMD
- investigation
  - confirm normal Free T4 if only low TSH measured
  - thyrotropin receptor antibodies: confirms diagnosis of Graves' disease
  - radioactive iodine uptake scan
    - if focal uptake
    - if diffuse uptake: suggestive of Graves' disease
- treatment
  - if TSH <0.1 and high risk patient (age >65, CV risk factors, osteoporosis risk factors): treat underlying cause of hyperthyroid
  - if TSH 0.1 to lower limit of normal and low risk patient: observation
  - otherwise reasonable to either treat or observe

### .Thyroid nodule

- if suspect thyroid nodule
  - get U/S. radiology then recommends FNA depending on suspicion level
  - if meets criteria for biopsy, refer to ENT and they decide whether to biopsy
- items concerning for thyroid cancer
  - on history
    - rapid growth of neck mass
    - head and neck irradiation
    - total body irradiation for bone marrow transplantation
    - familial thyroid carcinoma
    - thyroid cancer syndromes: MEN2, familial adenomatous polyposis
  - on physical exam
    - dysphonia
    - dysphagia
    - dyspnea
    - regional lymphadenopathy
    - fixation of nodule to surrounding tissue
- benign nodules

- cyst (colloid, simple, hemorrhagic), follicular adenoma, multinodular goiter, thyroglossal duct cyst, hashimotos thyroiditis
- malignant nodules
  - papillary carcinoma, follicular carcinoma, medullary carcinoma, anaplastic carcinoma, metastatic carcinoma, primary thyroid lymphoma

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## .Hypokalemia

- S:
  - Manifestations of hypokalemia include severe muscle weakness, cardiac arrhythmias, renal abnormalities, and glucose intolerance.
- each drop in K by 0.3 corresponds to 100mEq deficit. Does not apply when there is shifting or DKA.
- management
  - mild ( $> 3.0$ )
    - K Cl 10-20meq po 2-4 times per day (20 to 80mEq per day)
  - If symptomatic, or severe ( $< 3.0$ ):
    - K Cl 40 mEq po 3-4 times daily.
    - if also on IV potassium and severe, 20 mEq every two to three hours
    - another regimen
      - IV KCl 10mEq over 1 hour. x4 (total 4 hours) AND K Elixir 40mEq
  - if severe and doesn't tolerate oral:
    - may give KCl 10-20 mEq iv q2-3h
      - recommended maximum rate of IV potassium administration is 10 to 20 mEq/hour in most patients. but may go as high as 40mEq/h in life threatening hypokalemia.
    - e.g. KCl 20-60mEq/L added to IV NS at a rate 50-100cc/h
      - in order to decrease the risk of inadvertent administration of a large absolute amount of potassium
        - suggest max of KCl 60 mEq per 1L bag.
      - e.g. 20mEq/L added to 100cc/h. This is 20mEq over 10 hours, or 48mEq over 24 hours.
    - measure K level q2-4 hours to check response to therapy.
- potassium sparing diuretics
  - if used in conjunction with potassium supplements, should monitor potassium closely. be cautious in CKD patients, or if on ACEi, ARB
  - suggest monitoring the serum potassium concentration approximately every three to four months in all patients receiving chronic potassium supplementation, or more often if clinically indicated.
- IV KCl
  - Pain and phlebitis can occur during parenteral infusion of potassium into a peripheral vein. This primarily occurs at rates above 10 mEq/hour, but can be seen at lower rates.

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## .Hyperkalemia

- outpatient
  - Lasix 40mg po
  - Recheck in 1 week
- inpatient
  - IV NS
  - Lasix 40mg po/iv

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## .Hyponatremia

- DDx:

- [https://www.uptodate.com/contents/image?imageKey=NEPH%2F101823&topicKey=NEPH%2F2350&search=hyponatremia&rank=1~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=NEPH%2F101823&topicKey=NEPH%2F2350&search=hyponatremia&rank=1~150&source=see_link)
- <https://www.aafp.org/afp/2015/0301/hi-res/afp20150301p299-f1.gif>
- Pseudohyponatremia: hyperglycemia, protein, lipids
- renal failure
  - if GFR <15mL/min, impaired free water excretion. unable to dilute urine
- Thiazide,
  - presents similarly to SIADH. diagnosis confirmed if hyponatremia improves with stopping thiazide.
- Low effective blood volume: heart failure, cirrhosis
  - low effective blood volume results in ADH release. ADH causes you to retain water.
- Hypovolemia
  - low urine sodium (<25mEq/L): hypovolemia usually caused by GI losses (e.g. diarrhea), or movement of fluid into third space (e.g. pancreatitis), or renal fluid losses due to diuretics
  - high urine sodium (>40), low urine chloride (<25)
    - metabolic alkalosis caused by vomiting
  - high urine sodium and chloride (>40)
    - renal salt losses, commonly seen with diuretic therapy
- euvolemic: likely SIADH
  - low urine sodium usually seen in hypovolemia. high urine sodium usually seen in SIADH.
    - can also be primary polydipsia, protein malnutrition (low protein, high water diet)
  - high urine sodium and osmolality
    - SIADH most common cause of hyponatremia in euvolemic patients: malignancy, pulmonary disease, HIV infection, recent surgery
- 
- S:
  - Symptoms: headache, nausea, vomiting, muscle twitching, fatigue, gait disturbances, confusion
  - Vomiting, diarrhea, diuretics
  - Medications (diuretics), water intake, low protein diet, drug use (ecstasy)
  - Orthostasis, recent surgery
- O:
  - Signs of heart failure, liver failure,
- Investigations
  - Lipids, blood sugar, Cr, TSH
  - Urine sodium,
    - low urine Na: hypovolemic hyponatremia
  - urine osmolality
- Severe/acute hyponatremia
  - Treatment goal: prevent further decline in serum sodium, decrease intracranial pressure, relieve symptoms of hyponatremia, avoid excessive correction to avoid ODS
  - <https://www.aafp.org/afp/2015/0301/hi-res/afp20150301p299-f2.gif>
    - Infuse 3% saline (1 to 2 mL per kg per hour) goal of increasing serum sodium by 6 to 8 mEq/L. Consider desmopressin, 1 to 2 mcg every 4 to 6 hours
    - OR IV bolus 100 to 150mL 3%. goal of increasing serum sodium level by 2 to 3 mEq/L. check sodium level every 20 minutes until symptoms resolve.
  - Acute. Na <130. usually due to IV fluid administration in post-op patients or from self-induced water intoxication (e.g. competitive runners, psychotic patients with extreme polydipsia)
    - Asymptomatic: 50mL bolus 3 percent saline. Then remeasure Na concentration hourly
    - Symptoms of elevated ICP (seizure, coma, headache, vomiting)
      - 100mL bolus 3 percent saline (hypertonic saline). If symptoms continue, two additional 100mL doses over 30 minutes
  - Chronic hyponatremia. Na <130
    - Severe: 100mL bolus 3 percent saline. If symptoms continue, two additional 100mL doses over 30 minutes



- Monitoring
  - Measure sodium hourly until Na raised by 4-6. avoid rapid correction to avoid Osmotic demyelination syndrome. goal is to raise by 4-6 mEq/L in 24h period; maximum rate of correction in chronic, severe hyponatremia is 8mEq/L in 24h.
- Management: asymptomatic, mild/moderate. most common
  - Hypovolemic (decreased total body water and sodium level)
    - urine sodium >20: Renal loss (e.g. diuretics, mineralocorticoid deficiency)
      - give isotonic saline
    - urine sodium <20: extrarenal loss (e.g. from vomiting, diarrhea, third spacing)
      - give isotonic saline
  - euvolemic (increased total body water, normal total body sodium level). urine sodium usually > 20mEq/L
    - urine osmolality >100 mOsm/kg: SIADH, hypothyroid, adrenal insufficiency, stress, drug use
      - fluid restrict to less than 1L per day
    - urine osmolality <100 mOsm/kg: primary polydipsia, low solute intake (e.g. beer potomania syndrome)
      - fluid restriction
  - hypervolemic (increased total body water)
    - urine sodium < 20: heart failure, cirrhosis, nephrosis, hypoalbuminemia
      - diuresis. fluid and sodium restriction
    - urine sodium > 20: renal failure
      - fluid and sodium restriction. dialysis

## Hypercalcemia

- symptoms
  - [https://www.uptodate.com/contents/image?imageKey=ENDO%2F54647&topicKey=ENDO%2F836&search=hypercalcemia&rank=1~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=ENDO%2F54647&topicKey=ENDO%2F836&search=hypercalcemia&rank=1~150&source=see_link)
  - mildly elevated: polyuria, polydipsia, anorexia, nausea, constipation
  - moderate/severe elevation: lethargy, confusion, muscle weakness
- Investigations
  - [https://www.uptodate.com/contents/image?imageKey=ENDO%2F51698&topicKey=ENDO%2F836&search=hypercalcemia&rank=1~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=ENDO%2F51698&topicKey=ENDO%2F836&search=hypercalcemia&rank=1~150&source=see_link)
  - Get repeat corrected calcium
  - PTH: if elevated, primary hyperparathyroidism
  - PTHrP: if elevated, humoral hypercalcemia of malignancy
  - 1,25-dihydroxyvitamin D: if elevated, lymphoma, granulomatous diseases (sarcoidosis, tuberculosis) more likely
  - 25-hydroxyvitamin D: if elevated, vit D intoxication more likely
  - SPEP, UPEP, serum free light chain assay: if abnormal, multiple myeloma
  - Assess for other diagnoses: vit A intoxication, hyperthyroidism
  - other investigations
    - hyperparathyroidism: Neck U/S, BMD, 24h urine Ca
- Treatment
  - Mild/moderate - minimally symptomatic: avoid thiazide diuretics, avoid volume depletion, avoid prolonged rest or inactivity, avoid calcium supplementation
  - Severe: corrected Calcium > 3.5:
    - IV NS: can use up to 200-300mL/h initially, but risk of volume overload
    - Calcitonin 4 IU/kg q6-12h. may develop tachyphylaxis after 24-48 hours.
    - Zoledronic acid 4mg iv x1 over 15 minutes.
      - OR Pamidronate 60-90mg iv over 2 hours. ZA is preferable though.
      - OR Denosumab if bisphosphonates contraindicated.

## Primary hyperparathyroidism. Hyperparathyroidism. PTH

- Diagnostic pathway

- Uptodate graphics: Diagnosis of primary hyperparathyroidism in adults
- High PTH and hypercalcemia
  - Primary hyperparathyroidism.
- Hypercalcemia and PTH low (<20 pg/mL)
  - Unlikely primary hyperparathyroidism
- Hypercalcemia and PTH mid-upper normal or minimally elevated:: may be PHPT vs FHH
  - 24 hour urinary calcium excretion
    - If normal: 100-200 mg/day:
      - If 25-OH Vit D normal: likely PHPT
      - If Vit D low: reassess after repleting Vit D.
    - If low: <100mg/day:
      - If Vit D normal: likely FHH
      - If Vit D low: reassess after repleting Vit D
    - If normal to elevated: >200 mg/day: likely PHPT
- DDx
  - malignancy, FHH, drugs (thiazide diuretics, lithium), secondary hyperparathyroidism (renal insufficiency, osteoporosis)
- Investigations
  - 24 hour Urinary calcium excretion
  - Serum Vitamin D
  - Cr to assess kidney function
  - Renal imaging (CT or U/S) to assess for kidney stones
  - BMD to assess for osteoporosis
  - Other tests
    - Serum phosphorous
    - Imaging studies: not needed to establish diagnosis of PHPT. Localization studies should be performed only after a decision for surgery has been made; might be used for surgical planning.
- Management
  - If symptomatic (nephrolithiasis, fractures, symptomatic hypercalcemia), should have parathyroid surgery. This is the only definitive therapy
  - Asymptomatic
    - Surgery not mandatory
    - Surgical criteria
      - Ca 0.25 mmol/L above upper limit of normal
      - Skeletal: bone density at hip, L-spine, or distal radius T score < -2.5. previous vertebral fracture
      - Renal: GFR< 60, 24h urinary calcium > 400mg/day (>10 mmol/day). Nephrolithiasis on imaging
      - Age < 50 years
  - Non-operative management
    - Avoid: thiazide diuretic, lithium carbonate, volume depletion, prolonged bed rest, high calcium diet
    - Encourage physical activity. Encourage 6-8 glasses of water per day to minimize risk of nephrolithiasis. Maintain moderate Ca intake (1000mg/day), maintain moderate Vit D intake (400-800 IU daily)
    - Monitoring
      - Ca, Cr, and eGFR: annually
      - BMD: q1-2 years
  - Poor surgical candidates: meet surgical criteria but can't have surgery for other reasons
    - Symptomatic/severe hypercalcemia: cinacalcet 30mg bid. check Ca within 7 days of initiation or dose adjustment
    - Osteoporosis: bisphosphonates: e.g. alendronate
    -
- 
- 
-

## .HHS

- Diagnosis of HHS: this is distinct from DKA
  - marked hyperglycemia:  $>33$
  - minimal acidosis: venous pH  $>7.25$ , bicarbonate  $.15$
  - absent to mild ketosis
  - marked elevation in serum osmolality: effective osmolality  $>320$  mOsm/kg
- signs/symptoms
  - associated with more severe dehydration than DKA

•

## .DKA

- Signs/symptoms
  - initial: polyuria, polydipsia, fatigue, weight loss, nocturia, enuresis
  - subsequent: nausea, vomiting, abdominal pain, fruity breath, Kussmaul breathing, altered consciousness
- precipitating factors
  - poor metabolic control, missed insulin doses,
  - illness: dehydration, UTI, pneumonia
  - medication (e.g. corticosteroids, SGLT2i),
  - drugs/alcohol
  - eating disorder
- Diagnosis of DKA
  - hyperglycemia: blood glucose  $>11$  mmol/L
  - metabolic acidosis: venous pH  $<7.3$ , bicarbonate  $<15$
  - ketosis: ketones in blood or urine
- DKA needs to be distinguished from HHS
- Investigations in ER
  - blood glucose
  - electrolytes
  - BUN, Cr
  - venous pH
  - extended electrolytes
  - serum BOHB, urine ketones
  - lactate
  - HbA1c
- complication. especially in kids
  - cerebral injury
  - other complications
    - subtle cognitive impairment after recovery. even if no cerebral injury during treatment
    - VTE
    - pancreatic enzyme elevations
    - AKI
    - cardiac arrhythmias

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## .DKA Management in adults

- [https://www.uptodate.com/contents/image?imageKey=EM%2F57723&topicKey=ENDO%2F1795&search=dka&source=outline\\_link&selectedTitle=1~150](https://www.uptodate.com/contents/image?imageKey=EM%2F57723&topicKey=ENDO%2F1795&search=dka&source=outline_link&selectedTitle=1~150)
- [https://www.uptodate.com/contents/image?imageKey=ENDO%2F61747&topicKey=ENDO%2F1795&search=dka&source=outline\\_link&selectedTitle=1~150](https://www.uptodate.com/contents/image?imageKey=ENDO%2F61747&topicKey=ENDO%2F1795&search=dka&source=outline_link&selectedTitle=1~150)
- fluids
  - bolus 15-20mL/kg/h IV NS (1-1.5L/h in average sized adult) for a few hours

- then 0.45NS at 4-14mL/kg/h (250-500 mL/h) if serum Na normal or elevated. isotonic saline if corrected serum Na is reduced
  - for each 5.5 mmol/L glucose over 5.5 mmol/L, add 2.0mEq to corrected sodium
- once blood glucose <11, change to D5/0.45NS at 150-250mL/h
- potassium
  - if K < 3.3, hold insulin.
  - hypokalemic: (below 3.3 mEq/L): hold insulin. give KCl 20 to 40 mEq/hour IV until K<sup>+</sup> concentration is above 3.3 mEq/L
    - rarely, additional potassium supplementation may be necessary to avoid life-threatening muscle weakness and cardiac arrhythmias.
  - normokalemic: (between 3.3 and 5.3 mEq/L): give potassium chloride 20 to 30 mEq per liter IV fluid; maintain serum K<sup>+</sup> between 4 to 5 mEq/L.
  - hyperkalemic: (above 5.3 mEq/L): do not give potassium; check serum K<sup>+</sup> every 2 hours; delay administration of potassium chloride until serum K<sup>+</sup> has fallen to 5 to 5.2 mEq/L.
- insulin
  - only give insulin if K > 3.3
  - 0.14 U/kg per hour. insulin bolus not necessary
    - alternatively. 0.1 U/kg bolus, then infusion of 0.1U/kg/h
  - repeat blood glucose every hour.
  - if serum glucose does not fall by 3-4 mmol/L in first hour, double rate of insulin infusion
  - when serum glucose <11: consider decreasing infusion to 0.02-0.05 U/kg/h
    - or give insulin 0.1U/kg sc q2h
- bicarbonate
  - bicarbonate to correct metabolic acidosis is controversial. may give if arterial pH < 6.9
- Monitoring
  - check blood glucose hourly
  - electrolytes, venous pH, pCO<sub>2</sub> can be measured q2-4 hours
  - extended electrolytes (Ca, Phos, Mg) every 4-6 hours.
  - vital signs and neurologic status done hourly
  - fluid intake and output should be monitored

## .DKA management in kids

- [https://www.uptodate.com/contents/image?imageKey=PEDS%2F76460&topicKey=PEDS%2F5808&search=dka&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=PEDS%2F76460&topicKey=PEDS%2F5808&search=dka&source=see_link)
- rehydration:
  - IV NS 10-20 mL/kg
  - give additional IV fluids to replace remaining fluid deficit over 24-48 hours, with IV 0.45 to 0.9% NS
    - mild DKA: assume 5-7% fluid deficit
    - moderate to severe DKA: assume 7-10% fluid deficit
- potassium:
  - if hypokalemic (<3.5): insulin should be delayed until serum potassium is restored to near-normal. add 40mEq/L to IV fluids
  - if normokalemic (3.5-4.5): give potassium replacement 40mEq/L added to the IV fluid solution (but not initial fluid bolus)
  - if hyperkalemic (>4.5): monitor every hour and begin potassium replacement once potassium falls to normal range
- insulin
  - insulin infusion 0.1 unit/kg/hour.
  - insulin bolus is not recommended
  - once blood glucose is less than 14-17, add dextrose
- continue insulin infusion until

- anion gap normalized  $12 \pm 2$  mEq/L
- venous pH  $> 7.3$ , bicarbonate  $> 15$  mEq/L
- blood glucose  $< 11$
- patient tolerating oral intake
- Monitoring
  - check blood glucose hourly
  - electrolytes, venous pH, pCO<sub>2</sub> can be measured q2-4 hours
  - extended electrolytes (Ca, Phos, Mg) every 4-6 hours.
  - vital signs and neurologic status done hourly
  - fluid intake and output should be monitored
- complications
  - cerebral injury: altered mental status, urinary incontinence, new headache, recurrence of vomiting
    - start mannitol 0.5-1g/kg mannitol if cerebral injury suspected

#### .Corrected Sodium for hyperglycemia.Sodium correction for hyperglycemia

- for each 100 mg/dL glucose  $> 100$  mg/dL, add 2.0 mEq to sodium value for corrected serum sodium value
  - for each 5.5 mmol/L glucose over 5.5 mmol/L, add 2.0mEq to corrected sodium
- unit conversion: SI to American
  - 1 mmol/L = 18,018 mg/dL

#### .thiamine deficiency

- Thiamine 100mg po daily, multivitamin once daily

#### .Refeeding syndrome

- complications
  - Hypophosphatemia
  - Hypokalemia
  - Congestive heart failure
  - Peripheral edema
  - Rhabdomyolysis
  - Seizures
  - Hemolysis
  - Respiratory insufficiency

#### .Hypophosphatemia

- In asymptomatic patients with a serum phosphate less than 2.0 mg/dL (0.64 mmol/L), we give oral phosphate therapy.
- The treatment of symptomatic patients varies with the severity of the hypophosphatemia. We treat with oral phosphate if the serum phosphate is 1.0 to 1.9 mg/dL (0.32 to 0.63 mmol/L). We treat with intravenous phosphate if the serum phosphate is less than 1.0 mg/dL (0.32 mmol/L) and switch to oral replacement when the serum phosphate exceeds 1.5 mg/dL (0.48 mmol/L).
- We stop phosphate repletion when the serum phosphate is greater than or equal to 2.0 mg/dL (0.64 mmol/L) unless there is an indication for chronic therapy such as persistent urinary phosphate wasting.
- Treatment
  - Oral dosing
    - Phos  $\geq 0.48$ : 1mmol/kg elemental phos. (40-80 mmol). Given in 3-4 divided doses
    - $< 0.48$ : 1.3-1.4mmol/kg (max 100mmol). In 3-4 divided doses
    - Phosphate 500mg 1-2 times daily po.
  - Iv dosing
    - Phos  $> 0.40$ : 0.08-0.24 mmol/kg over 6 hours (max 30mmol)
    - Phos  $< 0.40$ : 0.25 - 0.50 mmol/kg over 8-12 hours (max 80 mmol)

- 

## .Polydipsia.Polyuria

- Causes

- primary polydipsia, central diabetes insipidus, nephrogenic DI, glucosuria from uncontrolled DM.

- Evaluation

- test for hyperglycemia. HbA1c, fasting glucose
- plasma electrolytes, glucose, creatinine, BUN
- confirm polyuria:
  - 24h urine. polyuria defined as 3L in 24h
    - measure urine osmolality, Cr, Na, K, Cl, urea, glucose in the 24h urine specimen
- urine osmolality: to differentiate water diuresis with solute diuresis
  - urine osm <300: water diuresis (central DI, nephrogenic DI, primary polydipsia)
  - urine osm between 300-600:
    - if total daily osmolar output >1000 mosmol: then solute diuresis, else water diuresis
      - calculate this as: urine osmolality x 24h urine volume
  - urine osm >600: solute diuresis (e.g. urea, sodium, glucose, mannitol)
- determining cause of water diuresis: differentiate primary polydipsia from DI
- ask patient to water restrict to achieve plasma sodium > 145.
  - protocol in adults/adolescents:
    - if suspect nephrogenic DI (bilateral urinary tract obstruction, hypercalcemia, family history)
      - probably refer to internal medicine
      - perform following test: give desmopressin 10mcg nasally and measure urine osmolality q30minutes for next 2h.
        - If rise in urine osmolality of <45% to value <300 mosmol/kg. Then nephrogenic DI
        - else perform water restriction
    - if don't suspect nephrogenic DI: perform water restriction protocol.
      - If baseline urine osmolality is >100mosmol/kg. Overnight fluid restriction and measure plasma sodium, osmolality and urine osmolality in morning
      - if baseline urine osmolality is <100 mosmol/kg. 2-3h of fluid restriction and measure plasma sodium, osmolality and urine osmolality
      - if urine osmolality >700 mosmol/kg. Then primary polydipsia.
      - Else consider referral to internal medicine

- 

## .ENT

### .saliva stone

- Risk factors – Dehydration, diuretics, anticholinergic medications, and trauma predispose to the formation of stones.
- Clinical presentation
  - 80-90 percent of stones arise from the submandibular glands (figure 1), most often occurring as single stones within Wharton's duct. (See 'Location' above.)
  - Sialolithiasis typically presents with pain and swelling with eating or anticipation of eating. Painless swelling or pain without swelling are less common. Symptoms may be episodic with intermittent obstruction. (See 'Symptoms' above.)
- Examination
  - Palpate and inspect floor of mouth and Wharton's duct, buccal mucosa and Stenson's duct
- Diagnosis
  - clinical diagnosis based on the characteristic history of swelling and pain associated with eating or anticipation of eating and a small rock hard mass palpable in the salivary gland or duct or visible at the os
- DDx
  - infection (viral or bacterial sialadenitis, human immunodeficiency virus [HIV]), Sjögren's syndrome, sarcoidosis, and malnutrition
- Management

- Conservative management is the mainstay of treatment in primary care;
  - keep well hydrated
  - apply moist heat to the involved area
  - massage the gland, "milk" the duct, and suck on tart, hard candies to promote salivary flow.
  - Pain management: NSAIDs. Occasionally opioids.
  - Anticholinergic medications should be discontinued when possible. Patients with severe or persistent symptoms should be referred for specialist management.
- Suspected secondary infection should be treated with an antistaphylococcal antibiotic (dicloxacillin 500 mg four times a day or cephalexin 500 mg four times a day for 7 to 10 days). Infection that worsens or fails to improve requires urgent referral.
- Most salivary gland stones that do not improve with conservative management can be treated by the otolaryngologist using minimally invasive techniques, particularly sialoendoscopy. Larger or more proximally located stones may require open surgical procedures. Sialadenectomy is reserved for patients with recurrent stones or failed minimally invasive procedures.

## • .smell.olfactory and taste disorder.taste

- Conditions that affect smell
  - nasal/paranasal disease: Rhinosinusitis, nasal polyps, allergic rhinitis, olfactory neuroblastoma
  - Postinfectious (postviral)
  - Posttraumatic (facial or head injury)
  - Central nervous system disorders (nontraumatic):
    - Alzheimer disease, Parkinson disease, dementia with Lewy bodies, pure autonomic failure, multiple systems atrophy, stroke, Kallman syndrome, idiopathic intracranial hypertension (pseudotumor cerebri), multiple sclerosis, malignancy, meningioma
  - Normal aging
  - Environmental and chemical exposures:
    - Methyl acrylate vapors, ammonia, benzene, cadmium dust, chromate, formaldehyde, hydrogen sulfide, nickel dust, solvents, sulfuric acid, ozone, lead, manganese, tobacco, cocaine
  - Endocrine disorders:
    - Hypothyroidism, diabetes mellitus
- Conditions that affect taste
  - Infections in the oropharynx:
    - Gingivitis, oropharyngeal candidiasis (thrush), dental caries
  - Inflammation in the oropharynx:
    - Sjögren's syndrome, effects of radiation (external beam, radioactive iodine), atrophic glossitis, laryngopharyngeal reflux
  - Normal aging
  - Nerve damage:
    - Bell's palsy, trauma, surgery, radiation
  - Vitamin and mineral deficiencies:
    - B12 deficiency, zinc deficiency
  - Metabolic and endocrine disorders:
    - End-stage kidney disease (ESKD), hypothyroidism, diabetes mellitus
  - Neurologic disorders:
    - Alzheimer disease, Parkinson disease, Guillain-Barré syndrome, multiple sclerosis
  - Environmental and chemical exposures:
    - Tobacco use (smoked and chewed), chemicals (eg, organophosphates, methyl acrylate), metals and metalloids (eg, mercury, copper, zinc, chromium, arsenic, lead)
  - Other:
    - Burning mouth syndrome

- Management
  - Nasal and paranasal sinus diseases are the most common causes of olfactory abnormalities
    - intranasal glucocorticoids can be helpful. Can be given as spray or steroid irrigation
  - postviral
    - olfactory training. preassembled “smell training kits” may be purchased, or vials of essential oils can be used for this purpose.
- 

## .chronic otitis media

- Recurrent infection of the middle ear and/or mastoid air cell tract in the presence of a tympanic membrane perforation.
- occurs as a result of Eustachian tube dysfunction with negative middle ear pressure causing rupture of the tympanic membrane.
- Clinical presentation
  - persistent purulent drainage through a perforated tympanic membrane.
  - Often painless. Often without fever or other systemic signs of infection
- Diagnosis
  - most otolaryngologists consider the diagnosis of chronic suppurative otitis media (CSOM) when discharge persists through a tympanic membrane perforation for six weeks to three months.
- Management
  - topical quinolone antibiotic recommended as first line. e.g. ciprodex
  - systemic antibiotics are indicated for patients with complications of CSOM if:
    - fail to respond to topical therapy after two to three weeks,
    - previously treated with several courses of empiric topical therapy and are at risk for resistant organisms.

## .cholesteatoma

- keratinized, desquamated epithelial collection in the middle ear or mastoid and may occur secondary to tympanic membrane perforation but also may occur as a primary lesion
  - primary acquired: most commonly as a result of Eustachian tube dysfunction.
  - Secondary acquired: Tympanic membrane perforation may lead to a secondary acquired cholesteatoma in a small percentage of cases.
- Cholesteatomas may result in erosion of the ossicles in the middle ear and consequent hearing loss. In rare cases, they can erode directly into the inner ear.
- Clinical Presentation
  - new onset hearing loss
  - persistent otorrhea for more than 2 weeks despite treatment
  - history of recurrent acute otitis media/chronic middle ear effusions
  - otoscopic findings
    - white mass behind an intact TM
    - deep retraction pocket
    - focal granulation on the surface of the TM especially at the periphery
    - primary: posterosuperior quadrant most common location. retracted area of the tympanic membrane that contains squamous debris or inflammatory tissue
    - secondary: white pearly mass behind tympanic membrane. tympanic membrane may be completely intact (after a perforation has healed).
- DDx
  - myringosclerosis. Scarring of TM. typically crescent-shaped,
  - white foreign body
  - inclusion cyst of TM
  - Exostoses (outgrowths of bone into the external ear canal)
  - Prosthetic and graft material in operated ears



- bulging acute otitis media may be hard to differentiate from a large congenital cholesteatoma
- management
  - refer to ENT to confirm diagnosis.
  - Managed with surgery

## .globus sensation

- Presentation
  - sense of a lump or retained food bolus or tightness in throat
  - not painful. Worse with swallowing saliva than solids/liquids
  - in 70% of patients, symptoms are intermittent
- Causes
  - upper esophageal sphincter dysfunction, psychological (anxiety, depression), GERD
- red flags
  - dysphagia, odynophagia, throat pain, weight loss, hoarseness, and lateralization of pathology
- diagnosis
  - no structural lesion seen on physical exam, laryngoscopy or endoscopy
  - no dysphagia or odynophagia
  - no GERD or eosinophilic esophagitis that cause symptoms
  - no major esophageal motor disorders
- referral and investigations.
  - Routine nasolaryngoscopy is controversial
  - initial
    - nasoendoscopy. Refer to ENT
  - next steps
    - barium swallow
    - esophageal manometry
    - upper endoscopy. Refer to GI.
- management
  - initial management
    - reassurance
    - acid suppression with PPI
  - if not improving with PPI or red flags, consider referral to ENT/GI
  - subsequent management
    - TCA. e.g. amitriptyline
    - gabapentin
- 

## .Acute Otitis media.Otitis media.AOM

- see Ear pain
- DDx:
  - otitis media with effusion, otitis externa, mastoiditis
  - TMJ, sinusitis, parotitis
- risk factors
  - second hand smoke, bottle feeding, crowded living conditions, daycare, feeding in supine position
- S:
  - acute onset, irritability, ear pain
  - ear discharge, hearing changes
  - teeth pain, sore throat
- O:

- bulging TM, discolouration of TM
- CN 7 intact; check mastoid for redness, swelling, pain
- Management
  - watch and wait: observe for 48-72h. 80% resolve on own. give parents rx so they can treat if no improvement
  - indications to start antibiotics regardless
    - very unwell/severe disease, ear pain for more than 48h, temp  $\geq 39^{\circ}\text{C}$  in past 48h, bilateral AOM or otorrhea, uncertain access to follow-up
    - high risk patient: immunodeficiency, craniofacial abnormality
    - recommended if age <6 month. suggested in age <2 y
- Antibiotics
  - first line: Amoxicillin
    - children: Amoxil 50mg/kg/day divided 3 times daily
      - 5 days course if uncomplicated, age >2 yo
      - or 10 day course if: age < 2yo, perforated TM, multiple recurrent OM, failure of initial treatment
  - allergy to penicillins: Cefprozil, Cefuroxime, Azithromycin or clarithromycin, TMP-SMX
  - treatment failure with first line: amox-clav
    - children: Amox-clav 7:1 at 50mg/kg/day divided 3 times daily x10 days
  - perforation of TM: amoxicillin
- refer to ENT if:
  - recurrent AOM, OME that is persistent (3 months),
  - hearing loss, speech delay,
  - perforation that is not healing, anatomical variants and difficulty with diagnosis.
- patient with ear tubes, he is well, but has pus flowing out of ear
  - swab the fluid. if comes back with pseudomonas, need to warn about mastoiditis. so, tell patient to keep an eye out on CN 7.
  - guidelines: treat with Amoxil, due to perforation of ear drum
  - another option: Cipradex  $\pm$  Amoxil

## .Otitis media with effusion. OME

- investigations
  - hearing test
- indication for tympanostomy tubes
  - OME-associated hearing loss.  $\geq 40\text{dB}$
  - children at risk for speech, language or learning problems
  - bilateral OME for  $\geq 3$  months, unilateral OME for  $\geq 6$  months, or recurrent episodes of OME with cumulative duration of OME for  $\geq$  of previous 12 months

## .Ear pain

- see Otitis Media
- DDx:
  - otitis media with effusion, otitis externa, mastoiditis
  - TMJ, teeth pain, neck referred to ear
- Management
  - TMJ: rest, heat, advil, night guard

## .Otitis externa

- DDx
  - contact dermatitis, psoriasis
  - mastoiditis
  - otitis media

- cause/prevention
  - dry ear canals after swimming. hair dryer on lowest setting after swimming
    - excess moisture leads to skin maceration and breakdown of skin-crumen barrier, changing microflora of ear
  - avoid cotton swabs
    - abrasions in ear canal allows organisms to gain access to deeper tissue
- management
- clean ear canal: removal of cerumen, desquamated skin, and purulent material from the ear canal greatly facilitates healing and enhances penetration of topical ear drops into the site of inflammation
- pharmacotherapy
  - ear drops
    - Ciprodex 4 drops bid for 5-7 days
    - others
      - acetic acid 2% and hydrocortisone 1% (Acetasol HC)
      - may use eye drops and apply to ears.
  - add oral antibiotics if severe disease in immunocompromised/T2DM/advanced age/concomitant AOM
  - expect improvement in 2-3 days, full response by 6 days
  - Correct instillation of topical preparation
    - Sufficient medication to adequately fill the entire ear canal should be used, typically 4 to 6 drops for an adult ear canal. Patients should lie on their (opposite) side for three to five minutes following instillation or place a cotton ball in the ear canal for 20 minutes following instillation
- ear hygiene
  - protect ear from water during treatment for external otitis
  - avoid hearing aids or ear buds until pain and discharge resolved
- prevention
  - if a swimmer: consider ear plugs. Shake ear dry after swimming. Or blow dry ear after water exposure.

### .otomycosis.fungal ear infection

- Clinical presentation
  - Patients with otomycosis most commonly report ear itching, discomfort, discharge, and/or a feeling that something is in the ear canal
  - Deep-seated itching is the most troublesome symptom; pain is less intense than with bacterial external otitis.
  - Edema of the ear canal is less severe than with bacterial external otitis. Fungal organisms have a very characteristic appearance in the ear canal, especially under magnified vision. Fine fungal filaments and spores may be seen that resemble mold growing on spoiled food. A. niger spores look like a fine coal dust sprinkled in the ear canal.
- Cleaning ear of debris
- pharmacotherapy
  - clotrimazole 1% solution bid for 10-14 days.
  - Locacorten vioform
  -

### .Hearing loss - acute

- Ddx: ear wax, otitis media, eustachian tube dysfunction
- If sudden onset unilateral hearing loss, and other obvious causes, such as no infection, no sinusitis, no ear wax
  - Send for audiology.
  - see notes on Sensorineural hearing loss
- Sensorineural vs conductive hearing loss
  - weber: tuning fork on forehead
    - normal: same both sides
    - unilateral conductive loss: sound lateralizes toward affected ear
    - unilateral sensorineural loss: sound lateralizes toward normal ear
  - Rinne: tuning fork on bone vs air conduction

- air conduction > bone conduction: normal
- bone conduction > air conduction: conductive loss

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### .Sensorineural hearing loss - sudden

- management
  - if within 2 weeks of symptoms onset
    - start prednisone 60mg x10 days. OR 50mg x7-14 days
    - if not candidate for systemic steroids, ENT can do intratympanic dexamethasone injections.
  - if within 48h of symptom onset:
    - may offer antivirals. low evidence but risks of harm are low.
    - valacyclovir 1g tid x7-10 days
  - refer to ENT
- investigations
  - consider MRI to evaluate for retrocochlear pathology

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### .Presbycusis

- age related hearing loss
- presentation
  - progressive, symmetric loss of high frequency hearing over many years. sensorineural loss
    - difficulty hearing consonant sounds
  - tinnitus
  - vertigo, disequilibrium falls
- risk factors
  - white race, genetics
  - low SES
  - noise exposures
  - ototoxins: aminoglycosides, chemotherapeutic agents, heavy metals
  - infections
  - smoking, hypertension, diabetes
- investigation
  - Audiogram
    - normal is hearing threshold below 25 dB
    - human speech mainly between 500-4000 Hz. at around 50 dB
- management
  - hearing aids: consider when high frequency thresholds >40dB on audiogram
  - if severe: cochlear implant
- effects
  - increased falls risk
  - social isolation
  - mood disorder, cognitive decline

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### .Audiogram

- Audiogram
  - normal is hearing threshold below 25 dB. for frequencies between 250 Hz and 8000 Hz
  - human speech mainly between 500-4000 Hz. at around 50 dB

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### .tinnitus

- DDx

- nonpulsatile
  - unilateral hearing loss
    - neurologic signs: brainstem infarction, MS, cerebellopontine angle tumor
    - no neurologic signs: chronic noise exposure, meniere disease, semicircular canal dehiscence
    - abnormal otoscopy: cerumen impaction, chronic otitis media, tympanic membrane perforation, cholesteatoma
  - bilateral hearing loss with normal otoscopy findings: presbycusis, chronic noise exposure, head trauma, ototoxic medication
  - other: fibromyalgia, meningitis, Lyme disease, neurosyphilis
- pulsatile
  - pulse asynchronous: mechanical: middle ear muscle myoclonus, palatal muscle contraction, eustachian tube contraction
  - pulse synchronous: vascular: arteriovenous malformation, vascular tumor
- red flags for referral to specialist
  - pulsatile or unilateral tinnitus, abnormal findings on otoscopy
- investigation
  - audiologic testing
  - lab testing typically not indicated
  - if pulsatile tinnitus: MRI of brain and neck to rule out vascular abnormalities
- management
  - lifestyle modification: improve sleep, reduce stress, reduce caffeine and alcohol
  - sound amplification with hearing aids
  - tinnitus maskers: white noise generators
  - pharmacologic
    - melatonin
  - rehabilitation therapy
    - tinnitus retraining therapy
    - CBT
    -
- 

## .Pharyngitis.strep throat

- DDx
  - strep pharyngitis, EBV mono
  - viral, non-GAS bacterial pharyngitis, viral URTI
  - Lemierre's (septic thrombophlebitis of internal jugular vein), peritonsillar abscess
- S:
  - centor: age 3-14, fever, tonsillar exudate/swelling, swollen lymph nodes, no cough.
  - cough, runny nose, sneezing
  - severe: muffled voice, drooling, SOB, fever, stiff neck
- O:
  - lymph nodes
- empiric treatment
  - empiric treatment not recommended. Short delays in therapy (awaiting culture results) not associated with increased rates of complications such as rheumatic fever.
- management
  - [https://www.uptodate.com/contents/image?imageKey=ID%2F116711&topicKey=PC%2F6867&search=acute%20pharyngitis&rank=1~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=ID%2F116711&topicKey=PC%2F6867&search=acute%20pharyngitis&rank=1~150&source=see_link)
  - if strong suspicion for viral URTI (e.g. cough, coryza, conjunctivitis, rhinorrhea, viral exanthem, oral ulcers)
    - supportive care
  - if suspicion for GAS, high CENTOR score
    - do rapid strep
  - if rapid strep is positive, or positive throat swab culture
    - treat as strep:

- Penicillin V 500mg bid-tid x10 days
- Amoxicillin 500mg bid x10 days
- if test negative for strep or presumed viral pharyngitis, and do not improve in 7 days, consider other diagnoses
- Further workup
  - get labs: CBC, ALT, monospot, atypical lymphocyte count, throat swab
  - if high CENTOR but neg rapid strep: consider starting azithro, clarithro while waiting for results (no penicillin due to it causing a rash if it was mono)
  - if atypical bacterial: results show neg monospot, elevated WBC, neg throat swab
    - continue antibiotic
  - if EBV: results show pos monospot, normal WBC, elevated LFT
    - stop antibiotic
    - symptomatic treatment
    - no contact sports x6 weeks
- Symptom relief:
  - Systemic oral analgesics suggested. e.g. NSAIDs, acetaminophen
    - limited role for glucocorticoids
  - topical therapies are a reasonable alternative as well.
    - Tantum 15mL q3h prn.
      - Benzydamine 0.15% mouthwash.
      - Gargle or rinse with 15 mL in mouth (for 30 seconds, followed by expulsion from mouth) q1.5-3hr. do not swallow.
    - Warm fluids with tea/honey
    - lozenges

## • .Pharyngitis - other info

- rapid testing
  - two types of rapid testing
    - rapid antigen testing
    - nucleic acid detection
  - helps with ruling in disease if result is positive, due to high specificity
  - limitations
    - cannot distinguish between active infection and carrier status
    - does not indicate antibiotic susceptibility or strain virulence
- benefits of antibiotics in group A strep
  - reduced sore throat at day 3, reduces duration of illness
  - decreased instance of peritonsillar abscess, quinsy, otitis media, sinusitis
  - decreased incidence of rheumatic fever
- complications of strep pharyngitis
  - treatment of strep with antibiotics is important for reducing complications
  - nonsuppurative
    - acute rheumatic fever: see notes on Rheumatic fever
    - post-streptococcal reactive arthritis
    - scarlet fever: diffuse erythematous eruption that blanches with pressure. numerous small (1-2mm) papular elevations. sandpaper quality. strawberry tongue. can predispose to acute rheumatic fever.
    - acute glomerulonephritis
    - PANDAS syndrome: pediatric autoimmune neuropsychiatric disorder associated with group A streptococci. describes OCD or tic disorders that worsen with group A strep infection
  - suppurative complications
    - Tonsillopharyngeal cellulitis or abscess
    - Otitis media
    - Sinusitis
    - Necrotizing fasciitis

- Jugular vein septic thrombophlebitis: Lemierre syndrome
- antibiotics and preventing complications
  - antibiotics prevent the suppurative complications
  - it also prevents acute rheumatic fever
  - uncertain
    - possibly prevents glomerulonephritis

- 
- 

### .rheumatic fever

- sequelae of group A strep pharyngitis 2-4 weeks following infection
- five major manifestations
  - arthritis: affects several joints in quick succession. appears to "migrate" from joint to joint
  - carditis: pancarditis. valvulitis most common clinical presentation
  - sydenham chorea: neurologic disorder with abrupt, non-rhythmic involuntary movements; muscular weakness; emotional disturbances
  - erythema marginatum: pink, nonpruritic rash in trunk and sometimes limbs, but not the face. lesion extends centrifugally.
  - subcutaneous nodules: firm, painless lesions ranging from a few millimeters to 2cm in size. usually located over bony surface or prominence or near tendons. usually symmetric
- late sequelae
  - most common sequela is rheumatic heart disease. usually 10-20 years later.
- management
  - treat joint symptoms with NSAIDs
  - treat with antibiotics even if pharyngitis no longer present
    - Penicillin G benzathine IM.
  - treat carditis with conventional therapy for heart failure. get an echocardiogram
- prevention
  - prompt diagnosis and antibiotic treatment of GAS infection.
  - secondary prevention:
    - continuous antimicrobial prophylaxis
      - as patients who have had acute rheumatic fever are at high risk for recurrent attack of acute rheumatic fever with subsequent GAS pharyngitis. rheumatic heart disease becomes more severe with each recurrent episode
    - duration of antibiotic prophylaxis:
      - in carditis: continue until patient is age 21. usually approximately 10 years
    - route
      - long acting Pen G IM q21-28days

### .peritonsillar abscess

- Presentation
  - severe unilateral sore throat, fever, muffled voice (hot potato voice), drooling, trismus
- management
  - drainage
    - needle aspiration or incision and drainage, or tonsillectomy
  - antibiotics
    -

### .Lemierre syndrome

- Septic thrombophlebitis of the internal jugular vein
- rare disease. usually begins with oropharyngeal infection

- presentation
  - fever, rigors, exudative tonsillitis, sore throat, dysphagia, trismus, unilateral neck pain, and tenderness
  - tenderness, swelling, and/or induration over the neck, over the angle of the jaw, or along the sternocleidomastoid muscle
- complications
  - pulmonary: necrotic cavitary lesions due to septic pulmonary emboli
  - bacteremia
- suspect if:
  - young adults with recent pharyngitis who present with fever, a tender/swollen neck, and/or pulmonary manifestations such as septic emboli.
- Investigation
  - blood culture
  - throat culture
  - CT of neck and chest
- Antibiotic therapy
  - piperacillin-tazobactam, a carbapenem, or ceftriaxone plus metronidazole.
  - may also add MRSA coverage with vancomycin

## • Mononucleosis.EBV

- DDx: group A strep, CMV, HIV
  - strep infection usually not accompanied by significant fatigue or splenomegaly
- fever, pharyngitis, fatigue, lymphadenopathy. splenomegaly
- Investigations
  - CBC diff, monospot, ALT, atypical lymphocyte count, throat swab
    - ALT may be elevated and stay elevated for months
- note: 70-90% of patients with mono will develop a rash when put on amoxicillin.
- management
  - symptomatic treatment
  - no contact sports for 4-6 weeks
- prognosis
  - acute symptoms generally resolve in 1-2 weeks
  - fatigue and poor functional status can persist for months.

## • canker sores

- oracort 0.1% apply sparingly bid.
- magic mouth wash 15-20mL swish x30s qid.

## • Ear wax

- flushing only covered if:
  - 2 weeks of oil
  - possible infection
  - baseline hearing impairment
- if patient asymptomatic, recommend not removing cerumen
- if patient symptomatic: options include:
  - irrigation
    - direct stream upwards in the ear canal
    - oil drops before to make flushing easier
      - oil drops 15 minutes each ear twice daily for 4-5 days
  - mechanical removal
  - cerumenolytic agents



- may use carbamide peroxide. 5-10 drops bid for up to 4 days.
  - Keep drops in ear for several minutes by keeping head tilted and placing cotton in ear
  - avoid use for more than 4 days.
- recurrent cerumen impaction (> once per year)
  - cotton ball dipped in mineral oil and place in external canal for 10-20 minutes once per week to liquefy cerumen
  - advise to avoid using cotton swabs inside ear.
- Refer to ENT if:
  - history of chronic cerumen impaction
  - perforated tympanic membrane
  - hx of ear surgery
  - persisting ear symptoms after removal of cerumen

### .Hyperacusis

- consider audiology and ENT referral
  - hearing loss can cause hearing sensitivity.
- maybe watch and wait.
- 
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### .Itchy Throat.Throat Irritation

- DDx: GERD, asthma, allergies
- 
- 

### .NECK MASS:

- S: Onset, progression over time, size, location, mobility, pain, movement with swallowing; obstructive symptoms (dysphagia, shortness of breath); other masses; associated symptoms (constitutional, hematologic, GI, endocrine, pulmonary); ill contacts; tobacco/alcohol/IV drug use, sexual history.
- O: Vital signs; HEENT exam; exam of lymph nodes, spleen, and tonsils; heart, lung, and abdominal exams, including assessment for splenomegaly.
- DDX: TB, lymphoma, thyroid nodule, neck malignancy, infectious mononucleosis

### .Sinusitis

- S:
  - PODS: at least one of obstruction or purulence
    - P: facial pain, pressure or fullness
    - O: nasal obstruction
    - D: nasal purulence or discoloured postnasal discharge
    - S: hyposmia or anosmia
- P:
  - conservative measures for everyone
    - Saline irrigation, Tylenol
  - if mild symptoms
    - try nasal steroid
      - Nasonex 2 sprays each nostril twice daily
    - reassess in 3 days
  - if severe symptoms or flare of chronic sinusitis.
    - treat with abx
  - if stable, but symptoms but >7-10 days, then more likely bacterial:
    - antibiotics

- Amoxicillin 500mg tid x5-7 days
- TMP-SMX/macrolides
- 2<sup>nd</sup> line:
  - Amoxi-Clav, fluoroquinolone
- Saline irrigation, Tylenol
- Omnaris 2 puffs bid.
- ENT referral if: >4 weeks of symptoms or 4 episodes in 1 year.
- Exacerbations of chronic rhinosinusitis
  - treat if symptoms greater than 7-10 days

## .sinusitis - chronic

- Management
  - intranasal steroid rinse
    - Pulmicort (Budesonide) nasal rinse
      - <https://med.stanford.edu/content/dam/sm/ohns/documents/Sinus%20Center/Stanford-Pulmicort.pdf>
      - mix Budesonide 2mL (0.5mg) nebule with 240mL of distilled water with saline packet with NeilMed bottle or Netipot.
      - Put tip of bottle in nose and aim towards top of head. The fluid will circulate in and out of your sinus cavities, coming back out from either nostril or through your mouth.
      - Use half the bottle on each side.
      - Perform irrigations 2 times daily.

## .SORE THROAT:

- see Pharyngitis
- S: Duration, fever, other ENT symptoms (ear pain, nasal or sinus congestion), odynophagia, swollen glands, cough, chest pain, SOB, rash, allergies, sick contacts, HIV risk factors.
- O: Vital signs; ENT exam, including oral thrush, tonsillar exudate, and lymphadenopathy; lung, abdominal (focusing on splenomegaly), and skin exams.
- DDX: infectious mononucleosis, bacterial pharyngitis, hepatitis, acute HIV infection, peritonsillar abscess
- P:
  - Symptom relief: Tantum 15mL q3h prn.

## .Eustachian tube dysfunction

- steroid nasal spray. point outwards towards eye on same side
- can take up to 1 months to unblock eustachian tube.
  - should start seeing improvement after 1 week
  - if not better by 1 month, refer to ENT.

## .Ears full of wax

- Oil (mineral oil, olive oil, commercial cerumenolytics) multiple times per day. Leave oil in ear for 5-10 minutes. Don't put cotton in ears. 3-7 days.
- Then book appointment for ear flush.

## .Dry mouth

- See Sicca
- Prevent dryness: regular sips of water. Avoid oral irritants (e.g. coffee, alcohol, nicotine). Avoid acidic drinks (e.g. cola, tea, coffee) Avoid anticholinergic medications. Avoid mouth breathing, keep nasal passages open.
- Salivary stimulants: sugar free candy (e.g. xylitol), chewing gum,
- Basic dental hygiene:
- If inadequate response to above:
  - Artificial saliva

- Sialagogues: pilocarpine, cevimeline

- 

## .Dysgeusia

- weird taste in tongue.
- can happen in pregnancy.
- treat underlying cause. no good direct treatment.

- 

## .Parosmia

- phantom smells.
- common causes: head trauma, dry mouth, nasal congestion
  - treat dry mouth or nasal congestion
- if disabling, consider clonazepam.

- 

## .Geographic tongue

- symptoms: oral discomfort, burning and sensitivity to some foods
- no therapy is needed.
- may try acetaminophen, anesthetic mouth rinses, topical corticosteroids. avoid triggering foods.

- 

## .Foreign body ingestion

- may try soda to see if it passes on own
  - 80-90% of ingested foreign bodies pass without intervention
- rule out difficulty breathing, choking
- symptoms of esophageal foreign body impaction: choking, refusal to eat, wheezing, blood stained saliva
- all foreign bodies in esophagus require removal within 24 hours.

- 

## .Tonsil stones

- can use cepacol lozenge to numb the tonsil
- use finger to dislodge it. crush entire tonsil against side wall with finger.
- other methods
  - may use sour candies to stimulate saliva production
  - use water pick

- 

## .Laryngitis

- acute laryngitis resolves without specific treatment other than hydration, humidification and voice rest. antibiotics unnecessary

- 

## .Laryngopharyngeal reflux.LPR

- symptoms: throat clearing, cough, heartburn/dyspepsia, hoarseness
- diagnosis
  - empiric treatment vs testing
  - testing
    - laryngoscopy by ENT
    - pH impedance testing: catheter that measure reflux events over 24h
- treatment
  - lifestyle: see lifestyle modification for GERD
  - PPI
    - e.g.: Omeprazole 40mg daily, Pantoprazole 40mg daily
    - treat for 3-6 months
- follow-up after 3 months of PPI
  - if symptom free: taper the PPI and continue lifestyle modifications

- if mildly symptomatic
  - get laryngoscopy
  - continue PPI for another 2-3 months then reassess
- moderate/severe symptoms
  - laryngoscopy
  - increase PPI to twice daily. consider adding H2 blocker
- referral for surgery: e.g. fundoplication
  - severe, refractory LPR symptoms on PPI therapy and those who are unable to wean off PPI therapy are referred for consideration of interventional management.

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### .Hoarseness

- DDx: laryngeal irritants, benign vocal fold lesions, laryngeal cancer, neurologic dysfunction. laryngopharyngeal reflux
- definition: any change in voice quality. This reflects a variety of complaints including vocal tremor, weakness, fatigue, altered pitch, breathiness, or strained voice quality.
- Acute laryngitis,
  - associated with an upper respiratory infection or acute vocal strain, generally lasts less than three weeks. We recommend not treating patients with antibiotics for acute laryngitis
  - treat with voice rest, hydration
- referral
  - Hoarseness that lasts for more than two weeks, in the absence of symptoms of an acute upper respiratory infection, requires a complete otolaryngologic examination, particularly in patients with a history of tobacco or alcohol use

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### .Broken nose.Nose broken.Nasal fracture

- <https://www.uptodate.com/contents/initial-evaluation-and-management-of-facial-trauma-in-adults>
- No x-ray if all present: because imaging results would not affect initial treatment if criteria met.
  - Tenderness and swelling are isolated to the bony bridge of the nose
  - The patient can breathe through each naris
  - The nose is straight (ie, no deviation of the septum)
  - No septal hematoma is present (draining the hematoma can convert a closed into an open fracture, which would require antibiotic prophylaxis)
- Fractures of the thin bones of the nasal bridge are common. Patients with a contusion or tenderness over the bridge of the nose may be assumed to have a fracture of the nasal bones. Imaging is often unnecessary; indications for radiographs are described above.
- Initial treatment
  - ice and head elevation.
  - reduction
    - Ideally, displaced but otherwise uncomplicated nasal fractures evaluated within six hours of injury are reduced immediately
    - However, some otolaryngologists prefer to wait for three to seven days to allow swelling to resolve. Isolated nasal fractures older than 10 days are referred to an otolaryngologist for outpatient management.
- Referral
  - may refer to ENT as outpatient 3-5 days after injury if appearance unacceptable

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### .Epistaxis.Nose bleed

- most common site of bleeding: anterior inferior nasal septum (Little's area or Kiesselbach plexus)
- history
  - previous incidents
  - frequency
  - amount of bleeding
  - how long bleeding lasts
  - triggering events: blowing nose, nose picking, nasal spray

- indications for hospitalization
  - hemodynamically unstable.
  - uncontrolled bleed
  - suspected posterior source
  - unable to return for reassessment for removal of packing in 24-48h
- initial management
  - sit forward, mouth open
  - direct pressure. pinch alae for 15-20 min
- management in ER/hospital
  - Labs if unstable: CBC, INR, blood type, cross match, consider LFT/creatinine
  - vasoconstriction
    - Topical or soaked cotton vasoconstrictors x 5-10 mins (eg. lidocaine, phenylephrine, epinephrine, cocaine, oxymetazoline)
    - Consider Tranexamic acid through atomizer and 15 minutes of external compression
  - chemical cauterization. e.g. silver nitrate
    - Suction and dry prior
    - Silver nitrate until gray precipitate
    - Only cauterize one side of septum (if both sides cauterized - risk of perforation)
    - Electrocautery usually done by ENT after local anesthesia
  - Packing
    - anterior nasal packing: ribbon gauze, anterior epistaxis balloon, nasal tampon, or nasal sponge
    - posterior packing
      - Analgesia
      - Double balloon catheters or foley with 30mL balloon
      - Admission to monitor for hypoxia
    - Leave packing 1-3 days prior to removal, can consider prophylactic antistaphylococcal antibiotics to prevent Toxic Shock Syndrome
      - follow-up in ER or with ENT for removal
- prevention of rebleeding
  - avoid: blowing/picking nose. smoking/alcohol/cocaine
    - consider avoiding O2 nasal prongs, if used.
  - nose care:
    - petroleum jelly tid x10d for dryness
    - humidifier
    - direct nasal sprays away from septum

## • .Epistaxis.Nose bleed

- causes for nose bleeds
  - trauma, nose picking
  - dry environment
  - medication use: nasal sprays
  - bleeding disorders
  - AV malformation
  - foreign body
  - neoplasm
  -

## • .Gen surg.General Surgery

## .inguinal hernia.hernia - inguinalf

- Physical exam
  - patient standing
  - Observation of the groin will occasionally reveal an obvious bulge.
  - Place hand over bulge and ask patient to valsalva or cough.
    - When coughing, hernias produce a distinct, soft impulse that increases the protrusion. The sensation is distinct from the firmer impulse that is felt when the intact abdominal wall is tensed with coughing.

## .gynecomastia

- Diagnosis
  - as a palpable mass of tissue at least 2.0 cm in diameter (usually underlying the nipple)
  - typical features
    - the glandular tissue is centrally located, symmetrical in shape, usually bilateral, and tender to palpation (if early in its course). Although gynecomastia is usually bilateral, some patients present with unilateral or greater enlargement on one side than the other.
- DDx
  - breast cancer
    - Breast cancers are typically unilateral, nontender, and often fixed masses found eccentric to the nipple-areolar complex (outside of areola).
    - If suspect: do mammogram and U/S.

## .anorectal fistula.anal fistula

- Pathogenesis
  - majority of anorectal fistulas originate from an infected anal crypt gland.
  - In Crohn disease, anal fistulas are caused by penetrating inflammation rather than infection of a perianal gland,
- Clinical features
  - Patients with an anorectal fistula usually present with a "nonhealing" anorectal abscess following drainage or with chronic purulent drainage and a pustule-like lesion in the perianal or buttock area.
- Management
  - surgical management is mainstay of therapy. The goal of surgical therapy is to eradicate the fistula while preserving fecal continence.

## .perianal abscess

- Pathogenesis
  - typically originates from an infected anal crypt gland
  - There are 8 to 10 anal crypt glands arranged circumferentially within the anal canal at the level of the dentate line
  - when an anal crypt gland becomes obstructed with inspissated debris, which permits bacterial growth and abscess formation.
- Management
  - incision and drainage
    - incision: make incision as close to anal verge as possible to minimize the length of a potential fistula while still providing adequate drainage of the abscess.
    - The abscess cavity is irrigated with sterile saline and the wound is dressed; no wound packing is necessary.
    - After the procedure, the area is kept clean with frequent sitz baths or hand-held showers until it heals.
  - Wound packing: no proven benefit
  - antibiotics: suggest giving course of empiric antibiotics to all patients after incision and drainage of an anorectal abscess. May reduce rate of fistula formation
    - 4-5 days of amox-clav or cipro and flagyl.
  -
-

## .Breast pain

- DDx
  - breast cancer, trauma, pregnancy
- 

## .Appendicitis

- ddx: ovarian torsion
- get abdominal Ultrasound. CBC, Chem7
- 
- 

## .Pilonidal cyst

- if drainage/discharge, give antibiotics
- 

## .Buttock hematoma

- watch and wait for resolution
  - observe for 4 weeks. if causing significant pain, numbness, may refer to general surgery for consideration of drainage.
- 

## .Hematoma vs abscess?

- Could aspirate if not sure if full of pus or blood. Then put it in a skin swab and/or urine container to send for culture.
- 
- 
- 

## .Ganglion cyst

- DDx
  - Tenosynovial giant cell tumor, epidermoid cyst, lipoma, rheumatoid nodule
- Due to herniation of dense connective tissue. Contain mucinous, gelatinous fluid. Due to mucoid degeneration of periarticular structures
- Diagnosis
  - Ultrasound useful in diagnosis.
- Management
  - If asymptomatic: reassurance and observation. >50% of patients experience spontaneous resolution
  - If bothersome: aspiration of cyst. But more than half of ganglion cysts will recur after aspiration
    - 18 gauge needle.
    - If cyst recurs rapidly (e.g. within 2-4 weeks), second aspiration unlikely to be successful. If recurs after longer period of time (e.g. 1 year), another aspiration may be attempted.
    - No benefit with glucocorticoid injection
  - If fail conservative therapy: surgical excision.
- 
- 

## .Cholecystectomy.Cholecystitis

- post chole: bland diet and avoid fatty foods.
- if patient gets fatty diarrhea
  - treat with cholestyramine
- investigations for cholecystitis
  - WBC
  - bilirubin
  - ALP, ALT, AST
  - lipase
  - INR, PTT
-

## .Cholecystectomy.Cholecystitis - other info

- complications
  - choledocholithiasis
  - empyema
  - pancreatitis, hepatitis
  - ascending cholangitis, peritonitis, perforation of gallbladder, sepsis

- 
- 

## .Subcutaneous emphysema

- on its own not worrisome. don't treat this on its own.
- but it has a cause.
- if large pneumothorax, consider chest tube. if small pneumothorax, consider follow-up X-rays
- if rib fracture only: just pain control

- 

## .bariatric surgery

- bariatric surgery will likely affect medication/nutrient absorption

- 
- 

## .Geriatrics

### .Geriatric assessment

- functional status: BADLs, IADLs
- falls/imbalance
- cognition to r/o dementia
- mood disorders. e.g. depression or anxiety
- polypharmacy
- social and financial supports
- goals of care
- advanced care preferences
- geriatric giants
  - immobility
  - instability
  - incontinence
  - impaired cognition

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- 

### .Delirium.Confusion

- DDX:
  - infection,
  - medication induced
    - thyroid hormone, anticholinergics, anticonvulsants, antiparkinsonians, steroids, cimetidine, opioids, benzodiazepines
  - hypoglycemia, B12 deficiency, neurosyphilis, hypothyroidism
  - subdural hematoma, normal pressure hydrocephalus,
  - dementia (Alzheimer, vascular, Lewy body), Wernicke encephalopathy,
  - pain, sleep disturbance, constipation
- S:
  - characterize memory loss (forgetting conversations, names of family, misplacing objects), function (IADLs, ADLs)
  - Detailed time course of cognitive deficits (acute vs chronic/gradual onset);



- falls, medications (and recent medication changes);
- associated symptoms (constitutional, incontinence, ataxia, hypothyroid symptoms, depression); screen for delirium {waxing/waning level of alertness};
- history of stroke or other atherosclerotic vascular disease, syphilis, HIV risk factors, alcohol use, or vitamin B12 deficiency; family history of Alzheimer disease or other neurologic disorders.
- O: Vital signs; complete neurologic exam, including mini-mental status exam and gait; general physical exam, including ENT, heart, lungs, abdomen, and extremities.
  - if not responsive: Check GCS. Check strength in extremities. Check pupils, POC glucose. Reflexes.
- investigations
  - bloodwork: CBC, Electrolytes, Cr, HbA1c, TSH, B12, Ca, Mg, Phos, LFTs
  - HIV, VDRL
  - imaging: CT head or MRI head
    - MRI preferred
- refer to memory clinic
- management
  - avoid sedating medications
  - frequent reorientation
  - if agitated: risperidone 0.125mg prn
  - lap belt restraint prn with family consent

## • [Dementia.Memory loss](#)

- Lab Investigations
  - Hb r/o anemia
  - WBC r/o infection
  - TSH r/o hypo/hyperthyroidism
  - Ca r/o hypercalcemia
  - glucose r/o DKA
  - B12 r/o pernicious anemia
  - Cr r/o AKI
  - VDRL r/o syphilis
  - HIV r/o HIV infection
- neuroimaging
  - indications: Neuroimaging recommended in most situations.
    - onset of cognitive signs/symptoms within the past 2 years, regardless of the rate of progression;
    - unexpected and unexplained decline in cognition and/or functional status in a patient already known to have dementia;
    - recent and significant head trauma;
    - unexplained neurological manifestations (new onset severe headache, seizures, Babinski sign, etc.), at onset or during evolution (this also includes gait disturbances);
    - history of cancer,
    - intracranial bleed
  - MRI is preferred over CT head
- safety
  - driving, finances
- advance care planning, will
- cholinesterase inhibitors
  - get ECG first. avoid if bradycardia HR<60
  - other side effects
    - myalgias, insomnia, incontinence, nausea/vomiting, diarrhea, dizziness
- cognitive assessment tools
  - MMSE: normal  $\geq 24$

- MoCA: normal  $\geq 26$
- types of dementia
  - Alzheimers: progressive memory loss. older age (e.g. 80 yo)
  - frontotemporal dementia: progressive disinhibition and compulsive behaviors. younger age (e.g. 60yo)
  - parkinson's dementia: parkinsons symptoms (unilateral tremor, bradykinesia, rigidity, postural instability), hallucinations
  - Lewy body dementia: recurrent falls with deficits in attention, executive function, visuo-perceptual ability
  - vascular dementia: stepwise cognitive decline with focal neurological deficits
- risk factors
  - delirium is not a risk factor for dementia. but dementia is a risk factor for delirium
- dementia vs delirium
  - onset: delirium = acute. dementia = insidious
  - course: delirium = fluctuant. dementia = progressive
  - mental status: delirium = impaired. dementia = clear
  - cognitive deficits: both memory reduced
  - hallucination and delusions: delirium = yes. dementia = no (except some types of dementia)
  - psychomotor activity: delirium = increased. dementia = normal
  - daily cycle: delirium = yes. dementia = no (except BPSD. e.g. sundowning)
- Memory clinic spiel
  - We're on your side. We expect to see memory decline over time
  - Go over test result
  - Dx: mixed, Alzheimer's, vascular
  - Pause for questions
  - Lifestyle: exercise, brain exercise
    - Stop alcohol
    - Consider sleep study if OSA
    - Offer meds for depression if depressed
  - other
    - hearing aids
  - Investigations:
    - Bloodwork
    - ECG
    - Consider head imaging
  - Driving: need to report to MTO?
  - Offer meds such as Donepezil
- 
- 

## .BPSD

- P
  - Citalopram 20mg OR Trazadone
  - Trazodone 25mg qhs or Mirtazipine 30mg po qhs
  - Severe:
    - Olanzapine. Start at 2.5mg. Up to 5mg bid
    - Risperidone. Max 1mg per day
    - Quetiapine. 25mg qhs. Max 75mg per day.
  - PRN
    - Olanzapine 5mg po/IM prn q2h for agitation. Max 20mg per day.
    - Quetiapine 12.5mg po q4h prn for agitation.
- deprescribing antipsychotics in elderly
  - deprescribe antipsychotics after 3 month for BPSD, whether stabilized or didn't respond.
    - 25%–50% dose reduction every 1–2 wk

- reasons to continue
  - attempted deprescribing in the past without success
  - taking for psychosis
- conservative measures
  - distraction, redirection, structured routines
  - music therapy, aromatherapy
  - exercise training
  - behavioral therapy

- 
- 

### .Altered mental status.Lethargic - acute

- assessment
  - if not responsive: Check GCS. Check strength in extremities. Check pupils, POC glucose. Reflexes.
- investigations
  - glucose
  - CT head
  - blood, urine cultures
  - CBC, CHEM 7, lactate
  - AXR, CXR
- consult ICU

- 

### .intellectual disability.developmental disability

- other conditions that may present earlier or go under-recognized
  - more prevalent: dementia, infectious conditions
  - present earlier: menopause, diabetes
  - underrecognized: epilepsy, addictions, psychiatric conditions
- conditions to look for in middle aged patients with developmental delay
  - vision, hearing impairment
  - respiratory disease, obesity, osteoporosis
  - thyroid disorder, mental health disorders
  - dementia
- there is benefit for annual physical examinations for patients with developmental disability

- 
- 

## .GI.Gastrointestinal

### .pale stool

- A lack of bile in stool. This may indicate a bile duct obstruction.
- If pale stools in a neonate, consider biliary atresia
- May also be caused by certain medications, such as large doses of bismuth subsalicylate (Kaopectate, Pepto-Bismol) and other anti-diarrheal drugs.
- If one time pale stools, consider reassurance. Consider further investigations if unwell or recurrent.
- Investigations
  - CBC, LFTs
  - abdominal ultrasound

### .SIBO.small intestine bacterial overgrowth

- Small bowel colonized with excessive aerobic and anaerobic microbes
- presentation

- bloating, flatulence, abdominal discomfort, watery diarrhea,
- etiology
  - [https://www.uptodate.com/contents/image?imageKey=GAST%2F81285&topicKey=GAST%2F4778&search=abdominal%20bloating&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=GAST%2F81285&topicKey=GAST%2F4778&search=abdominal%20bloating&source=see_link)
  - anatomic: small intestine diverticulosis, surgically created blind loops, strictures
  - abnormal motility: diabetes, scleroderma, Crohn disease
  - abnormal communication: gastrocolic or jejunocolic fistula
  - other: immunodeficiency, chronic pancreatitis, cirrhosis, alcoholism, ESRD, TPN
- investigation
  - carbohydrate breath test
- management
  - Rifaximin 550mg tid for 14 days.
    - If methanogen overgrowth, add neomycin
  - treat underlying etiology

## .bloating

- Bloating is the sensation of abdominal fullness, pressure, sensation of trapped gas. Distension is a measurable increase in abdominal girth
- DDx
  - [https://www.uptodate.com/contents/image?imageKey=GAST%2F119202&topicKey=GAST%2F2607&search=abdominal%20bloating&rank=1~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=GAST%2F119202&topicKey=GAST%2F2607&search=abdominal%20bloating&rank=1~150&source=see_link)
  - dietary: lactose intolerance, FODMAPS, gas producing foods
  - malabsorption: celiac disease, pancreatic insufficiency
  - functional: IBS, dyspepsia, constipation
  - dysmotility: diabetes, gastroparesis, scleroderma,
  - medications: anticholinergic agents, opioids, CCB
  - intestinal obstruction: small bowel obstruction, gastric outlet, SMA syndrome
  - malignancy: GI, ovarian, ascites
  - infections: SIBO, giardia
  - physiologic: pregnancy, obesity/adiposity
- history
  - diet (e.g. wheat, dairy, fructose, fiber), constipation, diarrhea, abdominal pain
- investigations
  - CBC, anti-TTG
  - breath test for SIBO
  - if new bloating in middle aged women: pelvic ultrasound to rule out ovarian cancer
- management
  - similar to treatment to IBS. Low FODMAP diet
  - treat underlying cause if found

## .gastroparesis

- Definition: delayed gastric emptying in absence of mechanical obstruction
- clinical presentation
  - nausea, vomiting, abdominal pain, early satiety, postprandial fullness, bloating
- causes
  - idiopathic
  - DM: GI complications of diabetes typically occur in patients who have had the disorder for more than 5 years.
  - Medications: opioids, TCA, CCB, dopamine agonists, GLP1 agonists

- investigations, evaluation
  - exclude mechanical obstruction: refer for upper endoscopy. May consider CT enterography to exclude mechanical obstruction
  - assess gastric motility: scintigraphic gastric emptying
  - to assess etiology
    - CBC, TSH, albumin, ANA, HbA1c
    - next steps: gastroduodenal manometry
- initial management:
  - diet modification: small frequent meals
  - optimize glycemic control
  - pharmacologic:
    - Metoclopramide 5-10mg 2-3 times daily prior to meals. Maximum 40mg/day
    - then Domperidone
    - then Erythromycin
- management for refractory symptoms
  - venting gastrostomy tube

## • abdominal bloating

- buscopan

•

## • ABDOMINAL PAIN - chronic.abdo pain

- S: Location, quality, intensity, duration, radiation, timing (relation to meals or menstruation); associated symptoms (constitutional, GI, cardiac, pulmonary, renal, pelvic); exacerbating and alleviating factors; history of similar symptoms; history of abdominal surgeries, trauma, gallstones, renal stones, atherosclerotic vascular disease; medications (eg. NSAIDs, corticosteroids); alcohol and drug use; domestic violence, stress/anxiety, sexual history, pregnancy history.
- O: Vital signs; heart and lung exams; abdominal exam, including tenderness, guarding, rebound, Murphy sign, psoas and obturator signs, and CVA percussion; bowel sounds, aortic bruits; rectal exam; pelvic exam (women).
- DDX: renal stones, appendicitis, pancreatitis, cholecystitis, hepatitis, AAA, PUD, gastritis, mesenteric ischemia, pneumonia, splenic rupture, diverticulitis, PID, ovarian/testicular torsion, ectopic pregnancy, bowel obstruction, gastroenteritis, hernia, ileus, IBD endometriosis, dysmenorrhea, pyelonephritis, bowel perforation
- DDX
  - chronic
    - IBS, dysmenorrhea, PUD, gastritis
    - AAA, mesenteric artery occlusion, neoplasia, hepatitis, recurrent PID
    - adhesions, appendicitis, food intolerance, constipation, chronic pancreatitis, IBD, endometriosis, diverticulosis
  - children
    - colic, gastro, mesenteric adenitis
    - intussusception (6-9 months), appendicitis (5-15 y), obstruction
    - abuse, constipation, testicular torsion, ulcer, infection, mumps, pneumonia, UTI, gyne
    - psychogenic, diabetes, UTI
- Investigations
  - abdominal U/S, abdominal X-ray
  - stool studies.
  - h. Pylori testing
  - bloodwork
- Consider referral to GI if investigations normal
- 

## • ABDOMINAL PAIN - acute

- DDX
  - ectopic pregnancy, AAA, testicular torsion, PUD, IBD, appendicitis, cholecystitis, pyelonephritis, renal colic, diverticulitis, ischemic bowel

- remember to consider testicular torsion in young patients and to examine the testes

- history
  - female: vaginal discharge, LMP
  - hx of abdominal surgery
  - sexual history
  - fever, chills, nausea/vomiting
  - bowel, urinary symptoms
- Acute Red flags. consider sending to ER if red flags
  - Frequent vomiting, q 1 hour
  - poor oral intake
  - severe abdominal pain
  - pregnant
- investigations
  - bHCG, CBC, electrolytes, Cr, BUN, urinalysis, lactate, glucose, LFT
  - if indicated: lipase, blood cultures, Ca, ECG, troponin
  - Ultrasound, CT

## • .Abdominal pain - children

- ddx
  - common: colic, gastroenteritis, mesenteric adenitis
  - serious: intussusception (6-9 months), appendicitis (5-15y), obstruction
  - often missed: abuse, constipation, testicular torsion, intolerance, ulcer, infection, mumps, pneumonia, UTI, gyne
  - other: psychogenic, diabetes

## • .dyspepsia.upper abdominal pain

- Presentation
  - postprandial fullness, epigastric pain or burning, early satiety,
  - belching, nausea
- Alarm features
  - age > 50 with new symptoms, GI bleeding, progressive dysphagia, persistent vomiting, unintended weight loss, personal hx of PUD, family hx of upper GI cancer.
- Investigations
  - CBC, ferritin, Anti TTG, ALT, ALT, GGT, bilirubin, lipase, urea breath test
  - abdominal U/S
- management
  - lifestyle modification: try avoiding lactose and foods high in FODMAPs
  - try PPI for 4-8 weeks
  - may consider trying motility agents. Domperidone 5mg tid ac, up to 10mg po qid as 2-4 week trial

## • .Blood in stool.Hematochezia

- S:
  - blood in stool or on toilet paper
  - with or without bowel movement
  - melena
  - vomiting, abdominal pain
  - hx of IBD, hx of colon cancer
  - fever, chills, weight loss

- Management
  - Examine In person to rule out fissure vs hemorrhoids. But still refer for colonoscopy.
  - If more than 5 years ago, redo colonoscopy

## • .BLOOD IN STOOL:

- S: Melena versus bright red blood per rectum; amount, duration; associated symptoms (constitutional symptoms like fevers, weight loss, or night sweats; abdominal or rectal pain; tenesmus; constipation or diarrhea); menstrual cycle; trauma; history of similar symptoms; prior colonoscopy; medications (blood thinners, NSAIDs); history of easy bleeding or atherosclerotic vascular disease, renal disease, aortic valve disease, liver disease, alcoholism, or abdominal aortic aneurysm repair; family history of colon cancer.
- O: Vital signs (including orthostatics); abdominal and rectal exams.
- DDX: colorectal cancer, diverticulosis, hemorrhoids, anal fissure, angiodysplasia, IBD, ischemic bowel, proctitis

## • .Dehydration

- hydration status
  - Decreased urine output
  - Lethargy, irritability
  - Elevated pulse and respiratory rate, low blood pressure
  - Loss of skin elasticity
  - Fatigue, thirst, muscle cramps, postural dizziness
- severity of dehydration in children
  - mild: 3-5%
    - normal pulse, BP, respirations, eyes, skin turgor, urine output
  - moderate: 6-9%
    - rapid pulse, normal/low BP, deep respirations, dry buccal mucosa, eyes sunken, sunken fontanelle
  - severe:  $\geq 10\%$ 
    - rapid and weak pulse, low BP, tachypnea, parched buccal mucosa, markedly sunken eyes and fontanelle, anuria, grunting, lethargy, coma
- management
  - Two steps: emergent and secondary fluid repletion
  - Emergent fluid repletion for Severe Dehydration
    - 20 mL/kg of isotonic saline bolus over 5-10 minutes. Repeat up to three times.
    - Continue monitoring mental status, pulses, skin perfusion, urine output, blood pressure
  - Secondary fluid repletion
    - Mild to Moderate Dehydration
      - Oral rehydration therapy is preferred (e.g. WHO ORS, Pedialyte, etc.)
      - 50-100mL/kg over 4 hours in small amounts.  $<5\text{mL q1-2 minutes}$ .
    - Severe dehydration
      - Either IV or oral rehydration
  - Maintenance
    - If IV: 4mL/kg/h for first 10kg, 2mL/kg/h for next 10kg, 1mL/kg/h over 20kg.
    - E.g. 25kg patient:  $25\text{kg} = 10 + 10 + 5\text{kg} \rightarrow 10*4 + 10*2 + 5*1 = (40\text{mL} + 20\text{mL} + 5\text{mL})/\text{h}$
- Indications for continued intravenous therapy include:
  - Inability of the child to take ORT (eg, alteration in mental status, ileus, or anatomic anomaly)
  - Inability of the caretaker to provide ORT
  - Failure of ORT to provide adequate rehydration (eg, persistent vomiting)
  - Severe electrolyte problems in clinical setting where ORT cannot be closely monitored or electrolytes frequently assessed

## • .Diarrhea - acute

- definitions: loose or watery stools, usually at least 3 times per day.

- etiology
  - acute: infection, food poisoning, C. diff, medication
    - viral most common
  - chronic:
    - IBS, gastroenteritis,
    - colorectal cancer, IBS, diverticulosis, GI parasitic infection, IBD, constipation due to low fiber, hypothyroidism, celiac disease
  - note: consider fecal incontinence in differential diagnosis
- consequences: dehydration
- common pathogens
  - parasitosis: chronic diarrhea, recent travel to tropical country, perianal itching
  - e. coli
    - travelers diarrhea
    - > 16h after ingesting food
  - vibrio parahaemolyticus
    - after eating seafood
  - rotavirus
    - watery diarrhea in winter
  - c. difficile
    - recent antibiotics
  - staph aureus
    - <6h after ingesting food
  - C. perfringens
    - 8-16h after ingesting food
- S:
  - frequency, volume
  - blood, color
  - fever, night sweats, chills, weight loss
  - n/v
  - travel, sick contacts, food exposure
  - recent antibiotic use, hospital visit
- Onset, frequency, color, odor, and volume of stools; presence of mucus or flatulence; whether stools float in bowl; duration of change in bowel habits; associated symptoms (constitutional, abdominal pain, bloating, tenesmus, sense of incomplete evacuation, melena or hematochezia); context (after meals, association with particular foods); thyroid disease symptoms (eg. feeling hot/cold, palpitations, weight loss/gain); diet (especially fiber and fluid intake); medications (including recent antibiotics); sick contacts, travel, camping, HIV risk factors; history of abdominal surgeries, diabetes, pancreatitis; alcohol and drug use; family history of colon cancer.
- O: Vital signs; heart exam, lung exam, relevant thyroid/ endocrine exam; abdominal and rectal exams; ± female pelvic exam.
- Investigations
  - no investigations needed in acute diarrhea unless:
    - severe illness, inflammatory diarrhea, high risk patient (age >70, immunocompromised, IBD, pregnancy), symptoms >7 days
  - if you do decide to do investigations
    - stool culture, O&P, C. diff
    - get C. diff especially if antibiotic use or hospitalization within prior 3 months
- inflammatory vs Non-inflammatory
  - Non-inflammatory: Usually viral. Absence of fecal leukocytes. Generally milder disease. Large stool volume, watery stool. Common pathogens: ETEC, Bacillus cereus, Staph aureus, Rotavirus, Giardia
  - Inflammatory: Generally invasive or toxin producing bacteria. Presence of fecal leukocytes. Symptoms: fever, smaller stool volume, Bloody stool. Generally more severe disease. Common pathogens: Salmonella, Shigella, Campylobacter, C. difficile



- Management
  - Fluid repletion
    - Most important, keep patient hydrated whether IV or ORT. Oral route preferred if not severely dehydrated.
    - see notes on Dehydration
  - Diet
    - Encourage food intake.
    - Common recommendations, with poor data: boiled starches (e.g. rice), avoid dairy
  - Loperamide
    - Can be used for symptomatic therapy
    - Do not use if febrile, severe abdominal pain or bloody diarrhea. May prolong illness in inflammatory diarrhea. May use pepto-bismol instead.
    - 4 mg PO after first loose BM, 2 mg after each subsequent BM (16 mg max daily)
  - Antibiotic Treatment
    - Empiric antibiotic therapy can reduce the duration of diarrhea and other symptoms by several days, but the benefits of antibiotics do not outweigh potential draw+-backs in most patients with acute diarrhea.
    - Offer if:
      - severe disease: fever, >6 stools per day, volume depletion needing hospitalization
      - inflammatory diarrhea: bloody/mucoid stools
      - high risk patient: age >70, immunocompromised
    - Empiric treatment:
      - Ciprofloxacin 500 mg PO BID x 3 days OR
      - Azithromycin 1g OR 500mg daily x3 days
    - If parasite suspected – treat with Flagyl 250 - 750 mg PO TID x 5-10 days
    - Once stool culture and O+P come back, change therapy accordingly
    - Avoid empiric antibiotics if suspect EHEC (bloody diarrhea, eating rare ground beef), due to risk of HUS, until stool culture comes back.
      - However, for adults with highly symptomatic or severe bloody diarrhea, the benefits of antibiotic therapy may outweigh the low risk of potential complications from treating STEC.
- management 2
  - [https://journals.lww.com/ajg/\\_layouts/15/oaks.journals/ImageView.aspx?k=ajg:2016:05000:00014&i=F1-14&year=2016&issue=05000&article=00014](https://journals.lww.com/ajg/_layouts/15/oaks.journals/ImageView.aspx?k=ajg:2016:05000:00014&i=F1-14&year=2016&issue=05000&article=00014)
  - watery diarrhea
    - illness severity
      - mild: no change in activities
      - moderate: able to function but with forced change in activities
      - severe: total disability due to diarrhea
    - mild: hydration only. may use loperamide 4mg initially to control stooling
    - moderate/severe.
      - travel associated: antibiotic therapy
      - non-travel associated
        - no fever or fever <72h: consider <48h of loperamide therapy
        - fever > 72h: consider stool tests
  - dysenteric diarrhea
    - no fever: stool tests, then antibiotics directed to cause
    - fever
      - travel associated: empiric treatment 1g single dose
      - non travel associated: stool tests, then antibiotics
- return to work
  - wait at least 48 hours after last loose bowel movement if infectious cause is suspected.
  - Patient can remain infectious for 48 hours after cessation of symptoms
  - 
  -

## .chronic diarrhea.diarrhea - chronic

- Etiology
  - general categories
    - Secretory
    - Osmotic
    - Fatty
    - Inflammatory
  - malabsorption, IBD, IBS, infection, maldigestion, laxative, drugs, motility disorder, neuroendocrine tumor, colon cancer, HIV, recent cholecystectomy
- red flags
  - Weight Loss, Fevers/Chills, Hematochezia/Melena/Anemia, Severe abdominal pain, Nocturnal diarrhea/pain
- initial investigations
  - CBC, TSH, electrolytes, Cr, B12
  - CRP or fecal calprotectin
  - anti TTG antibodies and IgA for celiac
  - stool occult blood
  - stool culture, O&P, C. diff
- next investigations
  - colonoscopy
  - other investigations
    - upper Gi endoscopy
    - hydrogen breath test r/o lactose intolerance
- 

## .C. difficile.Clostridium.Clostridioides.Difficile

- Symptoms
  - Non-severe: Watery diarrhea, low grade fever, lower abdominal pain and cramping
  - Severe: WBC > 15, diarrhea, severe abdominal pain, fever, hypovolemia
  - Fulminant colitis: Hypotension, ileus, megacolon, pseudomembranous colitis
- When to send for investigations
  - Patients with antibiotic use or hospitalization within 3 months should be tested. IBD patients are also often tested.
  - Only liquid stool should be sent for testing. Tests cannot differentiate between infection and asymptomatic carriage.
  - Tests involve detection of the cytotoxin or detection of the C. difficile toxin gene.
- General Treatment
  - Do not treat symptom-free carriers
  - Stop the inciting antibiotic
  - Fluid repletion
  - Avoid antimotility agents such as loperamide
- Antibiotic therapy
  - Non-severe
    - Vancomycin po 125mg po qid for 10 days
    - Metronidazole 500mg po tid for 10 days
  - Severe
    - Vancomycin po 125mg po qid for 10 days
    - Fidaxomicin 200mg po bid for 10 days.
  - Fulminant
    - Vancomycin 500mg po qid AND Metronidazole 500mg iv q8h
- If fulminant colitis, consider surgical consultation
- Recurrent C. Diff
  - defined as within 2 months of discontinuing treatment
  - Recurrent non-fulminant
    - Pulsed-tapered Vancomycin:

- 125mg po qid for 10-14 days, then
- 125mg po bid for 7 days, then
- 125mg once daily for 7 days
- 125mg po q2-3 days for 2-8 weeks
- Fidaxomicin 200mg bid for 10 days
- Recurrent fulminant
  - Antibiotics as for initial fulminant episode (enteric vancomycin + parenteral metronidazole)
- If frequently recurring C. diff infection (>3 recurrences), consider fecal microbiota transplantation.
- Prevention
  - Minimize antibiotic use
  - Avoid gastric acid suppression
  - Probiotics not recommended for prevention
  - enteric bacteria precautions: handwashing, instrument/room cleaning
  - In patients with recent history of C. diff infection (in past 12 months) and require systemic antibiotic therapy, consider secondary prophylaxis with oral vancomycin (125mg po daily)
  -

## • [.C. difficile.Clostridium.Clostridioides.Difficile - other info](#)

- risk factors
  - antibiotics
    - fluoroquinolones: ciprofloxacin, levofloxacin, moxifloxacin, ofloxacin
    - clindamycin
    - broad spectrum penicillins: amoxicillin, ampicillin
    - cephalosporins: cefotaxime, ceftazidime
  - gastric acid suppression
  - advanced age

## • [.DYSPHAGIA:](#)

- S: Solids or liquids versus both solids and liquids, ± progression, occurring at the beginning or middle of swallow; constitutional symptoms (especially weight loss); hoarseness, drooling. regurgitation of liquids versus undigested food, odynophagia, GERD symptoms; medications; HIV risk factors; weakness, focal neurologic symptoms, cognitive decline; history of anxiety, smoking. Raynaud phenomenon.
- O: Vital signs; HEENT exam; heart, lung. and abdominal exams; skin exam (for signs of systemic sclerosis/CREST).
- DDX: esophageal cancer, achalasia, esophagitis, esophageal stricture, Plummer-Vinson syndrome, systemic sclerosis

## • [.Irritable Bowel Syndrome.IBS](#)

- DDx
  - diarrhea: celiac, microscopic colitis, SIBO, IBD
  - constipation: slow colonic transit, colon cancer
- S:
  - red flags: rectal bleeding, progressive abdo pain, weight loss, nocturnal symptoms, family history of IBD or colon ca, age > 50, , iron deficiency anemia,
  - ROME IV criteria:
    - recurrent abdominal pain >1d/week on average in last 3 months with 2/3 of:
      - related to defecation
      - associated with change in stool frequency
      - associated with change in stool form
  - relief with bowel movements, looser/more frequent stools, passage of mucus, sense of incomplete emptying
- Investigations
  - CBC, celiac serology

- if diarrhea: fecal calprotectin (or CRP); stool O&P; stool culture, TSH
- if constipation: abdo X-ray
- low FODMAP diet. avoid the following:
  - oligosaccharides: wheat, rye, legumes, garlic, onions
  - disaccharides: milk, yogurt, soft cheese
  - monosaccharides: mangos, honey
  - polyols: blackberries, lychee, low calorie sweeteners
- mild:
  - avoid gas-producing foods (eg, cabbage, legumes, onions, broccoli, brussel sprouts, wheat, and potatoes)
  - avoid FODMAP foods.
  - psyllium for constipation
  - exercise
  - try Beano over the counter
- moderate, severe:
  - constipation:
    - PEG.
    - 2<sup>nd</sup> line: lubiprostone
    - Linaclotide (Constella) 290mg once daily
  - abdo pain:
    - antispasmodics. pinaverium, Hyoscyamine 0.125 to 0.25mg 3-4 times daily
    - 2<sup>nd</sup> line: TCAs: Amitriptyline 10-25mg qhs
  - diarrhea:
    - antidiarrheal: Loperamide 2mg
    - 2<sup>nd</sup> line: bile acid sequestrants: cholestyramine
- Pharmacologic options:
  - SSRI, SNRI, TCA (good RCT evidence for efficacy – desipramine 50 to 150 mg hs has best evidence)
  - loperamide (2 mg qid), lomotil, cholestyramine 4 gm qid
  - high fibre diet, osmotic agents (lactulose)
  - 5-HT agonist – Alosetron 1 mg bid (women only with diarrhea -predominant IBS)
  - Zelnorm (Tegaserod 6 mg bid – restricted access constipation dominant disease)
  - Linaclotide – IBS-C superior to placebo NNT 6 – 290 ugm od
  - Lubiprostone - IBS-C superior to placebo with NNT 12.5
  - Rifaximin - IBS-D superior to placebo for bloating/pain
  - eluxadoline - IBS-D

## [.Nausea.Vomiting](#)

- DDX:
  - neuro: meningitis, head trauma
  - GI: bowel obstruction, gastritis, pancreatitis, appendicitis, cholecystitis
  - GU: UTI,
  - metabolic: diabetes, DKA, hypercalcemia,
  - other: pregnancy, infection,
- S:
  - Acuity of onset, time course of symptoms,
  - abdominal pain, relation to meals, sick contacts, food poisoning symptoms,
  - pregnancy symptoms; LMP
  - neurologic symptoms (headache, stiff neck, vertigo, focal numbness or weakness);
  - urinary symptoms; polyuria, polydipsia, dysuria
  - other associated GI symptoms (heartburn, reflux, diarrhea, constipation, melena, jaundice, abdominal distention, chest pain, rash, food intolerances);
  - constitutional symptoms (weight loss, night sweats, fevers);

- exacerbating and alleviating factors; medications; history of prior abdominal surgery; alcohol and drug use; history of anxiety, depression, and restrictive eating.
- O: Vital signs; complete abdominal exam; ENT; consider fundoscopic exam (increased intracranial pressure); consider heart and lung exam.
- Management
  - if no red flags, consider treating empirically
    - try PPI, Zofran

## .Lower GI Bleed.LGIB.GI bleed - lower

- causes
  - diverticulosis, IBD, hemorrhoids, ischemic colitis, tumour, angiodysplasia
- investigations
  - colonoscopy: should be initial procedure for acute LGIB. should be ideally done within 24h of presentation
  - may consider CTA or radionuclide scintigraphy if active bleeding and low rates.

## .Upper GI Bleeding.UGIB.GI bleed - upper

- S: Amount, duration, context (after severe vomiting, alcohol ingestion, nosebleed); associated symptoms (constitutional symptoms such as fevers, weight loss, or night sweats; nausea; abdominal pain; dyspepsia); medications (especially blood thinners such as warfarin or factor Xa inhibitors, NSAIDs, and corticosteroids); history of peptic ulcer disease, liver disease, abdominal aortic aneurysm repair, easy bleeding.
- O: Vital signs, including orthostatics; ENT, heart, lung, abdominal, and rectal exams.
- DDX: peptic ulcer, gastritis, esophageal varices, Mallory-Weiss tear
- false melena
  - Swallowed blood (e.g. nose bleed)
  - Black licorice, blueberries
  - Bismuth (Pepto-Bismol), iron supplementation
  - Activated charcoal
- Investigations
  - CBC, INR, PTT
  - type cross and match
  - Electrolytes, Cr, BUN
    - elevated BUN:Cr means upper GI source more likely
  - LFTs
  - Cardiac investigations: consider in patients at risk for MI
- acute management
  - NPO
  - 2 large bore IV
  - supplemental oxygen
  - if on warfarin, give Vit K
  - if hypotensive: 500-1000mL bolus of fluids
  - medications
    - Pantoprazole 80mg iv x1. then 8mg/h drip x72 hours
    - Ceftriaxone 1g iv x7 days
    - Octreotide 50mcg iv bolus. then 50mcg/h drip
  - transfusion:
    - maintain Hb > 80
    - if unstable or severe ongoing bleeding, may require transfusion despite apparently normal Hb
    - if unstable CAD, maintain Hb > 90. if signs of ischemia, maintain Hb > 100
    - avoid over-transfusion in patients with suspected variceal bleeding as transfusion can precipitate worsening of bleeding. Maintain Hb > 70

- transfuse if platelets below 50
- consult GI for endoscopy

## .hematochezia.Bright red blood per rectum - minimal.BRBPR - minimal

- Etiologies
  - hemorrhoids, anal fissures, polyps, proctitis, rectal ulcers, colorectal cancer
- evaluation
  - red flags
    - should get scope regardless of age if:
      - melena, dark blood per rectum, postural vital sign abnormalities. Consider upper GI pathology
      - symptoms suggestive of malignancy: constitutional symptoms, anemia, change in frequency, caliber or consistency of stools
      - family history of familial polyposis, hereditary nonpolyposis colon cancer
  - age > 50
    - colonoscopy is test of first choice, regardless of if there are other anorectal pathology on clinical exam (e.g. hemorrhoids, fissures)
    - if normal colonoscopy within previous 2 years, then unlikely that a new clinically important neoplasm has developed. May consider sigmoidoscopy
  - age 40 to 49
    - if not at increased risk for colorectal cancer. Should get at least a sigmoidoscopy
  - age < 40
    - low risk for colorectal cancer.
    - Further evaluation not necessary if presentation and history do not suggest increased risk of cancer and potential source of bleeding identified (e.g. hemorrhoids, anal fissure)
    - if no potential source of bleeding identified, should refer for sigmoidoscopy or colonoscopy
  - persistent or recurrent bleeding
    - should undergo colonoscopy at least once and be periodically reassessed for any change in symptoms or development of red flags.

## .Hemorrhoids

- DDX for anal mass
  - colorectal cancer, polyp
  - skin tag, anal wart
  - rectal prolapse
- DDx: anal fissure, colon cancer
- hemorrhoids are normal vascular structures in the anal canal. when the veins or blood vessels in and around the anus and lower rectum become swollen and irritated.
- clinical presentation
  - most individuals are asymptomatic.
  - hemorrhoidal bleeding usually painless and associated with bowel movement
  - irritation or itching of perianal skin is common.
  - Perianal pain or palpable perianal lump from thrombosis
  - physical exam
    - inspect anal verge for external hemorrhoids, skin tags, fissures
    - DRE to palpate for masses, fluctuance, tenderness, anal sphincter tone.
    - Internal hemorrhoids are not visible on inspection unless prolapsed. Also, are generally not palpable on DRE.
- Conservative management
  - [https://www.uptodate.com/contents/image?imageKey=SURG%2F103146&topicKey=SURG%2F1382&search=hemorrhoid%20treatment&rank=1~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=SURG%2F103146&topicKey=SURG%2F1382&search=hemorrhoid%20treatment&rank=1~150&source=see_link)
  - topical analgesics
    - Anusol-HC 2.5% apply to hemorrhoids bid. max 7 days
    - Proctosedyl (cinchocaine and hydrocortisone) suppository 5mg 1 supp PR bid for 2 weeks

- Proctofoam-HC apply to affected area 3-4 times daily
- treat constipation
  - increase fiber intake. psyllium husk
  - increase fluid intake
- sitz baths
- other measures
- Thrombosed external hemorrhoid
  - incision
    - Generally, excision of entire hemorrhoid is preferred as simple incision is associated with high rate of recurrence. But incision is an option for non-surgeons.
    - may make incision to evacuate the thrombus for immediate pain relief.
    - Clot evacuation less likely to be beneficial if >48h following onset of pain.
- Prevention
  - prevention of constipation. Don't strain with bowel movements. Eats lots of fiber
- Examine In person to r/o fissure vs hemorrhoids. But still refer for colonoscopy if needed
- refer for colonoscopy if:
  - if rectal bleeding and age > 40.
    - if younger than 40 and no risk factors for colonic disease, can treat as hemorrhoids without colonoscopy
  - or if: anemia, change in bowel patterns, hx of polyps, family hx of IBD or colorectal cancer in first degree relative
  - alternatively, just get FIT once hemorrhoids/bleeding have resolved. Refer if FIT positive.
- prognosis
  - often shrink on their own after conservative treatment or on their own
  - mild hemorrhoids can improve within 2-7 days
  - larger hemorrhoids may not resolve on their own without treatment.

## hemorrhoids – banding, surgery

- indications to refer to surgeon for anoscopy/banding:
  - low grade internal hemorrhoids: refractory for 6-8 weeks.
  - high grade internal hemorrhoids
  - acute thrombosed hemorrhoids. Refer for excision if can be seen within a few days.
  - Other notes
    - external tags and external hemorrhoids are not treated with banding.
    - If fails banding or external hemorrhoid, surgeon may consider surgical treatment
- indications for surgical treatment
  - External hemorrhoids — (See 'External hemorrhoidectomy' below.)
    - Symptomatic external hemorrhoids (eg, pain, thrombosis) refractory to conservative measures, office-based procedures, or unable to tolerate office-based procedures because of pain
    - Large or severely symptomatic external hemorrhoids (eg, severe pain, interfere with hygiene, severe skin irritation and itching)\*
    - Patients with substantial external skin tags
    - Combined internal and significant external hemorrhoids
    - Symptomatic external hemorrhoids in the presence of a concomitant anorectal condition that requires surgery
  - internal hemorrhoids
    - Prolapsed internal hemorrhoids that can be manually reduced (Grade III), particularly if more than one column is involved\*
    - Prolapsed and incarcerated internal hemorrhoids (Grade IV)\* (picture 1)
    - Symptomatic internal hemorrhoids (eg, pain, thrombosis) refractory to conservative measures, office-based procedures, or unable to tolerate office-based procedures because of pain\*
    - Combined internal and external hemorrhoids
    - Symptomatic internal hemorrhoids in the presence of a concomitant anorectal condition that requires surgery

## .Anal fissure

- management of typical anal fissure (single, posterior or anterior fissure with no evidence of Crohn disease)
  - topical vasodilators (Nifedipine or nitroglycerin) for 1 month
    - Nifedipine 0.2-0.3% ointment or gel. apply around fissure 2-4 times daily for 4 weeks
  - fiber
  - sitz baths
- if no improvement with initial medical therapy
  - try 4 more weeks of medical therapy
  - if continued symptoms: endoscopy to r/o Crohns
  - if no Crohns may refer to colorectal surgery for surgical management
  - if doesn't want surgical management
    - try alternate topical vasodilator: try topical nitroglycerin if previously tried nifedipine as vice versa
    - OR second line medical therapy: one of following
      - topical diltiazem
      - topical bethanechol
      - oral nifedipine
      - oral diltiazem
- atypical fissure
  - anal fissure not at midline. consider Crohns
  - multiple recurring, or nonhealing fissure
- subsequent management

•

## .Belching.Burping

- Red flags for endoscopy: weight loss, abdominal pain, dysphagia, heartburn, and regurgitation
- Management:
  - avoid air swallowing. Avoid gum chewing, smoking, carbonated beverages, gulping foods, liquids.
  - Treat GERD if present
  - Diaphragmatic breathing
- Refractory symptoms: Baclofen 10mg tid.

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## .Constipation in kids

- if >6 months of age
  - may use PEG
- if 2-6 months of age
  - may use lactulose
- if younger than 2 months
  - may try different formula. such as partially hydrolyzed or hydrolyzed formula.
  - if no BM after several days, may consider glycerin suppository if there is very hard stool in the rectum but should not be used frequently.

•

## .Constipation

- Management
  - Severe
    - initial
      - PEG 17g bid routine
        - ± lactulose 30mL bid
      - Senokot 2 tabs bid routine. up to 4 tabs bid
        - Don't use senokot for kids
      - Should have BM in 48 hours of above
    - Then bisacodyl suppository. Should work within 4h
    - Then may try fleet enema



- if above not successful Then ER
- if still no BM, may try soap suds enema x3 days
- then half colonoscopy prep
- if palliative, consider Relistor
- After getting BM, continue PEG bid. May then titrate down to once daily
- Consider colonoscopy
- 

## .Diverticulitis

- Clinical features: Left abdo pain, fever, n/v, constipation, diarrhea,
  - Elevated WBC, CT abdo
- DDX
  - IBS
  - colorectal cancer
  - appendicitis
  - IBD
- If patient well, and history of diverticulitis, may consider treating empirically as outpatient without a CT abdo. If first presentation, should be evaluated in ER.
- inpatient vs outpatient treatment
  - criteria for inpatient:
    - CT shows complicated diverticulitis: perforation abscess, obstruction, fistulization
    - CT shows uncomplicated diverticulitis but patient has one of following:
      - sepsis
      - severe abdominal pain. Failure to control abdominal pain
      - age > 70
      - microperforation
      - significant comorbidities, immunosuppression
      - intolerance of oral intake secondary to obstruction or ileus
      - non-compliance with care. Unreliable for return visits
      - failed outpatient treatment
  - otherwise treat as outpatient
- Outpatient management
  - pain control and liquid diet.
  - Antibiotics not routinely recommended.
    - Antibiotics used to be cornerstone of diverticulitis treatment. But now not routinely recommended
    - may consider if patient is frail or major medical comorbidities, but do not meet criteria for admission
    - Cipro 500mg bid + Flagyl 500mg tid. X7-10 days
  - Reassess in 2-3 days. Then weekly until symptoms resolve
    - if not improve: two to three days after the initial presentation, patients who have persistent or recurrent abdominal pain, fever, or inability to tolerate oral fluids should be admitted for inpatient treatment.
  - There is no evidence for dietary restrictions in acute uncomplicated diverticulitis. May offer clear liquid or NPO.
    - One approach is liquid diet until reassessed in 2-3 days. Then soft/regular diet if improved
- long term management
  - Get colonoscopy 6 weeks later to rule out colon cancer, as it can look similar on CT
  - elective surgery
    - should be offered to patients at high risk of developing serious complications or dying from recurrent diverticulitis, including those with complicated diverticulitis and those who are immunosuppressed.
  - Recommend high fiber diet

- 
-

## .Pancreatitis - inpatient

- Etiology
  - Gallstone, alcohol
  - hypertriglyceridemia, hypercalcemia,
  - autoimmune (IGG4)
  -
- initial management
  - fluids: 5-10 mL/kg/h. be cautious in heart failure
    - reassess fluid requirements frequently.
  - pain control: hydromorphone 0.2 - 1mg q2-4h iv prn
    - Hydromorphone 1-2mg po q4-6h prn
  - monitoring: admit to hospital
    - monitor closely in first 24 to 48 ours
    - labs: electrolytes, Ca, Mg, glucose
  - nutrition:
    - in absence of ileus, n/v, can initiate oral feeding within 24 hours as tolerated. low fat, soft diet.
      - in moderate to severe pancreatitis: oral feeding may not be tolerated.
    - enteral feeding if cannot tolerate oral diet by day 5. with NJ tube.
- management of complications
  - if severe pancreatitis, sepsis, deterioration 72 hours after initial presentation: get CT abdo to assess for pancreatic necrosis
    - local complications: acute peripancreatic fluid collection, pancreatic pseudocyst, acute necrotic collection, walled off necrosis. pancreatic pseudocyst and walled off necrosis usually occur 4 weeks after onset of acute pancreatitis
  - suspect infected necrosis if CT shows necrosis and patient deteriorates (sepsis, increasing WBC, fevers), or fail to improve after 7-10 days. Start empiric antibiotics.
    - if doesn't respond to antibiotics, may require pancreatic debridement. Try to delay this until 4 weeks after presentation to allow infected necrosis to become walled off.
- underlying predisposing conditions
  - if gallstone pancreatitis and cholangitis: get urgent ERCP. No ERCP if no cholangitis.
  - cholecystectomy after recovery from acute pancreatitis if etiology was gallstone pancreatitis.
- dietary instructions on discharge:
  - avoid fatty foods. bland diet. will not feel well for 6 weeks.
- When to discharge
  - Lipase trending down. Refeed when feeling better.
- 

## .Choledocholithiasis.CBD dilation.ERCP.MRCP

- Evaluation of Choledocholithiasis
  - [https://www.uptodate.com/contents/image?imageKey=GAST%2F66945&topicKey=GAST%2F13922&search=ercp%20indications&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=GAST%2F66945&topicKey=GAST%2F13922&search=ercp%20indications&source=see_link)
  - High risk: do ERCP
    - CBD stone seen on imaging
    - acute cholangitis
    - bilirubin > 60-68 AND dilated CBD > 6mm
  - Intermediate risk: do MRCP
    - abnormal liver biochemical tests
    - age > 55 yo
    - dilated CBD on imaging
- After cholecystectomy
  - choledocholithiasis still possible after cholecystectomy. get MRCP as U/S not as useful in these patients.
-

## .Liver metastases

- Investigations
  - CT Chest, Abdo, Pelvis for staging
  - IR guided biopsy
- Referral
  - Cancer clinic for med onc
- 
- 

## .Liver failure.Cirrhosis

- History
  - alcohol use
  - GI bleed
  - leg swelling, SOB
  - muscle wasting/weight loss
- physical exam
  - jaundice
  - leg edema
  - ascites
- investigations
  - LFTs (albumin, bilirubin, ALP, ALT, AST), Hep B, Hep C, HIV, ANA, anti-mitochondria, anti smooth muscle, ferritin, iron studies, ceruloplasmin, immunoglobulins, alpha 1 antitrypsin, alpha fetoprotein
    - in end stage liver disease, bilirubin will be elevated, but ALT can be normal
  - biopsy is the gold standard for diagnosis
- Diagnosing ascites
  - low cell count, low protein, high serum-ascites albumin gradient
  - send for culture and cytology to rule out infection and cancer
- Treatment
  - ascites and peripheral edema. keep in mind likely intravascularly depleted.
    - abstinence from alcohol: Baclofen can assist with decreasing cravings
    - discontinue medications that decrease renal perfusion: NSAIDs, beta-blockers, ACEis, ARBs
    - <2g per day of sodium
    - see Paracentesis
    - diuretics
      - Spironolactone 100mg plus furosemide 40mg oral
      - titrate doses upward as needed at intervals of 3-5 days
      - maintain ratio of spironolactone 100 to furosemide 40
      - usual maximum doses: 400mg spironolactone, 160mg oral furosemide
  - hepatic encephalopathy
    - lactulose 30-45mL po tid-qid to achieve 3-4 soft BMs per day
    - may also add Rifaximin
  - Hepatorenal syndrome. increased Creatinine, decreased GFR. often associated with hypotension
    - iv albumin to perfuse kidneys
- transplant
  - refer once MELD score  $\geq 10$
  - usually will be candidate when score  $\geq 15$
- Diuretic resistant ascites
  - Definition: one of following:
    - on dietary sodium restriction, and at max doses of diuretics (Lasix 160mg po, spironolactone 400mg)
    - rapid reaccumulation of fluid after therapeutic paracentesis
    - diuretic related complications: e.g. progressive azotemia, hepatic encephalopathy, progressive electrolyte imbalances

- liver transplantation is only definitive cure
- stop beta blockers, NSAIDs, ACEi/ARB
- try oral midodrine for hypotension
- use frequent large volume paracentesis
  - may give albumin solution 6-8g albumin/liter of fluid removed, if >5 L of ascites removed.
  - e.g. for 5 L removed. replace 30-40g albumin. 25% albumin 120-160mL iv x1

•

## .Liver failure.Cirrhosis - other info

- complications
  - ascites
  - spontaneous bacterial peritonitis
  - hepatic encephalopathy
  - variceal hemorrhage
  - hepato-renal syndrome
  - hepatocellular carcinoma
- causes of cirrhosis
  - alcohol
  - Hep B
  - hep C
  - Hep D
  - non-alcohol steatohepatitis
  - Wilson disease
  - alpha-1 antitrypsin
  - galactosemia
  - hemochromatosis

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## .Paracentesis

- may give albumin solution 6-8g albumin/liter of fluid removed, if >5 L of ascites removed.
- e.g. for 5 L removed. replace 30-40g albumin. 25% albumin 120-160mL iv x1
- Indications for paracentesis
  - Send for culture to Rule out SBP
  - Send for cytology Rule out cancer
  - For comfort
    - Distended, hard
- Procedure
  - Landmark with ultrasound
  - Mark with needle cap to cause skin indentation
  - Clean area with chlorhexidine
  - Drape site
  - Inject local anesthetic. lidocaine with epi. Create bleb. Then inject some more, deeper into abdo cavity. Withdraw to make sure you get some yellow fluid
  - Make an incision
  - Advance catheter until black line, then aspirate while advancing
  - Stop when you see ascetic fluid (yellow fluid). Keep needle stationary. Advance the catheter. Withdraw needle
  - Withdraw from syringe to ensure you still get ascetic fluid
  - Attach bag to drain via gravity
  -

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## .Variceal bleeding.Cirrhosis

- acute management

○ [https://www.uptodate.com/contents/image?imageKey=EM%2F72195&topicKey=DRUG\\_GEN%2F9376&search=cirrhosis&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=EM%2F72195&topicKey=DRUG_GEN%2F9376&search=cirrhosis&source=see_link)

- IV fluids, oxygen, NPO
- 2 large bore IV lines
- transfusion
  - severe ongoing bleeding: 1:1:1 ratio of RBCs, plasma, platelets as for trauma patients
  - hemodynamic instability despite crystalloid resuscitation: 1-2 units of RBCs
  - Hb <80 in high risk (older adult, CAD): 1 unit of RBC
  - Hb <70 in low risk: 1 unit of RBC
  - avoid over-transfusion with possible variceal bleeding
- Ceftriaxone 1g iv x 7 days
- Consult GI. ideally, Upper endoscopy within 12 hours
- Octreotide 50mcg iv bolus, then 50mcg/hour iv infusion
- Secondary Prevention
  - refer for liver transplantation if elevated MELD score
  - endoscopic variceal ligation (EVL) by GI
  - bet blocker to lower portal pressure
    - Nadolol 20mg daily. start on day 5 after initial episode of bleeding, if hemostasis achieved and octreotide stopped, and no contraindication to beta blockers.
  - consider TIPS (transjugular intrahepatic portosystemic shunt) if recurrent bleeding despite variceal ligation and/or beta blocker.
- Primary prevention for patients with cirrhosis
  - screen with OGD
    - compensated cirrhosis without varices: q2-3 years
    - small varices: q1-2 years
    - decompensated cirrhosis: q1 year
  - Child B or C cirrhosis
    - prophylactic treatment recommended
      - small varices: with Nadolol as opposed to EVL.
      - medium varices: Nadolol or EVL
      - large varices: EVL as opposed to nadolol
  - Child A cirrhosis
    - expectant management with routine upper endoscopy
  -

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## .Hepatitis

- workup
  - ANA, anti mito Ab, anti SM antibody, alpha antitrypsin, ceruloplasmin, ferritin, iron saturation, SPEP, immunoglobulins, fasting lipids, Hb A1c, TSH

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## .Alcoholic hepatitis

- Diagnostic criteria :
  - AST/ALT elevated and > 2
  - Bilirubin > 86 umol
  - Elevated INR
  - Neutrophillia
  - Ascities
  - EtOH abuse history

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- .Hepatitis B.Hep B

Clinical interpretation	
HBsAg	Hallmark of infection Positive in early phase of acute infection and persistently positive in chronic infection
Anti-HBs	Recovery from acute infection or immunity from vaccination
HBeAg	Immune tolerance phase or immune clearance phase Usually associated with high viral load
Anti-HBe	Low replicative phase if hepatitis B virus DNA is low HBV variants if hepatitis B virus DNA is high
IgM anti-HBc	Acute infection; only positive serological marker in the serological window between disappearance of HBsAg and appearance of anti-HBs Might be positive during severe exacerbation of chronic infection
IgG anti-HBc	Exposure to infection Present in association with HBsAg in chronic infection Present in association with anti-HBs after recovery from acute infection Isolated presence might signify occult infection

**Table 1: Clinical interpretation of serological markers of hepatitis B virus infection**

- 
- indications for Hep B treatment
  - HBeAg pos with HBV DNA > 2,000
  - HBV DNA > 20,000 and ALT > 2x ULN
- Hep B vaccination
  - post vaccination testing
    - routine postvaccination testing unnecessary since response rate is > 90%.
    - post vaccination testing 1-2 months after primary vaccination indicated in patients with ongoing risk or less likely to respond to vaccination: health care workers, chronic hemodialysis, sex partners of HbsAg-positive people, immunocompromised
  - if HbsAb > 10
    - annual monitoring for adults on hemodialysis and immunocompromised persons with ongoing risk
  - HbsAb < 10 IU/L
    - patients who do not respond to initial vaccine series should complete a second vaccine series
    - retest for anti-Hbs one month after second vaccination series.
    - If still non-responding after second course of vaccine, test HbsAg and anti-Hbc to rule out undiagnosed chronic HBV infection. If no chronic HBV and not responding to second vaccine course, unlikely to benefit from further vaccination

- 
- 
- .H. Pylori.Heliobacter Pylori

- associations with:
  - peptic ulcer disease
  - gastric cancer
  - MALT lymphoma
- investigation
  - H. Pylori IgG. no need to stop PPI
  - H. Pylori stool Ag.
    - no antibiotics for 4 weeks. stop PPI for 1-2 weeks. No bismuth for 2 weeks
  - urea breath test. need to stop PPI, acid blockers, etc. 2 weeks before
- indications for testing

- low grade gastric MALT
- active peptic ulcer disease
- early gastric cancer
- other indications
  - uninvestigated dyspepsia in patients <60 yo without alarm features
  - prior to chronic NSAID treatment
  - unexplained iron deficiency
- dyspepsia alarm features
  - unintentional weight loss, dysphagia, odynophagia, unexplained iron deficiency anemia, persistent vomiting, palpable mass or lymphadenopathy, family history of upper GI cancer.
- test of cure
  - should be done on all patients after treatment
  - ≥ 4 weeks after completion of antibiotic and bismuth therapy and 2 weeks after withholding PPI
  - tests
    - can be done with urea breath test, stool antigen test or biopsy
- treatment for 14 days
  - Bismuth 524mg po qid
  - AND Metronidazole 500mg po qid
  - AND tetracycline 500mg po qid
  - AND PPI
    - Pantoprazole 40mg PO bid OR Rabeprazole 20mg po bid

## [.colon cancer.colorectal cancer - screening](#)

- Positive FIT in BC
  - patient coordinator will contact you. A patient coordinator is a nurse that works with your local health authority. He or she will assess your condition and book a colonoscopy procedure if appropriate, or let you know if other monitoring or treatment is advised.
- average risk
  - age 50-74
  - FIT: q2 years
  - Flex sigmoidoscopy: q10 years
  - no colonoscopy for screening of average risk patient
- Increased risk: first degree relative with colon Ca, IBD, FAP, Lynch syndrome
  - one first degree relative with colon cancer
    - begin at age 40, or 10 years younger than age relative was dx, whichever is earlier.
    - colonoscopy q5-10 years
  - IBD
    - begin at 8-10 years after pancolitis or 12-15y after left sided colitis
    - colonoscopy q1-2y
  - HNPCC (Hereditary Nonpolyposis colorectal cancer, Lynch syndrome)
    - begin at age 20 or 10 years younger than earlier case in family
    - colonoscopy every 1-2 years.
  - FAP (familial adenomatous polyposis)
    - begin at age 10-12
    - sigmoidoscopy annually
- search terms
  - colonoscopy,
  - occult blood, colon cancer
- .colon cancer.colorectal cancer
- follow up after colonoscopy

- see Summary of Canadian Association of Gastroenterology recommendations for surveillance intervals in individuals with baseline average risk.
- normal/no polyps: 10y
- low risk adenoma: colonoscopy in 7-10 years
- high risk adenoma ( $\geq 3$  or any  $\geq 10\text{mm}$  or any high grade dysplasia or any villous histology. c-scope in 3 year.
- $>10$  adenoma: get genetic testing: colonoscopy  $\leq 1$  year. if genetics and c-scope normal, repeat in 3 years
- sessile serrated adenoma  $<10\text{mm}$  without dysplasia: c-scope 5y
- large sessile polyp removed piecemeal: c-scope  $<6$  months
- serrated polyposis syndrome: c-scope 1y

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## .Colonoscopy preparation.Bowel preparation

- Bowel preparation
  - Colyte prep. 2L at 2pm, 2L at 6pm the previous day
  - NPO at midnight

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## .Intestinal metaplasia

- seen on gastroscopy
- repeat endoscopy q2-3 years

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## .Elevated Liver panel.LFTs elevated.Liver function tests elevated

- DDx
  - Severe ALT, AST elevation ( $>1000$ )
    - Viral hepatitis, auto immune.
      - Viral serologies
    - Drugs, toxins: alcohol, acetaminophen, meds, toxin.
      - Do tox screen, EtOH, acetaminophen levels
    - Ischemia: sepsis, hypotension, Budd Chiari
      - Do liver U/S with doppler
  - NAFLD
  - Hemochromatosis, alpha 1 antitrypsin, wilsons, celiac
- History
  - alcohol and drugs
  - medications, OTC supplements, herbs
- Patterns
  - Hepatocellular pattern:
    - Disproportionate elevation in the serum aminotransferases compared with the alkaline phosphatase
  - Cholestatic pattern:
    - Disproportionate elevation in the alkaline phosphatase compared with the serum aminotransferases
- AST/ALT: severe elevation ( $>15\times$  ULN)
  - Investigations: Acetaminophen, tox screen, hepatitis serologies (A,B,C), pregnancy test, ANA, anti SMA, ultrasound doppler
  - other tests: ceruloplasmin levels, urinalysis for proteinuria in pregnant women, CK
- AST/ALT: Mild, moderate elevation ( $<15\times$  ULN)
  - initial Investigations:
    - Hepatitis: Hep B, Hep C,
    - hemochromatosis: serum iron, TIBC, transferrin saturation. if transferrin saturation  $> 45\%$ , get ferritin
    - fatty liver: abdo U/S
  - other tests if above unremarkable
    - autoimmune: ANA, anti-SMA,
    - wilsons: ceruloplasmin



- serum alph-1 antitrypsin
- thyroid: TSH, T4, T3
- celiac: anti TTG
- other tests if above still unremarkable
  - adrenal insufficiency: 8am serum cortisol and plasma ACTH, ACTH stim test
  - muscle disorders: CK
- ALP elevated
  - get GGT level to confirm ALP elevation is coming from liver. if ALP elevated, but GGT not increased, should be evaluated for bone disorders.
  - get U/S: biliary dilation suggests extrahepatic cholestasis. no biliary dilation suggests intrahepatic cholestasis
  - extrahepatic cholestasis
    - if obstruction due to stone or acute, consider ERCP. otherwise get MRCP
    - if ERCP/MRCP negative, consider liver biopsy
  - intrahepatic cholestasis
    - AMA, ANA, anti smooth muscle. if AMA present, this is highly suggestive of PBC; consider liver biopsy
    - if AMA neg:
      - get MRCP to look for PSC
      - test for Hep A,B,C
      - beta HCG
      - if above negative, and ALP still elevated, get liver biopsy
- isolated GGT elevation
  - not very specific
  - elevated GGT with normal AST,ALT, ALP should not lead to exhaustive workup
  - can use GGT to confirm liver origin in elevated ALP or to support suspicion of alcohol abuse in patient with elevated AST and AST:ALT ratio > 2:1
- isolated hyperbilirubinemia
  - unconjugated (indirect) hyperbilirubinemia
    - hemolysis
      - Peripheral blood smear, retic count, serum haptoglobin
      - see notes on Hemolysis
    - impaired uptake or conjugation
      - most common drugs (e.g. Rifampin, probenecid) or Gilbert syndrome
  - conjugated (direct) hyperbilirubinemia
    - rare inherited condition: Dubin Johnson, Rotor syndrome
      - typically present with asymptomatic jaundice in 2nd decade of life.
- When to refer:
  - unexplained, persistent liver biochemical test elevations (>2x ULN for aminotransferases, >1.5x ULN for ALP). for aminotransferases use ULN as approximately 30 units/L for men and 20 units/L for women.
  - If mildly elevated, expectant management. Follow liver tests every 6 months.

## [.Fatty liver](#)

- see notes on Elevated liver panel, if relevant
- investigations
  - Labs
    - ALT>AST (usually AST:ALT <1, never >2)
    - may have GGT elevation
    - ferritin often high,
  - exclude
    - viral hepatitis (HBV/HCV)
    - hemochromatosis
    - drugs
  - exclude if relevant

- autoimmune hepatitis (IgG, ANA, SMA)
- Wilsons (ceruloplasmin, urine copper)
- confirm diagnosis
  - ultrasound to show fatty liver
  - rule out other common liver diseases (e.g. HBV, HCV)
- counselling
  - dietary and activity
- refer to specialty if
  - aminotransferases remain elevated despite loss of  $\geq 5$  percent body weight.
  - clinical features of advance liver disease
  - steatohepatitis on liver biopsy
  - advanced fibrosis (fibrosis stage  $\geq F3$ ) on noninvasive liver assessment

## • GERD. Gastroesophageal reflux disease

- investigations: for patients who fail PPI therapy. Can be arranged by GI.
  - upper endoscopy with biopsies
  - esophageal pH testing
- management
  - treat with PPI
    - for 4-8 weeks
  - may also add H2 blocker
  - may also try metoclopramide
    - no longer recommended but still in use.
- lifestyle modification
  - dietary modifications: decrease fatty foods, spicy, acidic, caffeine, chocolate, spicy foods, carbonated beverages, EtOH
  - exercise
  - elevate head of bed
  - stop smoking, stop EtOH
- red flags
  - dysphagia (esp progressive), odynophagia, weight loss, GI bleeding, anemia, persistent vomiting
    - these symptoms require prompt evaluation by endoscopy (not by UGI imaging)
- surgical
  - Indications:
    - 1) failure of medical management
    - 2) severe esophagitis (endoscopy)
    - 3) stricture formation
    - 4) Barret's metaplasia (in absence of dysplasia)
    - 5) recurrent pulmonary dis (asp pneumonia) related to GERD
  - nissen fundoplication: the upper stomach is wrapped around the lower esophagus
- H. pylori
  - no clear role for investigation or eradication at this time.
- patients in which to keep PPI long term
  - Barret esophagus
  - severe esophagitis
  - history of bleeding GI ulcers
  - chronic NSAID users with bleeding risk

## .Celiac

- Clinically presents with diarrhea, wt loss, failure to thrive (classical presentation in childhood); in adults can be bloating, diarrhea, constipation, and 30% have been given a previous Dx of IBS !
- Consider serology in new iron-deficiency anemia, early/severe osteoporosis/unexplained elevation in transaminases; remember to assess fat soluble vits (ADEK), B12, folate
- Investigation
  - anti tTG and total IgA. if low IgA, consider IgG anti DGP
- diagnosis
  - if screen positive, need endoscopy and pathology for diagnosis.
  - requires positive response to gluten free diet as well for diagnosis.
- dermatitis herpetiformis is pathognomonic for celiac
- management
  - gluten free diet for life (proteins from wheat, barley and rye)
  - refer to dietitian
- Other management aspects
  - osteopenia
    - investigations
      - get BMD scan. repeat q2y
      - Ca, Vit D, PTH
    - supplement with Vit D. ensure adequate Ca intake
    - weight bearing exercise, decrease alcohol intake, stop smoking
  - screen first degree relatives
  - monitor symptom resolution and repeat serology in 6 months
  - test and treat deficiencies (iron, B12, Vit D, Ca, folate)

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## .Celiac - other info

- risk factors
  - relative with celiac disease
  - type 1 diabetes
  - autoimmune thyroiditis
  - down syndrome
  - IgA deficiency

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## .Liver cyst

- [https://www.uptodate.com/contents/image?imageKey=GAST%2F134606&topicKey=GAST%2F3588&search=liver%20cyst&rank=1~131&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=GAST%2F134606&topicKey=GAST%2F3588&search=liver%20cyst&rank=1~131&source=see_link)
- if <4cm in size or asymptomatic, no follow-up needed
- if symptomatic and large, refer for surgery or IR percutaneous aspiration.
- small cysts not associated with development of symptoms

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## .inflammatory bowel disease.IBD

- extraintestinal
  - MSK: arthritis, ankylosing spondylitis,
  - eyes: iritis, uveitis, scleritis, conjunctivitis
  - skin: erythema nodosum, pyoderma gangrenosum,
  - mouth: aphthous ulcers,
  - biliary: primary sclerosing cholangitis
  - lungs: serositis
- medications to induce remission

- 5-ASA, budesonide, prednisone, infliximab
- characteristics
  - UC: lesions in colon/rectum only, continuous lesions, mucosal involvement only, mucus/blood per rectum, surgery is curative
  - Crohns: lesions from "gum to bum", i.e. entire GI tract. skip lesions present. transmural lymphoid aggregates. age onset usually <30y. fistula. abscess. large skin tags. RLQ mass. risk of SBO. lower risk of cancer than UC.
- maintenance
  - Crohns
    - methotrexate
  - UC
    - 5-ASA
  - both
    - azathioprine, 6-mercaptopurine, infliximab, adalimumab
- complications
  - Crohns
    - abscess, stricture, perforation, obstruction, fistula
  - UC
    - toxic megacolon, colon cancer
- investigations
  - consider fecal calprotectin to diagnose.
  - colonoscopy
- supportive, preventative measures
  - all therapies
    - stop smoking
    - avoid NSAIDs
    - ensure routine immunizations
  - for anti TNF alpha:
    - rule out TB
    - update immunizations including hep B
  - for corticosteroids:
    - baseline DEXA for BMD
    - Ca, Vit D supplementation, consider bisphosphonate
  - for sulfasalazine and methotrexate:
    - folic acid supplementation
- opioids are "strongly contraindicated" in IBD due to worse outcomes.
- 
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## [.Fecal incontinence. Incontinence of feces](#)

- definition: involuntary loss of feces.
- etiology
  - anal sphincter weakness: diabetes, spinal cord injury, childbirth, surgery
  - decreased rectal sensation
  - decreased rectal compliance: reduced ability to store fecal matter
  - overflow: fecal retention and impaction. hard stool produces inhibition of internal anal sphincter tone, permitting leakage of liquid stool around the impaction
- History
  - Incontinence vs frequency/urgency
  - Onset, duration, frequency, amount
  - neurologic red flags: Lower extremity motor or sensory symptoms, back pain, urinary incontinence
- O:
  - Anal tone
  - look for fistula, hemorrhoids, rectal prolapse

- Investigations
  - If diarrhea: stool studies
  - X-ray if considering overflow incontinence
  - Colonoscopy if not recently
  - Other studies
    - anorectal manometry and endorectal ultrasound
- Management
  - supportive management
    - Perianal skin hygiene. barrier cream (e.g. zinc oxide)
    - Avoid foods that trigger: use food diary
    - regular, timed defecation
  - medications
    - Bulking agent. psyllium fiber
    - loperamide for diarrhea
  - Refer to GI if fail initial management
    - anorectal manometry, endorectal ultrasound/magnetic resonance imaging
    - biofeedback, injectable anal bulking agent, sacral nerve stimulation, anal sphincteroplasty
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## .Gyne

### .fibroid

- Tumors arising from smooth muscle cells. Common pelvic tumor in female patients
- clinical features
  - AUB
  - pelvic pressure and pain
  - reproductive dysfunction
- investigation
  - transvaginal ultrasound
- management
  - heavy menstrual bleeding who do not desire future fertility
    - first tier
      - submucosal fibroids: hysteroscopic myomectomy
      - other fibroids: OCP
    - second tier
      - GnRH agonists and antagonists
    - third tier
      - focused ultrasound surgery
      - endometrial ablation
    - last line
      - hysterectomy
  - bulk or pain symptoms
    - GnRH analogs
    - uterine artery embolization
  - desire fertility
    - myomectomy
-

## .AMENORRHEA:

- S: Primary versus secondary, duration, possible pregnancy; associated symptoms {headache, decreased peripheral vision, galactorrhea, hirsutism, virilization, hot flashes, vaginal dryness, symptoms of thyroid disease}; history of anorexia nervosa, excessive dieting, vigorous exercise, pregnancies, D&Cs, uterine infections; drug use; medications.
- O: Vital signs; breast exam; pelvic exam.
- DDX: pregnancy, hypothyroidism, PCOS, hyperprolactinemia, UTI, premature ovarian failure/menopause, anorexia nervosa,
- P:
  - Pelvic u/s,
  - bloodwork - beta HCG, FSH, LH, testosterone, estradiol, TSH, prolactin

## .Dyspareunia

- S: Duration, timing; associated symptoms (vaginal discharge, rash, painful menses, GI symptoms, hot flashes); adequacy of lubrication, menopausal status, libido; sexual history, history of sexual trauma or domestic violence; history of endometriosis, pelvic inflammatory disease, or prior abdominal/pelvic surgeries.
- O: Vital signs; abdominal exam; pelvic exam.
- DDX: atrophic vaginitis, endometriosis, cervicitis, vaginismus, vulvodynia, depression
- treatment
  - Pelvic physio
  - Trial of premarin cream. 1g daily x14 days, then 1g twice per week for 3 months

## .female sexual dysfunction.sexual dysfunction female.sexual desire decreased.libido low

- Management
  - sex therapist, couples counselor
- pharmacotherapy
  - Bupropion: for sexual dysfunction in women with or without associated depression. Use for sexual dysfunction is off-label
    - First choice in uptodate author's practice
  - if postmenopausal and decreased sexual desire: may consider testosterone therapy. Note risk of androgenic side effects
    - 1% testosterone topical cream or gel; 0.5 grams is applied daily to the skin of the arms, legs, or abdomen
    - androgen therapy not recommended for premenopausal women.
  - for premenopausal women.
    - Bremelanotide: melanocortin receptor agonist. Subcutaneous injection Taken 45 minutes prior to anticipated sexual activity
      - side effects: nausea vomiting. Hyperpigmentation potentially permanent occurs in 1%
    - Flibanserin: centrally acting serotonin receptor agonist/antagonist
      - side effects: somnolence, dizziness. Safety concerns regarding combining flibanserin with alcohol or certain medications (eg, fluconazole, antidepressants)
      - not indicated in postmenopausal women.
  - PDE5i: for sexual interest/arousal or orgasm disorders associated with use of an SSRI. Not effective otherwise. not FDA approved for use in women

## .Rule out pregnancy.Not pregnant

- if meets any one of following criteria, can safely rule out pregnancy
  - $\leq 7$  days after start of normal menses
  - no sexual intercourse since start of last normal menses
  - correctly and consistently using a reliable method of contraception
  - $\leq 7$  days after spontaneous or induced abortion
  - within 4 weeks postpartum

- fully or nearly fully breastfeeding (exclusively breastfeeding or  $\geq 85\%$  of feeds are breastfeeds), amenorrheic, and  $<6$  months postpartum

- 

## .Backup contraception.Contraception backup

- how long to use condoms
  - 1 week after nexplanon insertion
  - 4 week after IUD insertion. after the string check to ensure still in place
  - 1-2 weeks after starting OCP

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## .OCP.Oral Contraceptive pills

- things to discuss
  - efficacy, contraindications, side effects, factors that decrease efficacy, plan for if pills are missed, barrier method to avoid STI, pap testing, HPV vaccination, STI screening
- mechanism of action
  - suppresses gonadotropins and inhibit ovulation. promote endometrial atrophy. increase cervical mucous viscosity to impede sperm transport
- contraindications
  - absolute
    - $<4$  weeks postpartum (breastfeeding),  $<21d$  postpartum not breastfeeding
    - smoker age  $>35$  and  $>15$  cig
    - HTN ( $\geq 160/100$ )
    - acute VTE
    - ischemic heart disease, stroke, valvular heart disease
    - breast cancer
    - cirrhosis, hepatocellular adenoma, malignant hepatoma
    - migraine with aura
  - risks usually outweigh benefit
    - 4-6 weeks postpartum with other risk factors for VTE
    - VTE on anticoagulants with no risk factors, hx VTE with low risk recurrence
    - unexplained abnormal uterine bleeding
- family history of breast cancer (but no personal history of breast cancer)
  - not an absolute contraindication for OCP or nexplanon/IUD
- counselling
  - Take at the same time daily
  - Side effects
    - Initial, but get better: headache, mood changes, breast tenderness, nausea, bloating. irregular/breakthrough bleeding for 3 months.
    - clots: 5/10000 per year in non-users. 10/10000 per year in OCP users. 29/10000 in pregnancy.
    - Cancer: maybe increases breast cancer, but decreases ovarian and endometrial cancer
- starting
  - can start OCP right away; no need to exclude pregnancy.
    - if pregnancy not excluded, do pregnancy test 2-4 weeks later
  - if  $>5$  days after LMP, use backup method (e.g. condoms) for 7 days.
- assess possibility of pregnancy. if ANY of the criteria, can safely rule out pregnancy:
  - no intercourse since last normal menses
  - correctly and consistently using reliable method of contraception.
  - within 7 days from the first day of menstrual bleeding
  - within 4 weeks postpartum (nonlactating patient)
  - within first 7 days postabortion/miscarriage

- fully breastfeeding, amenorrheic, less than 6 months postpartum
- missing OCP doses: see sexandu.ca website
  - Missed one pill: take missed pill as soon as noticed. No additional contraception required
  - Missing >2 pills:
    - Week 1: take one pill as soon as noticed. Back-up contraception for next 7 days. If unprotected sex in past 5 days, use emergency contraception.
    - Week 2 or 3: take one pill as soon as noticed. Skip the week 4 placebo pills and start with new pack of pills. Back-up contraception for next 7 days. If unprotected sex in past 5 days, use emergency contraception.
- OCP examples
  - Lolo 1mg-10mcg
    - 24 blue tablets of 1mg norethindrone 10mcg ethinyl estradiol
    - 2 white tablets 10mcg ethinyl estradiol
    - 2 brown tablets placebo.
  - initial prescription: prescribe for 3 months. if patient tolerates well, then can give more renewals.
  - Alesse, Marvelon, Loestrin, Lolo

# OCP: The Art

Minestrin 1/20  
 E+ P+++ A+++  
 Loestrin 1.5/30  
 E+ P+++ A++++  
 Demulen 30  
 E+ P++++ A+++  
 Brevicon 0.5/35; Ortho .5/35  
 E+++ P+ A+  
 Synphasic  
 E+++ P++ A++  
 Brevicon 1/35; Ortho 1/35; Select 1/35; Ortho-Novum 1/50  
 E+++ P+++ A+++  
 Ortho7/7/7  
 E++++ P++ A++  
 Alesse (if b/t bleed, can take extra tab those days, don't stop if b/t bleed as no change in efficacy)  
 E+ P+ A++  
 Triquilar; Triphasil (levonorgestrol)  
 E++ P+ A++  
 Min-Ovral (levonorgestrol)  
 E++ P++ A+++  
 seasonale  
 Ovral  
 E+++ P+++ A++++

Marvelon; Ortho-cept  
 E++ P+++ A+  
 Cyclen  
 E+++ P+ A+  
 Tri-cyclen  
 E+++ P+ A+  
 Yasmin (yasmin is diff progesterone drospirinone ?less Wt gain/water retention...caution if ACE/ARB, NSAID, heparin, Eating d/o etc as risk hyperkalemia equiv to Spironolact 25mg antiandrogen, so effective for acne)  
 E++ P? A0  
 yaz (24/4 dosing) (yaz same pg as yasmin but lower dose estr)  
 E+?P? A0  
 Diane 35 (cyproterone antiandrogen)  
 E+++ P? A0  
 Lolo (norethindrone acetate 1 mg, ethinyl estradiol 0.010 mg) 24/2/2 (combo/estr/placebo)  
 E+P+++1/2 A+++ (not great for acne)



# OCP: The Art

## 1. Estrogen deficiency

- early bleeding and spotting days 1-9
- Continuous bleeding or spotting
- decrease in flow, absence of withdrawal bleeding
- pelvic relaxation symptoms, atrophic vaginitis, vasomotor symptoms, nervousness

## 2. Progestin Def.

- late bleeding and spotting days 10-21
- delayed withdrawal bleeding

## 3. Estrogen Excess +/- Progestin def.

- PMS: bloating, edema, h/a, dizziness, nausea, vomiting, visual changes, weight gain.
- leg cramps, dysmenorrhea, hypermenorrhea/menorrhagia

## 4. Excess Estrogen

- hypermenorrhea/menorrhagia, dysmenorrhea, UTI
- Increase breast size/cystic changes, uterine enlargement or fibroid growth, thromboembolism
- HTN, vascular headaches, chloasma

## 5. Excess Progestin

- depression, fatigue, libido decrease
- weight gain/increased appetite, hypoglycemic symptoms
- leg vein dilation, HTN
- cervicitis, yeast infection

## 6. Excess Androgen

- libido increase, oily skin/scalp, acne
- rash & pruritis, hirsutism, cholestatic jaundice
- edema

Alternate resource: [https://cdn.dal.ca/content/dam/dalhousie/pdf/faculty/medicine/departments/core-units/cpd/academic-detailing/ADS\\_2015\\_Contraception\\_Workbook.pdf](https://cdn.dal.ca/content/dam/dalhousie/pdf/faculty/medicine/departments/core-units/cpd/academic-detailing/ADS_2015_Contraception_Workbook.pdf)

## .Contraception - comparing options 2

### • Patient resources

- <https://www.sexandu.ca/contraception/hormonal-contraception/>
- <https://www.reproductiveaccess.org/contraception/>
  - Birth Control choices fact sheet
  - <https://www.reproductiveaccess.org/wp-content/uploads/2014/06/2020-09-contraception-choices.pdf>
  -

### • failure rate - typical use. >99% effectiveness with perfect use.

- OCP/patch/ring: 9%
- progesterone pill: 9%
- depot injection: 6%
- nexplanon: 0.05%
- LNG IUD: 0.2%
- copper IUD: 0.8%

### • acne

- OCP/patch/ring: improves acne
- POP: can increase acne
- nexplanon: can increase acne
- LNG IUD: can increase acne
- copper IUD: neutral

### • weight gain

- OCP/patch/ring: ? neutral. possible weight gain

- progesterone pill: ? neutral
- depot injection: 3.6kg at 2y
- nexplanon: 1.7kg at 2y
- LNG IUD: ? neutral
- copper IUD: neutral
- cycle control, bleeding
  - OCP/patch/ring: provides cycle control
  - progestins: no predictable cycle control. unscheduled bleeding worse in first 3 months, can be for up to 6 months.
  - copper IUD: bleeding usually heavier and longer. cramping worse
- amenorrhea
  - OCP/patch/ring: usually amenorrhea after <1y of continuous use
  - progesterone pill: 5.4% at <1y
  - depot injection: 55% at 1y
  - nexplanon: 22% at 2y
  - LNG IUD: Mirena: 37% at 3y. Kyleena: 20% at 3y.
  - copper IUD: very unlikely. bleeding usually heavier and longer.
- other adverse events
  - OCP/patch/ring: breast tenderness, nausea, bloating
    - patch: skin irritation
    - ring: vaginitis, leukorrhea
  - progesterone pill: serious adverse events rare. main side effect is irregular bleeding
  - depot injection: headache 17%, decreased libido 6%, may decrease bone density
  - nexplanon: implant site reaction 8.6%. 11% quit due to irregular bleeding
  - LNG IUD: risk of uterine perforation NNH 1000.
  - copper IUD: also risk of perforation. high quit rates due to menstrual events or pain
- return to fertility
  - OCP/patch/ring: rapid. Most ovulate within <1 month. 99% of women ovulate within 3-6 months
  - progesterone pill: rapid. Most ovulate within <1 month. 99% of women ovulate within 3-6 months
  - depot injection: sometimes delayed up to 18 months
  - nexplanon: rapid. ovulation in <1 month
  - LNG IUD: rapid
  - copper IUD: rapid
- contraindications
  - OCP/patch/ring: see OCP notes
  - contraindication for progestins: current breast cancer, unexplained vaginal bleeding, current VTE, liver disease
  - LNG IUD: PID, active STI, ovarian cancer
  - caution for progestin pill and injection: uncontrolled hypertension, CVD
  - copper IUD: PID, unexplained vaginal bleeding, ovarian cancer
- mood changes
  - reports of mood changes with OCP. no different than placebo in trials
- 
- 

## .Contraception - comparing options

- Nexplanon:
  - unscheduled bleeding worse in first 3 months. worse than LNG IUD.
  - No bone loss.
  - less common: acne, weight gain, mood changes
  - cost: \$400
- Depo Provera:
  - unscheduled bleeding common.
  - Does cause bone loss. may cause weight gain.

- less common: acne, mood changes
- copper IUD:
  - no hormones
  - often increased bleeding and cramping with periods.
  - cost: \$150
- LNG IUD:
  - may cause acne.
  - less hormone than OCP. approximately 20% of the progesterone of OCP.
  - less common: mood side effects and weight gain
  - cost: \$400
- OCP:
  - same side effects as patch/ring.
  - increased risk of blood clots
  - may cause weight gain and mood changes
  - often improves acne.

●

### .Contraception - other options

- contraceptive implant (e.g. Nexplanon)
  - health canada says contraindicated, but SOGC disagree
- ring (e.g. nuvaring)
- patch
  - Evra patch
  - Change every week. No patch on week 4.
- lactational amenorrhea method
  - 90% effective if done perfectly.
  - effective up to 6 months post childbirth
  - 3 conditions: baby exclusively breastfed and feeds day and night. periods have not returned. baby is less than 6 months old

●

### .IUD counselling

- Kyleena vs Mirena
  - Both last 5 years.
  - Kyleena smaller, less hormone. Often better for nullips.
  - amenorrhea: 20% with Kyleena. 80% with Mirena.
- contraindications
  - pregnancy, recent PID, recent STI within 3 months, distorted uterine cavity, unexplained vaginal bleeding, cervical/endometrial ca
- risks
  - Overall
    - Migrating/Expulsion
      - around 5% chance of expulsion in first year.
      - Risk of falling out or migrating is highest in first 4-6 weeks
      - after first expulsion: risk of repeat expulsion is 14%-31%
      - after second expulsion: consider HSG to rule out abnormal cavity if wants a 3rd attempt
    - Ectopic pregnancy. Risk is lower overall, due to preventing pregnancy, but if you're in the 0.5% that gets pregnant, your chance of ectopic is higher
    - Infection
    - Small risk of not being able to put it in.
      - Instruct patient not to open box when they receive at the pharmacy. Warn that the box is huge, but the IUD is small.
  - Procedural

- Introduce infection
- Bleeding
- Uterine perforation. 1/2000 risk. 1/1000 if previous C-section
- if happens to get pregnant with IUD
  - need to rule out ectopic pregnancy
  - Intrauterine pregnancies conceived with an IUD in-situ are associated with both increased maternal and fetal risks compared with the general population.
    - maternal risk: infection, including septic abortion and chorioamnionitis
    - fetal risk: miscarriage, preterm birth, abruption
    - IUD should be removed as soon as possible. it reduces chance of chorioamnionitis, miscarriage, preterm birth.
- Side effects
  - can take 2-3 months for bleeding pattern to normalize. bleeding/spotting can be up to 6 months.
    - no need to tell patient to wear pad/liner. the patient can decide for themselves.
  - high probability of amenorrhea or shortened menses,
  - chance of irregular bleeding and acne
  - increased risk of yeast infections. Possibly increased BV.
- Post insertion
  - follow-up in 4 weeks for a string check.
  - use condoms until that time.
- Removal
  - fertility could return as soon as 1 week after removal or may take 2-3 months
  - Menses often returns within 1-2 months, but pregnancy can still occur.
  - after copper IUD removal, may take 3-4 days for bleeding to settle
  -
- IUD insertion and fibroids
  - As long as able to sound to normal numbers
  - If not able to sound, or too short, get pelvic U/S

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## IUD insertion - before

- Before insertion
  - within a few weeks of insertion:
    - urine sample to test for chlamydia and gonorrhea
      - needs to be within 3 months of the insertion.
  - Immediately prior to insertion
    - get urine pregnancy test. if insertion date is within a week of period, can defer urine pregnancy test.
- ideally, insert IUD after period
  - reason 1: to ensure patient is not pregnant
  - reason 2: in the second half of the cycle, the cervix is more closed and there is a thick mucous plug. After the period, the cervix is more open.
- scheduling the appointment - example procedure
  - example: get urine tested for G&C. once results in, nurse will call to schedule. Nurse can then decide to schedule right away with urine neg. Or schedule right after their period.

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## IUD insertion - after

- 1-7 days after
  - normal to feel cramps in lower abdomen after insertion of IUD. should improve in coming days
  - take NSAIDs/Acetaminophen 1-2 tabs q4-6h
  - nothing in vagina for 24 hours following insertion. No tampons, no fingers, no penis, no vaginal creams
  - continue with previous contraception method for 7 days
- Follow-up after insertion at 6-12 weeks

- check if strings in place
  - if strings not visible, get ultrasound to confirm placement
- loss of IUD
  - most common in first 4-6 weeks
  - may not feel the loss of IUD. but may feel abnormal cramps in lower abdomen. may feel tiny hard end in cervix
  - make an appointment and use condoms
- infection
  - rare but must be treated immediately
  - symptoms
    - pain in lower abdomen that seems to be worsening
    - new pain in lower abdomen during intercourse
    - abnormal or offensive vaginal discharge
    - fever
- removal
  - insert speculum
  - use ring forceps/bozeman to pull on the strings
  - if strings no visible: rotate cytobrush in the endocervix
- 
- 

### .IUD insertion - pain management

- most effective
  - Lidocaine-prilocaine cream (2.5% - 2.5%) (EMLA cream) applied to genital mucosa
    - reduces pain by 24-28%. 3/10 pain in EMLA group, compared to 5/10 in placebo group.
    - apply 7 minutes prior to insertion. After rinsing vagina and cervix with betadine twice, 5 g of the cream applied to the cervix and external os using a cotton swab
- possibly effective
  - misoprostol 600mcg vaginally 6h prior
    - reduce pain by 8%
  - 4% topical lidocaine on the cervix 5 min before.
    - reduce pain by 16%
- not effective
  - 400mcg misoprostol
    - from anecdotal experience
  - 2% topical lidocaine gel
  - ibuprofen
    - Ibuprofen 600mg OR Naproxen 500mg 1-2h prior
  - paracervical blocks with 1-2% lidocaine
    - 1% Xylocaine 10cc. 2cc at 12 o'clock. insert tenaculum. 4cc each on 4-5 o'clock and 7-8 o'clock.
- 
- 

### .IUD insertion - during

- Set-up
  - Tray: sound, scissors, gauze, tenaculum
  - Betadine on the gauze
  - Gel onto tray
  - Ring forceps for grabbing the gauze to clean the cervix
  - Speculum
  - Sterile gloves
- Instructions
  - Vaginal exam to locate the cervix and assess direction of uterus
  - Insert the speculum

- Clean the cervix with betadine with gauze and ring forceps
- Use tenaculum to grab the cervix at 10 and 2 o'clock
- Dip the uterine sound with some betadine. Then sound the uterus. Should be around 6-8 cm.
- Look at how far the sound was inserted.
- Open the IUD packaging. Set the top of the plastic flange to the depth as indicated by the sound.
- Push the slider to the top to load the IUD.
- Insert the IUD:
  - Handle forward until the plastic ring
  - Handle backward 1.5 cm
  - Slider backward to zero mark
  - Handle forward 1cm
  - Slider backward all the way
  - Handle backward all the way. Be careful to not pull the IUD as well.
- Remove the tenaculum.
- Cut the strings to 2-3 cm. Better to cut longer than shorter.
- Remove the speculum. Be careful to not clamp down on the strings and pull out the IUD.
- troubleshooting
  - if not able to sound, or getting numbers that are too low
    - consider using a plastic sound so you can push harder without fear of perforation
    - the internal and external cervical os may not be lined up. so try wiggling the sound side to side to get through.
  - unable to see the numbers while sounding
  -
- 
- 
- 

## .IUD side effects.IUD complications

- UTD: Intrauterine contraception: Management of side effects and complications
- bleeding and cramping:
  - with LNG IUD: 4% still report frequent or prolonged bleeding by 12 months
  - if less than 3 months, consider reassuring, as symptoms usually improve after 3 months. can be up to 6 months
  - if ongoing heavy bleeding and cramping by 3 months, evaluate:
  - exclude IUD malposition or expulsion, pregnancy and cervical dysplasia
    - get U/S, beta-HCG, pap smear
  - once complications excluded, try :
    - estrace 0.5mg daily for 1 month
      - note: up to date actually doesn't recommend estrogen
    - may also try:
      - Naproxen 500mg bid x5 days
      - tranexamic acid tid until bleeding stop (usually 4 days)
      - Mifepriston 100mg single dose
    - do not prescribe: mefenamic, estrogen, ulipristal acetate.
  - if still not effective, may just remove the IUD.
- hormonal side effects
  - progestin related: acne, weight change, hirsutism, headache, nausea, mood changes
- malpositioned IUD
  - if IUD stem can be seen on vaginal exam: remove and replace it as its not as effective
  - symptomatic and malpositioned: remove and replace
  - asymptomatic and incidentally found malpositioned: as long as tip not poking out of cervix, can just leave alone.
- expulsion
  - if only one expulsion,

- 

## .IUD check.IUD string check

- 3 possibilities
  - Normal. If symptoms and >3 months: Possible that IUD has migrated. Get U/S to confirm good position.
  - Tip is visible. Pull the IUD out as it won't be effective
  - No strings. Get U/S to confirm location. If can't see on U/S, get X-ray to see if still in body.
    - if seen on X-ray, but no U/S: refer to ER for gyne assessment. May need laparoscopy.

- 

## .emergency contraception.Plan B.ullipristal

- mechanism: does not cause abortion
  - prevents ovulation, changes cervical mucous, reduces sperm migration
- Plan B (Levonorgestrel) (Lancet 1998: 352 428)
  - 2 tablets, each 0.75 mg of levonorgestrel (can take 2 tabs at same time- better adherence and equivalent efficacy)
  - Declining efficacy with increased time since unprotected intercourse
    - 95% at 24h
    - 58% at 49-72h
    - some efficacy up to 5d
  - Side effects: nausea (23%), vomiting (5.6%), dizziness, fatigue
  - if no period w/in 3 weeks do a pregnancy test
  - less effective at >75 kg, ineffective >80 kg
- Preven (aka Yuzpe method)
  - Less popular due to increased side effects. Not Health Canada approval.
  - only relevant if can't access plan B
  - Equivalent of 100 mcg of ethinyl estradiol plus 0.50 mg of levonorgestrel followed by the same pill regimen 12 hours later
  - Need minimum 100 mcg estradiol and 0.5 mg levonorgestrel per dose
  - Give Gravol at same time
  - Usually Ovral 2 tabs per dose
- Ulipristal (ella, ellaOne)
  - 30 mg tablet ASAP
  - delays ovulation
  - more effective than plan B, effective up to 5 days
  - Mech: binds to progesterone receptor
  - need to use barrier for remainder of cycle
  - Adverse effect: usually nausea
  - Preferred over Plan B if wt >75kg but not evaluated for BMI >35
  - Contraindicated in CHC (do not restart CHC for 5d post UPA, back up contraception for 12 days total)
- Levonorgestrel IUD (52mg Mirena)
  - As of 2021 (see NEJM reference) non-inferior to Copper IUD up to 5d post unprotected intercourse.
  - IUDs are more effective than Ella and Plan B and provide the benefit of ongoing contraception.
- Copper IUD
  - A copper IUD can be considered for emergency contraception up to 7 days post intercourse – this is the most effective at preventing pregnancy, 98.7% (at five day mark)
- Indications:
  - Failure to use a contraceptive device
  - Condom breakage/leakage
  - loss of diaphragm/cervical cap
  - missed 2 or more pills that cycle
  - late Depo-provera injection (ie > 1 week)
  - ejaculation on ext genitalia
  - inaccuracy of fertility times



- sexual assault

- 
- 

### .Depo provera

- comes in pre-filled syringe
- side effects: irregular bleeding especially in the first few months, amenorrhea, weight gain, headache, mood changes, potential reduction in bone density which may not be reversible and delayed return to fertility. Advised to take Vit D 1000IU OD and to achieve 1200mg of Ca per day, preferably through diet.
- dose q12 weeks
- 

### .Nexplanon

- counseling
  - she could expect 2-3 months of irregular bleeding but most women eventually have a lighter or absent menses. A lesser proportion have a frequent or prolonged bleeding. We discussed the effectiveness and the rapid return to fertility once the implant is removed. There is a small chance of weight gain, mood changes, depression, headache or acne but few women discontinued the device because of this
- insertion
  - The patient was positioned appropriately with the left hand (or right) under her head
  - The insertion site was marked 5cm inferior to the sulcus between the biceps and triceps muscle and 10cm proximal to the medial epicondyle of the humerus
  - The area was cleaned with betadine. Anesthesia was achieved with lidocaine 2% without epinephrine.
    - Local: inject very superficially. Make sure lots of anesthesia at the initial insertion site.
    - Then clean with betadine again
  - The implant was inserted easily and was palpable just subdermally in the marked area
    - Again, insert the implant as superficial as possible. tenting the skin as you insert.
    - then slide the button to release the implant
- scheduling insertion appointment
  - no need to rule out chlamydia/gonorrhea, unlike for IUD
  - ask patient to call on first day of next period and insert it within a week. this is so we know the patient isn't pregnant.
- Removal
  - inject lidocaine just under the rod.
  - make an incision parallel to rod.
  - Use forceps with teeth to grasp the rod
  - close incision with steri-strips. Apply dressing. Can remove dressing in 24-48h. Leave the steristrips on for 5 days

### .Postmenopausal vaginal bleeding

- DDx:
  - atrophy, HRT, anticoagulation, infection
  - structural (polyps, endometrial hyperplasia, fibroids, adenomyosis),
  - adjacent organs (urethritis, UTI, IBD, hemorrhoids),
  - radiation therapy,
  - cancer
- S: trauma; postcoital; pain, fever; change in bowel, bladder function; medications (anticoagulant, hormones); fam hx of cancer;
- 

### .miscarriage.spontaneous abortion

- Presentation
  - Uncomplicated pregnancy loss
    - hemodynamically stable, at low risk of becoming hemodynamically unstable based on the volume of bleeding, and without evidence of infection.



- Complicated pregnancy loss –
  - hemorrhage and/or infection, which can be severe.
- Asymptomatic loss
  - can be diagnosed by bHCG and transvaginal U/S before onset of symptoms.
- Complete versus incomplete
  - complete or incomplete emptying of the uterus.
- Diagnosis/investigations
  - Transvaginal ultrasound is generally performed in all pregnant individuals with signs or symptoms suggestive of pregnancy loss to confirm both an intrauterine gestation and evidence of viability.
  - Bloodwork: blood type, antibody screen for Rh. BHCg.
- Management
  - if failed pregnancy seen on U/S
    - don't recommend watchful waiting
    - offer mifegymiso. see notes on Medical abortion.
    - Follow-up: U/S 2 weeks later to confirm passage of gestational sac. If the patient's history is consistent with completion and the ultrasound shows absence of a gestational sac, the pregnancy loss should be considered completed.
  - Treatment for miscarriage ranges from “watchful waiting”, to misoprostol (400 to 800 mcg PO/PV) or mifegymiso, to D&C. Proceed to treatment when bleeding >2wk or heavy bleeding or pelvic pain.
  - If Rh negative. Give rhogam if above 8 weeks.

#### .therapeutic abortion.abortion.medical abortion - contraindications, risks

- when patient tells you they are pregnant, don't assume their feelings.
  - how do you feel about this? Is this good news?
  - is this planned or unplanned.
- Planning
  - Make sure you find a pharmacy that stocks the medication.
  - Make sure you have a good U/S place that can do them quickly.
- Contraindications to medical abortion
  - Known or suspected ectopic pregnancy
  - An IUD in place
  - Uncontrolled asthma. Note: inhaled corticosteroids for asthma not a contraindication
  - Inherited porphyria
  - Chronic systemic corticosteroid use
  - Adrenal failure
  - Hemorrhagic disorders
  - Use of anticoagulants
  - Known allergy to mifepristone or misoprostol
  - Anemia Hgb < 95 (relative contraindication)
- risks of medical abortion
  - Retained products of conception      3 to 5%
  - Ongoing pregnancy   0.5 to 1%
  - Pelvic infection—all kinds      1%
  - Hemorrhage requiring IV fluids or transfusion      <1%
  - Life-threatening infection (e.g., toxic shock syndrome)      0.001%
  - Mortality      0.00004% (0.4 in 100,000). Risk of death from full term pregnancy is 12 times greater than the risk of death from abortion
- other considerations

- breastfeeding can continue uninterrupted. The medication is excreted into breast milk at low concentrations and clear within 2 hours
- incidence of complications in adolescents is the same or lower than in adults. Adolescents can have medical abortions if they consent.
- Obese and non-obese patients have identical rates of success.
- Same procedure for multiples. No modifications to regimen.

## .therapeutic abortion.medical abortion - evaluation, counseling

### • Initial Investigations

- Dating U/S to confirm dates.
  - If don't see intrauterine pregnancy. Ddx: too early, ectopic, failing pregnancy.
    - If bHCG <2000, ok to do MA.
    - if >2000 and no symptoms of ectopic, trend bHCG and recheck U/S in 1 week. If still no IUP, refer to gyne.
  - If poor access to U/S, may use LMP if periods are regular. But if risk factors for ectopic (e.g. IUD), then need U/S to confirm intrauterine pregnancy
- CBC. ensure Hb > 95. less than 95 is a relative contraindication
- If >8 weeks, Check Rh status. No need for rhogam if <8 weeks so no need to check Rh status.
- Serum beta HCG. Done on day 1 of MA. Day 7: >80% reduction.
- Urine G&C.

### • Rh status

- if Rh negative, give Rhogam if  $\geq 8$  weeks.

### • Giving rhogam

- 120mcg
- receive treatment within 72 hours after bleeding commences.
- need to find a location in your community where your patient can access it.

### • Counseling:

- use the word termination instead of abortion?
- Approved up to 63 days (9 weeks). SOGC guidelines say may use up to 70 days (10 weeks). 95-98% success rate. but need to proceed with surgical abortion in event of failure as medications are bad for the fetus.

### ○Regimen

- Day 1: mifepristone po (green box)
- Day 2-3: misoprostol 4 pills buccally (orange box). Causes cramping and nausea.
  - Place 2 tabs between gums and cheeks on both R and L side of mouth and wait 30 min before swallowing remainder
  - if GA 64 to 70 days (9-10 weeks): need a second dose of misoprostol at 4h. otherwise, second dose at 4h is only needed if no bleeding.
- for pain: ibuprofen and morphine

### ○bleeding: see below

### ○Will have 10-14 days of spotting

### ○To monitor: day 1 bloodwork and day 7 bloodwork

### ○advise on which pharmacy carries mifegymiso

### ○discuss contraception

### • key side effects to discuss: bleeding, pain, prostaglandin effect

- bleeding will start within 1-2h of misoprostol. Very heavy bleeding for 4-6 h. May see gestational sac/tissue passed. Use Heavy pads.
  - As a rule of thumb, up to two pads an hour for two consecutive hours is about the maximum amount of bleeding to expect, and clots may come out during that time.
  - If your patient experiences dizziness or a racing heartbeat or is using more than two pads an hour for two consecutive hours, the bleeding is excessive. In this situation, advise your patient to call you or present at an emergency room.
  - If no bleeding by 24h. Consider second dose of misoprostol.
- pain management

- Ibuprofen 600–800 mg every four to six hours—begin 30 minutes before misoprostol or with onset of cramping; OR
  - Naproxen 500 mg by mouth every 12 hours
- Add acetaminophen as needed
- Advise your patient that NSAIDs do not interfere with medication abortion efficacy and are more effective than acetaminophen
- Avoid narcotic analgesics
- Medication abortion tends to be more painful than a bad period and less painful than childbirth.
- Prostaglandin effect
  - prostaglandin effect may also cause them to experience nausea, diarrhea, vomiting, mild fever, and chills.
  - Symptoms are self-limited and should be gone the day after misoprostol administration—often by next morning.
  - Prostaglandin symptoms lasting longer than 24hrs are abnormal and need to be evaluated.
  - An anti-emetic such as Gravol can help with nausea. (For extreme nausea, you may need to prescribe a stronger anti-emetic.)
- Prescription
  - Mifegymiso 200 (1) - 200mcg (4). Quantity: 1 box
  - Ibuprofen 600mg 1 tab tid prn for 3 days. 10 tabs
    - take 1 tab 1h before the misoprostol
  - Morphine 5mg 1-2 tab q4-6h prn for 3 days. 12 tabs
    - Give to patient just in case. But rarely needed
  - Misoprostol 200mcg. Take only if no bleeding after 4h. 4 tabs.
    - if GA ≥ 9 weeks, then should take the additional dose routinely.
  - Place 2 tabs between gums and cheeks on both R and L side of mouth and wait 30 min before swallowing remainder
- Follow-up
  - NAF and SOGC guidelines require you to provide 24-hour emergency care for your patients for 14 days during and after the medication abortion.
- Monitoring
  - get a bHCG on day 1, day 7. Beta HCG should drop by 80% by day 7. No need to trend to 0.
  - if failed pregnancy seen on U/S: no need to trend bHCG. Instead, get a follow-up U/S on day 10 to ensure successful abortion with no retained products.
- Contraception
  - Discuss IUD vs OCP vs nexplanon. Can start those at around day 7-14
- Complications
  - betaHCG doesn't drop by 80%: may re-try misoprostol. Else refer for surgery
  - PID: treat with clavulin or doxy/ceftx
  - Prolonged bleeding. moderate/severe Bleeding beyond day 14. Recheck beta HCG. may consider U/S to r/o retained products. Need to clarify whether bleeding has stopped and restarted vs never stopped.
    - U/S to r/o retained products of conceptions
      - normal: endometrial thickness, doppler flow, and hyperechoic tissue after medication abortion care, like in this image. Even if reported as RPOC, this may not be clinically significant.
      - If see gestational sac or yolk sac: this is not normal. This suggests RPOC.
    - may offer misoprostol 800mcg x2, 24h apart or ER for D&C
      - if choose medical management, f/u in 1 week. If bleeding resolved, then no further investigations. If still bleeding, refer to ER for D&C.
      - advise on red flags to go to ER.
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  - counseling
    - may be painful. heavy bleeding.
    - need to proceed to surgical procedure in event of failure. 95% success rate
    - medical abortion is an option:
      - up to 9 weeks on label

- up to 10 weeks off label
- Contraindications:
  - Uncontrolled asthma or adrenal failure (mifepristone)
  - Inherited porphyria (mifepristone)
  - Ectopic pregnancy (mifepristone)
  - IUD in place (ok if removed)
  - Drug interactions (mifepristone, relative – phenytoin, rifampin, St Johns wort)
  - severe anemia with Hb <95 (relative)
  - anticoagulants (relative)
  - uncertain dates (confirm first)
  - long term steroid therapy (mifepristone, may require dose adjustment)
  - IBD (mtx/miso)
  - Liver or renal disease (mtx/miso)
  - Ambivalent re decision to abort
- Determination of Gestational Age:
  - Qualitative urine BHCG is sufficient to establish pregnancy
  - Dating ideally via early ultrasound, correlation with quantitative BHCG may be used
  - May be determined by reliable LMP, clinical history and physical exam
  - Ectopic must be excluded if symptoms of pain or bleeding are present or significant risk factor for ectopic pregnancy (prior ectopic, tubal surgery, IUD, hx PID)
- Mifepristone/Misoprostol
  - Better access to abortion in countries where mifepristone is approved
  - Mifepristone: potent antiprogesterone, breaks down endometrial lining, softens cervix, increases sensitivity to misoprostol
  - Misoprostol: causes uterus to contract and expel contents
  - Counselling: expect heavy bleeding, cramping, chills in the 6h after miso. light bleeding typically up to 2 weeks. use pads only. pain management NSAID +/- opioid. nausea, vomiting, diarrhea, dizziness, fever, headaches. Ongoing contraception.
  - Complications: heavy bleeding, incomplete abortion, fever after 24h
  - Route/Dose: Mifepristone 200 mg po, Misoprostol 800 mcg buccal/PV 24-48h later
  - Efficacy: 95-98% within 49d of LMP with <1% risk of ongoing pregnancy, 87-98% up to 63d of LMP with <3.5% risk ongoing pregnancy (But can use off label to 70d)
- Methotrexate/Misoprostol
  - Route/Dose: Typically Methotrexate 50 mg/m<sup>2</sup> IM followed by misoprostol 3-5d later (eg. 800 mcg SL/PV q3h)
  - Efficacy: 84-97% up to 63d of LMP with risk 0.4-4.3% of ongoing pregnancy
  - more annoying than mifepristone/misoprostol since the methotrexate is an injection and takes longer to work.
- Mife/Miso vs. MTX/Miso: mean number of days to completion 3.3 days vs. 7.1 days
- Follow-up
  - PEARL: ensure you have means to contact the patient
  - Serial BHCG showing drop of 80% at 7-14d, or 30% at 3d
  - Ongoing pregnancy or incomplete abortion
    - If retained gestational sac or ongoing pregnancy can consider 2nd dose misoprostol or D&C
    - If >14d refer for D&C
  - Ongoing contraception
    - Ovulation may occur as soon as 8d
    - IUD may be inserted as soon as completion of medical abortion is confirmed
    - COC may be started on same day as misoprostol
    - Limited data regarding POP and IM depot progesterone
- Rh immunoglobulin
  - Fetal RBCs express Rh antigen from 52d
  - Recommended for Rh neg patients if >49d, can offer if <49d
  - Ideal timing is 24h before medical abortion

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## .therapeutic abortion.abortion.medical abortion – contraception

- Timing of contraception
  - IUD: after passage of pregnancy
    - optimal time: may be 7-14 day followup appointments
  - implant: on day of mifepristone
  - OCP: on day of mifepristone
  - injectable DMPA: more evidence needed – 1 week
  - 
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## .abortion - other

- Common misconceptions/myths
  - post abortion stress syndrome isn't real. Best indicator of mental health after abortion is their mental health prior. Although people have a range of emotions around the time of an abortion, including sadness, relief, guilt, happiness, or feeling numb, when they are followed over years, over 99 percent of people who choose abortion say it was the right decision for them.
  - Abortions do not increase risk of breast cancer.
  - Abortions, when carried out by a medical practitioner, are safe. But they may have been risky historically when illegal. Serious complications like serious infection, or bleeding requiring transfusion, occur in far less than one in 100 abortions. The risk of death as a result of abortion care is less than a tenth of the risk posed by childbirth.
- Cost
  - abortion care is free in BC and throughout Canada, except New Brunswick.
- Components of informed consent
  - competence: ability to reason, understand, and appreciate the consequences of their decision.
  - Understanding of nature of proposed treatment, alternatives and risks/benefits of each.
  - Appreciation: they appreciate the consequence of the decision
  - decision making is voluntary and free from coercion
  - Determining evidence of a choice made by your patient.
- Informed consent not present
  - consider referral: child/family services, victim services/crisis shelter
- responding to challenging questions
  - is it a baby
    - medical terminology: pregnancy is an embryo until 10 weeks of pregnancy. Then it's called a fetus until birth. At birth, it's called a baby
    - "That's the medical terminology, but the truth is you get to use the word that feels right to you. You also get to decide how you feel about the pregnancy no matter which word you decide to use. What's important is what's meaningful to you."
- Mifegymiso.
  - Mifepristone: green box
  - Misoprostol: orange box

## .VAGINAL BLEEDING.Abnormal Uterine Bleeding.AUB

- DDX: cervical cancer, endometrial cancer, molar pregnancy, dysfunctional uterine bleeding, spontaneous abortion, ectopic pregnancy, cervicitis, PCOS
  - polyps - cervical or endometrial: intermenstrual bleeding
  - adenomyosis: heavy or prolonged bleeding. menstrual pain. dense enlarged uterus
  - leiomyoma - myoma or fibroids: heavy or prolonged bleeding. pelvic pain/pressure. enlarged uterus
  - malignancy/hyperplasia: variable bleeding patterns

- COEIN: coagulopathy, ovulatory dysfunction: irregular bleeding, heavy or prolonged bleeding; endometrial, iatrogenic, not yet specified.
- AUB
  - Volume: changing tampons/pads > q3h
  - regularity: normal is 2-20 days
  - period frequency: normal is every 24-38 days
  - duration of period: normal is 3-8 days
  - irregular, non-menstrual
    - intermenstrual bleeding
    - post-coital
    - premenstrual/post-menstrual spotting
  - outside reproductive age
    - post-menopausal or precocious
- ovulatory vs anovulatory
  - ovulatory AUB: typically regular and often accompanied by premenstrual symptoms and painful periods
  - anovulatory AUB:
    - irregular, heavy and/or prolonged bleeding
    - is common near menopause
    - e.g.: PCOS, thyroid disease, Cushing syndrome, hyperprolactinemia
- History
  - signs of anemia: presyncope, SOB/OE
  - Last menstrual period;
  - pre-, peri-, post-menopausal status;
  - duration, amount;
  - menstrual history;
  - associated discharge; pelvic or abdominal pain; urinary symptoms; trauma; medications or contraceptives; history of easy bleeding or bruising; history of abnormal Pap smears; prior episodes; pregnancy history.
- O: Vital signs; abdominal exam; complete pelvic exam.
  - speculum: look for active bleeding, cervical polyp, friable cervix
- When to do the workup
  - if just heavy period
    - if always had heavy periods, we are more reassured. can proceed with IUD/OCP
    - if recent change in bleeding, do the workup.
  - For perimenopausal women, consider reassurance if heavy bleeding is only intermittent. Consider investigations if there is a consistent pattern of heavy bleeding and periods are getting closer together.
  - If a single isolated bleeding event and no hemodynamic stability. Do not need evaluation other than keep a menstrual diary
  - but if single episode of postmenopausal bleeding, needs evaluation.
- Investigations
  - Pap smear if not up to date.
  - pelvic ultrasound
  - labs
    - CBC, beta-HCG, TSH,
    - PT, aPTT.
      - may consider vWF if abnormal
    - iron studies
    - gonorrhea, chlamydia
    - if irregular bleeding. ovulatory dysfunction
      - TSH, prolactin,
      - LH, FSH, E2, DHEAS, free testosterone.
  - endometrial sampling if:
    - postmenopausal

- age >40 AND
  - frequent (interval < 21 days) OR heavy, OR prolonged (>8 days) OR intermenstrual bleeding
- age < 40 AND
  - risk factor: obesity, PCOS, high risk of endometrial cancer (e.g. HNPCC)
- persistent AUB
- acute/emergent management
  - Premarin 25 mg in 5 ml isotonic saline over 2 min (may repeat q6h if bleeding continues)
    - causes vomiting so give prochlorperazine IV 2.5-10 mg or similar
    - risk of DVT
    - CI: VTE, inherited thrombophilia, MI, CVA, Malignancy
    - Relative CI - need to counsel: HTN, smoking, diabetes, SLE
  - Minovral (or other 35 ug combined BCP) 2 pills daily for 5d then 1 pill daily for 20 days, then will have withdrawal bleed
    - discuss risk of thrombosis
  - Tranexamic acid
    - 1 g IV q6h
    - 500 mg tabs, use 2-3 tabs TID to QID to control bleeding
  - Progestins
    - MPA 10 - 20 mg po bid
    - Megestrol acetate 20-60 mg po bid
  - - combined OCP (Marvelon) tid x7 days
    - OR Medroxyprogesterone acetate (Provera) 20mg tid x7 days
    - OR tranexamic acid 1g po tid x5 days
- AUB-heavy menstrual bleeding
  - mirena IUD
  - OR combined OCP: >30mg ethinyl estradiol (Marvelon)
    - first line: cyclic, continuous
    - second line: bid x5 days, then daily for acute bleeding
  - OR tranexamic acid. not as effective
    - Tranexamic acid 1g qid. contraindicated in previous VTE
  - OR NSAIDs. not as effective
    - Ibuprofen 1200mg x1, then 600mg tid x3-5days
    - OR Naproxen 1000mg x1, then 500mg bid x3-5 days
- AUB-ovulatory dysfunction
  - mirena IUD
  - OR combined OCP
  - OR progestin
- for patients trying to conceive
  - oral progestin therapy
- for patients on anticoagulation therapy
  - evaluate for etiology. structural lesions can be removed
  - may use OCP or progestin only
  - if history of VTE on warfarin
    - prefer progestin only therapy, such as IUD
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## VAGINAL DISCHARGE:

- S: Discharge amount, color, consistency, odor, duration; associated vaginal burning, pain, or pruritus; recent sexual activity; sexual history; onset of last menstrual period; use of contraceptives, tampons, and douches; history of similar symptoms; history of sexually transmitted infections.
- O: Vital signs; abdominal exam; pelvic exam.

- DDX: bacterial vaginosis, candida, trichomonas, cervicitis (chlamydia, gonorrhea)

#### [.Vaginal yeast infection.candidiasis](#)

- 30% of vaginitis
- Symptoms: itch, dysuria, "cottage cheese" discharge, recent antibiotic use, diabetes, steroid use, pregnancy
- Treatment
  - Fluconazole (Diflucan) 150 mg po x1
  - Clotrimazole (Canesten)
    - 500 mg tab PV x1
    - 200 mg pv daily x3 days
    - Clotrimazole 10% PV x1 dose
    - Clotrimazole 2% PV daily x3d
  - Miconazole (Monistat)
  - Terconazole (Terazol)
  - Butoconazole 2% cream 5g PV x1
- Recurrent infections
  - Fluconazole 150 mg po q72h x3, then qweekly for 6 months CI in Pregnancy
  - Investigate and refer if >4 recurrences/yr
  - Treat diabetes, HIV
  - Prophylaxis: Consider at onset of abx for prone women (use fluconazole)
- pregnancy
  - only treat if symptomatic. don't use oral medications

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#### [.bacterial vaginosis.BV](#)

- 50-70% of vaginitis
- Symptoms: thin, watery discharge, no vulvar erythema
- Flagyl: Antabuse effect! avoid alcohol
  - Flagyl 500 mg po bid x7d
  - Flagyl 2g po single dose
  - Flagyl 0.75% gel 5 g qhs pv x 5d
- Clindamycin 300 mg po BID x 7d
- Vit C 250 mg PV x 10d
- management/diagnosis
  - should not treat empirically
  - should always do a swab with speculum examination. Clinician performed examination with speculum was more likely to result in correct diagnosis of BV compared with self obtained vaginal swab.
  - Suggest observation and not antibiotic treatment for asymptomatic nonpregnant individuals.
- Patients for whom treatment not indicated
  - Asymptomatic non-pregnant
  - asymptomatic sex partners: data do not support treatment of asymptomatic sex partners
- Less effective treatments
  - boric acid alone not effective for BV. May be helpful in a supportive role with primary antibiotic therapy.
- Prevention
  - may try using condoms
  - hormonal contraception also associated with reduction in BV

#### [.Trichomoniasis :](#)

- 3 to 4 % of vaginitis
- Profuse vaginal DC, frothy yellow, may have "strawberry cervix"
- treat sexual partner



- Treat with Flagyl (dosing same as for BV)

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### .Vaginitis.vulvovaginitis

- DDx: Gonorrhea, Chlamydia, candida, BV, trichomonas, foreign body, vulvovaginal atrophy
  - Inflammation: vulvar dermatitis, desquamative inflammatory vaginitis
  - Pruritus: vulvar dermatitis, lichen sclerosus, lichen planus, psoriasis, eczema,
  - Malignancy: vulvar intraepithelial neoplasia
- S:
  - LMP;
  - # sexual partners in past year; protection
  - change in discharge (quantity, color, consistency, odor);
  - fever; burning; pruritus; bleeding, spotting; dyspareunia; pain
- Investigation
  - vaginal swab
- Management
  - BV: metronidazole 500mg po bid. 7 days
  -

### .yeast infection.candida vulvovaginitis

- Diagnosis
  - based on candida on wet mount
  - suspected clinical diagnosis should always be confirmed by laboratory methods. Self diagnosis is not recommended.
- Risk factors
  - antibiotics
  - hormonal contraceptives (estrogen), IUDs, vaginal sponge
  - pregnancy, diabetes, being sexually active
- Treatment
  - asymptomatic individuals do not require treatment
  - most yeast infections improve within a few days of starting treatment
  - uncomplicated
    - Fluconazole (Diflucan) 150mg po. Single dose
    - Miconazole (monistat)
      - 2% cream. 1 applicatorful daily for 7 days
      - 4% cream. 1 applicatorful daily for 3 days
      - 100mg vaginal suppository. 1 suppository daily for 7 days
      - 200mg vaginal suppository. 1 suppository daily for 3 days
  - complicated: severe, recurrent, nonalbicans species, patient immunosuppressed, uncontrolled DM, pregnant
    - if severe or immunocompromised
      - Fluconazole 150mg po. 2 doses. 3 days apart
    - candida glabrata: intravaginal boric acid 600mg daily at night for 2 weeks.
    - Candida krusei: topical (cream or suppository) -azole other than fluconazole. May use clotrimazole, miconazole or terconazole
    - pregnant: topical clotrimazole or miconazole.
  - Recurrent candida vulvovaginitis ( $\geq 4$  episodes per year)
    - suggest suppressive maintenance therapy.
    - Induction with fluconazole 150mg q72h for 3 doses. Then maintenance fluconazole 150mg weekly for 6 months.
    - Should probably see ID first before starting suppressive maintenance therapy.
- Natural course
  - some mild yeast infections go away on their own, but not all cases do.

## .Menorrhagia

- S:
  - <https://www.aafp.org/afp/2007/0615/p1813.html>
  - LMP
  - volume of blood:
    - number of pads
    - clots
- P:
  - refer to gyne
  - bloodwork
  - treatment
    - OCP, IUD, oral progestens.

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## .PCOS

- DDx of ovulatory dysfunction
  - pregnancy
  - hypothalamic amenorrhea
  - hyperprolactinemia
  - thyroid dysfunction
  - primary ovarian insufficiency
- DDx of ovulatory dysfunction and clinical hyperandrogenism
  - PCOS
  - non-classic congenital adrenal hyperplasia: consider 17-OHP
  - androgen-secreting neoplasm: dx clinically: clitoral megaly, voice dropping (consider testosterone, DHEAS)
  - Cushing's: dx clinically
  - acromegaly: dx clinically
- pathophysiology
  - imbalance in LH/FSH secretion. causes oligo or amenorrhea
  - increased androgen production in ovary. this causes hyperandrogenism
  - insulin resistance: tendency for weight gain
- Diagnosis is usually made if the patient has two of the following:
  - oligomenorrhea: cycle lengths > 35
  - polycystic ovaries on U/S,
  - hyperandrogenism or hyperandrogenemia
    - hirsutism, acne, androgenic alopecia
- Risks with PCOS
  - She has a higher risk of developing HTN and DM
  - She is having a higher risk of developing endometrial cancer as of continuous exposure to unopposed estrogen.
- Investigations
  - beta HCG, prolactin, TSH, FSH to rule out other causes of oligomenorrhea
    - not necessary to measure LH as LH:FSH ratio isn't part of criteria
  - if hyperandrogenism
    - with oligomenorrhea:
      - serum total testosterone. If serum testosterone >150ng/dL, need evaluation for more serious causes of hyperandrogenism (ovarian and adrenal androgen secreting tumors)
      - Morning serum 17-OHP to rule out nonclassic congenital adrenal hyperplasia.
      - other androgen measurements
        - do not suggest routine measurement of serum free testosterone or DHEAS.
  - FSH, E2 ± LH
    - gonadotrophic agonism. bloodwork normal.

- high LH, FSH, low estrogen: problem with ovaries. premature ovarian failure
- low LH, FSH, low estrogen: problem with pituitary.
- adrenal issue: very high DHEAS.
- slightly high DHEAS and testosterone: probably PCOS.
- Additional evaluation after diagnosis
  - Cardiometabolic: HbA1c, lipids, VMI
  - screen for depression, sleep apnea
- Management if does NOT want pregnancy
  - combined hormonal contraceptives. will help with hyperandrogenism and oligomenorrhea
  - antiandrogenic therapy
    - spironolactone 50-100mg 1-2x daily
    - Finasteride 2.5-5mg daily
    - flutamide not recommended due to hepatotoxicity
  - progesterone
    - IUD (e.g. Mirena)
    - depo provera
    - etonogestrel contraceptive implant (e.g. Nexplanon)
  - For irregular period: She needs to have her period coming at least once every three months with giving progesterone and waiting for withdrawal.
  - For Hirsutism the options are hair removal, OCP, and aldosterone (spironolactone?)
- Management for infertility and PCOS
  - lifestyle modification: exercise, weight loss
  - For infertility; Metformin and ovarian stimulation with clomid or Letrozole.
  - aromatase inhibitors (letrozole)
    - blocks peripheral estrogen synthesis
    - shown superior to clomiphene citrate for ovulation induction in PCOS
    - start with 2.5-5mg day 3-7 of cycle and confirm ovulation with day 24 progesterone
    - 8-10% risk of twins. 1% risk of triplets
  - clomiphene
    - historically used for ovulation induction in PCOS
  - failure with clomiphene/letrole
    - injectable gonadotropins. increased risk of ovarian hyperstimulation syndrome and multiple pregnancies

## • Infertility

- When to start evaluation
  - After 12 months of frequent intercourse: Age < 35 and no risk factors
  - after 6 months: Age 35-40
  - Upon presentation:
    - Age > 40
    - oligomenorrhea/amenorrhea
    - Chemo, radiotherapy, advanced endometriosis
    - uterine/tubal disease
    - Male partner: groin/testicular surgery, adult mumps, impotence, infertility with another partner
- Investigations
  - Semen analysis
  - Hysterosalpingogram to test tubal patency
  - pelvic U/S
  - Mid-luteal phase (Day 21) progesterone to check if ovulating
    - probably not necessary. because if cycles are regular, you know they're ovulating.
  - Day 3 FSH for ovarian reserve.
  - TSH, HbA1c, Hb electrophoresis (thalassemia), CBC, rubella, HIV, Hep B
- age is the only predictor of oocyte quality

- most patients become infertile approximately 10 years prior to final menstrual period
- frequency of intercourse
  - abstinence intervals >5 days affect sperm quality
  - should have sex q1day, q2days, or q3days during ovulation
- ovulation prediction
  - usually ovulate 14 days prior to period
- fertile window
- coital practices
  - no need to remain supine after intercourse. it is the semen that leaks out. the sperm stays in.
- lifestyle modification
  - supplement with folic acid 0.4mg to decrease risk of neural tube defects
  - smoking cessation in both partners
  - avoid being underweight (BMI <19) or overweight (BMI >35)
  - decrease alcohol to <2 drinks/day
  - optimize frequency/timing of coitus: 2-3 times per week
  - avoid overheating the testicles

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## Pap Smear

- Sampling technique
  - Thin prep, liquid based cytology in BC
    - use both plastic spatula (rotate 360 deg) and endocervical brush
    - plastic spatula: swirl vigorously 10 times. Endocervical brush: rotate while pushing against the vial wall 10 times and swirl vigorously
  - single slide method
    - need to sample transformation zone
    - rotate spatula 360 degrees once. Smear sample lengthwise onto slide
    - if squamocolumnar junction not visible, also use cytobrush. Rotate 180 degrees only. Place both specimens side by side lengthwise.
    - Fix sample with cytology spray fixative
- screening guidelines
  - start: age 25 if ever sexually active
  - stop: after age 70 if ≥ 3 consecutive normal pap tests
  - frequency: q3 years
- S:
  - LMP:
  - abnormal vaginal discharge, bleeding
- Preparation
  - take out the following swabs/containers
    - for yeast/BV: vaginal swab
    - pap smear: endocervical brush, container with preservative
    - for gonorrhea/chlamydia: endocervical swab, container with preservative
    - lubrication jelly
    - speculum
  - take out the stirrups.
  - ask the patient to take bottoms off. have the gown to drape.
  - step out and ask for a chaperone
- inserting speculum
  - apply jelly to speculum.
  - ask patients to bring knees to the side. and bring butt to edge of table. and feet in stirrups.
  - fingers to spread labia

- insert speculum at 45 degree angle
- push in speculum. aim for the creases/path in the vaginal wall.
- if can't find cervix right away, pull back and try different angles. try aiming downward if straight ahead doesn't work.
- lab requisitions
  - for other swabs: General lab requisition:
    - vaginal swab
    - chlamydia and gonorrhea: cervical
  - Pap smear: Cytology
- troubleshooting
  - finding cervix
    - aim for the creases up ahead, formed by the vaginal wall, which signifies the path to the cervix.
    - if can't find cervix right away, pull back and try different angles. try aiming downward if straight ahead doesn't work.
  - If patient unable to hang bum off edge of bed. Could put pillows under lower back. or have patient put fists under their lower back.
    - may also try the frog position

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### .Vaginal Atrophy.Vulvovaginal Atrophy.Vaginal estrogen

- first line is vaginal moisturizers/lubricants
  - moisturizers: Replens, Vagisil Moisturizer, Feminease, Moist Again, K-Y Liquibeads, Hyalo GYN
  - lubricants during sexual activity: Astroglide, Slippery Stuff, K-Y Jelly
- second line is Vaginal estrogen
  - [https://www.uptodate.com/contents/image?imageKey=OBGYN%2F58506&topicKey=PC%2F6881&search=overactive%20bladder&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=OBGYN%2F58506&topicKey=PC%2F6881&search=overactive%20bladder&source=see_link)
  - Ring: estring.
    - 7.5mcg estradiol per day. removed and replaced every 90 days.
  - Insert: vagifem.
    - 10mcg estradiol per vaginal tablet. insert daily for 2 weeks. then twice weekly
  - Cream: premarin, estrace
    - 0.5g - 1g of cream intravaginally administered daily for 2 weeks, then reduce to twice weekly
  - Progesterone supplementation, for an intact uterus, is not required if using these doses/intervals
- patients with breast cancer
  - if treated with SERM: may treat with vaginal estrogen or vaginal DHEA
  - if treated with aromatase inhibitor: suggest not using vaginal estrogen, DHEA (prasterone), or testosterone
- vaginal estrogen is safe for breast, endometrial cancer survivors

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### .hot flashes

- Hot flashes tend to resolve in 85 to 90 % of women in 4 to 5 years – 10 to 15 % of women experience them for many years and 9% of 72 y/o women still have hot flashes
- Management
  - Single most effective treatment is HRT – CES 0.625 mg od reduces hot flashes by 94% but other options exist:
  - Venlafaxine 75 mg od – decrease by 34% over placebo
  - Paroxetine 20 mg od/25 mg od – decrease by 25 % over placebo
  - Medroxy progesterone acetate 20 mg od – decrease by 48% over placebo but ++ s/e
  - Gabapentin 300 mg tid – decrease by 31% over placebo
  - Clonidine 0.05 mg bid – decreased by 27% over placebo
  - Black cohosh – possibly helpful
  - Red clover/ Evening primrose oil/Dong Quai/ Ginseng – not helpful

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### .Menopause

- definition: final menses. confirmed after 12 consecutive months without menses

- it is a clinical diagnosis
- no need for lab investigations to make the diagnosis.
- average age 51-52 years
- symptoms
- vasomotor symptoms:
  - hot flash, night sweats
  - typically last 5-7 years. but may last >10-15 years
- genitourinary syndrome of menopause
  - genital dryness, burning, irritation
  - decreased lubrication: pain with sex
  - urinary: urgency, dysuria, recurrent UTI
- sexual issues
  - decreased libido
  - dyspareunia
  - arousal, orgasm difficulties
- mental health: mood changes common due to hormonal fluctuations
  - increased risk of depression
- non-hormonal treatments
  - weight loss
    - losing 10 lb: 23% more likely to eliminate vasomotor symptoms
    - losing 10%+: 56% more likely to eliminate vasomotor symptoms at 1 year
  - CBT
  - clinical hypnosis
  - SSRI, SNRI
    - Paroxetine has best evidence: start at 10mg.
  - gabapentinoids
  - clonidine
    - fallen out of favour due to side effects. e.g. hypotension
- not recommended conservative options
  - lifestyle modifications aside from weight loss
  - supplements: black cohosh, evening primrose,
    - possible evidence for soy, but not enough to recommend
  - other treatments: acupuncture, chiropractic
- 

## [.Hormone Replacement Therapy.HRT](#)

- primarily used to control menopausal symptoms
- when to start
  - early initiation: <10 years post menopause
    - increase risk of VTE, but no change in stroke
    - decrease risk of CHD
    - decreases all cause mortality
  - later initiation
    - increased risk of stroke and VTE
    - no effect on CHD
    - no effect on all cause mortality
- when to stop
  - usually duration of 3-5 years. may consider extended use of HRT if symptom relief outweigh risks.
    - increased risk of CAD, CVA after 5 years
  - periodic trial of lowering or discontinuing HRT
  - no need to routinely discontinue HRT when age > 65
  - if tapering is unsuccessful, keep the patient at the lowest effective dose.

- transdermal route is safer for systemic administration
- ensure has progesterone for uterine protection
- tapering: abrupt withdrawal of exogenous estrogen may result in return of hot flashes
  - pills: decrease by one pill per week every few weeks (e.g. 6 pills per week for 2-4 weeks, then 5 pills per week for 2-4 weeks)
  - transdermal: taper over 3-6 months.
- pros and cons of stopping
  - cons
    - return of vasomotor symptoms, vaginal atrophy. may be managed with clonidine, venlafaxine and topical vaginal estrogen
    - resumption of bone loss
  - pros
    - decrease in breast cancer risk
    - decrease in VTE, stroke, CAD
- Dosing
  - [https://www.uptodate.com/contents/image?imageKey=ENDO%2F78136&topicKey=ENDO%2F7450&search=hrt&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=ENDO%2F78136&topicKey=ENDO%2F7450&search=hrt&source=see_link)
  - transdermal route preferred for systemic administration. because it bypasses the liver
  - start at low doses. titrate up until symptoms resolve.
  - Estrace oral 0.5mg to 1 mg once daily. dose range: 0.5 to 2mg/day
  - estradot patch 0.025mg/day patch. apply twice weekly.
  - Progesterone
    - Progesterone 100mg daily
      - 200mg/day for 12 days/month to mimic cycle.
    - if doesn't tolerate oral progesterone
      - IUD
      - vaginal progesterone

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## .premature menopause.premature ovarian failure

- presentation
  - change in menstrual function
  - estrogen deficiency symptoms: hot flashes, vaginal dryness
  - before age 40
- diagnosis
  - FSH in menopausal range (as defined by the measuring laboratory)
  - irregular menses. negative serum hCG. off OCP
    - amenorrhea not required for diagnosis.
  - age < 40
- investigations
  - TSH
  - prolactin
  - FSH
  - E2
  - bHCG
- interpreting FSH, E2 levels
  - if low/normal FSH, low/normal E2
    - primary ovarian insufficiency (POI) vs hypogonadotropic hypogonadism
  - if high FSH, low/normal E2
    - likely POI. repeat FSH, E2 in 1 month to confirm
  - high FSH, high E2

- ddx: gonadotroph-secreting pituitary adenoma. midcycle surge
- additional evaluation after diagnosed
  - serum adrenal cortical and 21-hydroxylase antibodies, 8am serum cortisol, plasma ACTH      r/o autoimmune adrenal insufficiency
  - TSH, anti-TPO      r/o autoimmune hypothyroidism
  - karyotype      r/o Turner syndrome
  - test for FMR1 gene      r/o fragile X syndrome
  - BMD      r/o osteoporosis
- informing patient of diagnosis
  - inform patient in sensitive and caring manner
  - inform: 5-10 percent are able to become pregnant after diagnosis. 50-75 percent experience intermittent ovarian function.
- management
  - Estrogen therapy: until age of 50-51, average age of natural menopause
    - Estradiol 2mg po daily.
      - OR Transdermal estradiol 100mcg patch
    - purpose: reduce risk of osteoporosis, cardiovascular disease, urogenital atrophy
    - also need to add progesterone. e.g. Progesterone 100mg daily.
  - infertility
    - clomiphene to induce ovulation not recommended as not effective
    - oocyte cryopreservation likely not helpful at time of diagnosis, as likely not enough oocytes left at that time. but may be an option if known genetic risk and done before diagnosis.
    - consider IVF with donor oocytes
  - autoimmune endocrinopathy
    - as mentioned above, should measure adrenal antibodies, serum cortisol, ACTH. as well as TSH

#### .Speculum insertion.Vaginal speculum.pap smear

- if having difficulty finding the cervix, may do a vaginal exam first
- troubleshooting
  - if problem of not enough depth
    - have patient hold knees to chest
  - if vaginal walls collapsing in
    - put condom with tip cut off over speculum.

#### .Delay period temporarily.Delay menstruation temporarily

- Norethisterone 5mg TID: start 3-7 days prior to the expected day of period and let her know her period usually comes back 3 days after stopping it

#### .pelvic inflammatory disease.PID

- Abdominal pain/fever/vaginal discharge commonly      R/O pregnancy always
- Physical exam may show signs of purulent cervical DC (30%) and have cervical motion tenderness/adnexal tenderness/masses. usually bilateral findings but not always
- To diagnose PID, must have cervical motion tenderness, adnexal tenderness, lower abdo pain + one of the following:
  - high risk partner
  - fever > 38
  - purulent Cx DC
  - positive culture Chlamydia, GC ect
  - elevated WBC



- adnexal mass/complication
- ESR/hsCRP elevation
- Causative agents: Chlamydia, GC (most commonly) then E coli, Staph, Strep, Enterococcus, Bacteroides ect
- Patient should be admitted if concerns of abscess, immunocompromised, vomiting, signs of SIRS, or moderately/severely ill for iv meds (cefotetan/doxycycline iv or clindamycin/gentamycin iv)
- Out-patient treatment:
  - Ceftriaxone 250 mg IM + Doxycycline 100 mg bid x 14 days (+/- Metronidazole 500 mg bid x 14 days)

## .Ovarian cyst rupture

- signs/symptoms
  - cyst rupture may be asymptomatic or may have sudden onset unilateral, lower abdominal pain
  - onset of pain usually with: strenuous physical activity such as exercise or sexual intercourse
- DDx: ruptured ectopic pregnancy, appendicitis, adnexal torsion, PID
- Investigations
  - Ultrasound
  - beta HCG to rule out ectopic pregnancy
  - CBC
    - WBC usually normal. elevated WBC should raise suspicion for other diagnoses such as infectious or necrotic process
  - testing for STI, UTI to rule out PID or UTI
- complicated cyst rupture
  - hemodynamic instability: hypotension, tachycardia
  - large volume of blood loss or ongoing blood loss
  - signs of infectious: fever or leukocytosis:
- management
  - uncomplicated cyst rupture
    - expectant management
    - nonhemorrhagic cyst fluid usually resorbed within 24 hours and symptoms typically resolve within a few days
    - oral analgesia as needed
    - return to care for increased pain or lightheadedness
  - heavy or ongoing blood loss
    - inpatient observation or surgery
    - observation: vital signs, serial hematocrit testing, repeat pelvic ultrasound to monitor volume of blood
    - large volume hemoperitoneum may take several weeks to resolve
    - if hematocrit continues to decrease or hemodynamically unstable, recommend surgery
  - rupture teratoma
    - spillage of sebaceous material into abdominal cavity. uncommon. can cause shock.
    - emergency surgery suggested

## .Bartholin cyst

- Bartholin glands bilaterally at the vulva at four and eight o'clock position with respect to the vagina. If the orifice of the Bartholin duct becomes obstructed, a cyst (sterile) or abscesses can form
- management
  - Small mass <3cm
    - Signs of infection: I&D with culture. Sitz baths. Antibiotics if high risk for complicated infection
    - No infection: sitz baths and warm compresses
  - Large mass ≥ 3cm
    - Signs of infection: same as for small mass. But also word catheter placement
    - No infection: I&D, word catheter. Sitz baths, warm compresses.
  - role of antibiotics
    - recurrent Bartholin abscess (≥ 2nd occurrence)

- high risk of complicated infection
- culture positive MRSA
- signs of systemic infection

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### .Primary ovarian insufficiency

- [https://www.uptodate.com/contents/image?imageKey=ENDO%2F131982&topicKey=ENDO%2F7443&search=early%20menopause&rank=2~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=ENDO%2F131982&topicKey=ENDO%2F7443&search=early%20menopause&rank=2~150&source=see_link)

- Diagnosis
  - Woman <40 years
  - Irregular menses
  - Neg serum hCG
  - Hot flashes
- Investigations
  - TSH, Prolactin, FSH, E2
  - Get bloodwork on day 3 of cycle. day 1 is the day your period begins

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### .Endometriosis

- pathogenesis: not fully known. most common theory is ectopic endometrial cells
- Clinical symptoms
  - pelvic pain: dysmenorrhea, dyspareunia
  - infertility
  - ovarian mass
- does not cause laboratory abnormalities
- imaging suggestive of endometriosis: ovarian endometriomas, deep nodules of rectovaginal septum, bladder detrusor lesions
- diagnosis
  - definitive: tissue biopsy and histologic confirmation via laparoscopy
  - presumptive: symptoms, signs, imaging
- management: to suppress the cycle (except NSAIDs)
  - NSAIDs and OCP
  - IUD
  - if severe: GnRH analog
  - if still severe: aromatase inhibitor
  - if still not responding: laparoscopy and surgical resection
- infertility
  - surgery, and assisted reproductive techniques

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### .Chronic pelvic pain.pelvic pain

- definition: non-cyclic pain in pelvic area for 3-6 months
- alarm findings: ectopic pregnancy, bowel perforation, acute appendicitis PID, obstructive renal stones, ovarian torsion
- DDx: pelvic floor pain IBS, interstitial cystitis, chronic uterine pain disorders (leiomyoma, endometriosis, adenomyosis), peripheral neuropathy
- history
  - worse with eating/better with BM suggestive of GI process
  - pain with urination or defecation may be endometriosis or disorders of bladder or intestine
  - pain that changes with specific activities or position suggests MSK or pelvic congestion syndrome
- investigations
  - urinalysis to exclude UTI
  - exclude STI
  - pelvic U/S

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## .Heme.Hematology

### .blood type

- Patients who want to know their blood type
  - tell them to donate blood
  - testing without an indication is not covered by MSP

### .thalassemia

- Evaluation
  - suspect in unexplained microcytic anemia
  - CBC, blood smear, iron studies
  - hemoglobin electrophoresis
    - can diagnose beta thalassemia. Definitive diagnosis of alpha thalassemia requires genetic testing
- management
  - transfusion dependent (previously thalassemia major):
    - suggest chronic transfusion. Threshold of 95 to 105.
    - start luspatercept for transfusion dependent beta thalassemia
  - non-transfusion dependent (previously thalassemia intermedia):
    - periodic transfusions for symptomatic relief
    - decisions to start regular transfusion depends on patient age and disease complications
- excess iron stores
  - Patients receiving transfusions require regular assessment and treatment of excess iron stores
- Splenectomy
  - Splenectomy is an option for severe anemia, hypersplenism, or other splenic complications; however, we try to avoid splenectomy if possible.
- Thalassemia minor vs iron deficiency
  - iron deficiency
    - MCV normal to low
    - RDW: high
    - RBC count: low
    - retic count: low
    - blood smear: microcytosis, target cells
    - iron studies: low ferritin and TSAT
  - thalassemia minor
    - MCV low
    - RDW: low
    - RBC count: high
    - retic count: normal to slightly increased
    - blood smear: microcytosis, abundant target cells, teardrop cells
    - iron studies: normal or slightly increased ferritin

### .hemochromatosis

- Clinical findings
  - nonspecific findings: fatigue, lethargy
- evaluation and diagnosis
  - see notes on Iron Overload
  - if ferritin and TSAT both increased and HFE mutation positive, then hereditary hemochromatosis diagnosed.

- liver function testing: ALT, AST, bilirubin, ALP

## iron overload

- Causes: blood transfusion, dietary iron, hereditary hemochromatosis (HH), beta thalassemia, liver disease
- clinical presentation
  - fatigue, arthropathy, liver disease, diabetes, heart failure, hypogonadism
- investigations
  - CBC
  - liver function testing: ALT, AST, bilirubin, ALP
  - ferritin, TSAT
- interpretation of investigations
  - iron studies
    - defining elevated iron
      - high ferritin:
        - women > 150 to 200mcg/L
        - men > 200 to 300mcg/L
      - high TSAT > 45%
    - [https://www.uptodate.com/contents/image?imageKey=HEME%2F111015&topicKey=HEME%2F7157&search=iron%20overload&rank=1~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=HEME%2F111015&topicKey=HEME%2F7157&search=iron%20overload&rank=1~150&source=see_link)
    - if elevated ferritin and TSAT: likely iron overload
      - need to determine cause and determine extent of iron overload
    - if elevated ferritin and low/normal TSAT: unlikely to be iron overload
      - consider other causes of elevated ferritin:
        - alcohol/liver disease
        - metabolic syndrome/obesity/diabetes
        - malignancy
        - HIV/inflammatory condition
    - if low ferritin and TSAT: no iron overload
  - CBC
    - normal CBC with increased ferritin and TSAT: suggests hemochromatosis
    - microcytic anemia with increased ferritin and TSAT: suggestive of thalassemia
    - normocytic anemia with increased ferritin: suggests anemia of chronic inflammation
    - macrocytic anemia with increased ferritin and/or TSAT: suggests hemolysis or megaloblastic anemia
    - polycythemia with increased ferritin and/or TSAT: suggests increased production of RBCs
      - secondary erythrocytosis: hypoxia (heart, lung disease), increased erythropoietin production (liver, kidney disease)
      - primary erythrocytosis: polycythemia vera, MPN
- if diagnosed with iron overload:
  - determine extent and severity.
    - MRI and liver biopsy to estimate total body iron stores
    - Evaluation based on symptoms
      - cardiac symptoms: cardiac MRI, echo, ECG
      - elevated liver enzymes: Hep B, Hep C, alpha-1 antitrypsin deficiency, liver biopsy
      - hepatomegaly: hep B, ep C, liver biopsy, liver MRI
      - arthralgias: radiography of affected joints
      - thyroid dysfunction: TSH, antithyroid antibody
  - determine cause:
    - investigations
      - HFE testing: C282Y, H63D
    - causes
      - increased intake
        - transfusional overload

- iron loaded diet
- increased absorption
  - hereditary hemochromatosis. May be due to HFE mutation or other rare mutations
  - thalassemia
  - chronic liver disease: alcoholic liver disease, NAFLD, chronic hepatitis
- management
  - phlebotomy if without significant anemia
  - chelation therapy for patients with anemia

## .ITP

- Clinical presentation
  - most patients asymptomatic
  - bleeding, fatigue
- diagnosis
  - need to rule out other causes of low platelets
- Management of bleeding
  - critical bleeding: critical anatomical site or causing hemodynamic or respiratory compromise
    - platelet transfusion. Glucocorticoids plus IVIG
  - severe bleeding: hemoglobin decrease  $\geq 2$  g/dL or requiring  $\geq 2$  units transfusion but not critical
    - glucocorticoids alone
- glucocorticoids
  - pulse dexamethasone: 40mg po or IV daily for 4 days. No taper
    - initial response: 2-14 days. Peak response 4-28 days.
  - pulse methylprednisolone: 1g iv once daily for 3 days. No taper
  - oral prednisone: 1mg/kg po daily. For 1-2 weeks. Taper over less than 6 weeks.
    - initial response: 4-14 days. Peak response 7-28 days.

## .thrombocytopenia

- Causes
  - HIT, TTP, HUS: severe thrombocytopenia with bleeding
  - asymptomatic: ITP, HIV, myelodysplastic syndrome
  - acutely ill: DIC, sepsis, drug induced thrombocytopenia
  - hepatosplenomegaly
  - bleeding but no systemic illness: ITP, drug induced
- Approach
  - asymptomatic, mild thrombocytopenia (between 100 to 150)
    - causes: ITP, liver disease, HIV, myelodysplastic syndrome
    - if normal, likely ITP. May refer to hematologist to confirm diagnosis
  - thrombocytopenia with bleeding (petechiae, purpura, mucosal bleeding)
    - if bleeding but lack systemic illness: likely drug induced thrombocytopenia or primary ITP. May get HIV, HCV testing. No other labs necessary
    - if other symptoms:
      - fever: possible infection, sepsis, DIC
      - hepatosplenomegaly: possible liver disease with hypersplenism, lymphoma
      - neurologic findings: possible TTP, HUS, vit B12 deficiency
      - lymphadenopathy
      - thrombosis: possible HIT, antiphospholipid syndrome
- investigations
  - CBC, peripheral blood smear

- HIV, HCV testing
- if investigations normal and asymptomatic, likely ITP. May refer to hematologist to confirm diagnosis
- other testing
  - symptoms of autoimmune disorders: ANA, anti-phospholipid antibody
  - liver disease: hepatic enzymes, albumin, coagulation testing
  - thrombosis: consider DIC, HIT
  - microangiopathic changes on peripheral smear: coagulation test (PT, aPTT, fibrinogen), LDH, renal function. To evaluate for DIC, TTP, HUS
- history
  - family history of bleeding disorders
  - history of bleeding
  - medication exposures
  - infectious exposures

## .Thrombocytosis

- Defined as platelet >450
- Causes:
  - Reactive: iron deficiency, splenectomy, inflammatory, malignancy
  - Autonomous processes: polycythemia vera, myeloproliferative neoplasms
- Evaluation
  - <https://www.uptodate.com/contents/image?imageKey=HEME%2F117410>
  - Repeat CBC, get ferritin. May consider ESR/CRP if suspect inflammatory process.
  - If worrisome findings on blood smear: refer to hematology
    - E.g.
      - large platelets may reflect malignant process.
      - Giant platelets may be seen with malignant or familial disorders, less likely with reactive thrombocytosis.
  - If clinical symptoms suggesting myeloproliferative neoplasm (vasomotor symptoms, constitutional symptoms, unusual thromboses, splenomegaly): test peripheral blood for JAK2, CALR, MPL, BCR-ABL1. or refer to hematology for testing.
  - If ferritin <15: replete iron. f/u CBC in 1-2 months. If resolved, no further evaluation needed, else refer to hematology
- 
- 

## .Bleeding

- S:
  - amount of bleeding, frequency of bleeding
  - if on anti coagulant, NSAIDs, ASA
- P:
  - consider switching anticoagulant (e.g. Rivaroxaban to Apixaban for lower risk of GI bleed), or reducing dose of anticoagulant.
    - or hold anticoagulant for a few days
  - Ferrous Gluconate 300mg po daily
  - investigations
    - measure CBC
    - consider colonoscopy/ultrasound to determine cause of bleeding.

## .Iron studies

- Iron deficiency anemia
  - ferritin: decreased
  - transferrin saturation (Tsat): decreased
- acute phase response/anemia of chronic disease
  - ferritin: normal/increased

- transferrin saturation: normal/decreased
- iron deficiency + ACD
  - ferritin: normal/increased
  - transferrin saturation: decreased
- iron overload
  - transferrin saturation: increased
  - ferritin: increased
- other notes
  - low serum ferritin is diagnostic of iron deficiency
  - high serum ferritin can have many causes. suspect iron overload if transferrin saturation is >50% in men or >45% in women
  - high serum ferritin without raised transferrin saturation is seen in inflammatory conditions
  - serum iron is measured to calculate transferrin saturation and is not useful alone to assess iron status
  - ferritin <100 mcg/L but within normal range does not exclude iron deficiency in patients with inflammation/acute phase response
- iron panel
  - iron: circulating iron
  - transferrin: extracellular protein responsible for transporting iron in the blood
  - TIBC: indirect measure of transferrin
  - transferrin saturation (iron sat): iron/TIBC
  - ferritin: intracellular protein responsible for storing iron

Interpreting the Iron Panel

	Iron	Transferrin / TIBC	Transferrin Saturation	Ferritin
Iron deficiency	↓	↑ / Normal	↓	↓
Anemia of chronic inflammation	↓	↓ / Normal	↓ / Normal	↑ / Normal
Iron deficiency + Chronic inflammation	↓	↓	↓	↓ / ↑ / Normal
Thalassemia <small>(specific pattern depends on type of thalassemia)</small>	↑ / Normal	↓ / Normal	↑ / Normal	↑ / Normal

	IRON DEFICIENCY (NAID)	IRON DEFICIENCY ANAEMIA	FUNCTIONAL IRON DEFICIENCY	IRON DEFICIENCY AND ACUTE PHASE RESPONSE/ACD	ACUTE PHASE RESPONSE/ ANAEMIA OF CHRONIC DISEASE (ACD)	TRUE IRON OVERLOAD
Hb	Normal	Reduced	Normal	Reduced	Reduced	Normal
MCV	Low or Low-normal	Low	Normal	Low or Low-normal	Low or Low-normal	Normal
Serum Iron	Decreased	Decreased	Decreased/N	Decreased	Decreased	Increased
Transferrin or TIBC	Increased	Increased	Variable	Variable	Decreased	Decreased
Transferrin Saturation	Decreased	Decreased	Usually < 30%	Normal/Decreased	Normal/Decreased	INCREASED
Ferritin	Decreased - < 30	Usually < 15	30-299	30-100, but within normal range	> 200. Usually increased	INCREASED
CRP	Normal	Normal	Possibly increased	Increased	Increased	Normal
Soluble Transferrin Receptor	Increased	Increased	Increased	Variable	Normal	Decreased
ZPP	Normal	Increased	Increased	Increased	Normal	Normal
Marrow Iron	Reduced	Reduced	Low Normal	Low Normal	Increased	High Normal

## .Ferritin elevated.Elevated ferritin

- Transferrin saturation testing can identify iron overload states
  - If the transferrin saturation is above 45% and ferritin levels are greater than 300 µg/L in men or than 200 µg/L in women, genetic testing should be done to assess for hemochromatosis
- Ferritin elevations above 10 000 mcg/L should prompt consideration of specific diagnoses
  - DDx: malignancy, CKD, liver dysfunction, Still disease, hemophagocytic lymphohistiocytosis
- Patients with stable, mild ferritin elevation do not require further testing
  - if ferritin <1000 mcg/L and transferrin saturation not elevated and no obvious cause:
    - counsel on alcohol cessation and lifestyle modification to avoid metabolic syndrome
    - Stable repeat levels at 3–6 months do not require additional testing
  - if ferritin > 1000 mcg/L, should be investigated by internal medicine or hepatology

- 

## .Iron deficiency

- Causes
  - blood loss: menstrual, GI
  - reduce absorption: celiac, H. Pylori, bariatric surgery
- clinical findings
  - anemia, pica, restless leg syndrome
  - pallor, alopecia, dry skin, atrophic glossitis, angular cheilitis
  - CBC: may be normal or microcytic hypochromic anemia, low RBC count, low retics, elevated platelets
- Diagnosis
  - Serum ferritin <30 ng/mL
  - OR Transferrin saturation <19 percent, mostly used in patients for whom the ferritin is thought to be unreliable due to an inflammatory state
  - Anemia that resolves upon iron administration
  - Absence of stainable iron in the bone marrow (providing that adequate staining controls are performed)
- Search for source of blood and iron loss
  - history
    - menstruation
    - GI blood loss
    - symptoms suggestive of celiac, H. Pylori
    - history of bariatric surgery
    - blood donations
    - NSAIDs
  - evaluation
    - FIT testing. Consider refer to GI for colonoscopy even if negative
      - consider GI blood loss even if on anticoagulation.
    - Celiac testing, H. Pylori testing, autoimmune gastritis testing (anti-parietal cell antibodies)
    - premenopausal female: use clinical judgement to decide if needs further workup or can be attributed to menstrual blood loss
  - then check FIT.
- management
  - if severe or life-threatening anemia: RBC transfusion indicated
  - IV vs oral iron. IV iron if:
    - lack of response or intolerance of oral iron
    - surgery planned within next two months
    - IBD
    - gastrectomy or bariatric surgery
    - dialysis dependent kidney disease
  - oral
    - formulations
      - <https://www.ontariomidwives.ca/sites/default/files/Iron%20chart%20final%20no%20bleed.pdf>
      - Polysaccharide iron complex (FeraMax) 150mg daily x 3 months
      - Ferrous Sulphate 325mg
      - Ferrous fumarate (Palafer) 300mg po daily
      - ferrous gluconate 240-325mg po daily
      - avoid enteric coated or sustained release capsules. Less efficient for absorption
    - dosing: once per day on alternate days. Results in equivalent or better iron absorption. No need to give more than one dose per day.
    - vitamin C: no good evidence that taking this with iron improves absorption.
    - Food, PPI: generally should not be given with food, especially calcium containing food. Should take iron 2 hours before or 4 hours after antacids.
    - duration of therapy depends on iron deficiency: typically 6 weeks to 6 months



- iv
  - Venofer 100-300mg iv
- lack of response to iron
  - possible causes:
    - patient not taking oral iron (eg, due to side effects)
    - reduced absorption of oral iron (see 'Dosing and administration (oral iron)' above)
    - Blood loss exceeds iron intake
    - Incorrect initial diagnosis
    - More than one diagnosis (especially relevant in older adults)
    - Inflammatory state with block in intestinal iron regulation
    - Therapy was effective but bleeding recurred
  - evaluation
    - testing for Celiac, H. Pylori, autoimmune gastritis

## .Anemia

- Normocytic anemia
  - DDx: iron deficiency, vit B12, ACD, infection, liver disease, hemolysis, hypothyroid
  - Workup
    - FOBT, retic count, TSH, B12, iron, ferritin, TSAT, LFTs.
- investigation
  - reticulocyte count, FIT, ferritin, TSAT, B12, bilirubin, TSH, ALT, SPEP
  - all FIT positive should get endoscopy
  - anemic patients with clear endoscopy may require hematology for bone marrow assessment

## .anemia - other info

- microcytic/macrocytic
  - microcytic: MCV <80
- hypochromic/hyperchromic
  - mCH

## .Neutropenia

- Neutropenia is defined as an absolute neutrophil count (ANC) <1500 cells/microL (<1.5 x10<sup>9</sup>/L)
- Urgency of evaluation
  - If sepsis, hemodynamic instability, respiratory compromise, or other clinical emergencies: these patients require immediate hospitalization and urgent evaluation
  - Asymptomatic patients with moderate neutropenia (ie, ≥500 to <1000 neutrophils/microL) and no worrisome findings on blood smear should have a repeat CBC and differential count within one to two weeks, followed by outpatient evaluation if neutropenia persists.
  - Asymptomatic patients with ANC >1000 cells/microL and no worrisome findings on blood smear should have repeat CBC/differential within two to six weeks, followed by outpatient evaluation if neutropenia persists.
- Initial evaluation
  - History of infections, prior neutropenia, other cytopenias, medications (table 1), diet, alcohol use, and examination for liver disease, acute or chronic infection, or a rheumatologic disorder.
  - Complete blood count (CBC) – CBC with differential count and red blood cell (RBC) indices.
  - Blood smear – Assessment of neutrophil morphology and other lineages.
- Causes and further evaluation
  - Nutritional disorder – Patients with macrocytic RBC indices, hypersegmented neutrophils, macro-ovalocytes, history of gastrointestinal surgery, poor diet, alcohol use, or long-term veganism should be tested for RBC folate, vitamin B12, copper deficiency, and liver disease.
  - Suspected medications

- Severe neutropenia (ANC <1000 cells/microL) – Drugs associated with idiosyncratic reactions should be discontinued immediately, if clinically feasible, and cytotoxic/immunosuppressive drugs should be withheld.
- Moderate/mild neutropenia (ie,  $\geq 1000$  cells/microL) – Cytotoxic/immunosuppressive drugs should be withheld until the neutropenia improves, but it is not necessary to discontinue all suspected medications (eg, psychotropic or antiseizure medications).
- Infectious causes
  - Neutropenia can occur with viral hepatitis, HIV, or Epstein-Barr virus (EBV); bacterial, parasitic, and rickettsial infections.
- Rheumatologic condition
- Suspected hematologic malignancy
  - Bone marrow examination and/or flow cytometry should be performed for patients with unexplained splenomegaly, abnormal blood smear
- Normal variant
  - Moderate neutropenia (eg,  $>1000$ /microL) is more common in individuals of certain ethnicities.
- Suspected familial disorder
- Medications associated with agranulocytosis
  - Antithyroid drugs (thionamides): Methimazole, carbimazole, Propylthiouracil
  - Anti-inflammatory drugs: Sulfasalazine, Nonsteroidal anti-inflammatory drugs, Gold salts, Leflunomide, Methotrexate, Penicillamine, Phenylbutazone, Antipyrine, Dipyrrone, Phenacetin
  - Psychotropic drugs: Clozapine, Phenothiazines, Tricyclic and tetracyclic antidepressants, Meprobamate, Cocaine/heroin (adulterated with levamisole)
  - Gastrointestinal drugs: Sulfasalazine, Histamine type 2 receptor antagonists
  - Cardiovascular drugs: Antiarrhythmic agents (tocainide, procainamide, flecainide), Ticlopidine, ACE inhibitors (enalapril, captopril), Propranolol, Dipyridamole, Digoxin
  - Dermatologic drugs: Dapsone, Isotretinoin,
  - other: Antibiotics, Antimalarial, Antifungal, Antiviral, Antiseizure, Diuretics, Sulfonylurea, Iron chelating
- 

## Phlebitis – lower extremity

- Lump on legs around varicose veins
- findings of pain, tenderness, induration, and/or erythema along the known course of a superficial, typically varicose, vein
- Investigation
  - order ultrasound upon initial presentation to rule out the presence of coexistent deep vein thrombosis (DVT) and to evaluate the location and extent of thrombosis.
  - evaluate the deep and superficial axial veins to exclude DVT and superficial venous thrombosis
- Initial management
  - extremity elevation, warm or cool compresses, compression stockings, and pain management.
  - Treat with NSAIDs, oral or topical
- Anticoagulation
  - Low risk: no anticoagulation
    - Includes:
      - phlebitis without thrombosis,
      - thrombosis of tributary vein,
      - thrombosis of axial vein (e.g. SVT) remote from saphenofemoral junction or sapheno-popliteal junction (e.g. SVT below knee),
      - focal SVT  $\leq 5$  cm in length
  - Intermediate risk: prophylactic anticoagulation
    - Anticoagulation for 45 days
      - suggest subcutaneous prophylactic-dose fondaparinux 2.5 mg daily
    - Includes: no medical risk factors for VTE AND

- SVT in proximity (3 to 5 cm) to the deep venous system, particularly if involving the great saphenous vein or small saphenous vein
- SVT in the above-knee rather than the below-knee great saphenous vein
- SVT that is more extensive with the affected vein segment  $\geq 5$  cm, rather than focal involvement
- SVT that propagates with conservative management
- Elevated risk: therapeutic anticoagulation

## .Transfusion reaction

- example management
  - stop transfusion immediately
  - Methylprednisolone 60mg x1, Benadryl 25mg iv x1, IV fluid 1L bolus
  - Lactate, PR-7, immunoglobulins to r/o low IgA
  - Troponin, ECG
  - CXR, AXR
- [https://www.uptodate.com/contents/image?imageKey=HEME%2F96323&topicKey=HEME%2F95132&search=transfusion%20reaction&rank=1~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=HEME%2F96323&topicKey=HEME%2F95132&search=transfusion%20reaction&rank=1~150&source=see_link)

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## .Multiple myeloma

- Presentation
  - CRAB: calcium elevation, renal insufficiency, anemia, bone disease
  - Normocytic normochromic anemia
  - Bone pain and pathologic fractures
  - Renal disease:
    - Two major causes: light chain cast nephropathy and hypercalcemia
  - Hypercalcemia: secondary to multiple myeloma induced bone demineralization
    - Get ionized calcium if patient has high serum calcium level but no symptoms of hypercalcemia
  - Neurologic disease: rare
    - Extradural spinal cord compression: suspect in severe back pain with weakness or paresthesias to lower extremities or bladder/bowel dysfunction/incontinence. This is a medical emergency
- Evaluation
  - [https://www.uptodate.com/contents/image?imageKey=HEME%2F94388&topicKey=HEME%2F6649&search=multiple%20myeloma&rank=1~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=HEME%2F94388&topicKey=HEME%2F6649&search=multiple%20myeloma&rank=1~150&source=see_link)
  - CBC
  - Ca, Cr
  - SPEP and immunofixation
  - Serum free light chain (FLC) assay
  - Quantitative immunoglobulins
- Diagnosis:
  - Clonal bone marrow plasma cells  $\geq 10\%$ . Monoclonal protein (m-protein) present on SPEP and/or immunofixation PLUS
    - CRAB:
      - Anemia: Hb  $< 100$  or  $> 20$  g/L below normal
      - Hypercalcemia: Ca  $> 2.75$  mmol/L
      - Renal insufficiency: CrCl  $< 40$  mL/min or Cr  $> 177$  mmol/L
      - Bone lesions: osteolytic lesions  $> 5$  mm on imaging.
    - SLiM: Sixty, Light chain ratio, MRI
      - $\geq 60$  percent clonal plasma cell in bone marrow
      - Involved/uninvolved FLC ratio of 100 or more
      - MRI with more than one focal lesion involving bone or bone marrow
- SPEP interpretation

- Solely elevated gamma globulin: indicates possible multiple myeloma
- If all the globulins are elevated: possibly inflammatory
- Characteristic Features of Monoclonal Gammopathies
  - <https://www.aafp.org/afp/2005/0101/p105.html#afp20050101p105-t4>
  - Multiple myeloma
    - M protein appears as narrow spike in gamma, beta or alpha2 regions. M-protein level usually greater than 30g/L.
    - Diagnosis requires 10-15% plasma cell involvement on bone marrow biopsy
  - Monoclonal gammopathy or undetermined significance (MGUS)
    - M-protein level less than 30g/L.
    - less than 10% plasma cell involvement on bone marrow biopsy
    - No CRAB features
  - Smoldering multiple myeloma
    - M-protein level greater than 30g/L. >10% plasma cell involvement on bone marrow biopsy
    - No CRAB

## ● .Hemolytic anemia

- <https://www.aafp.org/afp/2018/0915/p354.html>
- investigations
  - Haptoglobin
    - Decreased
    - Binds free hemoglobin
  - Lactate dehydrogenase
    - elevated
    - Released from lysis of red blood cells
  - Peripheral blood smear
    - Abnormal red blood cells
    - Based on cause of anemia
  - Reticulocyte count
    - Increased
    - Marrow response to anemia
  - Unconjugated bilirubin
    - Increased
    - Increased hemoglobin breakdown
  - Urinalysis
    - Urobilinogen, positive for blood
    - Free hemoglobin and its metabolites

## ● .DVT – lower extremity.PE.VTE

- most patients are anticoagulated for 3-6 months
- indications for indefinite anticoagulation
  - more than one episode of unprovoked proximal DVT or symptomatic PE
  - VTE and active cancer
  - first episode of unprovoked proximal DVT
  - first episode of unprovoked symptomatic PE
- DVT treatment
  - [https://thrombosiscanada.ca/wp-uploads/uploads/2021/11/3.-Deep-Vein-Thrombosis-Treatment\\_14November2021-1.pdf](https://thrombosiscanada.ca/wp-uploads/uploads/2021/11/3.-Deep-Vein-Thrombosis-Treatment_14November2021-1.pdf)
- DVT diagnosis
  - [https://thrombosiscanada.ca/wp-uploads/uploads/2021/07/2.-Deep-Vein-Thrombosis-Diagnosis\\_20July2021.pdf](https://thrombosiscanada.ca/wp-uploads/uploads/2021/07/2.-Deep-Vein-Thrombosis-Diagnosis_20July2021.pdf)
  - Wells score: if <2, DVT unlikely. if ≥ 2, DVT likely.

- DVT unlikely
  - get D-Dimer
    - if neg: no DVT
    - if pos: get U/S
      - if neg: no DVT
      - if pos: DVT present
- DVT likely
  - get U/S
    - if pos: DVT present
    - if neg: get D-dimer
      - if neg: no DVT
      - if pos: repeat U/S in 5-7 days
- empiric anticoagulation
  - if high suspicion for DVT, and no fast access to U/S
- 

### .DVT – upper extremity - primary

- thrombosis of the deep veins draining the upper extremity (axillary, subclavian) due to an underlying anatomic anomaly at the thoracic outlet causing compression or repetitive venous injury.
- Clinical presentation
  - sudden onset, severe arm swelling and pain
  - edema of affected extremity and cyanosis of hand and fingers.
  - palpable venous cord (superficial thrombophlebitis) may be apparent in associated superficial veins (eg, proximal cephalic vein)
- diagnosis/evaluation
  - confirm diagnosis with ultrasound
  - determine etiology. identify the underlying anatomic abnormality that is the source of the obstruction.
    - get CXR
- referral
  - thrombosis clinic
- treatment for primary upper extremity DVT
  - goal: preventing pulmonary embolism, recurrent venous thrombosis, and post-thrombotic syndrome.
  - Anticoagulation: elps to maintain patency of collateral veins, reduces propagation of thrombus, and is effective for preventing pulmonary embolism.
    - Treat for 3 months
  - if moderate-severe symptoms+
    - should treat with thrombolysis in addition to anticoagulation
    - after thrombolysis, suggest thoracic outlet decompression
- treatment for catheter related upper extremity DVT

### .DVT – upper extremity – catheter related

- Presentation
  - phlebitis: inflammatory reaction within the vein. pain and tenderness along course of vein
    - frequently associated with use of peripheral IV catheters.
  - edema, pain
  - PE can occur, although less common
- clinical prediction score
  - Scoring
    - low probability: 0 points. Intermediate probability: 1 point. High probability: 2-3 points
  - Presence of a catheter or access device in a subclavian or jugular vein or a pacemaker (plus 1 point)

- Unilateral pitting edema (plus 1 point)
- Presence of localized pain in that extremity (plus 1 point)
- Another diagnosis at least as plausible (minus 1 point)
- diagnosis
  - ultrasound to rule out DVT
- management
  - superficial phlebitis related to peripheral IV
    - discontinue IV and remove catheter
    - symptomatic care: extremity elevation, warm or cool compresses, and oral nonsteroidal anti-inflammatory drugs (NSAIDs)
- treatment for catheter related upper extremity DVT
  - anticoagulation for 3 months
  - Thrombolysis not suggested as first line therapy
  -

## .hemoptysis

- history
  - hx of bleeding disorder, hx of lung disease
  - quantity of blood
  - fever, night sweats, weight loss
  - hx of trauma
- common causes
  - bronchitis, pneumonia, TB, fungal infection
  - bronchiectasis
  - lung ca
- investigations
  - WBC
  - type and screen
  - Hb
  - Plt, INR, PTT
- indications to admit
  - massive hemoptysis
  - hypercapnia
  - active TB
  - ongoing bleeding, unstable vital signs
  - hypoxia requiring O2

●

## .ID.Infectious Disease

### .bed bugs

- do not live on humans. Rather, they tend to inhabit cracks and crevices of mattresses, cushions, bed frames, or other structures. Bedbugs are attracted to the host by warmth and carbon dioxide and generally feed at night while the victim sleeps
- Skin reactions to bedbugs vary: pruritic papules or wheals, purpuric macules, or bullae.
  - Reactions are typically noticed upon awakening or within a few days after the bites.
  - A linear series of bites is a potential but not consistent finding.
- Confirmation of the diagnosis: requires detection of bedbugs in the victim's environment. Inspection of the victim's residence by a professional pest control service is the preferred method for detection
- Management of bedbug infestation consists of eradication of the infestation through employment of a professional pest control service. The primary methods include application of insecticides and heat treatment. When such

interventions are not feasible, physical removal of detected bedbugs may reduce the severity of infestation but is unlikely to eradicate the infestation.

- Bedbug bites resolve spontaneously. Topical corticosteroids and oral antihistamines may reduce associated pruritus. Psychologic support services can be beneficial for some victims.

## .HPV

- Detection
  - testing for HPV is limited to testing of cervical specimens
  - HPV testing in order to determine appropriateness of HPV vaccination is also not warranted.
  - no FDA approved serological blood tests to detect HPV infection
- Vaccination
  - HPV vaccine should be administered at 11 to 12 years of age. It can be administered starting at 9 years of age.
  - For adolescents and adults aged 13 to 26 years who have not been previously vaccinated or who have not completed the vaccine series, catch-up vaccination is recommended.
  - For age > 26: suggest against catch up vaccination as most individuals in this age range have already been exposed to HPV and vaccination is unlikely to assist in immunity.
    - But exceptions include:
      - Previously unvaccinated adults aged 27 to 45 years who have a low likelihood of prior HPV exposure (eg, no prior sexual experience or a limited number of prior sexual partners) but have a future risk of HPV exposure (eg, new sexual partners).
      - Health care workers who have repeated exposure to HPV in vapors generated during surgical excision or ablation of HPV-associated lesions (eg, health care providers and operating room and office staff in the fields of gynecology, dermatology, and family practice)
  - Vaccination during pregnancy - HPV vaccination during pregnancy is typically avoided because of limited information about safety; however, data from inadvertent use in this setting are increasingly available and reassuring.

## .long COVID

- If symptoms persist beyond 3 months. Refer to Post COVID recovery clinic
- pre-referral diagnostic checklist
  - [http://www.phsa.ca/health-info-site/Documents/PC-ICCN\\_pre\\_referral\\_diagnostics.pdf](http://www.phsa.ca/health-info-site/Documents/PC-ICCN_pre_referral_diagnostics.pdf)
  - fatigue, brain fog: CBC, ferritin, TSH, B12. OSA testing, PHQ9, GAD7
  - SOB: CXR, spirometry, consider BNP
  - chest pain: ECG, BNP, CXR
  - palpitations: ECG, holter monitor
  - rash: dermatology
  - loss of taste/smell: ENT
- initial management
  - brain fog: frequent breaks. Pay attention to mood/sleep. Get regular physical activity

## .dental antibiotic prophylaxis. antibiotic prophylaxis for dental work

- History of endocarditis
- prosthetic heart valve
- unrepaired cyanotic heart disease

## .dental abscess. tooth abscess

- Abscess visualized in the gum; red, fluctuant swelling to gum. Very tender to palpation
- Tooth sensitive to palpation and percussions

## .parotitis

- clinical presentation

- sudden onset of unilateral firm, tender, and erythematous swelling over the parotid gland. Associated symptoms include fever, chills, trismus, dysphagia, and purulent drainage from the parotid duct.
- Cause
  - viral:
    - No purulent discharge from Stensen's duct.
    - Typically begins with a few days of fever, headache, myalgia, fatigue, and anorexia; these manifestations are usually followed by development of salivary gland swelling within 48 hours.
    - Often bilateral.
    - typically in children 2-9 yo.
    - Initially present unilaterally, swelling extends bilaterally in 90% of infected individuals over a few days
  - Suppurative (bacterial) parotitis:
    - sudden onset of firm, erythematous swelling of the pre- and postauricular areas that extends to the angle of the mandible, associated with exquisite tenderness;
    - systemic findings of high fevers, chills, and toxicity are typical.
    - typically in infants under age 1 or hospitalized adults.
    - Purulent Discharge from Stensen's duct
    - Microbiology: staph aureus, oral aerobes and anaerobes
- Other causes
  - swelling outside of parotid gland: dental abscess, external otitis, cervical adenitis, infected cysts, lymphoma
  - other viral causes: influenza A virus, parainfluenza, adenovirus, HIV
  - sialolithiasis: salivary stones. if pain present, usually with eating
  - Sjogren's syndrome
- 

#### .parotitis - suppurative

- Initial treatment
  - hospitalization, aggressive hydration, IV antibiotics
- antibiotic therapy
  - community acquired
    - initial IV regimen
      - Ampicillin-sulbactam 3g iv q6h
      - OR Ceftriaxone 1g q24h PLUS (Metronidazole 500mg iv/po q8h OR Clindamycin 600mg iv/po q6-8h)
    - oral step down
      - Amox-clav 875/125mg po bid
  - hospital acquired
    - initial IV regimen
      - (Vancomycin OR linezolid 600mg iv/po q12h) AND (piv-tazo 4.5g iv q6h OR (Cefepime 2g iv q12h AND Metronidazole 500mg iv/po q6-8h))

#### .osteomyelitis

- Infection involving bone. Can be hematogenous spread or contiguous spread from adjacent soft tissue
- non-hematogenous osteomyelitis. Suspect if:
  - new/worsening MSK pain in poorly healing soft tissue, signs of cellulitis over previously implanted orthopedic hardware, traumatic injury (including bite and puncture wounds).
  - Should also suspect in diabetic patients with ulcers
- hematogenous osteomyelitis. Suspect if
  - worsening MSK pain in setting of fever/recent bacteremia
  - vertebral osteomyelitis most common form of hematogenous osteomyelitis
- evaluation



- CRP, WBC, blood cultures
- if  $\geq 2$  weeks of symptoms: conventional X-ray reasonable
- if  $< 2$  weeks, advanced imaging such as MRI, CT, nuclear imaging

### .blastocystis hominis

- There is controversy on whether it is a commensal organism, marker of intestinal dysbiosis, or a true pathogen
- Asymptomatic treatments do not warrant treatment
- if symptomatic, ensure other pathogens not identified. Decision to treat is controversial
  - try Metronidazole 500-750mg tid for 5-10 days

### .dientamoeba fragilis

- Controversial whether is a pathogen or commensal parasite

### .monkeypox

- Clinical presentation
  - fever, chills, myalgias and characteristic vesicular rash
  - rash: usually begins within 1-4 days of appearance of fever. Concentrated on face, but often develops on palms of hands, soles of feet. Can also appear on genitals or mouth
    - rash begins as 2-5mm macules, then papules, vesicles, then pustules. Then crust over
- transmission
  - close contact with infectious skin lesions. Indirect contact with infectious fluid on contaminated linens. Large respiratory droplets: Prolonged face to face contact.
  - Considered infectious until sores crust over, are dry and new skin is visible
- diagnosis
  - swab the skin for PCR. Lesion does not need to be unroofed.
- ddx
  - varicella, HSV, small pox
- management
  - most patients have mild disease and recover without medical intervention
  - antivirals: for those with or at risk for severe disease
- post-exposure management
  - post-exposure vaccination:
- pre-exposure prophylaxis
  - in 2022 outbreak: offer vaccine to at-risk populations such as those in LGBT community

### .thrush.candidiasis oropharyngeal

- Clinical presentation
  - experience a cottony feeling in the mouth, loss of taste, and, in some cases, pain during eating and swallowing.
  - white plaques on the buccal mucosa, palate, tongue, and/or the oropharynx
    - Patients who have only a white coating on their tongue rarely have candidiasis; this condition is usually caused by hypertrophic papillae. Smokers can have a yellow-brown coating on their tongue from this same cause.
- Management
  - mild
    - topical therapy 7-14 days
      - clotrimazole troches
      - miconazole mucoadhesive buccal tablets
      - Nystatin swish and swallow

### .erythematous candidiasis

- Form of candidiasis associated with pain
- burning sensation in oral cavity
- painful localized erythematous area
- Risk factors
  - HIV, dentures, reduced salivary flow, corticosteroid inhalers, diabetes mellitus, and use of broad-spectrum antibiotics.

### .lice.pediculosis capitis

- Management
  - topical pediculicides: ivermectin: leave on hair for 10 minutes then rinse
  - permethrin 1%: prior to application, wash hair with shampoo then dry. Apply lotion to dry hair to saturate hair. leave on hair for 10 minutes then rinse; remove remaining nits with nit comb.
    - May repeat application 7 days after first treatment.
- School
  - children do not need to be excluded from school
  - individuals who share bedding with affected person should be treated prophylactically
  - louse survival off the scalp beyond 48h is unlikely. Recommend washing clothing and linen used by infested person during the two days prior to therapy in hot water

### .hookworm

- Four phases
  - dermal penetration by infecting larvae
    - itch usually between toes for a few days.
    - Serpiginous tracks of larval migration
  - transpulmonary passage
    - usually asymptomatic
  - acute gastrointestinal symptoms
    - n/v/d
  - chronic nutritional impairment
- diagnosis
  - stool O&P
  - unexplained eosinophilia is suspicious for parasitic infection
- management
  - albendazole 400mg po once on empty stomach
  - other acceptable therapies but less effective
    - Mebendazole and pyrantel pamoate
- preventative measures
  - hygiene measures including drinking safe water, properly cleaning and cooking food, hand washing, and wearing shoes.

### .Diabetic foot ulcer.Diabetic foot infection

- Investigations
  - CBC, ESR, CRP
  - get HbA1c. wounds don't heal with high sugar
  - all diabetic foot should get X-ray: look for erosion, osteopenia.
  - MRI is the best test. bone scan isn't as good of a test to look for infection.
- specific organisms of concern
  - MRSA: common in diabetic foot infections

- pseudomonas:
- ESBL
- Management
  - advise patient to avoid walking until assessed by ID or foot specialist
- 
- refer to foot care specialist
  - hx of foot ulceration/amputation
  - neuropathic foot
  - peripheral vascular disease
- 

## .Cellulitis

- DDx
  - contact dermatitis. e.g. polysporin
  - venous insufficiency. especially if bilateral
  - Lofgrens: fever, BL hilar lymphadenopathy, ankle swelling, erythema nodosum.
  - hidradenitis suppurativa: consider this for anyone with recurrent abscess/soft tissue infections
  - recurrent abscess at a site of previous infection should prompt a search for local causes such as pilonidal cyst, hidradenitis suppurativa, or foreign material
  - delayed type IV hypersensitivity to vaccination
  - necrotizing fasciitis: consider if fast onset and pain out of proportion
- Signs/symptoms
  - portal of entry
    - recent trauma, mosquito bite
    - underlying skin condition
  - sudden onset, pain, swelling. feel sick: fever, shakes, chills
  - acute or chronic
    - if chronic, less likely to be cellulitis
- reasons why patient's infections aren't improving
  - wrong diagnosis
  - source control issue: e.g. abscess
  - wrong bug/drug combination
    - probably not the cause
- O:
  - palpate for abscess. should feel fluctuant
- P:
  - with abscess/purulent drainage.
    - incision/drainage: need to cut deep enough and wide enough
    - antibiotics: 5 days usually enough. may need 14 days if slow response.
      - Amoxicillin 875mg bid
      - Trimethoprim sulfa 1-2 double strength bid.
      - Doxycycline 100mg bid
  - if mild/nonpurulent
    - Cephalexin (Keflex) 500mg qid x5 days. reassess if not resolved. for uncomplicated cellulitis, 5 days just as effective as 10 days
    - Clindamycin 150mg q6h x10 days
      - 300-450mg q6h for moderate/severe infections or immunosuppressed (e.g. diabetic)
    - Trimethoprim-sulfamethoxazole 1-2 DS tablets bid.
    - Doxy 100mg bid. 10 days
    - Cefprozil 250-500mg bid. 10 days
- Home IV:
  - order home IV:

- e.g. CCAC - CEHLIN form
- Ancef 1g iv q8h. 7 days. send prescription to specialty pharmacy.
  - e.g. To Bayshore Specialty pharmacy, Markham
- follow-up, counselling
  - skin infections may visually worsen the first few days after I&D and antibiotics. Does not represent treatment failure. Reassess management if systemic symptoms develop.
  - full symptom resolution may take 1-2 weeks after antibiotics are stopped

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### .Ureaplasma.Mycoplasma hominis

- part of normal genital flora of sexually experienced men and women
- associated with GU infections. PID for M. hominis and urethritis for ureaplasma
- evaluation
  - send urine sample for culture/NAAT
- treatment for neonates
  - M. hominis: clindamycin, tetracycline, fluoroquinolones
- indications for treatment
  - only if have compatible clinical symptoms,
  - not warranted in asymptomatic patients.

### .urethritis

- Causes: gonorrhea, chlamydia, mycoplasma genitalium, trichomonas, HSV
- clinical presentation
  - dysuria, pruritus, burning, discharge from urethra
- diagnosis: any one of findings
  - mucoid, mucopurulent or purulent discharge on examination
  - positive leukocytes on dip stick
  - urethral swab gram stain findings suggestive of urethritis
- determining etiology
  - NAAT of first catch urine. Test for gonorrhea, chlamydia. May also test for trichomonas. As well as Mycoplasma genitalium
- counseling and follow-up
  - if positive for gonorrhea, chlamydia, trichomonas: should repeat NAAT 3 months after treatment due to high rate of reinfection.
  - Refrain from sexual activity for 7 days following initiation of therapy until symptoms resolved
  - partners: all sexual partners within 60 days should be evaluated, or most recent sexual partner.

### .STI.Sexually Transmitted Disease.Gonorrhea.Chlamydia

- DDx: UTI, STI, yeast infection
- S:
  - LMP, num sexual partners in past year, gender of sexual partners
  - last time tested for STIs.
  - characterize discharge (colour, consistency)
  - redness, itchiness, pain
  - dysuria, frequency, fever
  - ask about safe sex practices. use of condoms, birth control.
- Investigations:
  - chlamydia, gonorrhea: urine NAAT
    - male: first catch urine preferred. Urethral swab acceptable too
    - female: vaginal swab preferred. Endocervical swab acceptable too. First catch urine also acceptable but might detect 10% less infections

- trichomonas (in females): urine NAAT, but vaginal swab preferred.
- HIV screening
- syphilis screening (RPR/VDRL)
- Hepatitis immune status: Hep A, Hep B, Hep C
- if symptomatic: urinalysis and urine culture,
- treatment
  - Chlamydia: Azithromycin 1g single dose OR doxycycline 100mg bid x7days
  - Gonorrhea: Ceftriaxone 250mg IM single dose AND Azithromycin 1g single dose.
    - OR Cefixime 800mg po
    - if pregnant: ceftriaxone + azithromycin dual therapy. re-test in 3 months
    - if allergic to penicillin/cephalosporins: Gentamicin 240mg IM AND Azithromycin 2g po
- empiric treatment
  - consider treating empirically for chlamydia with Azithromycin 1g single dose in the following patients
    - symptoms of cervicitis, PID, urethritis
    - possible exposure
    - documented gonococcal infection, unless NAAT negative.
  - if symptoms of proctitis (e.g. tenesmus), treat empirically for both chlamydia and gonorrhea
    - Doxycycline 100mg bid x7-21 days, PLUS ceftriaxone 500mg IM x1
  - if symptoms of epididymitis, treat empirically for both chlamydia and gonorrhea
    - Doxycycline 100mg bid x7-21 days, PLUS ceftriaxone 500mg IM x1
- screening
  - as per 2021 CTFPHC: screen for chlamydia and gonorrhea in sexually active individuals:
    - yearly screening if age < 30 and not high risk group. more freq
- Test of cure:
  - should do in pregnant women, persistent symptoms, treated with suboptimal antibiotics
  - Chlamydia: No test of cure unless symptomatic. Test of cure should be done 4 weeks after treatment.
  - Gonorrhea: no test of cure unless alternate regimen for oropharyngeal infection. Test with culture 7 days after therapy, or NAAT 14 days afterwards.
- Counselling
  - make sure to test for pregnancy, especially if treating with doxycycline.
  - offer to retest all patients at 3 months due to risk of reinfection
  - abstain from sex until they and partners treated (7 days after single dose, or after 7 day regimen), and no symptoms.

## ● .STI.Sexually Transmitted Disease.Gonorrhea.Chlamydia - other info

- non-GU physical exam findings
  - DRE: tender prostate
  - oropharynx: exudate, ulceration
  - groin: lymphadenopathy
  - lips: ulceration
  - eyes: conjunctivitis
- complications in male patients
  - infertility
  - orchitis
  - epididymitis
  - urethritis
  - prostatitis
  - proctitis
  - reactive arthritis triad: arthritis, uveitis, urethritis
-

## .trichomonas

- Diagnosis
  - with NAAT. Urine sample?
- Management
  - pt with vagina:
    - Metronidazole 500mg po bid for 7 days
  - pt with penis:
    - Metronidazole 2g po x1.
    - Alternatively: Azithromycin 1g, then 500mg for 3 days

## .mycoplasma genitalium.m. genitalium

- Diagnosis
  - first void urine in males, or vaginal/cervical swab in females
- management
  - Moxifloxacin 400mg po for 7 days
  - alternative: Azithromycin 1g then 500mg po for 3 days

•

## .Herpes.HSV.Cold sore

- S:
- O:
  - check inguinal lymph nodes
- P:
- oral antivirals
  - orolabial
    - initial: Valacyclovir 1g bid x7-10 days
    - recurrent: Valacyclovir 2g bid x1 day
    - suppressive: Valacyclovir 500mg to 1g daily
  - genital
    - initial: Valacyclovir 1g bid x7-10 days
    - recurrent: Valacyclovir 500mg bid x3 days. OR 1g daily for 5 days.
    - suppressive: Valacyclovir 500mg to 1g daily
  - pregnant: genital
    - initial: Valacyclovir 1g bid for 7-10 days
    - recurrent: Valacyclovir 500mg bid x3 days. OR 1g daily for 5 days.
    - Suppressive : Valacyclovir 500mg bid beginning at 36 weeks until delivery.
  - antivirals most effective in first 72 hours
- topical antivirals
  - Xerese (Acyclovir - Hydrocortisone) 5-1% qid prn. 1 tube. 2 refills
- lab work:
  - swab lesions
    - For those with evidence of infection, the diagnosis of HSV is best confirmed through polymerase chain reaction (PCR) testing of a sample obtained from an active genital lesion.
    - Use UTM viral swab
  - bloodwork: HSV antibodies
    - Serologic testing is indicated for determining evidence of past infection with HSV. it may take up to 3 to 6 months for HSV IgG antibodies to be detectable in serum/blood.
    - a positive result only means you have been exposed to the virus. The test can't tell if you will get sores or if any sores you have are caused by the herpes virus. The test also can't tell if you can infect another person.
- diagnosis

- 
- Counselling
  - No sex until lesions fully resolve
  - treatment doesn't get rid of the virus
  - will have latent HSV
  - should inform future sexual partners. can shed even when lesions not present
  - if lots of recurrences, can take antivirals chronically.
- HSV1 vs HSV2
  - HSV type 1 causes cold sores (also called fever blisters) on the lips. HSV-1 is generally spread by kissing or by sharing eating utensils (such as spoons or forks) when sores are present. HSV-1 can also cause sores around the genitals.
  - HSV type 2 causes sores in the genital area (genital herpes), such as on or around the vagina or penis. HSV-2 also causes the herpes infection seen in babies who are delivered vaginally in women who have genital herpes. HSV-2 is generally spread by sexual contact. HSV-2 can sometimes cause mouth sores.
- Transmission
  - Transmission of HSV-1 occurs when someone with no prior infection with HSV-1 comes in contact with herpetic lesions, mucosal secretions, or skin that contain HSV-1
  -

## • Shingles. Herpes zoster

- DDx
  - herpes simplex
- Treatment
  - should start treatment in 72 hours
  - if no rash yet, but only burning: watch and wait. start Valacyclovir before 72 hours if not better
  - if >72 after onset
    - consider antiviral therapy if new lesions still appearing. Otherwise, likely minimal benefit.
  - Valacyclovir 1g tid x7days.
  - pregnant women
    - should treat shingles.
    - Valacyclovir likely safe in pregnancy
- complications
  - Ocular zoster
    - presentation
      - prodrome: headache, malaise, fever.
      - hyperemic conjunctivitis, uveitis, episcleritis
      - rash to area around eye or tip of nose.
    - should refer to ophthalmology
  - Ramsay hunt syndrome (herpes zoster oticus)
    - ipsilateral facial paralysis, ear pain, vesicles in auditory canal or auricle.
    - also: altered taste perception, hearing abnormality, lacrimation
  - Post herpetic neuralgia
    - prognosis: may persist for months to years.
    - Management
      - TCA, pregabalin, gabapentin. opioids are third line
- Vaccination
  - timing after recent infection is uncertain
    - usually give Shingrix vaccine 1 year after infection, since there is some immunity after infection
  - 2 dose series at 0 months and 2-6 months.
  - prescription
    - Shingrix 50mcg/0.5mL vial

- for IM injection now and 2-6 months after 1st dose. Mit: 1. Repeats 1.

## .Syphilis

- Investigation:
  - screen: CMIA, VDRL
  - RPR, TPPA for confirmatory
- transmission
  - vaginal/anal/oral sex (direct contact with chancre), less likely kissing, needles, organ transplant
- staging
  - Primary (incubation 3 weeks): chancre (disappears in 2-8 weeks without treatment), lymphadenopathy
  - Secondary (incubation 2-12 weeks): fever, malaise, lymphadenopathy, headache, rash (pink/brown macules on palms, soles), oral lesions (mucous patches), GU rash
  - Latent: asymptomatic
  - Tertiary: aortic aneurysm, headache, vertigo, dementia, ataxia,
- test interpretation for patients with a history of treated syphilis
  - treponemal tests (FTA-ABS, TPPA) usually remain positive after infection. Non-treponemal titres usually decline (RPR, VDRL) and revert to nonreactive over time
  - if history of treated syphilis, a positive non-treponemal test may indicate: new infection, recent treatment, treatment failure, serofast state
  - compare titers with prior post-treatment titer
  - new syphilis infection diagnosed if: nontreponemal test shows fourfold or greater increase in titer from prior post-treatment test (e.g. 1:4 to 1:16)
  - Serofast if: persistently reactive nontreponemal test despite adequate treatment
- Management
  - early syphilis, (Primary, Secondary, early latent syphilis)
    - Pen G 2.4 million units IM x1
    - other options (Doxy, Ceftriaxone require 10-14 days); Doxy 100mg bid x 14d
  - tertiary syphilis (gummatous or cardiovascular disease) or late latent syphilis
    - Pen G 2.4 million units once weekly for 3 weeks
  - neurosyphilis:
    - IV pen G
  - refer to ID clinic (e.g. Positive Care clinic)
- monitoring
  - monitor nontreponemal titers (RPR or VDRL)
  - fourfold decline in nontreponemal titer is considered to be an acceptable response (e.g. 1:16 to 1:4)

## .Syphilis - other info

- Jarisch-Herxheimer reaction
  - acute, self-limited febrile reaction within first 24h after therapy for syphilis
  - occurs in 10-35 percent of cases
  - symptoms: headache, myalgias, rigors, diaphoresis, hypotension, rash
  - usually resolve without intervention in 12-24 hours.
  - may treat supportively with NSAIDs and tylenol

## .Hep C.hepatitis C.HCV - other info

- percentage of people who clear the virus spontaneously
  - 25-35%
- risk factors
  - injection drug users



- recipients of infected blood products
- children born to mothers with HCV
- people with sexual partners with HCV
- people with HIV infection
- tattoos or piercing

### .ingrown nail

- Clinical presentation
  - inflammation and edema to nail fold
  - stage 1: mild erythema and edema
  - stage 2: severe inflammation with seropurulent discharge
  - stage 3: formation of granulation tissue and chronic hypertrophy of nail fold
- conservative management
  - soak affected digit in warm soapy water 10-20 min twice daily. Followed by high potency topical steroid for two weeks
  - place dental floss under nail corner to separate it from nail fold
- surgical
  - wedge resection of nail with phenolization
  - vandenbos

### .Paronychia, Acute

- DDx:
  - foreign body, trauma, nail biting, thumb sucking
- Management
  - No abscess:
    - warm soaks multiple times per day. 10-15 minutes each.
    - apply antibiotic ointment after each soak
    - if severe: anti-staph agent (e.g. cephalexin). if nail biting/sucking: amox-clav for oral flora.
    - if spreading past distal phalangeal joint or systemic symptoms, consider oral antibiotics
  - with abscess:
    - treat with incision and drainage
- Incision and drainage if abscess present
  - for anesthesia: ice bath or digital block. may not be needed if using needle.
  - slice under (lateral nail fold) to release pus
  - antibiotics generally not needed after successful drainage
  - aftercare:
    - soak in warm water to maintain patency of incision and assist wound drainage.
- 

### .Paronychia, Chronic

- Presentation
  - periungual erythema and swelling, loss of cuticle and nail dystrophy
- management
  - avoid exposure to irritant or allergen
  - keep hands as dry as possible. use gloves for wet work.
  - use topical corticosteroids rather than topical antifungals

- 

## .Tetanus prophylaxis

- when to give vaccine
  - should give as soon as possible
  - may still give vaccine to patients who present late. the incubation period of tetanus is approximately 8 days but ranges from 3 to 21 days
- clean and minor wound
  - <3 doses of previous Td or unknown (note: vaccine schedule in Canada gives >3 doses as a baby)
    - give tetanus vaccine
  - ≥ 3 doses of Td previously
    - only if last dose ≥ 10 years ago
- all other wounds (e.g. contaminated with dirt, feces, soil, saliva, puncture, avulsions, burns, crush, frostbite)
  - <3 doses of previous Td or unknown (note: vaccine schedule in Canada gives >3 doses as a baby)
    - give tetanus vaccine
    - give tetanus immune globulin
  - ≥ 3 doses of Td previously
    - only if last dose ≥ 5 years ago
  - patients with severe immunodeficiency or HIV infections with contaminated wounds should also receive tetanus immune globulin, regardless of tetanus vaccination history.
- if never received initial series of 3 doses. give at day 0, >4 weeks later, then 6-12 months later.

- 

## .rabies

- history
  - animal: vaccination status, animal caught/identified,
    - assume any raccoon, skunk, fox, coyote, feral cat, bat is rabid. assume any squirrel, chipmunk, rabbit, rat, mouse is not rabid. absolutely impossible: fish, reptiles, birds
  - provoked/unprovoked attack, animal's behaviour
  - nature of bite: puncture, abrasion
- post exposure prophylaxis
  - unimmunized
    - RabIg (20IU/kg): on day 0. inject into wound, rest IM
    - Rabies vaccine: four doses of 1.0mL doses of HDCV (human diploid cell vaccine) or PCECV IM (day 0,3,7,14)
  - immunized
    - RabIg: not indicated
    - Rabies vaccine: 2 doses of HDCV or PCECV (day 0, 3)

## .Rabies Post-exposure prophylaxis

- not previously vaccinated
  - Rabies immune globulin
    - 20 units/kg. Inject into wound as much as possible. remainder given IM
  - Vaccine. IM into deltoid. on day 0,3,7,14
    - if immunosuppressed: give 5 doses. day 0,3,7,14,28
- previously vaccinated
  - Rabies immune globulin: not indicated
  - Vaccine. IM into deltoid. on day 0,3.

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## .Animal bite

- Amox-clav

- Td. within 72 hours
- Imaging
  - not necessary for uninfected, shallow bites
  - children age <3 with bite to skull: consider CT head to look for penetrating injury to skull
  - if concerned for deeper infection: MRI
- Managing wound
  - control bleeding
  - clean with soap and water
  - remove grossly visible debris
- Reporting
  - need to report animal bite to public health
- Wound closure
  - don't close: crush injury, puncture wound, cat bite wounds (except face), wound on hands/feet, wounds >12 hours old (>24 hours on face), immunocompromised patient (including diabetes), venous stasis
  - may close simple lacerations. should be uninfected. <12 hours old (<24 hours for face). copious irrigation prior to closure.
    - usually recommend wound closure only if on face due to cosmetic considerations.
    - avoid subcutaneous sutures. avoid glue.
    - should give antibiotic prophylaxis
    - do wound check in 24 to 48 hours
- Antibiotic prophylaxis
  - indications
    - primary closure or surgical repair
    - wound to hands, face, genitals
    - close to joints or bone
    - underlying venous or lymphatic compromise
    - immunocompromised hosts (including diabetes)
    - Deep puncture wounds or laceration (especially due to cat bites)
    - Wounds with associated crush injury
  - Regimen
    - treat for 3-5 days for prophylaxis. 5-14 days for established infection
    - Amox-Clav 875/125mg bid.
    - Children > 28 days old
      - Amox-Clav 7:1 formulation: 22.5 mg/kg (amoxicillin component) twice daily (maximum Amox-Clav 875 mg-125 mg per dose)
      - Amox-Clav 4:1 formulation: 10 mg/kg (amoxicillin component) 3 times daily (maximum Amox-Clav 500 mg-125 mg per dose)
    - other options: (Doxycycline, TMP-SMX, Cefuroxime) PLUS (Metronidazole, Clindamycin)

## • .Anal pruritus

- Etiology
  - infectious (e.g. pinworms), eczema, irritation
  - hemorrhoids, anal fissure
- Treat underlying cause: see pinworms
- If idiopathic
  - in patients with anal pruritus, initial management consists of improving anal hygiene, avoiding moisture in the anal area, removing offending agents, dietary modification, and protection of skin.
  - Empiric treatment: hydrocortisone, zinc oxide

## • .Pinworms

- S:

- Perianal itching at night
- Testing
  - Normal lab req. Order pinworm testing
  - Press sticky surface of paddle against buttock
- In cases of confirmed enterobiasis, simultaneous treatment of the entire household is warranted regardless of symptoms in other household members given high transmission rates among families.
  - Need to wash bed sheets
- treatment
  - nonpregnant adults and children
    - Albendazole (adults and children: 400 mg orally once on empty stomach, repeat in two weeks)
    - Mebendazole (adults and children: 100 mg orally once, repeat in two weeks)
    - Pyrantel pamoate (adults and children: 11 mg/kg, maximum 1 g; repeat in two weeks; available over the counter in the United States)
  - pregnant
    - Treatment of enterobiasis in pregnant women should be reserved for patients with significant symptoms. Pyrantel pamoate is favored over mebendazole or albendazole for treatment of symptomatic enterobiasis in pregnant women. The dosing is the same as for nonpregnant adults.

## • Tick bite

- Lyme prophylaxis
  - criteria for prophylaxis: must meet ALL of the following:
    - doxycycline not contraindicated
    - bite occurs in highly endemic area
    - attached tick identified as deer tick
    - prophylaxis started within 72 hours of tick removal
    - tick attached for >36 hours
  - prophylaxis: Doxycycline 200mg single dose. 4.4mg/kg in children
  - if does not meet criteria for prophylaxis or if patient refuse prophylaxis: we observe and treat only if signs or symptoms of Lyme disease (eg, erythema migrans develop).
- Tick removal
  - Use fine tipped tweezers/forceps. Grasp tick as close to skin surface as possible. Grasp the head. Avoid compressing the body
  - Pull straight up with steady pressure.
    - Do not squeeze/crush the body of the tick because its fluids may contain infectious agents.
    - Do not jerk or twist the tick since this may cause mouth parts to break off and remain in skin
      - If tick mouth parts remain in the skin. Don't dig the parts out. Wait for them to fall out on their own.
  - After tick removal. Cleanse the bite site with alcohol or soap/water
  - The patient should observe the site for erythema migrans for 30 days.
  -

## • Lyme disease

- 3 stages
  - early stage: within 30 days. erythema migrans, non-specific flu like symptoms
  - early disseminated disease: 1-3 months after infection: multiple erythema migrans. severe headaches, neck stiffness, fatigue, carditis (heart block)
  - late disseminated disease: arthritis

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## .Antibiotics

- example regimens
  - meropenem is usually given for 5 days for pneumonia
  - Pneumonia: step down to Azithro and Cefuroxime 500mg bid po to finish 5 days
  - Sepsis from cholangitis: on pip-tazo. Step down to clavulin to finish 7 days
  - Sepsis from post prostate biopsy: on cefazolin. Step down to Keflex to finish 10 days
  - Sepsis from thoracostomy wound. Failed Cipro flagyl. Pip-tazo x7 days. Amox-clav x7 days.
- IV vs PO antibiotics
  - bioavailability is equivalent in most cases
  - consider IV in following circumstances
    - poor compliance as you know the nurse will be checking on them regularly
    - staph aureus bacteremia
    - issues with GI absorption, such as IBD
    - life threatening infection or brain infection
- 
- 

## .Sepsis.Bacteremia

- find the source
  - if joint pain, back pain:
    - consider that the infection may be from these sources.
  - Abdominal imaging (CT or U/S) to look for intra-abdominal abscess
- if strep/staph bacteremia
  - consider ordering echocardiogram to rule out endocarditis. consider TEE if nothing seen on TTE.
- Initial management
  - Trend lactate.
  - Pip-tazo.
  - IV fluids bolus 1L over 2 hours, 75mL maintenance.
  - get Blood, urine cultures
- Gram negative bacteremia
  - Empiric therapy: ceftriaxone
  - Urinary source most common
  - Get Kidney, bladder ultrasound. Rule out hydronephrosis.
  - Consider CT abdo and meropenem if patient crashes.
- 
- 

## .COVID isolation and testing requirements

- see BCCDC self isolation guidelines
- isolate until:
  - if fully vaccinated
    - 5 days after tested positive AND until symptoms improve and no longer have fever
  - if not fully vaccinated
    - age > 18
      - 10 days after tested positive AND until symptoms improve and no longer have fever
    -
- <https://dfcm.utoronto.ca/confused-about-covid>
- 
- 

## .COVID assessment center

- preparation
  - put initials on label
  - put label on collection container.

- attach tape to top of collection bag
- stick the collection bag to the wall when you walk in to the booth
- encounter
  - introduction
  - confirm name and birthday
  - ask vaccination status, travel history, sick contacts
  - symptoms: fever, SOB, runny nose, sore throat, cough
  - advise on swab process: feels like water going up nose. it is uncomfortable. swab will be inserted into back of nose. swab will be in place for 5 seconds
  - squirming children
    - child on parent's lap with child's back to parent's chest
    - child's legs between parent's legs
    - one of parent's arms wrapping around child, holding both arms
    - other parent's arm holding child's head
    - I will hold child's head with left hand. swab with right hand.
- counselling regarding self isolation
  - if test positive
    - self isolate for 10 days
    - public health will provide with further instructions
  - if symptoms
    - self isolate
    - get tested
    - if test negative, self isolation until symptoms improving for 24 hours (48 hours for GI symptoms)
      - further self isolation depends on vaccination and exposure status.
  - vaccinated and no symptoms
    - no exposures:
      - go to work
    - has exposure with confirmed COVID 19
      - go to work
      - get tested
      - self monitor for next 10 days
    - has exposure to someone with symptoms
      - go to work
      - self monitor for next 10 days
  - unvaccinated and no symptoms
    - no exposures:
      - go to work
    - has exposure with confirmed COVID 19
      - self-isolate for 10 days following last exposure, even if test negative
      - get tested
    - has exposure to someone with symptoms
      - self isolate until person with symptoms gets negative COVID 19 test result
    - household member exposed to someone with confirmed COVID 19. household member no symptoms
      - go to work
      - self monitor for 10 days
    - household member exposed to someone with confirmed COVID 19. household member has symptoms
      - self isolate until person with symptoms gets negative COVID 19 test result
- when to get tested for COVID
  - if fever, chills, cough, loss of taste or smell, or SOB: get tested
  - if sore throat, loss of appetite, headache, body aches, fatigue/tiredness, nausea, vomiting, diarrhea: stay home until get better
    - if 2 of symptoms: stay home and wait 24 hours. if better, then great. if not better, get tested for COVID

## .COVID.paxlovid

- nirmatrelvir-ritonavir (Paxlovid) indicated if:
  - <https://www2.gov.bc.ca/assets/gov/health/forms/2368fil.pdf>
- eligibility criteria: age > 18 with mild/moderate symptoms and increased risk of progression
  - any adult in clinically extremely vulnerable groups CEV1, CEV2, CEV3
    - CEV Group 1 includes severe immunocompromise e.g., solid organ transplant, stem-cell transplant or CAR-T cell therapy, active treatment for hematological malignancies, B-cell depleting and anti-CD 40 therapy
    - 2. CEV Group 2 includes moderate immunocompromise e.g., solid tumor cancer treatment, active hematological malignancy, immunosuppressive therapy, primary immunodeficiencies and advanced/untreated HIV
    - 3. CEV Group 3 includes high-risk conditions e.g., cystic fibrosis, severe asthma or severe COPD, diabetes requiring insulin, developmental or intellectual disabilities, rare metabolic or blood disorders and others
  - 0 vaccines and no previous infection
    - age 18-49: 3 chronic conditions/comorbidities: obesity, diabetes, HF, stroke, neurological conditions. OR Indigenous
    - Age ≥ 50: any individual
  - 1-2 vaccines OR previous infection alone
    - age 18-49: not at increased risk
    - age 50-69: 3 chronic conditions/comorbidities. OR Indigenous
    - age 70+: 1 chronic conditions/comorbidities. OR Indigenous
  - 3 vaccines OR previous infection + any vaccination
    - age 18-49: not at increased risk
    - age 50-69: not at increased risk
    - age 70+: 3 chronic conditions/comorbidities. OR Indigenous
- exclusion criteria
  - hx of significant liver disease: cirrhosis, active hepatitis (ALT 5x ULN), or severe liver dysfunction
  - moderate-severe renal impairment requiring renal replacement therapy or known eGFR less than 30ml/min
  - hypersensitivity or other contraindication to any components of medication

## .Whooping cough.Pertussis

- cause: bordetella pertussis.
- sound
  - lots of coughing, followed by the large inhalation, which is the "whoop"
- 3 stages
  - catarrhal stage: 1-2 weeks. URI symptoms
  - paroxysmal stage: 2-8 weeks. paroxysms of coughing, and inspiratory whoop and post-tussive vomiting
  - convalescent stage: cough subsides over weeks to months
- clinical diagnosis
  - 2 weeks of cough and one of following
    - paroxysms of coughing
    - inspiratory whoop
    - posttussive vomiting
    - apnea with or without cyanosis.
  - acute cough and contact with lab confirmed case.
- public health reporting
  - this is a reportable disease
- 

## .Whooping cough.Pertussis - management

- vaccination
  - routine at 2,4,6,18 month, 4-6y, 14-16 year
- indications for hospitalization
  - increased work of breathing, pneumonia, inability to feed, cyanosis, apnea, seizures, age <4 months

- supportive care
  - fluid and nutrition
  - symptomatic therapy for cough not recommended: not proven benefit to bronchodilators, corticosteroids, antihistamines, antitussive agents
- Antibiotics
  - macrolides: azithromycin preferred
    - associated with infantile hypertrophic pyloric stenosis. consider this if develop vomiting within one month of therapy with macrolide in the first month of life.
  - may treat with TMP-SMX if cannot tolerate macrolides
  - indication:
    - in children/infants
      - positive bordetella pertussis cultures or PCR
      - clinical diagnosis with symptoms <21 days
      - may also treat patient with >21 days of symptoms, but benefit less clear.
    - in adolescents/adults
      - clinical symptoms of pertussis and any one of: pregnancy, age ≥ 65, COPD/asthma, immunocompromised
        - and onset of cough within 6 weeks
      - clinical symptoms of pertussis and onset of cough within 3 weeks
- post exposure prophylaxis
  - for all household and close contacts
  - prophylaxis regimen is the same as the treatment regimen
- 

#### .Reportable illnesses

• [https://www.bclaws.gov.bc.ca/civix/document/id/lc/statreg/167\\_2018](https://www.bclaws.gov.bc.ca/civix/document/id/lc/statreg/167_2018)

- HIV
- amoebiasis
- anthrax
- botulism
- chlamydia
- CJD
- cryptosporidiosis
- giardiasis
- gonorrhea
- viral hepatitis
- leprosy
- Lyme disease
- malaria
- measles
- mumps
- pertussis
- rabies
- rubella
- small pox
- syphilis
- tetanus

- 
- 

#### .TB.Tuberculosis

- investigation
  - CXR, sputum x3 for AFB and culture



- prevention with BCG as infant (effective against pediatric millary TB and Potts disease) but effectiveness debated in adults
- treatment
  - active TB
    - isoniazid, rifampid, ethambutol, pyrazinamide x2 months. followed by INH, RIF x4 months
- risk factors for progression from latent to active
  - HIV
  - diabetes
  - chronic steroid use
  - chronic immunosuppressnat therapy
  - chronic renal failure and dialysis
  - excessive alcohol
  - transplant
  -

## .Infection in sport

- prevention
  - proper hygiene
  - do not share water/drink bottles
  - wear slippers in the showers
  - hand washing
  - do not share razors

- 
- 

## .MRSA

- risk factors for acquiring MRSA
  - limited access to clean water
  - overcrowding
  - participation in contact, team sports
  - prisoners
  - military
  - recent antibiotic use in last 6 months
  - HIV positive
  - IVDU
  - homeless
  - prior MRSA colonization
- classes that treat MRSA
  - lincosamides: clindamycin
  - sulfonamides: trimethoprim-sulfamethoxazole
  - tetracyclines: doxycycline, minocycline
  - oxazolidinones: linezolid
  - lipopeptides: daptomycin
  - glycopeptides: vancomycin

- 

## .HIV - other info

- HIV associated opportunistic infections
  - CNS
    - toxoplasma gondii
    - treponema pallidum
  - respiratory
    - pneumocystis jiroveci

- mycobacterium avium complex
- GI
  - CMV
  - cryptosporidiosis
  - microsporidiosis
  -

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- 

## .Outbreak

- management
  - isolation of patients with symptoms
  - notify public health
  - control visitors to facility
  - contact precautions
  - contact tracing
  - test patient zero to determine organism
  - collect and test samples in the home

- 
- 

## .schistosomiasis

- parasitic infection. highest prevalence in sub-Saharan Africa.
- symptoms
  - fever, diarrhea, abdominal pain, headache, myalgia, cough
- investigation
  - stool O&P
  - urine examination for parasite eggs
  - rectal biopsy
- treatment
  - praziquantel plus prednisone for 6-12 weeks. then praziquantel for 4-6 weeks without steroids.

- 

## .leprosy

- Leprosy is a chronic infection caused by Mycobacterium leprae and Mycobacterium lepromatosis
- DDx
  - fungal infection, annular psoriasis, SLE
- physical exam
  - loss of sensation at rash
  - hypopigmented or reddish skin patches
- diagnosis
  - skin biopsy
- risk factors
  - low SES
  - genetic predisposition
  - exposure to affected household contacts
  - endemic locations
    - India, Indonesia, Brazil, Congo
- treatment
  - tuberculoid disease: dapsone 100mg and rifampicin 600mg daily for 12 months
  - lepromatous disease: dapsone, rifampicin and clofazimine 50mg for 24 months
  - treat neuritis and corticosteroids

-

## .HIV PrEP.PrEP for HIV

- indications for PrEP
  - negative HIV test
  - GFR  $\geq 30$
  - high risk:
    - men who have sex with men
    - people who inject drugs/share needles
    - people who engage in sex with HIV positive partner with detectable viral load
- investigations before starting PrEP
  - screen for Hep B, hep C
  - rule out pregnancy
  - consider BMD if high risk for osteoporosis
- drugs
  - Truvada: emtricitabine/tenofovir
- when is it taken
  - taken daily
  - OR around time of sex (on demand)
- when can stop
  - 2-28 days after last potential exposure
- monitoring
  - patient should be seen every 3 months
  - investigations
    - HIV
    - STIs
    - Cr
    - urinalysis
- 

## .Needlestick.Exposure to HIV, Hep C, Hep B

- <https://www.uptodate.com/contents/image?imageKey=ID%2F66128>
- After exposure: Wash area thoroughly with soap, water
- general management/assessment
  - wash thoroughly right away
  - ensure tetanus shot is up to date
  - assess HIV risk. and if should be on PrEP
  - assess Hep B risk and if should be vaccinated vs IgG
- Baseline bloodwork and associated reason
  - Hep B: can give HBIG if not immune
  - Hep C: for baseline for medicolegal purposes. So, if you claim disability, you can prove it was from the needlestick and you didn't have it before.
  - HIV: if you're already positive, shouldn't get PEP, since this would cause resistance and you should be on full treatment.
  - Cr: to get baseline kidney function if treating with PEP for HIV.
- Summary of testing timeline
  - HIV (if antibody only): 6 weeks, 3 months, 6 months
  - Hep B: if not vaccinated. 6 months
  - hep C (anti-HCV): 6 months
- Exposure to possible HIV
  - Risk of seroconversion is 3 per 1000 with no prophylaxis
  - Testing: should do follow-up testing even if doing PEP
    - 4th generation antibody-antigen test: at baseline, 6 weeks, 4 months
    - Antibody only: six weeks, three months, six months

- Offer PEP if patient known HIV, or high risk for HIV. PEP for 28 days.
  - If source negative for HIV, can discontinue PEP
- Exposure to possible Hep B
  - If not immune to HBV, no PEP, exposed to Hep B positive patient, risk of seroconversion 23-62%
  - Determine vaccination status of healthcare worker:
    - Date of hep B vaccinations. Post immunization titer
  - If status of source patient unknown, manage healthcare worker as if source patient is HbsAg positive.
  - Post-exposure prophylaxis
    - If healthcare worker anti-HBs pos (history of past infection): worker considered protected. no PEP
    - If worker vaccinated x3 and vaccine responder (anti-HBs >10): worker considered protected. No PEP
    - If worker vaccinated x3 and vaccine non-responder (anti-HBs <10): worker considered not protected. If source patient is HBsAg positive: worker needs HBIG initially and at 1 month
    - If worker not fully vaccinated: should get HBIG if source patient HBsAg pos.
  - Follow-up testing:
    - HBsAg 6 months after exposure
- Exposure to possible Hep C
  - HCV seroconversion 1.8% in HCV positive source
  - No PEP is available
  - Testing:
    - Test source patient for HCV RNA. If not available, test for anti-HCV.
    - If source is HCV RNA negative: worker needs no further evaluation.
    - If source is anti-HCV negative: additional testing of worker generally not needed, unless concerned
    - If source is HCV positive or source unknown:
      - Workers should have baseline testing for anti-HCV within 48h of exposure
        - If anti-HCV positive: test the worker for HCV RNA
          - If HCV RNA positive: worker has pre-existing HCV infection.
          - If HCV RNA negative: worker needs repeat HCV RNA 3 weeks after exposure. If repeat HCV RNA is negative, initial anti-HCV likely false positive. If repeat HCV RNA is positive, worker has HCV infection
        - If anti-HCV negative: worker needs HCV RNA three weeks after exposure. OR get anti-HCV 6 months after exposure. If repeat HCV RNA negative, no further evaluation needed.

## .Neurology

### .CSF leak.spontaneous intracranial hypotension

- Clinical presentation
  - postural headache. Worse with standing up. Better with lying down. often described as throbbing or a dull pain that may be generalized or focal.
- CSF leak
  - clear fluid
  - Metallic taste in the back of the throat
  - postural headache
  - Rhinorrhea caused by a CSF leak has a typical characteristic of positional variation; that is, the rhinorrhea only occurs when the patient lowers his or her head.
- diagnosis
  - If a cranial CSF leak is suspected, the patient's physician may ask them to lean forward so they can observe if this increases the flow of nasal discharge. If the discharge can be collected, it is sent for laboratory tests to determine if it is cerebrospinal fluid.

### .facial twitch.hemifacial spasm

- Cause: irritation or damage to facial nerve. Often due to facial nerve compression by blood vessel
- presentation
  - involuntary twitching to one side of face. Twitch to eyelid is blepharospasm
- initial management
  - rest
  - limit caffeine
- subsequent management
  - pharmacotherapy
    - baclofen, gabapentin, anticholinergics
    - botulinum toxin injections is the treatment of choice
  - surgery to address underlying cause
- investigations
  - may do MRI to rule out tumors or other structural abnormalities that could affect the nerve
    - rule out the vascular malformation or tumor at the brainstem exit site of the nerve
  - EMG/NCS can be helpful to rule out other diagnoses

### .Chronic subdural hematoma

- S:
  - headache, lightheaded, cognitive impairment, somnolence, seizures, vision changes
  - medications: blood thinners, ASA, NSAIDs
- P:
  - if asymptomatic, not on blood thinners, no mass effect/midline shift no need for surgical evaluation.
  - f/u with MRI/CT in 2 months
- 

### .Epilepsy

- conditions that can cause a single seizure
  - febrile seizure
  - alcohol/drug withdrawal, drug abuse
  - acute traumatic seizures
  - sleep deprivation
  - CNS infection
  - hypoglycemia, hyponatremia, metabolic encephalopathy
- titration and monitoring
  - start treatment with single drug. titrate to highest tolerated dose
    - if breakthrough seizures still occur, add a second seizure medication, since raising the dose won't be tolerated
  - check drug levels at least yearly
- osteoporosis
  - chronic use of antiseizure medications associated with bone loss, particularly phenytoin
  - monitor bone density
  - supplement Vit D and Calcium
- investigations after seizure
  - EEG
  - neuroimaging
  - extended lytes, glucose, LFTs, Cr
  - ECG
- investigations for increase in seizure frequency
  - beta HCG r/o pregnancy
  - serum antiepileptic level

- lifestyle changes that could exacerbate epilepsy

- alcohol intake
- recreational drug use
- stress
- sleep deprivation

- Driving

- see notes on Driving

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## .Dizziness.Dizzy

- DDX: stroke, Meniere disease, BPPV, labyrinthitis, vestibular neuronitis, orthostatic hypotension,

- S:

- sensation of movement, worse with head movement
- menieres: auditory symptoms (hearing loss, tinnitus),
- orthostasis: with lie to stand
- vestibular migraine: history of migraines
- onset, duration of episodes,
  - if stayed perfectly still, is patient still be dizzy
  - longest time they were continuously dizzy for
  - if came on with position change, how long were dizzy for?
- aggravating factors (head movement, standing);
- other associated symptoms (visual disturbance, URI, ear pain or discharge, nausea, palpitations, chest pain, loss of consciousness, falls);
- medications that cause: hypotension, arrhythmias, central anticholinergic effects, cerebellar toxicity, hypoglycemia, ototoxicity, bleeding complications

- Physical exam

- orthostatic vitals
- neuro exam: cranial nerves, cerebellum, Romberg, gait
- Ears, cardiovascular exam
- Dix Hallpike
  - patient sitting on table. head turned 45 degrees. support patient's head, have them lay back quickly, ending with patient's head hanging 20 degrees off the end of the table. maintain position for 30 seconds.
- do HINTS exam (head impulse, nystagmus, test of skew) if acute vestibular syndrome
  - AVS: rapid onset vertigo, nausea/vomiting, gait unsteadiness, nystagmus

- Distinguish Vertigo vs non-vertigo

- spinning quality notoriously unreliable
- vertigo never continuous for more than a few weeks, even if permanent vestibular lesion. distinguish constant vs frequent episodes
- all vertigo worse with moving head.
- nystagmus suggests vertigo.

- Non-vertigo dizziness

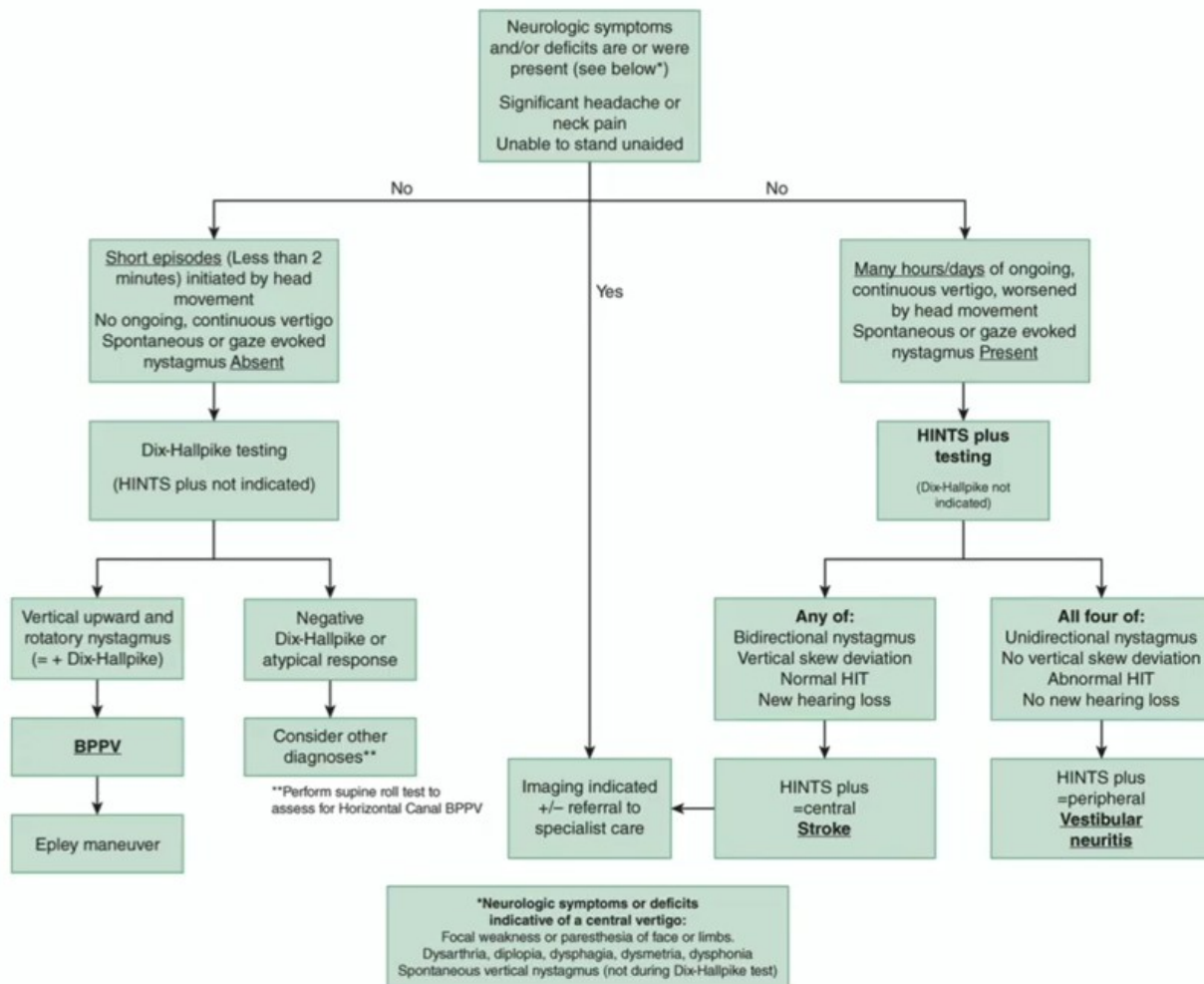
- syncope/presyncope
- disequilibrium: sense of imbalance primarily when walking
  - peripheral neuropathy
  - visual impairment
- non-specific dizziness
  - hyperventilation, anxiety, depression
  - head trauma
  - hypoglycemia

- dizziness in elderly

- likely multifactorial: anxiety, impaired balance, postural hypotension, visual impairment, drug side effect
- Investigations
  - refer to ENT
  - carotid doppler, audiogram, bloodwork
- referral
  - [https://balanceanddizziness.org/diagnosis-and-treatment/other-health-professionals/practitioners-list/?fwp\\_location=bc\\_lower\\_mainland](https://balanceanddizziness.org/diagnosis-and-treatment/other-health-professionals/practitioners-list/?fwp_location=bc_lower_mainland)
    - Physiotherapists who specialize in dizziness

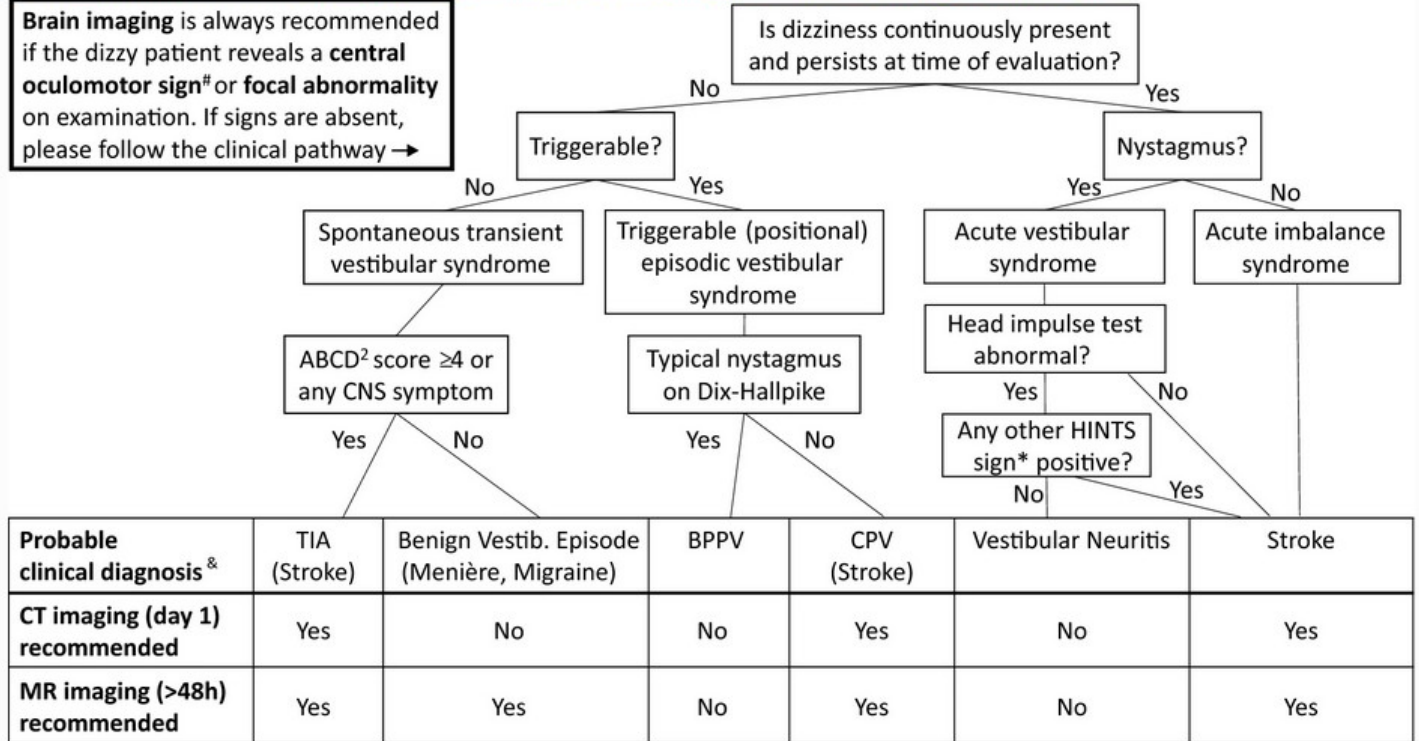
## .Dizziness.Vertigo

•



- <https://www.youtube.com/watch?v=MwbqJvMDonU>
  - big 3 of vertigo: BPPV, vestibular neuritis, cerebellar stroke

From: [Risk of acute brain lesions in dizzy patients presenting to the emergency room: who needs imaging and who does not?](#)



o <https://link.springer.com/article/10.1007/s00415-020-09909-x/figures/2>

- [https://www.uptodate.com/contents/image?imageKey=NEURO%2F81596&topicKey=NEURO%2F5094&search=dizziness&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=NEURO%2F81596&topicKey=NEURO%2F5094&search=dizziness&source=see_link)

## • Vertigo

- o spinning quality is notoriously unreliable. lack of spinning can't exclude vestibular disease
- o time course: never continuous for more than a few weeks.
- o provoking:
  - if dizzy with standing, could be postural presyncope.
  - if dizzy with lying down, rolling over in bed, bending the neck to look up; could be vertigo
- o aggravating: all vertigo is made worse by moving the head. if head motion doesn't worsen the feeling, probably another type of dizziness.
- o ask if single or recurrent episode. and duration of episodes
- o associated symptoms:

- nystagmus suggests that dizziness is vertigo

## • rule out central vertigo red flags:

- o diplopia, dysarthria, dysphonia, dysphagia, dysmetria
- o headache, neck pain, recent trauma
- o neuro signs: facial palsy, sensory loss, limb ataxia, hemiparesis, oculomotor
- o gait unsteadiness

## • specific presentations

- o if constant significant dizziness AND spontaneous nystagmus AND negative for central features
  - Do HINTS exam. If suggests central cause, then possible stroke.
    - If suggests peripheral cause, then likely vestibular neuritis
- o constant significant dizziness AND NO spontaneous nystagmus
  - if gait disturbance, consider stroke. As patient likely doesn't have vestibular neuritis.
  - Remember that you can't use the HINTS plus exam if no spontaneous nystagmus
- o if constant dizziness, no central features, no nystagmus, no objective difficulty with gait
  - patient likely low risk

## • S



- if stayed perfectly still, is patient still be dizzy
- longest time they were continuously spinning for
- if came on with position change, how long were dizzy for?
- Investigations/Workup
  - if suspect central cause: do head MRI
  - ECG
  - CBC, Electrolytes, TSH
  - if non-specific dizziness, may advise patient to get eye exam if not done in several years.
- Treatment - Central
  - cerebellar infarct (persistent over days-weeks, vascular risk factors, gait impairment)
    - MRI
    - evaluation for thrombolysis/thrombectomy
    - secondary risk management
      - antihypertensives if BP > 140/90
      - ASA or clopidogrel
      - Atorvastatin 80mg/day
      - Carotid endarterectomy for recent symptoms
      - Holter 24-48 hours to r/o afib
      - Echocardiography
      - lifestyle
        - glucose control if diabetic
        - eliminate alcohol, smoking
        - exercise

## ● .Dizziness.Vestibular Migraine

- clinical features
  - at least five episodes of significant dizziness/vertigo lasting minutes to days
  - history of migraine headache.
  - at least half of episodes of vertigo have migrainous features associated (e.g. migraine headache or photophobia/photophobia or visual aura)
- pitfalls
  - vestibular migraine can cause minutes/hours/days of vertigo without migrainous symptoms
  - don't make diagnosis unless multiple episodes
  - careful in elderly with risk factors for TIA and only 1 or 2 episodes in past
- treatment
  - avoid migraine triggers
    - sleep deprivation, hunger, food
  - prophylaxis of migraine headache

## ● .Dizziness.BPPV

- loose canaliths become dislodged and enter semicircular canals. most common between age 50-70.
- clinical features
  - transient episodes of vertigo triggered by head movement
  - Dix Hallpike: vertical rotatory nystagmus
- Treatment: Epley maneuver
  - no need to continue to do Epley maneuvers as long as not dizzy
  - mental foggiess should resolve over time.

## ● .Dizziness.Vestibular neuritis

- likely viral origin
- clinical features

- severe vertigo with nausea, vomiting, gait instability
- spontaneous nystagmus
- HINTS plus testing: peripheral result
- treatment:
  - Prednisone for 10 days; 60 mg day 1 to 5, 40mg day 6, 30mg day 7, 20mg day 8, 10mg day 9, 5mg day 10.
  - symptomatic treatment for first 24-48 hours, as may interfere with central compensation and long term recovery
    - antiemetics: dimenhydrinate
  - vestibular rehabilitation: PT/OT

## .Dizziness.Meniere's Disease

- clinical features:
  - classic triad: episodic vertigo, tinnitus, hearing loss
  - spontaneous episodes of vertigo lasting 20 minutes to 12 hours
  - low to mid frequency sensorineural hearing loss
  - fluctuating aural symptoms (reduced hearing, tinnitus, fullness)
- attacks are not reproducible by specific head movements
- treatment
  - lifestyle: limit dietary salt, reduce caffeine, limit alcohol
  - pharmacotherapy:
    - betahistine
    - daily thiazide diuretic. betahistine is preferred though.
    - glucocorticoids if refractory despite first line treatments
  - vestibular rehab
- driving
  - may continue to drive, provided they have sufficient warning before attacks
    - exception: tumarkin otolithic crises (drop attacks), where patient falls to ground without warning but does not lose consciousness.

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## .Lightheadedness

- DDx
  - dysrhythmia, MI, hypovolemia, vasovagal, sepsis, panic disorder, drug side effect
- try serc and epley even if not vertigo

- 

## .Carpal tunnel syndrome

- S: numbness, tingling, weakness in D1,2,3, entire palmar and tips of dorsum; nocturnal symptoms; impact on ADLs: provoked by extending, flexing wrist;
- P:
  - mild/moderate, pregnant: splinting; steroid injection; OT
  - moderate/severe: NCS, surgery
- Clinical features – The hallmark of classic carpal tunnel syndrome (CTS) is pain or paresthesia (numbness and tingling) in a distribution that includes the median nerve territory, with involvement of the first three digits and the radial half of the fourth digit
  - Diurnal character: The symptoms are typically worse at night and characteristically awaken affected patients from sleep.
  - Location of pain: The pain and paresthesia may be localized to the wrist, involve the entire hand, or radiate proximally to as high as the shoulder
  - Provoking: worse with flexing/extending wrist, or lifting arms
- Provocative maneuvers:
  - Phalen: bring the dorsal surfaces of the hands against each other to provide hyperflexion of the wrist while the elbows remain flexed. Position held for 1 minute. Positive sign is pain/paresthesia in the fingers.
  - Tinel: firm percussion over carpal tunnel

- Manual carpal compression
- The hand elevation test involves having the patient raise the hands above the head for one minute
- Electrodiagnostic testing if:
  - Atypical symptoms
  - Moderate to severe symptoms.
- DDx
  - Cervical radiculopathy: features that favor this:
    - The presence of neck pain that radiates into the shoulder and arm
    - Exacerbation of symptoms with neck movement
    - Reduced reflexes (ie, biceps, brachioradialis, and triceps)
    - Weakness of proximal arm muscles involving elbow flexion, extension, and arm pronation
    - Sensory loss in the forearm or medial palm
  - Median neuropathy in the forearm: may occur where median nerve passes through pronator teres in forearm. Features that favor this:
    - findings of sensory loss over the thenar eminence (typically spared in CTS) and weakness of more proximal median-innervated muscles (thumb flexion, wrist flexion, and arm pronation)
- Management
  - If moderate to severe: continuous numbness/weakness, pain disrupts sleep, impairment of hand function
    - Get NCS/EMG. If positive, refer for surgical decompression. If negative: see nonsurgical measures
  - If mild symptoms
    - Non surgical measures:
      - wrist splinting. Typically worn at night.
      - glucocorticoid injections. Max q6 months per wrist
      - f/u in 1-2 months if not improved. Consider NCS/EMG.
- Prognosis – The natural history of untreated CTS is not well defined. Most patients improve with treatment by one year.
- 

## Falls in Elderly

- DDx
  - etiology: medications (antipsychotics, benzodiazepines, TCAs, SSRI, antihypertensives), orthostasis, stroke, MSK weakness, seizure, arrhythmia
  - consequences: ICH, fracture
- S:
  - mechanism of fall; palpitations, dizziness, syncope before fall;
  - ICH: headache, blurry vision, neck pain, head trauma
  - bleeding: hematuria, blood in stool, hemoptysis. anticoagulation
  - BP
  - fracture: pain, bruising,
  - screening: fall in past year, difficulty with gait or balance
  - frequency and circumstances of falls, medications, gait, vision, hearing, mood, cognition, postural vitals
- O:
  - postural vitals,
  - extremities,
  - gait,

- strength,
- visual acuity,
- whispered voice test. Stand at arms length behind patient. Block one of patient's ears. Whisper a short sequence of letters and ask patient to repeat them.
- Investigations
  - bloodwork
    - CBC. r/o anemia
    - A1c. r/o autoimmune neuropathy from diabetes
    - Cr, BUN. r/o dehydration.
  - Other investigations
    - Holter, echo, brain imaging should not be routine but driven by findings during history/physical.
  -

## .Falls in Elderly – prevention

- 
- Management
  - minimize medications
  - physical therapy
  - treat vision impairment
  - manage postural hypotension
  - manage HR, rhythm abnormalities
  - manage foot/footwear problems
    - barefoot particularly risky.
    - Low heeled shoes advisable
    - some studies suggest athletic shoes are best. Others say thin, hard soles.

## .Head trauma

- S: headache, neuro symptoms, vision changes
- O: pupils, ears, neuro
- A/P:

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- 

## .Concussion

- blunt impact to head, neck or body (with transmitting forces to the brain)
- assessment tool: SCAT5
- symptoms
  - physical: headache, dizziness, n/v, amnesia, tinnitus, vertigo, poor balance
  - emotional: irritable, anxiety, fatigue, lethargy, drowsiness
  - cognitive: confusion, feeling in a fog, difficulty concentration
  - sleep: drowsiness, trouble falling asleep, sleep more/less than usual
  - red flags
    - weakness, vomiting, unable to walk
- Prognosis
  - Symptoms greatest within first 7-10 days.
  - At one month, symptoms are improved and in many cases resolved
  - the vast majority of patients have largely recovered by three months
- Treatment
  - cognitive/physical rest

- Patients should limit activities that exacerbate their symptoms in the first days after injury and then gradually return to their former level of activity as tolerated.
- avoid stimulating activities that worsen symptoms such as screens.
- kids: may need cognitive rest. avoid school for 1-2 days. gradual return as tolerated by symptoms.
- Post traumatic headache
  - Tension: Amitriptyline 10mg qhs, Mirtazipine 15mg, Venlafaxine 75mg
  - Migraine: metoprolol 50mg daily, Candesartan 8mg, Amitriptyline
- readiness for return to play
  - symptoms resolved
  - return to normal cognitive activity without symptoms
  - vigorous endurance/resistance physical activities performed without symptoms
  - normal clinical exam with normal C-spine and neuro status
- if persistent symptoms, other causes to consider
  - C-spine issue
  - vestibular issue
  - migraine
  - sleep disturbance
  - autonomic dysfunction
  - anxiety
  - depression
- 

## Headache – red flags

- <https://pathwaysbc.ca/ci/2894>
  - <https://actt.albertadoctors.org/CPGs/Lists/CPGDocumentList/Quick-Reference-Headache.pdf>
- S:
  - characterize: Onset (acute vs chronic), location (unilateral vs bilateral), quality (dull vs stabbing), intensity (is it the "worst headache of their life"?), duration, frequency, progression, timing (does it disturb sleep?), any symptoms prior to headache (aura),
  - nausea/vomiting, jaw claudication, dental surgery, sinusitis symptoms, exacerbating factors (stress, fatigue, menses, exercise, certain foods, alcohol) and alleviating factors (rest, medications); patient and family history of headache; history of trauma.
  - last optometry appointment, lifestyle (sleep, exercise, screen time)
- red flags:
  - emergent
    - thunderclap onset (SAH)
    - fever, meningismus (meningitis)
    - papilloedema plus focal signs or reduced LOC (ICH)
    - acute glaucoma
  - urgent
    - temporal arteritis
    - relevant systemic illness
    - elderly: new headache with cognitive change
  - possible indicators of secondary headache
    - unexplained focal signs
    - atypical headaches
    - unusual headache precipitants
    - onset after age 50
    - aggravation by neck movement. Consider cervicogenic headache
    - jaw symptoms. Consider TMJ.
  - rule out: SAH, cervical dissection, infection, HTN emergency, GCA, central venous thrombosis
- DDx - red flags
  - meningitis: fever, neck stiffness, decreased LOC

- Giant cell arteritis: scalp tenderness, jaw claudication, vision loss/diplopia
- SAH: sudden/severe/worst headache/thunderclap
- elevated ICP (tumor, bleed): worsening pain over time, worse in am
- stroke: neurologic deficit
- Need for emergency evaluation
  - sudden onset severe headache (max intensity within a few seconds)
  - fever, altered mental status,  $\pm$  nuchal rigidity
  - Horner syndrome: unilateral decreased pupil size, drooping eyelid, decreased sweating
  - focal neurologic deficit
  - visual impairment, weakness of EOM,
- DDx - other: MM it aches
  - Migraine
  - meningitis
  - increased intracranial pressure
  - tension headache, temporal arteritis, trigeminal neuralgia
  - AV malformation
  - cluster migraine
  - hypertension
  - eye disorder
  - sinusitis, subarachnoid hemorrhage, systemic illness
  - red flags
    - S: fever, weight loss, fatigue, malignancy, immunosuppression, HIV
    - N: neurologic symptoms: focal neuro deficits, altered consciousness, confusion
      - paresthesias, visual symptoms, weakness, numbness, ataxia, photophobia, dizziness, neck stiffness
    - O: thunderclap, abrupt, new onset, progressive headache
    - O: age > 50
    - positional, pattern change, age > 50, sudden onset, trauma
- indication for neuroimaging
  - The "first or worst" headache
  - Recent significant change in the pattern, frequency, or severity of headaches
  - New or unexplained neurologic symptoms or signs
  - Headache always on the same side
  - Headaches not responding to treatment
  - New-onset headaches after age 50 years
  - New-onset headaches in patients with cancer or HIV infection
  - Associated symptoms and signs such as fever, stiff neck, papilledema, cognitive impairment, or personality change
- O: Vital signs; inspection and palpation of entire head and neck; ENT inspection; complete neurologic exam (including fundoscopic exam) and examination for meningeal signs for an acute headache.

## .Headache – general management

- behavioural management of primary headache
  - headache diary: record frequency, intensity, triggers, medication
  - lifestyle factors: reduce caffeine, regular exercise, avoid irregular sleep/meals, avoid screens
  - stress management
- other management
  - get eyes checked. as headache may be due to eye strain
  - consider sinus headache
  - consider medication prophylaxis for tension/migraine headache.
- symptom management in ER
  - initial

- Toradol 30mg iv/im
- Maxeran 10mg iv
- Gravol 50mg iv
- Dexamethasone 10mg iv
- 1L NS bolus
- after 1 hour, if no improvement
  - Zofran 8mg iv x1
  - 1L NS bolus

•

## .Migraine

- DDX:
  - see headache
- S:
  - photophobia, incapacity (limit work, function), nausea
- diagnosis of migraine without aura
  - last 4-72h (untreated or unsuccessfully treated)
  - two of following characteristics
    - unilateral location
    - pulsating
    - moderate/severe
    - aggravated by or causing avoidance of routine physical activity
  - one of following
    - nausea/vomiting
    - photophobia and phonophobia
  -
- diagnostic testing
  - neuroimaging not necessary for most patients
  - suggest neuroimaging if:
    - Patients with an unexplained abnormal finding on neurologic examination
    - Patients with atypical headache features or headaches that do not fulfill the strict definition of migraine or other primary headache disorder (or have some additional risk factor, such as immune deficiency)
- P:
  - conservative treatment:
    - sleep, exercise, fluid intake, weight loss, avoid caffeine,
    - avoid acute headache medication overuse (15 days of OTC headache meds OR 10 days of Rx headache meds per month)
    - headache diary to identify triggers
  - supplements: low evidence
    - Mg citrate 300mg bid, riboflavin 400mg daily, coq10 100mg tid
  - acute treatment
    - first line
      - Ibuprofen 400mg, ASA 1000mg, naproxen 500mg, acetaminophen 1000mg, Diclofenac (Cambia) 50mg
    - second line
      - triptans: sumatriptan 100mg, rizatriptan 10mg, almotriptan 12.5mg, zolmitriptan 5mg, eletriptan 40mg, frovatriptan 2.5mg naratriptan 2.5mg
        - contraindicated in cardiovascular disease. prevents vasodilation
      - antiemetics: domperidone 10mg, metoclopramide 10mg for nausea
    - Tylenol #2, #3
    - Ketorolac 10mg q6h. mit: 30 tablets
  - status migrainosus >72h
    - iv ketorolac 30mg

- dihydroergotamine 1mg iv

## .Migraine prevention

- Consider if
  - headache >3 days/months and acute meds not effective
  - OR >8 days/month (risk of overuse)
  - OR disability despite acute meds
- First line
  - propranolol 20mg bid. Increase weekly by 40mg. Target: 40-120mg bid
  - metoprolol 50mg bid. Increase weekly by 50mg. Target 50-100mg bid
  - nadolol
  - amitriptylin 10mg qhs. Increase weekly by 10mg. Target 10-100mg qhs
    - side effects: sedation, dry mouth, constipation, palpitations, orthostasis, blurry vision, urinary retention)
  - nortriptyline 10mg qhs. Increase weekly by 10mg. Target 10-100mg qhs
- 2nd line
  - topiramate 25mg once daily. titrate to max 100mg bid.
    - most amount of evidence.
    - side effects: nausea, paresthesia, fatigue, anorexia, diarrhea, memory difficulty.
    - note: this reduces efficacy of birth control.
  - Candesartan 8mg daily. Increase weekly by 8mg. Target 16mg daily
    - avoid in pregnancy or when pregnant planned
  - lisinopril 10mg daily. Increase weekly by 10mg. Target 20mg daily
- other
  - divalproex sodium 250mg daily. titrate at 250mg intervals weekly. Target 750-1500mg daily, divided bid
    - avoid in pregnancy or when pregnancy planned
  - Venlafaxine 37.5 mg. titrate to 75mg to 150mg.
- botox
  - side effects: neck pain, muscular weakness, eyelid ptosis
- CGRP monoclonal antibodies
  - erenumab, fremanezumab, galcanezumab
  - side effects: constipation, injection site reaction, pruritus, muscle spasm, vertigo, urticaria
  - once monthly injection
  - bind up CGRP
    - contraindicated in cardiovascular disease. prevents vasodilation
- 

## .thunderclap headache

- if thunderclap headache within 2 weeks, send to ER for CT head and CT angio
  - in the ER: if symptomatic and CT, CTA normal, consider LP

## .Tension headache

- Acute medication
  - ibuprofen 400mg, ASA 1000mg, naproxen 500mg, acetaminophen 1000mg
- Prophylaxis
  - amitriptyline/nortriptyline 10-100mg qhs
  - mirtazapine 30mg hs
  - venlafaxine. 150 mg daily



- Gabapentin, topiramate

### .cluster headache

- Acute medication
  - sumatriptan 6mg sc
  - intranasal zolmitriptan 5mg or sumatriptan 20mg
  - 100% oxygen at 12L/min
- consider early specialist referral
- prophylactic medication
  - verapamil 240-480mg daily
  - lithium 900-1200mg daily
  - topiramate 100-200mg per day

### .LOSS OF CONSCIOUSNESS:

- S: Presence or absence of preceding symptoms (nausea, diaphoresis, palpitations, pallor, light-headedness), context (exertional, postural, traumatic; stressful, painful, or claustrophobic experience; dehydration); associated tongue biting or incontinence, tonic-clonic movements, prolonged confusion; dyspnea or pulmonary embolism risk factors; history of heart disease, arrhythmia, hypertension, or diabetes; alcohol and drug use; medications and recent changes; family history of sudden death.
- O: Vital signs, including orthostatic; complete neurologic exam; carotid and cardiac exam; lung exam; exam of the lower extremities.
- DDX: arrhythmia (long QT, Brugada, heart block), stroke, MI, PE, aortic stenosis, tonic-clonic seizure, orthostatic hypotension/vasovagal, hypoglycemia

### .Meralgia Paresthetica

- numbness on side of leg.
- Due to entrapment of lateral femoral cutaneous nerve as it passes underneath or through the inguinal ligament
- common risk factors
  - obesity, diabetes, old age
  - restrictive clothing,
- management
  - self limited, benign disease. Reassure patient
  - avoid tight garments or belts in groin area
  - weight loss if appropriate
  - may use non-opioid analgesics for pain relief. e.g. topical voltaren
- persistent symptoms: if symptoms more than 2 months
  - may consider neuropathic agents for nerve pain
  - consider referral to anesthesia for nerve block
  - may consider surgical release.
- 

### .Peripheral Neuropathy. Numbness in hands, fingers, legs

- DDX: carpal tunnel; peripheral nerve injury; cervical radiculopathy
- S: weakness, distribution, pain
- O: phalens, tinnels
- P:
  - consider nerve conduction studies

- bloodwork: B12, TSH, iron, A1C, CBC, Electrolytes, Cr

- Bloodwork

- CBC, CHEM7
- HbA1c, glucose
- B12
- TSH
- ESR/CRP
- Additional
  - Lyme antibodies
  - Syphilis - VDRL
  - ANA, RF, p-ANCA, c-ANCA
  - SPEP, UPEP
  - HIV
  - Hep B and C

- EMG studies

- 

### .Neuropathic pain

- Pharmacotherapy

- Gabapentin.

- start 300mg qhs.
- effective dose: IR 300-1200mg po tid. ER 600-1800mg po bid

- Pregabalin

- start: 150mg qhs
- effective dose: 150-300mg po bid

- Duloxetine

- effective dose: 60-120mg po

- Nortriptyline

- start: 10-25mg qhs
- effective dose: 25-75mg daily

- Amitriptyline

- effective dose: 25-125mg daily

### .polyneuropathy.numbness.neuropathy

- Presentation

- symmetric distal sensory loss, burning, weakness

- Causes

- common: diabetes mellitus, critical illness, carcinoma
- less common: uremia, connective tissue disease, hypoglycemia, vitamin B12 deficiency, chronic liver disease, malabsorption, HIV infection, Lyme disease, Lymphoma, multiple myeloma,
- rare: porphyria, PBC, hypothyroidism, COPD, acromegaly, polycythemia vera, cryoglobulinemia

- investigations

- refer for EMG, NCS
- labs: HbA1c, B12, SPEP/UPEP, thyroid tests, ANA, ESR
  - others: HIV, RF, lyme testing, Hep B/C

- referral

- Pathways → EMG → Consultants → EMG/Nerve Conduction

### .NUMBNESS.WEAKNESS:

- S: Onset (acute, subacute, chronic, relapsing); distribution (unilateral, bilateral, proximal, distal); duration; progression; pain (especially headache, neck or back pain); constitutional symptoms, other neurologic symptoms; history of diabetes, alcoholism, atherosclerotic vascular disease.

- O: Vital signs; neurologic and musculoskeletal exams; relevant vascular exam.
- DDX: TIA, seizure with Todd paresis, subdural/epidural hematoma, hypoglycemia, hypothyroidism, Cauda equina, Guillain-Barre, multiple sclerosis, spinal cord compression, peripheral neuropathy, B12/folate deficiency, myasthenia gravis, diabetes

- 
- 

### .Bell's palsy.Bells palsy

- etiology
  - suspected viral, HSV.
- O:
  - assess for complete eye closure.
  - assess peripheral vs central
    - central: forehead sparing
    - peripheral: no forehead sparing
- Management
  - Prednisone 60-80mg 7 days
  - valacyclovir 1g tid. 7 days
    - less evidence for antivirals
  - supportive care if inadequate eye closure
    - eye lubrication. artificial tears four times daily. up to hourly if needed
    - eye protection
      - protective glasses during day
      - may tape eyelid closed. patches not recommended due to risk of eyelid opening under the patch
    - tape eye shut at night.
    -
- referral
  - if no improvement by 3-4 months, refer to facial nerve clinic
- prognosis:
  - 70% recover spontaneously by 3-6 months.
  - 80-85% recover with glucocorticoid treatment
  - recurrence: 7-15 percent. mean time to recurrence was approximately 10 years.

- 

### .Trigeminal neuralgia

- S: intermittent stabbing pain in trigeminal distribution
- P:
  - get MRI
  - Treatment
    - Carbamazepine
      - initial: 200-400mg /day. usual maintenance: 600-800mg/day. max: 1.2g/day
      -
    - Gabapentin, Lamotrigine, phenytoin

- 

### .Stroke - ER, inpatient

- 3 phases:
  - Code: hyperacute in ER
  - Acute: integrated stroke unit
  - Rehab
- Code stroke
  - Investigations

- CT head to rule out hemorrhagic stroke. 20% of strokes are hemorrhagic, 80% of strokes are ischemic
- CTA to look for emboli causing ischemia
- Management for ischemic stroke
  - less than 4.5h
    - TPA
    - OR TPA plus EVT
    - OR EVT only
  - 4.5h to 24h
    - EVT only
  - EVT
    - basically only removable from large arteries. M1, M2, A1. Maybe P1.
- TPA criteria
  - Onset within 4.5h, no ICH, no prior ICH, no head trauma or stroke within 3 months, no intracranial neoplasm, AVM or aneurysm, no recent intracranial /intraspinial surgery,
  - no active bleeding, BP < 185/110, not on Xa inhib, INR >1.7
- ER workup after TIA
  - Labs: cardiac panel, ECG, CT head to rule out bleed
  - outpatient CTA of neck, head
  - refer to outpatient stroke clinic
- stroke unit
  - Stroke workup in Stroke unit
    - Neuroimaging to establish the ischemic stroke: MRI
    - Echocardiogram. look for thrombus, ASD/PFO, rhythm
    - Carotids: CTA
      - >70% stenosis and symptomatic (stroke on that side): refer to vascular
    - Labs
      - HbA1c
      - LDL: target <2
    - Holter monitor as outpatient to assess for atrial fibrillation
  - issues list on stroke unit
    - CTA: any occlusion
    - echo: EF, thrombus, septal defect
    - ECG: sinus, holter as outpatient
    - LDL, HbA1c. on ASA, statin, anti-glycemics
    - anticoagulation
    - driving
- Physical exam on stroke unit
  - full neuro exam
    - cranial nerves
    - motor
      - upper extremity: deltoids, biceps, triceps, finger flexors, finger extensors
      - lower extremity: hip flexors/extensors, knee flexor/extensors, dorsiflexion/plantarflexion
    - deep tendon reflexes
    - cerebellar
- Secondary prevention
  - statin to target LDL <2. treat diabetes if HbA1c elevated
  - anticoagulation after stroke
    - [https://www.uptodate.com/contents/image?imageKey=NEURO%2F131701&topicKey=NEURO%2F1082&search=anticoagulation%20after%20stroke&rank=1~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=NEURO%2F131701&topicKey=NEURO%2F1082&search=anticoagulation%20after%20stroke&rank=1~150&source=see_link)
    - if Atrial fibrillation
      - 1-3-6-12 rule: amount of time to wait after the event before starting anticoagulation
        - 1 day for TIAs

- 3 days for small, disabling infarct strokes
- 6 days for moderate strokes
- 2-3 weeks for large strokes
- if no Atrial fibrillation:
  - ECA/ICA stenosis: refer for carotid revascularization
    - Carotid endarterectomy
      - ASA prior to CEA, then long term single agent antiplatelet
    - Carotid stenting
      - DAPT (ASA plus clopidogrel) prior to and for 30 days after. Then long term single agent antiplatelet
  - Minor ischemic stroke - large artery
    - DAPT for 90 days. Then long term single agent antiplatelet therapy
  - Major ischemic stroke (NIHSS >3) - large artery
    - ASA alone. Consider clopidogrel for 90 days once risk of HT is acceptable. Then long term single agent antiplatelet
  - Minor ischemic stroke - small vessel
    - DAPT for 21 days. Then long term single antiplatelet (either ASA or Plavix)
  - Major ischemic stroke - small vessel
    - Long term single agent antiplatelet: either ASA or plavix
- BP:
  - first 48h: permissive hypertension. systolic 180 for ischemic stroke. 160 for hemorrhagic stroke
  - day 3: target systolic 140. systolic 130 for diabetic patients
    - can try Perindopril/indapamide, or amlodipine
- Driving
  - no driving at least 1 month
  - may resume if no significant motor, cognitive, perceptual or vision deficits. and no seizure

## [.stroke.TIA in community](#)

- Do workup according to risk. Refer to stroke clinic
- TIA workup: risk for recurrent stroke
  - Very high risk: send to ER
    - onset within 48h AND (unilateral weakness, speech disturbance/aphasia, hemibody sensory symptoms, monocular visual loss, posterior circulation: binocular diplopia, dysarthria, ataxia)
    - Investigations to be completed in ER
      - CT head
      - CTA or carotid doppler
      - 12 lead ECG
      - CBC, PTT/INR, lytes, Cr, glucose, LFTs, Trop
      - Validated swallowing screening
  - High risk: send to ER for workup.
    - Onset between 48h and 2 weeks AND (unilateral weakness, speech disturbance/aphasia)
    - Investigations to be completed in ER
      - CT head
      - CTA or carotid doppler
      - 12 lead ECG
      - CBC, PTT/INR, lytes, Cr, glucose, LFTs, Trop
      - Validated swallowing screening
  - Moderate risk: ideally see stroke expert within 2 weeks
    - Onset between 48h and 2 weeks AND (without unilateral weakness or speech disturbance/aphasia)
    - Investigations suggested to be completed within 2 weeks
      - CT head
      - CTA or carotid doppler
      - 12 lead ECG

- CBC, PTT/INR, lytes, Cr, glucose, LFTs, HbA1c, TSH, lipid profile, LFTs
- Low risk: symptom onset beyond 2 weeks. ideally see stroke expert within 1 month
  - CT head/CTA
  - 12 lead ECG
  - CBC, HbA1c, TSH, PTT/INR, lytes, Cr, Glu, LFTs, lipid profile

## .carotid endarterectomy

- risks and complications
  - death
  - stroke
  - nerve palsies
  - myocardia infarction
  - infection
  - bleeding
  - pain
  - re-stenosis
- indication for carotid endarterectomy
  - symptomatic + ipsilateral >50% stenosed
  - consider if asymptomatic + >60%

## .Seizure

- Causes: tumor, infection, trauma, EtOH, primary neurodegenerative disease, metabolic conditions
  -
- Prophylaxis
  - Kepra 500-1000mg bid
    - no need for antiseizure medication for first seizure, unless high risk features for another seizure.
- Evaluation
  - electrolytes, glucose, calcium, magnesium, CBC, renal function tests, liver function tests, urinalysis, and toxicology screens
  - MRI
  - EEG
  - LP if CNS infection or SAH suspected and neuroimaging negative
  - Consult neurology
- Management
  - Ativan 2-4 mg iv prn for seizure
- Inpatient
  - Don't need to necessarily admit for the seizure. Can be seen as outpatient. As long as patient is stable.
- classification
  - focal
    - simple partial: no impaired consciousness
    - complex partial: impaired consciousness
    - simple evolving to generalized seizure
  - generalized
    - absence
    - myoclonic
    - clonic
    - tonic
    - tonic-clonic
-

## .Epilepsy

- complications
  - monitor for depression as very common.
  - association with fibromyalgia, migraine, chronic pain
- counselling
  - advise no high risk regarding working at heights
  - discuss around pregnancy planning
- driving:
  - single unprovoked seizure: no driving for at least 3 months
  - after diagnosis of epilepsy:
    - private driver: can drive when 6 months seizure free
    - commercial driver: 5 years seizure free
- pregnancy
  - counsel patient to be on folic acid 1mg, as opposed to 0.4mg
- drug monitoring
  - Reasonable to monitor drug levels q 3 to 6/12 until stable and then q 6 to 12/12 after that

## .antiseizure drugs and pregnancy.Epilepsy drugs and pregnancy.Pregnancy and epilepsy

- all antiseizure drugs increase risk of birth defects.
  - lamotrigine/levetiracetam lowest risk. Valproic acid highest risk
- associated birth defects
  - neural tube defects: spina bifida
  - cleft lip and palate
  - urogenital defects
  - heart malformations
  - low birth weight
  - lower IQ
- 1-2 years before pregnancy
  - avoid valproate. consider changing to safer antiseizure drug
  - use lowest effective dose of antiseizure medication
  - start 5mg folic acid
  - aim to be seizure free for 9 months
- during pregnancy
  - avoid stopping or switching anti-seizure drugs during pregnancy
  - check serum drug levels if there are more seizures
    - especially lamotrigine and levetiracetam, whose levels decline during pregnancy
  - watch for new drug interactions
    - e.g. folic acid may decrease phenytoin serum concentrations. antacids may decrease phenytoin absorption
- after delivery
  - may need to adjust antiseizure drugs
  - generally safe to breastfeed with antiseizure drugs
- 

## .Post traumatic headache

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## .Facial tingling.Facial paresthesia

- ddx: early shingles, early Bells Palsy

•

## .Restless leg syndrome.RLS

- DDx

- akathisia, nocturnal leg cramps, leg pain, periodic limb movement disorder
- causes
  - generally idiopathic
  - secondary RLS: iron deficiency, medications (antihistamines, dopamine antagonists, lithium, SSRIs, TCAs), uremia, pregnancy
- diagnosis
  - criteria
    - presence of urge to move legs
    - urge to move legs: worse at rest, relieved by movement, worse at night
- investigations
  - ferritin, CBC, Cr, glucose
- conservative management
  - eliminate caffeine, alcohol
  - stop exacerbating medications. e.g. SSRI
  - sleep hygiene
  - exercise
- pharmacologic management
  - treat iron deficiency if present (ferritin < 50mcg/L). should improve within 2-3 months of po iron
  - intermittent RLS
    - levodopa/carbidopa prn
    - if ineffective: opioid prn, pramipexole or ropinirole daily, gabapentin daily
  - frequent RLS
    - gabapentin
      - initial: 100 to 300mg 2 hours before bedtime
      - assess every 5 to 7 days
      - usual dose: 900-2400mg in two divided doses
    - pregabalin
      - initial: 50-75mg 1-3 hours before bedtime
      - usual dose: 150-450mg
    - pramipexole
      - initial: 0.125mg 2-3 hours before bed
      - usual dose: 0.25-0.50mg
    - ropinirole
      - initial: 0.25mg 1-3 hours before bed
      - usual dose: 2-4mg
    - if ineffective: opioid daily, gabapentin daily
  - if above still ineffective:
    - try combination therapy
    - refer
- side effects of dopaminergic agents
  - Augmentation
    - Onset of symptoms earlier in the day with regular, long-term therapy. overall increase in RLS symptoms severity
    - Majority of patients taking regular levodopa develop augmentation. If develops augmentation, consider switching to ropinirole or pramipexole.
    - 30% of patients taking ropinirole or pramipexole get this.
  - Rebound
    - Recurrence of RLS in the morning
    - Occurs in 20-35% of patients taking levodopa
    - Best to maintain patients on lowest effective dose
  - Pathologic gambling and impulse control. Caution patients on dopamine agonists of this.
- special populations
  - RLS in Pregnancy



- RLS risk 2-3 times general population
- Important to assess serum ferritin
- Pramipexole or ropinirole not recommended since haven't been studied for teratogenic risk
- Can use opioids or gabapentin. Should consider discontinuation of opioids near term to avoid respiratory depression in neonate.
- Pediatric RLS
  - No RCTs on pharmacotherapy. Pharmacotherapy is controversial
  - Common comorbidities: ADHD, depression, anxiety

## • Horner syndrome

- signs
  - miosis
    - constriction of the pupil of the eye.
  - ptosis
    - drooping or falling of the upper eyelid
  - anhidrosis
    - no sweating
- etiology
  - first order: central
    - stroke, tumor
  - second order: preganglionic
    - subclavian artery aneurysm
    - apical lung tumor
    - mediastinal tumor
  - third order: postganglionic
    - internal carotid dissection, aneurysm, tumor
    - cavernous sinus lesion
    - skull base lesion
- localizing lesion
  - Hydroxyamphetamine eye drops can help distinguish third order Horner syndrome from first or second order syndrome
- Investigations
  - brainstem symptoms
    - brain MRI
  - myelopathic features
    - C-spin MRI
  - acute Horner syndrome with pain of neck/face, consider carotid artery dissection
    - MRI of neck
  - ophthalmoparesis
    - MRI of cavernous sinus
  - preganglionic Horner syndrome with no neuro symptoms
    - MRI or CT to evaluate lung apex and paravertebral area
  - child with Horner syndrome
    - evaluate for tumor. e.g. neuroblastoma

## • Guillain Barre. AIDP.GBS

- AIDP: acute inflammatory demyelinating polyneuropathy
  - Subtype of Guillain Barre. Most common
    - Weakness: distal arm and leg weakness
    - Cranial nerve and bulbar symptoms
    - Decreased or absent DTR
    - Paresthesias in hands and feet

- The typical finding with lumbar puncture in patients with GBS is an elevated CSF protein with a normal white blood cell count
  - Cell count normal

- 
- 

### .Spasticity

- causes
  - spinal cord injury
  - multiple sclerosis
  - stroke
  - cerebropalsy
- triggers for increased spasticity
  - UTI
  - bladder retention
  - constipation
  - pregnancy
  - postpartum hormonal changes
  - fatigue
  - improper wheelchair/seating
  - anxiety
  - pressure ulcers
  - tight clothing
  - worsening of underlying condition
  - infection
  - improper positioning

- 

### .degenerative cervical myelopathy.DCM

- age-related osteoarthritic changes cause narrowing of cervical spinal canal, leading to chronic spinal cord compression
- DDx
  - ALS: absence of sensory symptoms
  - MS: visual dysfunction, fatigue, cranial nerve findings
  - peripheral nerve entrapment (carpal tunnel): lack of central symptoms
  - brain neoplasm: altered cognition, headache, vomiting, cranial nerve findings
  - normal pressure hydrocephalus: cognitive changes, speech, swallowing problems
  - Vit B deficiency: fatigue, cognitive dysfunction, glossitis, visual dysfunction
- symptoms
  - paresthesia in extremities
  - clumsiness: e.g. difficulty with buttons or handwriting
  - unsteady gait
  - neck pain
  - late finding: bowel and bladder problems, saddle paresthesia
- physical exam
  - fine motor dysfunction of hands
  - hyperreflexia
  - gait ataxia
  - sensory deficits
  - focal weakness
- diagnosis
  - spinal cord compression on MRI
  - 1 or more sign/symptom
- investigation

- Neck MRI
- management
  - mild
    - offer structured rehabilitative therapy
    - if no improvement, refer to neurosurgery
  - moderate/severe
    - refer to neurosurgery

## ● .Wernicke encephalopathy

- due to thiamine deficiency. often associated with alcoholism, but can be from malabsorption, poor dietary intake
- symptoms
  - classic triad: confusion, gait ataxia, oculomotor dysfunction (e.g. nystagmus, lateral rectus palsy)
- no diagnostic lab measurement
- management
  - administer thiamine whenever WE is considered
  - thiamine 500mg iv over 30 min. repeated tid for 2 days. and 250mg iv or IM daily for an additional 5 days
- Korsakoff syndrome
  - chronic neurological conditions as a consequence of WE
  - marked deficits in anterograde and retrograde memory, apathy, an intact sensorium, and relative preservation of long-term memory and other cognitive skills
  - confabulation seen in some cases
  - Patients with Korsakoff rarely recover

## ● .NPH

- gait instability, urinary incontinence, confusion

## ● .beri beri

- also due to thiamine deficiency (in addition to Wernicke-Korsakoff syndrome)
- infantile
  - clinically apparent between the ages of two and three months and mainly affects infants who are breastfed by mothers with a thiamine-deficient diet
  - clinical features are variable and may include a fulminant cardiac syndrome with cardiomegaly, tachycardia, a loud piercing cry, cyanosis, dyspnea, vomiting and pulmonary hypertension
- adult beri beri
  - Dry beriberi is the development of a symmetrical peripheral neuropathy characterized by both sensory and motor impairments, mostly of the distal extremities.
  - Wet beriberi includes signs of cardiac involvement with cardiomegaly, cardiomyopathy, heart failure, peripheral edema, and tachycardia, in addition to neuropathy

## ● .Parkinsons disease

- Diagnosis: Movement Disorder Society criteria
  - Bradykinesia AND
    - Rest tremor (4-6Hz) OR
    - Muscular rigidity
  - ≥ 2 supportive criteria
    - Clear benefit to dopaminergic therapy
    - Levodopa-induced dyskinesia (chorea, dystonia), Marked “on-off” fluctuations, rest tremor, progressive, olfactory loss, etc
  - No absolute exclusion criteria and no red flags (signs indicating other causes of parkinsonism)

- cerebellar abnormalities, Parkinsonian features restricted to lower limbs >3 years, diagnosis with FTD within the first 5 years, downward supranuclear gaze palsy
- Rapid progression to wheelchair within 5 years, autonomic failure in first 5 years
- physical exam
  - Bradykinesia: finger tap, pronation/supination, toe/foot tapping
    - micrographia, difficulty with fine movements
  - rigidity
  - tremor: 4-6hz tremor. tremor suppressed with initiating movement
  - glabellar tap
  - difficulty walking heel toe

## • [Parkinsons disease - management](#)

- Management
  - No curative or disease-modifying agents available.
  - Symptomatic management to improve function and QOL.
  - Early Neurology Referral
  - Pharmacological therapy
  - Monitor for Side-effects
  - Multidisciplinary Approach
- Pharmacotherapy in early Parkinsons
  - Levodopa
    - Consider as first choice when moderate parkinsonism, elderly (age > 65)
    - Combination with peripheral decarboxylase inhibitor, carbidopa “Sinemet”
    - Most effective symptomatic treatment, but highest risk of motor complications (e.g. wearing off and dyskinesia)
    - Side-effects: nausea, vomiting, orthostatic hypotension
    - Long-term complication: dyskinesia, motor fluctuations
  - Dopamine agonists (Pramipexole, Ropinirole)
    - when age <65 and mild/moderate symptoms, can consider DA or levodopa.
    - less effective than levodopa
    - Side-effects: Hallucinations, cognitive impairment, leg edema, daytime somnolence, impulse control disorders
    - Lower risk of dyskinesia
    - Less tolerated in older patients and those with cognitive dysfunction.
  - MAO-B inhibitor (Selegiline, Rasagiline)
    - Modest symptomatic benefit
    - For patients with mild symptoms that are not interfering with quality of life.
    - Less side-effects
    - Can consider as first line in mild parkinsonism.
  - COMT inhibitors
    - Increases half-life of levodopa
    - Combination levodopa + COMT inhibitor reduces wearing-off time.
- Pharmacotherapy in later Parkinsons
  - first line:
    - Entacapone (COMTi): less off time in patients with motor fluctuations
    - Rasagiline: less off time in patients with motor fluctuations
  - second line
    - Dopamine agonists (pramipexole, ropinirole)
  - third line
    - levodopa controlled release: improves wearing off and night akinesia
    - SC apomorphine infusions
    - intrajejunal levodopa-carbidopa enteric gel through G-tube: to decrease off time or dyskinesia
    - amantadine: to reduce dyskinesia
- When to start drug therapy

- Decision of when to start drug therapy depends on the degree of impact on quality of life
- Fear of starting levodopa is common
- Discussing motor complications
  - Motor fluctuations (“wearing off”) and dyskinesia are common after 5-10 years of treatment.
- Unproven belief that responsiveness to levodopa is finite and should be rationed.
- There is evidence that choice and initial timing of therapy for PD has little impact on the long term outcome of PD in terms of motor fluctuations and dyskinesia.
- Reassure patients that the onset of motor fluctuations depends on the rate of progression of the underlying disease, rather than the drug therapy.
- Motor Fluctuations and Dyskinesia
  - Motor fluctuations and dyskinesia become more common as the disease progresses and the dopaminergic neurons continue to degenerate
  - Motor fluctuations: alterations between periods of positive response to medications (“on”) and periods of reemergence of parkinsonian symptoms (“off”)
    - “wearing off”: increase in motor symptoms towards the end of the levodopa dose interval
  - Dyskinesia: abnormal involuntary movements, often choreiform.
- Managing motor complications
  - Wearing off:
    - Increase the dose or increase dosing frequency
    - If levodopa adjustment not tolerated, add COMTi or MAO-Bi
  - Dyskinesia:
    - Lowering levodopa, increasing dosing frequency, longer acting levodopa
    - try Amantadine
  - If fail medical therapy:
    - Deep brain stimulation, continuous levodopa-carbidopa intestinal gel infusion through GJ tube
- Management of Dopaminergic Side Effects of medication
  - Nausea
    - Carbidopa
    - Domperidone
  - Orthostasis
    - Reduce antihypertensive medications
    - Lower MAO-Bi, amantadine, and DAs prior to tapering levodopa
    - If orthostasis persists on minimum effective dose of levodopa, can add symptomatic medications for orthostatic hypotension
  - Confusion
    - Taper to minimum effective dose of levodopa before adding antipsychotics
  - Impulse control disorders
    - Patients and families should be advised of this. Symptoms include gambling, hypersexuality, compulsive cleaning, etc. Higher risk with DAs.
    - Discontinue DAs. If persists, CBT.
  - Dopamine dysregulation syndrome
    - Compulsive use of dopaminergic drugs. Patients taking increasing quantities of dopaminergic drugs despite drug related dyskinesia.
    - Management not well studied. Limit dose increases when possible. Low doses of clozapine or quetiapine may be helpful
- Management of Non-Motor features of Parkinsons
  - Symptomatic treatment
  - Depression
    - SSRI, SNRI
    - Safety considerations: beware of QT prolongation, Serotonin syndrome
  - Psychosis
    - Assess for underlying causes such as infection, delirium, drugs

- If persists, consider quetiapine, clozapine. Avoid first generation antipsychotics, risperidone, and olanzapine
- Excessive Daytime Sleepiness
  - Sleep hygiene
  - Modafinil, methylphenidate
- Fatigue
  - Treat Excessive daytime sleepiness and depression
  - Amantadine, stimulants
- Cognitive impairment
  - Trial of cholinesterase inhibitors. Taper therapy if no benefit or intolerable side effects
- Constipation
  - Very common nonmotor problem
  - PEG 3350
- Sialorrhea (drooling)
  - Botox injections
  - Oral glycopyrrolate, atropine SL, ipratropium SL
- Rhinorrhea
  - Ipratropium nasal spray
- Orthostatic hypotension
  - Nonpharmacologic: oral fluid intake, salt supplement, stockings, exercise
  - Fludrocortisone, midodrine can be used but may cause supine hypertension.
- Follow-ups
  - Assess Functional Status
  - Monitor for medication Side-effects
  - Monitor for the non-motor complications
    - Depression
    - Constipation
    - Cognitive impairments
    - Insomnia
    - Falls
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## [.Parkinsons disease.](#)[Atypical parkinsons.](#)[Parkinsons plus](#)

- Features Suggestive of Atypical Parkinsonism
  - Poor response to levodopa
  - Abrupt presentation
  - Rapid progression
  - Symmetric presentation at onset
  - Early postural instability, early falls
  - Early autonomic dysfunction
  - Early age of onset (age < 50)
  - Early cognitive impairment
- Atypical Parkinsonism (Parkinson's Plus):
  - Dementia with Lewy bodies
    - visual hallucinations, fluctuating cognition, neuroleptic sensitivity
    - Lots of overlap between PD dementia and DLB: if dementia occurs after one year of PD, then PD dementia
  - Corticobasilar Degeneration
    - Present with movement disorder affecting one limb
    - Apraxia, aphasia, loss of cortical sensory function, alien limb phenomenon.
  - Multi system Atrophy
    - Autonomic dysfunction
    - cerebellar and pyramidal symptoms.
    - Symmetry of onset, absence of tremor, poor response to levodopa.

- PSP: Progressive supranuclear palsy
  - Vertical gaze palsy with downward gaze abnormalities
  - Early postural instability, akinesia, dysarthria, dysphagia
  - Symmetrical presentation.
- Secondary parkinsonism
  - Medication-induced Parkinsonism
    - Antipsychotics (especially typical), Anti-emetics (Metoclopramide)
    - May take up to one year to resolve. Patient may not be on the offending drug at time of assessment.
  - Vascular Parkinsonism
    - Lower-extremity prominence of symptoms
    - Stepwise progression
  - Hereditary: Huntington's disease, Wilson's disease, juvenile PD
  - Toxins: carbon monoxide, MPTP, organic solvents
  - Infectious: encephalitis, HIV/AIDS, neurosyphilis, prion disease

## ● .Parkinsons disease - other info

- epidemiology
  - 0.3 % of general population age > 40
  - Mean age of onset is 60 years
  - incidence increases with age
  - Fastest growing source of disability due to neurologic disorder
  - Prevalence of PD expected to increase in future with aging population
  - Second most common neurodegenerative disorder (after Alzheimer's disease)
- Pathophysiology
  - Dopamine depletion from the basal ganglia results in bradykinesia and other parkinsonian signs
  - Depigmentation and degeneration of dopaminergic neurons in substantia nigra pars compacta
  - Accumulation of intracytoplasmic inclusions (Lewy bodies) are the pathologic hallmark
  - Precise mechanism of neurodegeneration in PD not yet understood, but most likely cascade of events that include genetic and environmental factors.
- risk factors
  - pesticide exposure
  - prior head injury
  - rural living
  - beta blocker use
  - agricultural occupation
  - well water drinking
- Prognosis
  - Proportion of patients severely disabled or dead from PD
    - 25% by 5 years
    - 67% by 5-9 years
    - 80% by 10-14 years
  - Disease impairment (difficulty with ADLs) to disability (loss of independence) 3-7 years after onset of PD.
  - Only modest increase in mortality compared to age-matched control.
  - Prevalence of dementia 30-40%, but increases with age
  - Worse prognosis for
    - Older age at symptom onset
    - Rigidity/bradykinesia as presenting symptom (vs rest tremor)
    - Decreased response to dopaminergic medications
    - Dementia
- TRAP
  - Tremor

- Rest tremor
- 4-6 Hz
- “Pill-rolling”
- Earlier symptom
- unilateral at onset.
- Tremor decreases with purposeful action.
- Anxiety, emotional excitement, stress can exacerbate the tremor
- Rigidity
  - Increased resistance to passive movement.
  - Occurs in 75-90% of PD patients
  - Unilateral at onset
  - Cog-wheel rigidity
  - Ratchety pattern of resistance and relaxation as you move the limb through ROM
  - Lead-pipe rigidity
- Bradykinesia
  - generalized slowness of movement
  - Patients may describe as “weakness”, “incoordination”, “tiredness”
  - Early decreased manual dexterity: difficulty buttoning clothes, tying shoelaces, typing.
  - Gait: dragging the legs, shuffling steps, feeling unsteadiness
  - Delay in initiating movements.
  - Freezing of gait
  - Major contributor to disability
  - Clinical exam: look at speed, amplitude of finger tapping, toe tapping,
  - Mild PD: slowing and decreased amplitude after a few seconds
  - Movements become less coordinated as disease progresses
- Postural instability
  - late finding in Parkinson’s Disease.
  - Increased risk of falls
  - Festination gait: short stride length, rapid steps
  - Among the primary motor features of PD, least responsive to dopaminergic therapies.
  - Major contributor to disability with PD
  - Loss of postural reflex -> wheelchair bound
  - Clinical exam:
    - “pull” test: stand behind patient, pull the patient backward by shoulders
    - Normal postural reflex: maintain balance or step backwards no more than one step
    - Postural instability: likely to fall or take multiple step backwards
- Non-motor symptoms
  - Neuropsychiatric
  - cognitive dysfunction, dementia (~60% within 12 years of diagnosis)
  - Psychosis, depression, anxiety
  - Autonomic dysfunction
  - Orthostasis, constipation, urinary retention/incontinence, sexual dysfunction
  - Sleep disturbances: insomnia, REM sleep behavior disorder, RLS
  - Olfactory Dysfunction

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## [.spinal cord injury.SCI](#)

- should be seen by physiatry. there are lots of various preventative health issues to think about. e.g. osteoporosis, self catheterization for neurogenic bladder
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## .Tremor

- DDX
  - medications: beta agonist, corticosteroid, alcohol withdrawal, caffeine intake
  - essential tremor
  - Parkinsons
- Parkinson's Tremor vs Essential Tremor
  - Parkinson's tremor
    - Unilateral tremor, rest tremor, leg tremor
    - Other symptoms: gait disturbance, rigidity
    - 4-6Hz
  - Essential tremor
    - Postural, kinetic tremor
      - More apparent when arms are held outstretched
      - Increases at the very end of goal directed movements: e.g. drinking from a glass, or finger-to-nose testing
    - Affects hands, arms, head, voice
    - Better with alcohol, worse with caffeine
    - 6-12 Hz
- history
  - body part involved
  - affect on ADLs
  - rest versus action
    - rest:
    - action
      - kinetic: with voluntary movement
        - simple kinetic tremor: tremor roughly the same throughout voluntary movement
        - intention tremor: crescendo increase in tremor as body part approaches its target
        - task specific kinetic tremor
      - postural tremor: with specific posture or position. E.g. arms outstretched
      - isometric tremor: muscle contraction against stationary object. E.g. making fist, squeezing object
- investigations
  - CBC, glucose, TSH, LFTs, electrolytes, Ca
  - Wilsons disease if under 40 with unexplained tremor
- Tremor types
  - Rest tremor: parkinson disease common
    - when body part fully supported, relaxed
  - physiologic tremor: normal individuals have very low amplitude, high frequency physiologic tremor. Worse with:
    - medications: beta adrenergic agonists: e.g. terbutaline, salbutamol, epinephrine, amphetamines, SSRIs
    - high adrenergic state: anxiety, excitement, hypoglycemia, alcohol/opioid withdrawal
  - essential tremor: see Essential Tremor
  - primary writing tremor
  - orthostatic tremor
  - cerebellar tremor
  - rubral tremor
  - dystonic tremor

•

## .essential tremor

- most common neurologic disorder that causes action tremor
- presentation
  - often postural tremor, where there is a tremor with a specific posture/position. E.g. arms outstretched
  - often affects hands/arms. less often, may involve head, voice, trunk, legs
  - typically increases at end of goal directed movements such as drinking from glass or finger-to-nose testing

- better with small amount of alcohol. Worse with caffeine
- diagnosis
  - bilateral upper limb action tremor. No other motor abnormalities
  - at least three years in duration
  - absence of other neurologic signs: e.g. dystonia, ataxia, parkinsonism
- referral to neurology when:
  - diagnostic uncertainty
  - poor response to standard pharmacotherapies
  - disabling tremor
- criteria for treatment
  - Drug treatment should be offered to patients who have functional or psychological disability caused by tremor.
- Management
  - Goal of treatment is to reduce tremor severity enough to mitigate disability while minimizing side effects
  - Situational tremor (e.g. public speaking)
    - Propranolol 10-20mg 1h before event
    - Alternatives
      - Benzodiazepine prn
      - Primidone prn
  - Frequent/daily tremor
    - Start with propranolol unless there is a reason to avoid it (e.g. heart block)
    - Propranolol ER 60-80mg once daily
      - OR Propranolol IR 20mg 3-4 times daily
      - Titrate in  $\geq 1$  week intervals as needed and tolerated
      - Usual maximum dose 320mg/day
    - Primidone
      - Start: 25mg daily qhs
      - Titrate: increase by 25mg q3-7 days as needed
      - Benefit unlikely if no effect at 250mg/day
    - If inadequate benefit or poorly tolerated: add or switch to primidone (preferred). Or add/switch to gabapentin or topiramate
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## .Obstetrics

### .Progesterone supplementation to reduce the risk of spontaneous preterm labor and birth.preterm labor

- Previous spontaneous singleton preterm birth – For pregnant people with a singleton pregnancy who had a previous spontaneous singleton preterm birth, we suggest intramuscular (IM) injections of hydroxyprogesterone caproate (17-OHPC) rather than vaginal progesterone (Grade 2C). We prescribe 250 mg IM weekly, beginning in the second trimester (16 to 20 weeks) and continuing through 36+6 weeks of gestation. Daily administration of natural progesterone vaginally is a reasonable alternative.
  - We also follow the cervical length with serial ultrasound examinations until 24 weeks of gestation and consider cerclage if cervical length is  $\leq 25$  mm.
  - We manage pregnant people with a singleton pregnancy who have had a prior spontaneous preterm twin birth the same way.
- Midtrimester cervical shortening – For pregnant people with midtrimester cervical shortening (defined as  $\leq 25$  mm before 24 weeks) and no prior spontaneous singleton preterm birth, we suggest daily vaginal progesterone treatment

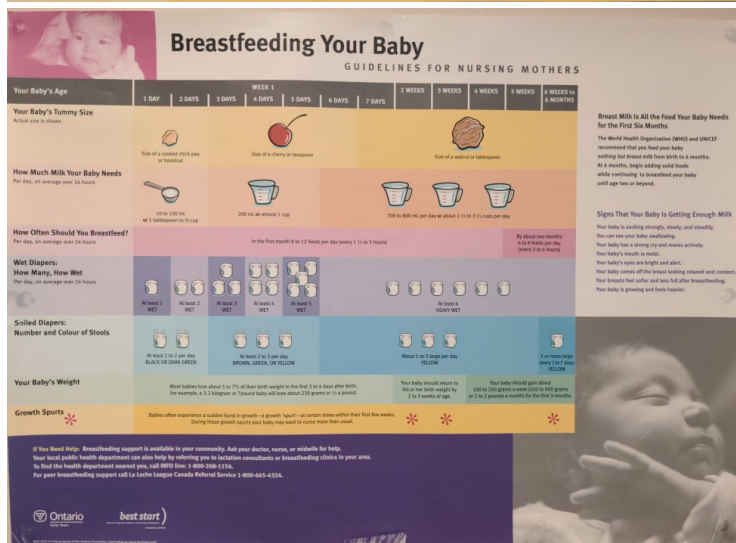
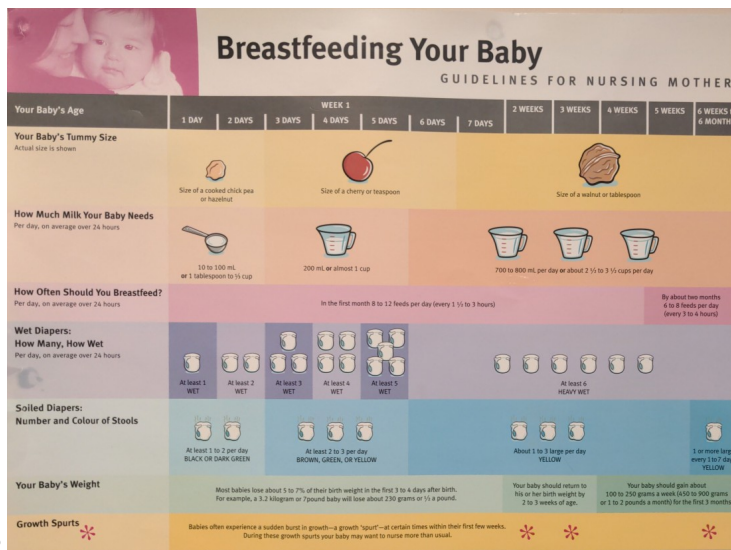
(Grade 2C). Progesterone is administered from diagnosis of short cervix until 36+6 weeks of gestation. Reasonable options include a vaginal suppository (100 or 200 mg), gel (90 mg), or tablet (100 mg micronized progesterone).

### .subchorionic hemorrhage

- A subchorionic hematoma is when blood collects under the chorion membrane during pregnancy. This membrane attaches the mother's uterine wall to her baby's amniotic sac.
  - occurs when the chorion membrane detaches from the wall of the uterus.
  -
- The most common symptom is vaginal bleeding. But some people don't have symptoms. Most subchorionic membranes go away on their own without causing pregnancy complications.
- Management is expectant

### .Breastfeeding

- medications safe with breastfeeding
  - can use: ibuprofen, tyleno, sertraline, paroxetine
  - Lactmed
  - <https://www.aafp.org/afp/2001/0701/p119.html>
- colostrum 1-2 days. transitional milk 5-14 days. Mature milk 14 days.
- They are fed on demand, but the duration between feedings should not exceed four hours. Newborns should get 8-12 feedings daily.
- signs of hungry baby: open mouth, stick out tongue, move head side to side, crying is a late sign of hunger.
-



## .Breastfeeding - galactagogue, domperidone.galactagogue

- Routine use of galactagogue (e.g. domperidone, metoclopramide) not recommended.
- Recommend lactation consultant instead.
- No good evidence regarding efficacy
- Side effects
  - domperidone: QT prolongation.
  - Small amount passes into breast milk. Effect on infant unknown.
- Usual dosing
  - domperidone 10-20mg tid.
  - Metoclopramide 10-20mg bid
- occasionally offer a galactagogue to selected mothers with low breast milk volume who failed to increase their milk production despite expert lactation counseling.
- Oxytocin nasal spray
  - can help with milk let down.

## .Breastfeeding benefits

- infant benefits
  - short term
    - prevent illnesses: gastroenteritis and diarrhea, respiratory tract infection, otitis media, SIDS
    - neurobehavioral: skin to skin reduces infant crying

- GI function: increase rate of gastric emptying. decrease risk of NEC
- long term
  - reduce risk of chronic disease: type 1 diabetes, IBD, wheezing, dental caries
- maternal benefits
  - during lactation:
    - reduced risk of postpartum blood loss
    - delays resumption of ovulation: for contraception (although not reliable)
  - long term benefits
    - reduced cancer risk: breast, ovarian, endometrial
    - reduced risk of cardiovascular disease
    - reduced risk of Type 2 diabetes
  - unclear benefit: osteoporosis, postpartum depression and weight change
  - 
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## .Prenatal First Visit.Prenatal 1st Visit.Pregnancy

- History
  - n/v,
  - LMP: « »
  - Pregnancy confirmed? «yes, with home pregnancy test.»
  - is this pregnancy desired? Is this good news?
  - Breast tenderness? «yes»
  - Nausea/vomiting? «yes»
  - Vaginal bleeding? «no»
  - Taking prenatal vitamin? «yes»
- Counselling. may be done during major prenatal visit
  - Guidance on nutrition and physical activity in pregnancy
    - <https://www.healthlinkbc.ca/healthy-eating-physical-activity/age-and-stage/pregnancy>
  - UpToDate: Prenatal care: Patient education, health promotion, and safety of commonly used drugs
  - avoid elevated core body temperature. avoid hot tubs and saunas. maternal hyperthermia associated with birth defects.
  - food: avoid unmasturized foods, avoid undercooked meat, avoid fish with elevated mercury levels. limit caffeine to <3 cups/day. wash cutting boards after contact with raw meat
  - avoid alcohol, cigarettes
  - use folic acid/Prenatal vitamin.
    - Folic acid: 0.4mg/day. 1mg/day if DM, antiepileptics, MTX. 4mg/day if previous spina bifida
    - Vitamin D: 600-800 IU/day
  - exercise: able to carry on a normal conversation during exercise.
  - medications: avoid NSAIDs. can take tylenol. avoid retinoids, ACEi, warfarin, lithium, valproic acid.
    - risks of untreated depression often outweigh risks of antidepressants
    - NSAID use at around 20 weeks or later can cause rare but serious kidney problems in the unborn baby.
- Consider ASA 80-160mg
  - at bedtime ideally before 16 weeks gestation, if either 1 high risk factor or 2 moderate risk factors:
  - 1 high risk factor: history of preeclampsia, multifetal gestation, chronic hypertension, DM1 or DM2, renal disease, autoimmune disease (SLE, antiphospholipid)
  - 2 moderate risk factors: Nulliparity, Obesity (BMI≥30), family history of preeclampsia, age 35 years and older, sociodemographic risk factors (low socioeconomic status, etc), or personal history factors (fetus is small for gestational age, previous adverse pregnancy outcomes, etc)
- Ultrasounds
  - dating U/S: write down LMP. order for 8-13 weeks GA by dates.
  - give requisition for 20 weeks morphology ultrasound
- prenatal bloodwork

- CBC, Blood ABO group, Rh factor and antibody screen, HbsAg, STS/RPR, HIV, Rubella titre
- urine C&S, Chlamydia, Gonorrhea
- additional tests
  - HbA1c if at risk for T2DM
  - anti HCV if at risk for Hep C
  - TSH if indicated: age > 30 years, more than 2 prior pregnancies, history of pregnancy loss, preterm delivery, or infertility, type 1 diabetes or other autoimmune disorders, morbid obesity ( $\text{BMI} \geq 40 \text{ kg/m}^2$ ), history of hypothyroidism/hyperthyroidism or current symptoms or signs of thyroid dysfunction, family history of autoimmune thyroid disease or thyroid dysfunction (1st degree relative<sup>32</sup>), history of head or neck radiation or prior thyroid surgery, known TPO antibody positivity or presence of a goitre, currently receiving levothyroxine replacement, use of amiodarone or lithium, or recent administration of iodinated radiologic contrast, residing (or recently resided) in an area of known moderate to severe iodine insufficiency
  - ferritin if at risk for anemia
  - Varicella antibody if history uncertain
  - hemoglobin electrophoresis to screen for hemoglobinopathy carrier
    - screen all women except: Japanese, Korean, Northern European, First Nations
- prenatal genetic testing in BC (publically funded):
  - lab requisition: Prenatal Genetic screening
    - Note: all information needs to be filled out. Including weight, IVF. Consider waiting for dating U/S first before ordering this.
  - Mom age < 35: SIPS
  - mom age 35-39: IPS
  - mom age > 40: IPS
  - personal or family history that increases risk of T21, T18, T13 NIPT
  - tests
    - SIPS
      - part 1 at 9 to 13+6 weeks
      - part 2 at 14 to 20+6 weeks
    - IPS
      - SIPS bloodwork as above
      - NT done at 11 to 13+6 weeks
- NIPS Funding
  - NIPS is funded for women who meet one of the following criteria:
    - has received a Positive Screen result from IPS, SIPS, or Quad;
    - has had a previous trisomy 13, 18, or 21 pregnancy; or
    - has a risk of Down syndrome greater than one in 300 based on results of screening and ultrasound marker(s) of aneuploidy.
- prenatal testing in Ontario. eFTS. done at 12 weeks
  - eFTS
    - IPS prenatal screening form to MSH - LMP, race, weight, cigarettes
    - need separate lab req ordering eFTS. the blood sample will be drawn at lab and sent to MSH with the IPS requisition.
  - U/S: 12 week IPS, NT.
- Follow-up
  - book in person follow-up at 10 weeks
  - then follow-up every 4 weeks

## **.Prenatal Second Visit.Prenatal 2nd Visit.Pregnancy**

- complete physical exam
- cervical/vaginal cultures, Pap if due
- fill out prenatal forms

- Lab results follow-up
  - if Rh negative, schedule for Rh Ig 300mcg IM at 28 weeks.
  - iron deficiency: treat if ferritin level < 30ng/mL or TSAT < 20%
    - take oral iron Mon, Wed, Fri with Vit C
- referral to OB: Transfer of prenatal care.
  - G\_P\_, weeks, EDC
  - IPS, prenatal bloodwork status
  - hx of pregnancy complications
  - Priority: routine.

## • .Prenatal Second Trimester.Prenatal 2nd trimester.

- week 13 - 26
- investigations
  - Add on MS-AFT 15-21w for those with BMI>35
  - 19-21w: Anatomy U/S
  - 26-28 weeks: 50g OGTT - if positive, then 75g OGTT fasting 2hrs
  - 26-28 weeks: CBC, ferritin, repeat type and screen if Rh neg
- If ferritin <50: Ferrous fumarate 300mg daily + vit c 500 mg (or glass of OJ qhs on empty stomach)
- previa/low lying placenta
  - abstain from intercourse
  - repeat U/S at 32 weeks
- if Rh negative, give Rhogam at 28 weeks, or after vaginal bleeding. even if baby's father is also Rh negative. Because of protocol and because we can never be sure about who the father is. We don't test the baby's blood type until after birth for ABO compatibility
- routine prenatal visit
  - check SFH, FHR, BP
  - FHR: start checking at 14 weeks. normal is 110-160
    - if elevated, keep listening for 2 minutes. if still elevated, consider urgent referral for NST. most commonly comes back down as it's just an acceleration
  - SFH: start checking at 20 week (around umbilicus). usually number of centimeters equals number of weeks
  - urine protein: no need to check routinely, unless patient is hypertensive
- Prenatal visit frequency
  - Every 4 weeks until 30 weeks' gestation.
  - Every 2 weeks from 32 to 36 weeks' gestation.
  - Every 1 week from 37 weeks' gestation until birth.

## • .Prenatal Third Trimester.Prenatal 3rd trimester.

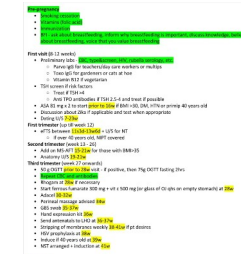
- Third trimester (week 27 onwards)
- Prenatal visit frequency
  - Every 2 weeks from 32 to 36 weeks' gestation.
  - Every 1 week from 37 weeks' gestation until birth.
- Timing of Investigations and treatments
  - 28w: Rhogam if necessary
  - 30-32w: Adacel
  - 34w: Perineal massage advised
  - 35-37w: GBS swab
  - 36w: Hand expression kit
  - 36-37w: Send antenatals to hospital. Give patient a copy
  - 38-41w: Stripping of membranes weekly if pt desires
  - 38w: HSV prophylaxis. Valacyclovir 500mg PO BID

- 39w: Induce if 40 years old
- 41w: NST arranged + induction
- membrane stripping
  - gentle way to induce labour. prompts the cervix to start producing its own prostaglandins
  - finger is inserted through cervix and manually separates amniotic sac from uterine lining
  - may offer to patient starting at 38 weeks.
- GBS swab: done at 35-37 weeks
  - can be done by the patient themselves
  - ask patient to insert into both vagina and rectum (insert at least 1cm)
- 
- 
- 

### .Prenatal timing of investigations

- First visit (8-12 weeks)
- Preliminary labs - CBC, type&screen, HIV, rubella serology, etc.
  - Parvo IgG for teachers/day care workers or multips
  - Toxo IgG for gardeners or cats at hoe
  - Vitamin B12 if vegetarian
- TSH screen if risk factors
  - Treat if TSH >4
  - Anti TPO antibodies if TSH 2.5-4 and treat if possible
- prior to 16wk: ASA 81 mg x 2 to start prior to 16w if BMI >30, DM, HTN or primip 40 years old
- Discussion about Zika if applicable and test when appropriate
- 7-23w: Dating U/S
  - best done at 7-8 weeks. early gives more accurate dates. but late enough that the fetus can be seen.
- 
- First trimester (up till week 12)
  - eFTS between 11s3d-13w6d + U/S for NT
    - If over 40 years old, NIPT covered
- 
- Second trimester (week 13 - 26)
  - Add on MS-AFT 15-21w for those with BMI>35
  - 19-21w: Anatomy U/S
  - Glucose, iron, CBC
    - If ferritin <50: Ferrous fumarate 300mg daily
- 
- 
- Third trimester (week 27 onwards)
  - prior to 28w: 50 g OGTT - if positive, then 75g OGTT fasting 2hrs
  - Repeat CBC and antibodies
  - 28w: Rhogam if necessary
  - 28w: Start ferrous fumarate 300 mg + vit c 500 mg (or glass of OJ qhs on empty stomach)
  - 30-32w: Adacel
  - 34w: Perineal massage advised
  - 35-37w: GBS swab
  - 36w: Hand expression kit
  - 36-37w: Send antenatals to LHO at
  - 38-41w: Stripping of membranes weekly if pt desires
  - 38w: HSV prophylaxis at
  - 39w: Induce if 40 years old at
  - 41w: NST arranged + induction at





## .Pregnancy and nausea.Nausea in Pregnancy.Vomiting in pregnancy

- [https://www.uptodate.com/contents/image?imageKey=OBGYN%2F74451&topicKey=OBGYN%2F6811&search=pregnancy%20nausea&rank=1~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=OBGYN%2F74451&topicKey=OBGYN%2F6811&search=pregnancy%20nausea&rank=1~150&source=see_link)
- Dietary changes
  - Eat small amounts of food every one to two hours to avoid an empty or full stomach. It can be helpful to eliminate spicy, odorous, high-fat, acidic, and very sweet foods, and substitute protein-dominant, salty, low-fat, bland, and/or dry foods. Fluids should be consumed at least 30 minutes before or after solid food to minimize the effect of a full stomach. Fluids are better tolerated if cold, clear, and carbonated or sour. Avoid lying down after eating.
- Is vomiting, no hypovolemia
  - Dietary changes. Start diclectin or pyridoxine 10mg. titrate up to 1 tab AM, 1 PM, 2 QHS
    - then stop diclectin. Start Gravol
    - Then add any of following
      - metoclopramide 5-10mg q8h po/im. promethazine or prochlorperazine
    - then add ondansetron
      - discuss the potential risks and effectiveness of oral or intravenous ondansetron in treating nausea and vomiting on a case-by-case basis in women less than 10 weeks of gestation, given controversies about a potential small increase in risk of congenital anomalies. Ideally, a combination of two agents should be tried and found to be unsuccessful before initiating ondansetron in pregnancies less than 10 weeks.
    - refractory cases: then add glucocorticoids
      - An effective dose is methylprednisolone (16 mg) intravenously every 8 hours for 48 to 72 hours [117]. An alternative regimen is hydrocortisone 100 mg intravenously twice daily [54]. Glucocorticoids can be stopped abruptly if there is no response and tapered over two weeks in women who experience relief of symptoms.
      - After intravenous therapy, we use an oral prednisone taper regimen of 40 mg oral prednisone per day for one day, followed by 20 mg per day for three days, followed by 10 mg per day for three days, and then 5 mg per day for seven days. This regimen may be repeated up to three times over a six-week period.
  - continue a drug for a week to determine whether nausea and vomiting are improving.
  - Adjuncts: acid reducing agents
    - Cimetidine and ranitidine
- Is vomiting and is hypovolemic
  - IV rehydration
  - Mg, Phosphate, Ca as needed
  - Ondansetron 8 mg administered over 15 minutes every 12 hours, added to current treatment regimen
- Refractory cases
  - investigations for other causes
    - U/S
    - bHCG
    - CBC, electrolytes, TSH, Cr, urinalysis, liver enzymes, liver function, H. Pylori
  - if really bad for extended periods of time: Tube feeding and parenteral nutrition
- Stable and improving patients
  - continue the drug regimen that has been effective patient completely asymptomatic (no nausea or vomiting) for at least a week.
  - Then discontinue the medications and see how patient responds. If nausea and vomiting recurs, we resume therapy.

- The majority of women will have resolution of nausea and vomiting by 16 to 20 weeks of gestation and will be able to discontinue their medications. Rare patients require therapy beyond 20 weeks.

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## [.hypertension in pregnancy.pregnancy induced hypertension](#)

- pre-existing hypertension
  - prior to pregnancy or onset < 20 weeks gestation age
  - Definition of preeclampsia in this population: resistant hypertension, new or worsening proteinuria (>300mg/24h), adverse conditions
  - Management
    - Consider pre-preg 24h urine protein
    - Check Cr, lytes, urinalysis early in pregnancy and document
    - BP: treating reduced risk of severe hypertension, but not preeclampsia, abruption or growth restriction
      - Treatment target generally SBP< 150 and DBP<100
    - Drug choices
      - Labetalol 100 mg bid to 800 tid
      - Methyldopa 250 mg BID to 1000 mg TID
      - Nifedipine XL 30mg daily to 60 mg bid
      - Can continue thiazide if already stabilized pre-preg
  - Prophylaxis with ASA 162mg and at least 1g of calcium supplementation.
  - Monitoring
    - U/S for IUGR/growth
    - Weekly-twice weekly NST
- Gestational hypertension
  - Onset >20 weeks GA
  - Definition of preeclampsia in this population: new-onset proteinuria or adverse conditions
  - Of women diagnosed with gestational hypertension at 24-35wk GA ~50% go on to develop preeclampsia
  - Require increased monitoring for IUGR and signs/symptoms of preeclampsia
  - Generally, are induced at 37-38+ weeks GA
  - Monitoring
    - Fetal U/S for IUGR/growth
    - Weekly NST
- Prevention for women who are high risk
  - high risk: hypertension in previous pregnancy, CKD, autoimmune, DM, HTN
  - mod risk: first pregnancy > 40 yo, BMI > 35, family hx of pre-eclampsia, multiple pregnancies, interval > 10 y
  - ASA 81mg qhs. after dx pregnancy, but before 16 weeks GA
  - Ca supplementation 1g/day

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## [.hypertension in pregnancy.pregnancy induced hypertension - other info](#)

- conditions associate with future cardiovascular disease risk
  - hypertensive disorder of pregnancy
  - gestational diabetes
  - placental abruption
  - delivery of baby with IUGR
  - idiopathic preterm birth

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## [.preeclampsia.pre-eclampsia](#)

- Definition: HTN (>140/90) + one of proteinuria, increasing proteinuria, thrombocytopenia, renal insufficiency, impaired liver function, pulmonary edema, cerebral or visual symptoms
- Severe preeclampsia: onset prior to 34 wk GA, SBP >160, DBP >110, PLT <100, transaminitis >2x ULN, serum Cr >2x normal, severe persistent RUQ pain, new onset visual disturbance

- Evaluating for proteinuria
  - Dipstick is satisfactory when suspicion is low
  - Definitive:
    - 24h urine protein >300mg (typically equivalent to 2+ dipstick)
    - urine protein-creatinine ratio (>0.3) or 24h urine protein
- Labs
  - CBC, coag, LFTs, Cr, fibrinogen, uric acid, albumin, bilirubin, glucose
- Fetal monitoring: U/S growth, BPP +/- umb dopplers
- Red Flags:
  - Hyperreflexia is a sign of lowered seizure threshold
  - Altered mental status
  - Severe headache
  - Visual disturbance
- Severe complications
  - hepatic capsule rupture, stroke, pulmonary edema, DIC, acute renal failure, HELLP
- Monitoring - outpatient (no severe features)
  - Maternal: Weekly bloodwork, Twice weekly BP
  - Fetal: U/S for growth q3wk (+/- umb artery doppler), weekly BPP, Twice weekly NST
- Monitoring - inpatient (severe features)
  - Fluids to maintain UOP 30mL/h, avoid excessive fluids due risk of pulmonary edema, total input should remain <125mL/h
  - Continuous FHR monitoring in labour or if requiring IV BP meds
- Delivery Timing
  - Deliver if >37 weeks
  - At 34-37 weeks earlier delivery reduces maternal complications but increases RDS. Need to balance pros/cons Lancet 2015; 385: 2492-501
- Mode of delivery
  - Vaginal delivery unless seizures not responding to treatment, severely elevated BP not responding to treatment, maternal or fetal deterioration when delivery is not imminent
  - Some experts also recommend C/S if the cervix is unfavorable or if severe features are present
- BP Management
  - Recall the goal of antihypertensives is to prevent stroke, stroke risk increases at SBP >160
  - Severe hypertension: Target SBP <160 and DBP <110
  - Non-severe hypertension: Target 130-155/80-105
- Magnesium Sulfate - indicated if severe features
  - MgSO<sub>4</sub> 4 g IV loading dose, then 1-2 g/h
  - NNT 100 for preventing eclamptic seizure
  - NNT 100 for preventing placental abruption
  - Not recommended as antihypertensive agent
  - Reduces risk of eclamptic seizures
  - Indicated if severe features and inHELLP syndrome
  - Continue for 24h post delivery
  - Management of women on MgSO<sub>4</sub> infusion
  - Generally monitor magnesium levels q 6h. Though some evidence this is not required in women with normal renal function.
  - Signs of toxicity: weakness, resp depression, heart block. Contractions stop at 5-8mg/dl, DTR stop at 9-13mg/dl, resp depression at >14mg/dl.
  - Antidote: 10% calcium gluconate IV 10ml (1 gram) over 2-3min
- Follow-up
  - Inpatient if severe
  - if followed outpatient: follow AT LEAST 1/wk antenatally

- At least once within first 3 postpartum days
- Acceptable with breastfeeding nifedipine XL, labetalol, methyldopa, captopril, and enalapril
- Follow any end-organ dysfunction to resolution
- AVOID NSAIDs postpartum
- Screen for baseline hypertension, renal disease, thrombophilia
- Weight loss prior to next pregnancy, aim for >2 yrs but <10yrs
- risk reduction
  - low risk
    - no evidence for ASA
    - Calcium 1g/d if less than 600mg/d dietary intake
    - Not helpful: ASA, Mg, salt restriction, low dose aspirin, thiazide diuretics
  - high risk: start ASA 162mg in following
    - prior preeclampsia, multifetal gestation, chronic hypertension, type 1 or type 2 diabetes, renal disease, antiphospholipid antibody syndrome, assisted reproductive therapy in current pregnancy, BMI >30
    - Other risk markers (start aspirin if two or more): prior placental abruption, prior stillbirth, prior IUGR, nulliparity, chronic kidney disease, known SLE, age >40 yrs, birth interval >10 yrs, Multiple pregnancy
  - ASA 162 mg po qhs
    - Usual start at 8-10 weeks due to association of NSAIDs with gastroschisis, start before 16 weeks
    - Promotes deep placentation
    - Stop at 37 weeks
    - Calcium 1g/d if less than 600mg/d dietary intake
    - Mixed evidence: rest at home in 3rd trimester, reduce work stress, avoid weight gain between pregnancies
    - Not helpful: Mg, antihypertensive therapy for prevention, Vit C and E, calorie restriction
    -

## ● .Obesity and pregnancy

- women with obesity have 3-8 fold increased risk of stillbirth
- in pregnant women with BMI > 40, consider delivery before 39-40weeks to reduce risk of stillbirth
- offer elective C-section if: projected birthweight >5kg, or >4.5kg if patient has diabetes.
- ultrasound monitoring for fetal growth
  - 28, 32, 36 weeks, then weekly.

## ● .gestational diabetes

- diagnosis
  - 50g glucose challenge test + 1hPG
  - <7.8 is normal
  - ≥ 11.1 is gestational diabetes. refer to endo
  - 7.8-11: go for 75g OGTT for 0hPG, 1hPG, 2hPG
    - 0hPG ≥ 5.3
    - 1hPG ≥ 10.6
    - 2hPG ≥ 9.0
- when to screen: at 24-28 weeks of gestation
- post partum
  - screen for diabetes 6 weeks to 6 months post partum
  - may use OGTT
- consequences
  - short term
    - large for gestational age
    - in mom, increased risk of pre-eclampsia, polyhydramnios, stillbirth
    - in newborn, increased risk of hypoglycemia, hyperbilirubinemia, hypocalcemia, hypomagnesemia, polycythemia
  - long term

- increases maternal risk for type 2 diabetes
- increases newborn's risk for obesity, diabetes

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## .Pregnancy and vaginal bleeding.Vaginal bleeding in pregnancy.bleeding in pregnancy

### • DDx:

- first trimester: implantation bleed, ectopic/molar, abortion, uterine/cervical pathology
- second trimester: bloody show, previa, abruption, uterine rupture, vasa previa

### • give Rhogam if Rh negative

### • first trimester

- do speculum exam. r/o miscarriage for threatened miscarriage
- order U/S to confirm intrauterine pregnancy.
- investigations
  - CBC, blood type,
  - serial b-HCG: rising >35-55% over 48h consistent with viable IUP. but expect doubling every 48h
    - if bHCG > 3510, an IUP should be visualized by TVUS if present.
    - If IUP was not confirmed, or if fall in BHCG <80% over 1 week, then BHCG should be followed to zero.
  - U/S to confirm IUP
  - see notes on Ectopic pregnancy
- management in ER
  - tranexamic acid 1g iv over 10-20 minutes
  - if incomplete abortion, consider D&C

### • second trimester bleed

- DDx: placenta previa, placental abruption, vasa previa
  - others: cervical, rectal, thrombophilia
- physical exam:
  - vitals
  - abdominal exam
  - avoid digital cervical exam until placenta previa ruled out
- investigations
  - CBC, kleihauer-Betke if abruption, INR, type and crossmatch
  - U/S to rule out abruption or previa
- management in ER
  - oxygen, IV fluids, foley
  - massive transfusions protocol
  - follow Hb and Coag

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## .placenta previa

- Placenta previa is associated classically with painless vaginal bleeding – close observation, U/S for Dx (no fingers, etc. into the vagina) small sentinel bleeds tend to settle and pt is rested and instructed re serial US, f/u urgently for bleeding, section when fetal lungs matured (Celestone)
- risk factors
  - Previous placenta previa (recurrence 4 to 8%)
  - Advanced age
  - Multiparity
  - Multiple gestation
  - Fibroids/previous C section/scarring from D&C, myomectomy
- Practical points for management:
  - no sexual intercourse, tampons, FB, ect
  - Remember Rh status and RhoGam for Rh neg women

### .abruption.placental abruption

- Defined as the separation of the placenta from the uterine wall before delivery
- 1/2 of abruptions occur before 36 weeks
- Typical presentation: painful vaginal bleeding/back pain and evidence of fetal distress when evaluated – large amounts of blood can be concealed in an abruption and unstable VS are an ominous sign
- Management involves maternal resuscitation and fetal monitoring– emergent C-section as indicated – small abruption may be observed if immature fetus (Celestone)

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### .vasa previa

- Velamentous insertion of the umbilical cord into the membranes of the lower uterine segment, resulting in the presence of fetal vessels between the cervix and the presenting part. These vessels are not protected by Wharton's jelly as in the umbilical cord
- Presents as hemorrhage at the time of membrane rupture or at AROM – fetal blood volume is only 250 cc – the fetus must be delivered ASAP if non-reassuring fetal tracing

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- 

### .Ectopic pregnancy

- clinical presentation
  - vaginal bleeding and abdominal pain
  - typically 6-8 weeks after LMP
- diagnosis
  - no IUP on TVUS.
  - suspected:
    - extraovarian adnexal mass.
    - serum bHCG rising abnormally. <35% rise in 2 days
    - abdo pain and/or vaginal bleeding in patient with risk factors for ectopic pregnancy
  - confirmed
    - extrauterine gestational sac on TVUS
    - no products of conception on uterine aspiration
- rule out hemodynamic instability:
  - suspect rupture if: sudden onset severe abdominal/pelvic pain
  - symptoms/signs of hemodynamic compromise: feeling faint, hypotension, tachycardia
  - if unstable, transfer to center where resuscitation and immediate surgical treatment can be provided
    - CBC, serum HCG, Rh blood type and cross matching
    - abdominal ultrasound can quickly assess for intraperitoneal hemorrhage. if not found, ruptured ectopic pregnancy unlikely to be cause of hemodynamic instability
- if hemodynamically stable
  - history: LMP, hx of ectopic, IUD, IVF
  - physical:
    - hemodynamic stability
    - pelvic examination: be gentle on bimanual exam, since excessive pressure may rupture an ectopic pregnancy.
    - speculum examination: assess volume of bleeding
- diagnostic algorithm for stable patients
  - <https://www.uptodate.com/contents/image?imageKey=OBGYN%2F80606>
  - get TVUS and beta HCG
  - TVUS
    - diagnose as IUP: if gestational sac with yolk sac or embryo inside the uterus. gestational sac alone not sufficient for diagnosis
    - diagnose as ectopic: gestational sac with yolk sac/embryo outside the uterus

- if pregnancy of unknown location. trend bHCG q2days and f/u U/S until diagnosis is made.
- serial beta HCG q2days
  - if serum hCG  $\geq 3510$  mIU/mL; gestational sac usually visualized at this point if IUP is present. 1% of IUP will not be visualized on TVUS when HCG is 3510.
  - HCG rise  $\geq 35\%$  every 2 days: likely IUP
  - HCG rise  $< 35\%$  every 2 days: likely abnormal pregnancy (e.g. ectopic pregnancy, nonviable IUP)
  - Plateauing or decreasing HCG: likely failed pregnancy (e.g. arrested pregnancy, tubal abortion, complete/incomplete abortion)
    - if decreasing: likely failed IUP, resolving ectopic pregnancy. repeat HCG weekly until undetectable
    - if plateau: perform diagnostic uterine aspiration. if no IUP, treat as ectopic.
- keeping following beta HCG and TVUS every 2-7 days until definitive diagnosis by TVUS.
- Management
  - Treatment options include methotrexate (certain selected pts – early gest age,  $< 3.5$  cm mass, B-HCG  $< 5000$ , VSS), expectant (small and no fetal heart), surgical (VS unstable, large adnexal mass, unreliable follow up)
- 

### .Rhogam.RhD alloimmunization in pregnancy.alloimmunization of RhD in pregnancy

- RhD negative patients who deliver an RhD positive newborn (or exposed to RhD pos red cells) are at risk of developing anti D antibodies. RhD-positive fetuses/neonates of these mothers are at risk of developing hemolytic disease of the fetus and newborn (HDFN)
- screening
  - perform RhD typing and antibody screen at first prenatal visit
  - in RhD neg patients, repeat antibody screen at 28 weeks and repeat at delivery
- diagnosis of D alloimmunization
  - detection of anti-D antibody in maternal serum.
    - means that the fetus is at risk for hemolytic disease of the fetus and newborn (HDFN), not that it has occurred or will develop.
- management if mom is Rh neg and has anti-D antibody
  - if father is RhD neg: then fetus is RhD negative and therefore not at risk
  - if father RhD and heterozygous for D, then check cell free DNA for fetal RhD type. if father homozygous for D, then baby is RhD for sure.
  - If the fetus is RhD-positive: check indirect Coombs titer (ie, indirect antiglobulin test)
    - if indirect Coombs titer stable: repeat monthly
    - if titers rising: repeat every 2 weeks
    - anti-D titer between 16-32 is critical
  - if critical titers: follow with Doppler of MCA peak systolic velocity to predict moderate/severe fetal anemia
  - if MCA-PSV  $> 1.5$  MoMs (multiples of the median)
    - check fetal hemoglobin/hematocrit. if Hb below 2 standard deviations below mean or hematocrit  $< 30\%$ 
      - if gestational age  $< 35$  weeks: intrauterine transfusion
      - if gestational age  $> 35$  weeks: deliver
- 
- 

### .Rhogam.RhD alloimmunization in pregnancy.alloimmunization of RhD in pregnancy - prevention

- purpose: prevent alloimmunization and hopefully prevent HDFN (hemolytic disease of fetus and newborn)
- Rhogam dose: 300mcg
- screening
  - perform RhD typing and antibody screen at first prenatal visit
  - in RhD neg patients, repeat antibody screen at 28 weeks and repeat at delivery
- indications for rhogam in women who are D- negative
  - routinely at 28 weeks
  - conditions/procedures with increased risk of fetal maternal hemorrhage

- delivery
- antepartum hemorrhage
- spontaneous or therapeutic abortion
- amniocentesis, cordocentesis, chorionic villus sampling
- ectopic pregnancy
- abdominal trauma: e.g. fall, MVA
- routinely postpartum
- no need to give Rhogam if before 8 weeks, as per SOGC 2020 medical abortion guidelines. but UpToDate disagrees.
- Rhogam inadvertently omitted
  - give as soon as possible once you remember
  - After delivery, partial protection is afforded with administration within 13 days of the birth, and there may be an effect as late as 28 days after delivery.
- other events that can cause maternal alloimmunization
  - Injection with needles contaminated by RhD-positive blood
  - Inadvertent transfusion of RhD-positive blood
  - RhD-mismatched allogeneic hematopoietic stem cell transplantation

## • .Pregnancy and abdominal pain. Abdominal pain in pregnancy

- round ligament pain is common
- ddx: abruption, braxton hicks
  - non pregnant causes: UTI, appendicitis,

•  
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## • .pregnant with spotting

- hCG q2 days and ultrasound to rule out ectopic.
- send to ER.

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## • .Postpartum

- day 1
  - brain: blues, depression, sleep, substances, support, sex
  - breasts: feeding, formula, latch
  - blood pressure: if gestational HTN
  - bladder/bowel: incontinence, UTI, flatus
  - bleeding: colour, smell, clots, increasing/decreasing
  - baby: bonding, feeding
  - C-section: calf pain/swelling, chest pain, SOB, ambulatory
  - social support: who is at home, meds mom is on, follow-up
- follow-up at 6-8 weeks. may coincide appointment with 2 month appointment for infant.
  - Pap smear if not up to date
  - bloodwork: CBC, ferritin, B12. TSH doesn't need to be routinely checked.
  - vaccines
  - Contraception
    - may offer combined contraceptives 3-6 weeks postpartum. Before that, there is increased risk for VTE.
    - no OCP if breast feeding. may offer progestin only pill, or IUD instead.
  - S:
    - the B's. brain, breasts, BP, bladder, bowel, baby, bleeding
    - if still bleeding at 6 weeks, consider U/S for retained products
    - if issues with urinary incontinence, refer for pelvic floor physio
- post C-section
  - typically:
    - acute pain for up to 2 weeks. usually don't require opioids by 2 weeks



- avoid heavy lifting. nothing heavier than baby with carseat until 6 week mark
- oozing usually stops by 2 weeks

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## .folic acid

- ideally start 3 months before pregnancy
- Start 3 months prior to conception
- 0.4 mg for average risk
- 1 mg if moderate risk
- women with a family history of NTD or folate-sensitive congenital anomalies, women on anti-folate medications, women with pre-existing diabetes, and women with GI malabsorptive conditions
- 4 mg if high risk (previous child with NTD, NTD in self or partner)
- Folic acid (0.4mg in multivitamin), Pregvit may be covered by drug plans, Pregvit 5 also available - has extra folic acid
- Extra folic acid is needed until 12 weeks, after which 0.4 mg is fine. Continue until done breastfeeding.

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## .immunization in pregnancy

- Tdap immunization recommended in each pregnancy between 27-32 weeks
  - Rationale: unimmunized infants are at highest risk pertussis complications
- Influenza immunization recommended at any stage of pregnancy
  - Pregnant women are a high risk group for flu complications – 4x rate of hospitalization vs non-pregnant women,
  - Immunization associated with reduced risk low birth weight

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## .Post partum depression

- risk factors
  - previous post partum depression, MDE, GAD
  - family history
  - single parent, abusive relationship
  - drug issues
  - complicated/unwanted pregnancy, difficult baby
  -

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## .Ophtho.Ophthalmology

### .dry eye disease

- Clinical presentation: chronic eye irritation. Eye dryness, red eyes, burning
- diagnosis:
  - based on patient symptoms
  - findings: symmetric conjunctival injection, corneal scarring, reduced blink rate
- ddx
  - viral conjunctivitis
  - other microbial infections
  - allergic conjunctivitis
- management
  - tear supplementation with artificial tears
    - drops: 1 drop in each eye four times per day. May increase frequency to every hour
    - gels/ointments: can be used if eye drops are not providing enough symptomatic relief

- environmental strategies
  - frequent blinking, especially with reading or computer use
  - avoid exposure to air conditioning or heating
  - use humidifiers
  - moisture chambers: goggles that protect the humidity around the eyes
- indication for referral
  - patients with diabetic neuropathy as can have reduced sensation
  - if diagnosis in question
- treatments offered by ophtho
  - topical cyclosporine
  - topical lifitegrast
  - intranasal varenicline
  - other options: topical glucocorticoids, punctal occlusion, autologous serum tears, tear stimulation, omega 3 fatty acids

### .Entropion.Ectropion

- inverted/everted eyelid
- management
  - lubricating ointment to prevent eyelashes from rubbing and prevent dry eye
  - definitive management in surgery

### .Dacryocystitis.Blocked tear duct

- blocked tear duct
- usually not infected.
- 90% blocked tear ducts resolved by 1 year of age
- conservative treatment
  - massage. do it with every diaper change
    - push really hard that you blanch the skin. pressing on nose, not on eye.
- check for amblyopia
  - red reflex testing
- management
  - if cellulitis, treat with antibiotics
  - refer to ophtho
    - if patient >1 year old and conservative treatment not effective
    - unilateral more worrisome. can cause amblyopia

### .Preseptal cellulitis

- signs/symptoms
  - redness, swelling to eyelid
- rule out orbital cellulitis
  - if good EOM, no redness of eyeball. less likely orbital cellulitis
- management
  - po antibiotics: e.g. keflex
  - need close follow-up to ensure doesn't progress to orbital cellulitis

### .Pinguecula.Pterygium

- both Pinguecula and Pterygium have same pathophysiology.
- pinguecula: growth on conjunctiva adjacent to cornea
  - treat with tears prn
- pterygium: growth onto cornea
  - artificial tears prn

- consider referral if affecting vision
- often caused by UV exposure. treat with sunglasses
- if small, may be monitored by optometrist

### .Subconjunctival hemorrhage

- usually benign
- can be caused by cough, sneeze
- if trauma:
  - consider globe rupture. needs urgent referral

### .Orbital cellulitis

- signs/symptoms
  - decreased EOM or pain
  - vision may be normal or decreased
  - proptosis
- management
  - treat with IV antibiotics
  - refer to ophtho

### .Acute Vision Loss:

- DDX:
  - unilateral painless: lens dislocation, vitreous hemorrhage, retinal detachment, retinal artery/vein occlusion, ischemic optic neuropathy
  - unilateral painful: Corneal abrasion, Keratitis, Acute glaucoma, Hyphema, Endophthalmitis, Anterior uveitis, Optic neuritis, giant cell arteritis
  - bilateral painless: Pseudotumor cerebri (variable symptoms), Metabolic or toxic (hyperglycemia, methanol toxicity), Homonymous field loss (chiasmal or retrochiasmal etiology)
  - bilateral painful: keratitis (contact lens, UV light, chemical),
- S:
  - pain, laterality, trauma, contact lens, distribution of vision loss, redness
  - progression, ability to see light;
  - associated symptoms (eye pain, discharge, itching, tearing, photophobia, redness, headache, weakness, numbness, floaters, sparks);
  - history of cardiac, rheumatic, thrombotic, autoimmune, or neurologic disorders;
  - jaw claudication, medications, trauma.
- O:
  - visual acuity, EOM
  - Vital signs, HEENT, funduscopy, neurologic, and cardiovascular exams
- 

### .Globe rupture

- clinical findings
  - 360 degree bullous subconjunctival hemorrhage
  - uveal prolapse
  - peaked pupil: asymmetric pupil that comes to a point instead of a circle
- suspected globe ruptures are an ophthalmologic emergency
- don't check pressure with Tonopen.
- management
  - keep patient comfortable. antinausea, pain killers
  - sitting upright
  - keep patient NPO
  - refer to ophtho urgently.

- 

### .Dry eye

- punctate staining seen on fluorescein
- treat with artificial tears

- 

### .Hyphema

- collection of blood in anterior chamber
- can occur with trauma or spontaneously
- are always pathologic and refer to ophthalmology urgently.
- get IOP measurement, unless suspect globe rupture

- 

### .Red eyes

- <https://www.youtube.com/watch?v=EtKLoc8wF1E&t=8s>

- DDx

- bacterial/viral conjunctivitis, dry eyes, foreign body, allergic conjunctivitis

- Emergent DDx

- acute angle closure glaucoma. painful, in distress. ciliary flush. fixed pupil in mid dilation.
- iritis: objective photophobia, ciliary flush. small pupil.
- infectious keratitis: FB sensation and trouble keeping eye open. contact lens wear is risk factor. objective photophobia. corneal infiltrate/ulcer.
- scleritis: painful. tenderness to touch (through eyelid). violaceous redness. pain with eye movement.

- S:

- vision affected: can you still read with the affected eye
- foreign body: does it feel as though there is something in your eye, interfering with your ability to keep eye open
  - objective: patient unable to spontaneously open the eye: suggests corneal involvement
  - subjective: scratchy feeling, grittiness. not necessarily suggest corneal problem that requires referral
- photophobia: look for objective signs of photophobia. wearing sunglasses, covering affected eye with hand.
- trauma: injury due to finger poke, tool, or other object
- contact lens wear
- discharge other than tears that continues throughout the day: morning crusting followed by watery discharge throughout the day is characteristic of many self-limited processes

- O:

- penlight examination: ciliary flush, reactive pupils, hyphema/hypopyon
- check tenderness on palpation
- visual acuity
- fluorescein
- tonopen

- P:

- dry eyes: artificial tears
- uncertain diagnosis: f/u with optometrist in 3-5 days

- Imaging

- MRI for optic neuritis
- CT for orbital cellulitis

- 

### .Lumps and bumps of eyelid.Eyelid lesions

- rule of thumb

- likely benign
  - pedunculated
  - stuck on
  - cystic
- needs biopsy: refer to oculoplastic surgery

- deeper
- infiltration, destruction
- subcutaneous growth
- physical exam
  - inspection
  - palpation
  - tests
    - transillumination
    - wrinkle test. look for wrinkling of epidermis. rules out epidermis lesions
- features suggestive of malignancy: LUI acronym
  - loss of lashes
  - ulceration
  - infiltration of normal architecture/anatomy
- benign lesions
  - epidermal
    - squamous papilloma: skin tag
    - seborrheic keratosis
    - epidermal inclusion cyst
    - verruca vulgaris
  - adnexal
    - chalazion/hordeolum
    - sweat gland cyst
- malignant
  - epidermis
    - basal cell carcinoma
    - squamous cell carcinoma
  - adnexal
    - adenocarcinoma
  - melanoma
- treatment
  - surgical excision
  - topical: Aldara (Imiquimod)
    - for AK, superficial BCC
  - systemic: Erivedge (Vismodegib)
    - for recurrent, advanced BCC
- Mimics for common diseases
  - eye lid mass: misdiagnosed as chalazion. palpation showed fixed orbital lesion. was rhabdomyosarcoma
  - chronic unilateral "blepharitis". was SCC
  - recurrent "chalazion": sebaceous cell carcinoma

## • Strabismus.Amblyopia

- misalignment of the eyes
- importance of strabismus
  - can cause permanent vision loss in childhood if not corrected
  - does not result in double vision, but rather suppression
  - results in amblyopia. which if untreated at an early age results in permanent vision loss
    - amblyopia: loss of vision caused by abnormal binocular interaction during visual development (usually under age 7)
- types
  - esotropia: eyes crossing in
  - exotropia: eyes crossing out
  - hyper/hypotropia: eyes vertically deviated
- physical exam

- cover test: gold standard
  - cover/uncover
  - alternating cover
  - if baby doesn't mind one eye being covered, but really doesn't like the other eye covered, this is a clue for amblyopia
- screening eye exam at welll baby check
  - cover testing
  - bruckner red reflex testing
    -
- normal visual behaviour by age
  - all newborn babies have poor vision.
- when to refer vs watch
  - normal
    - intermittent strabismus before age 3 months is normal
  - urgent referral
    - constant strabismus is never normal
    - diplopia with strabismus is a red flag. indicates acquired strabismus
    - strabismus with abnormal red reflex
    - strabismus with headache

## .Red reflex

- compare red reflex in both side
- if red reflex asymmetric, could be:
  - anisometropia (asymmetrical refractive error, requiring glasses)
  - strabismus (lighter reflex in non-fixating eye)
  - if poor red reflex in both eyes
    - could indicate either cataract or tumor in the eye
    - retinoblastoma
- abnormal red reflex is urgent referral
- red reflex in other ethnicities: asian, black, first nations etc.
  - yellowish, duller red reflex
- leukocoria
  - appears white in ambient light (not from ophthalmoscope light)

## .Viral Conjunctivitis.Conjunctivitis - Viral

- Often associated with URI, Adenovirus highly contagious, HSV less likely to spread
- clinical symptoms
  - conjunctival injection, tearing,
  - watery discharge
  - red, sore eye with tearing
  - often in one eye and then spreads to other eye
  - often URTI
- Treatment:
  - Supportive, cold compresses, ocular decongestants, artificial tears
  - Strict hand washing/hygiene, avoid work if healthcare worker until eye discharge ceases
  - Spontaneous remission 1-2w
  - Refer if not resolved after 14d
- Ophthalmology referral if
  - Herpes Zoster Ophthalmicus (vesicular eruption)
  - Herpes Simplex Virus (dendritic epithelial defect)
- Return to work/school

- The safest approach to prevent spread to others is to stay home until there is no longer any discharge, but this is not feasible for most students and for those who work outside the home.
- suggest advising patients to consider that their problem is like a cold, and their decision to return to work or school should be similar to the one they would make in that situation.
  - Most children with colds need not be excluded from out-of-home child care or school because transmission is likely to have occurred before the child became symptomatic

## .Bacterial conjunctivitis. Conjunctivitis - Bacterial

- Spread through direct contact
- signs/symptoms
  - lots of mucopurulent discharge. Mucous, stringy discharge
- Treatment
  - Antibiotic therapy in healthcare workers, immunocompromised, comorbidity, contact lens wearers, unreliable
    - Staph aureus in adults
    - Strep pneumoniae, H influenzae in children
  - Suspect chlamydial conjunctivitis if sexually active, do not respond
    - Treat with erythromycin ophthalmic ointment, and azithromycin 1g PO
  - Delay antibiotic therapy in patients willing as self-limiting
    - Follow-up at **day 4** of symptoms, if not improved start antibiotics
      - Fucidin 1% ophthalmic 1 drop BID x 7 days
      - Erythromycin ointment 1.25cm QID x 5-7 days
    - If severe or contact lens, cover for pseudomonas
      - **Ciprofloxacin 0.3%** (or ofloxacin) QID x 5-7 days
- **Ophthalmology referral** if
  - Hyperacute copious purulent discharge usually **N. gonorrhea** (*see image to the right*)
  - Chronic >4w bacterial conjunctivitis

•

## .Corneal ulcer

- not transparent defect to cornea. white or yellow opacity.
- ulcers are urgent and can progress to sight losing complications. needs to be assessed by ophtho the same day.

•

•

## .corneal foreign body. foreign body in eye

- try removing with a cotton swab first.
- if unable to remove all the foreign body from the cornea, need to refer to ER, where they have a slit lamp and can refer to ophtho if needed.

•

## .Corneal abrasion

- Check for retained foreign body under upper eyelid
- Abrasion vs ulcer
  - abrasion: no opacity underlying area. cornea is transparent
  - ulcer: not transparent. white or yellow opacity.
    - ulcers are urgent and can progress to sight losing complications. needs to be assessed by ophtho the same day.
- Treatment
  - Topical NSAIDs
    - diclofenac 0.1% [Voltaren], ketorolac 0.4% [Acular LS] 1 drop QID x 2 days maximum)
  - Topical **Antibiotic options. dose QID x5 days or until asymptomatic x24h**
    - erythromycin 0.5% opht oint
    - OR polymyxin B/trimethoprim (Polytrim) opht solution,

- OR sulfacetamide 10% opht oint QID x 5d or until asymptomatic x 24h
- If **contact lens** wearer, cover for **pseudomonas** (Ciprofloxacin, Gentamicin, Ofloxacin)
  - Refer to ophthalmology if corneal infiltrates
  - Close follow-up
  - Avoid contact lens until healed
  - Low threshold for referral
- Ophthalmology if
  - Symptoms worsen or do not resolve in 48h
  - Branching staining suggests HSV
  - Chemical or flash burns
  - Penetrated cornea, Positive Seidel test (surround leak site, *see image to right*)
- **AVOID topical anesthetics** (*delay healing, symptom masking*), patching, cycloplegics
- **Follow-up**
  - q1-2 days until healed
- **Note**
  - previous organic trauma can result in recurring corneal erosions which look/present like a corneal abrasion but NO recent history of trauma

## • Subconjunctival hemorrhage

- Rule out bleeding disorder
- Treatment
  - Warm compresses, lubricants

## • Episcleritis.Scleritis

- Differentiate from **scleritis** (emergency)
  - Phenylephrine (2.5%) eye drops leads to swift, transient resolution of episcleral redness in episcleritis
  - Non-tender on palpation in episcleritis (tender in scleritis)
  - Pink-red in episcleritis (blue-purple hue in scleritis)
  - Radial pattern of sclera maintained in episcleritis (loss of radial pattern of sclera in scleritis)
- clinical presentation
  - abrupt onset of redness, irritation, watering of eyes. Often without pain. Normal vision
  - redness usually sectoral, confined to one segment. But can be diffuse.
- Rule out systemic disease (RA)
- Episcleritis Treatment
  - No treatment, self-limiting up to 3w
  - May consider symptomatic treatment with Topical lubricants, NSAIDs, steroids or Oral NSAIDs, steroids

## • Scleritis

- symptoms/signs
  - severe, boring pain
  - severe redness, bluish sector or diffuse

## • Eye injury.Eye Trauma

- S:
  - vision changes, photophobia, eye pain
  - ask about contact lenses
- O:
  - Fluorescein: one drop of anesthetic. 1-2 drops of fluorescein dye. then UV light
    - with fluorescein strips, use the topical anesthetic and drip it onto the strip and let the droplet go into the eye.
  - visual acuity with Snellens. one eye at a time.
- corneal abrasion



- antibiotic drops
  - Vigamox 1 drop tid x 7 days
  - Ciprofloxacin 1-2 drops q2h x 2 days, 1-2 drops q4h x 5 days.
- Diclofenac 1 drop qid x 7 days
- consider slit lamp

- 
- 
- 

## .Vision Loss, Transient

- DDX
  - monocular: giant cell arteritis, ischemia, retinal vein occlusion, retinal vasospasm, papilledema,
  - binocular: migraine, seizure, vertebrobasilar ischemia
- P:
  - exclude GCA: ESR, CRP
  - exclude carotid disease: carotid duplex ultrasound,
  - exclude cardiac: ECG, echocardiogram
  - brain MRI if suspect vertebrobasilar ischemia

- 

## .Retinal Detachment, Posterior Vitreous detachment

- Posterior vitreous detachment
  - occurs in 70% of 70 year olds
  - caused by vitreous liquefaction
  - traction on retina causes flashes and vitreous opacities result in floaters
  - signs/symptoms
    - few to several floaters, no persistent change in vision, absence of risk factors, no change in visual acuity, normal intraocular pressure (12-20)
- retinal detachment
  - signs/symptoms:
    - > 100s floaters, change in vision or curtaining, change in visual acuity, decreased intraocular pressure
    - key finding: confrontational visual field defect in periphery
- ophtho consult
  - patient age/gender
  - affected eye
  - timing ± quantity of flashes and floaters
  - persistent visual field defects (vision change or curtaining)
  - visual acuity, intraocular pressure
- referral to Ophtho
  - Flashes and floaters without vision loss or visual field defect: likely PVD
    - should be assessed by ophthalmology usually within 72 hours, to rule out retinal tear
  - with vision loss or confrontational visual field deficit or subjective visual field defect: possibly retinal detachment
    - should be seen urgently

- 
- 

## .Conjunctivitis in newborn. Newborn conjunctivitis. Neonatal conjunctivitis

- conjunctivitis vs blocked tear duct
  - blocked tear duct: watery discharge
  - conjunctivitis: yellow, green, thick discharge. Lots of discharge. Continuous
- swab for chlamydia and bacterial C&S
  - viral swab for chlamydia
  - red topped swab for C&S
- treat with topical erythromycin ointment

- 

### .Stye

- Abscess of the eyelid that presents with localized pain, erythema and edema
- Warm compresses
- If lesion does not reduce in size within 1-2, refer to ophthalmology for incision and drainage

- 

### .Chalazion

- DDx
  - basal cell carcinoma, sebaceous cell carcinoma
- red swollen bump on eyelid margin
- usually caused by blockage of meibomian gland.
- often recurrent.
- natural course is to last for weeks, if not months
- management
  - hot compresses. minimum 4 times per day
  - refer for I&D by oculoplastics
    - acutely causing visual field defect due to mechanical ptosis
    - non-urgently if persistent for months and bothersome

- 

### .Pyogenic granuloma of eyelid

- often forms in area of previous chalazion
- resembles a fleshy pink mass, often with a small stalk attached to the conjunctiva
- may refer to ophtho to confirm diagnosis

- 

### .Blepharitis

- Inflammation of the eyelid margin. meibomian gland dysfunction
- S:
  - often associated with dry eye
  - often pain, crusting, red eye, tearing
  - often worse in winter
- DDx: Rule out seborrheic dermatitis or rosacea
- Management
  - Warm compresses, lid massage, lid washing. May benefit from supplemental artificial tear
    - warm compresses bid x7-8 min over both eyes
  - lid hygiene (wipe lids after warm compresses with dilute baby shampoo or lid care wipes)
  - artificial tears QID and prn
  - If don't respond to conservative measures after 6 weeks: refer to ophtho.
    - Topical antibiotic ointment on the lid margin for 1-2 weeks
    - Consider oral antibiotic therapy (doxycycline, azithromycin) if response to topical therapy inadequate.
      - Doxycycline 100mg daily x2-4 weeks. Then 50mg
      - OR azithromycin 500mg day 1. 250mg for 4 or more days

- 

- 

### .Tonopen.IOP measurement

- calibrate
  - hold vertically with tip down.
  - press button twice. CAL will show on screen.
  - hold in this position for 20s. UP will show on screen
  - flip the pen so that tip is pointing up. Good will show on screen if successful. If "bad", repeat calibration
- use tetracaine to anesthetize eye

- click button once to turn Tonopen on. should see 2 bars on the screen
- quickly and lightly touch tonopen to cornea
  - do not try to indent the cornea
- get 4 valid readings.

- 

### .Flipping eyelid

- put stick end of cotton swab over eyelid
- with other hand, grab eyelid/eyelash and flip it up

- 

### .AMD.Age related Macula degeneration.Macula degeneration

- signs/symptoms
  - lose central vision. peripheral vision preserved
- dry
  - due to thinning of the macula
  - no cure.
  - risk factor modification
    - smoking cessation
    - cholesterol/HTN optimization
    - UV protection
- wet
  - new blood vessels grow into retina. these can bleed, scar
  - management
    - intravitreal injection with anti-VEGF

- 

### .Diabetic retinopathy

- develop small hemorrhages in retina. microaneurysms. neovascularization
- treated similarly to wet AMD with intraocular anti-VEGF injections
- Screening
  - when to initiate screening
    - Type I diabetes
      - 5 years after diagnosis and >15 yo
    - Type II diabetes
      - at time of diagnosis
  - screening frequency
    - if retinopathy absent
      - Type I: annually
      - Type II: every 1-2 years
    - if retinopathy present
      - based on severity. <1 year
- Management
  - optimize blood glucose, lipids, BP
  - intraocular injections: anti-VEGF
  - laser
    - damages the tissue and can reduce peripheral vision.

- 

### .Glaucoma

- increased ocular pressure which damages the optic nerve
- management
  - drops to decrease production, increase outflow
  - laser to increase outflow. laser peripheral iridectomy
  - surgery to increase outflow. surgical peripheral iridectomy

- 

## [.Glaucoma - acute.acute glaucoma](#)

- risk factors
  - family history
  - age > 60, female, race (inuit, Asian)
  - farsightedness
  - medications: alpha agonist eye drops, anticholinergic eye drops, topiramate, antihistamines, thiazide diuretics, TCAs, SSRIs, SNRIs
- empiric treatment
  - beta blocker: timolol eye drops
  - alpha2 agonist: apraclonidine eye drops
  - agent that causes miosis: pilocarpine eye drops

- 

## [.herpes simplex to eye](#)

- dendritic staining on fluorescein
- Valacyclovir 500mg tid x 7 days
  - half the dose for shingles
- refer to ophtho
- often recurrent condition. the antivirals don't cure the disease, just like shingles

- 

## [.Orthopedics](#)

### [.finger fracture – middle phalanx.middle phalanx fracture](#)

- My management
  - If nondisplaced, buddy tape. Follow up radiographs
  - If displaced, refer to ER for splinting and fracture clinic referral.
- Management
  - Uncomplicated, nondisplaced middle phalanx fractures are treated with finger splinting or buddy taping.
    - reevaluate with radiographs within one week injury to check for displacement, angulation, or rotational deformity [3,11]. If no malalignment is detected, continue buddy taping for total of 4-6 weeks, until clinical healing has occurred.
    - Encourage range of motion exercises to restore normal mobility at the distal interphalangeal (DIP), proximal interphalangeal (PIP), and metacarpophalangeal (MCP) joints while buddy taping is continued
  - Minimally displaced fractures are reduced and initially treated in a gutter splint.
  - Minor volar plate avulsion fractures are treated with early mobilization, with initial splinting provided as needed for comfort.
    - Generally, an extension block or aluminum splint is used, with the finger held in slight flexion. For 5-10 days
    - Once the splint is no longer needed for pain, allow range of motion of the finger while using buddy taping until range of motion and function have returned (generally three to four weeks).
  - Spiral or oblique fractures are often unstable and should be reassessed regularly looking for rotation and shortening.
- Surgical referral – Immediate consultation with a hand surgeon should be obtained for any open fracture and any fracture associated with a tendon or nerve injury. Comminuted fractures, rotational fractures, intraarticular fractures, and displaced or angulated fractures that cannot maintain their reduction require referral.

- 

### [.finger sprain](#)

- DDx
  - flexor tendon injury of DIP (jersey finger), extensor tendon injury of DIP (mallet finger)

- mechanism. Often from hyperextension
- physical exam
  - confirm active flexion and extension of all joints.
- management
  - buddy taping
  - splinting

#### .mallet finger.extensor tendon injury of DIP

- partial or complete rupture of the extensor tendon's terminal insertion distal to the distal interphalangeal (DIP) joint. They are caused by forced flexion of the DIP joint.
- Physical exam
  - swelling of dorsal aspect of DIP
  - DIP flexor deformity
  - inability to actively extend the DIP joint
- indications for surgical referral
  - Surgical referral should be obtained if the mallet finger is associated with:
    - a fracture of greater than one-third of the joint surface,
    - the DIP joint cannot be passively extended,
    - or there is DIP joint subluxation.
- Treatment
  - We suggest that uncomplicated mallet finger injuries be treated by maintaining the DIP joint in full extension or minimal hyperextension using an appropriate splint
  - It is crucial that patients not allow flexion of the DIP **at any time** during the initial period of splinting (generally six to eight weeks).
- Follow-up and return to activity
  - DIP splinting is performed continuously for six to eight weeks. If no extensor lag exists at the end of this period, night splinting is then performed for two additional weeks. Heavy laborers and athletes should continue to protect the finger with a splint or buddy taping during activity for an additional six to eight weeks.

#### .jersey finger.flexor tendon injury of DIP

- jersey finger is an acute rupture of the flexor digitorum profundus (FDP) tendon at its insertion at the distal phalanx. The tendon may retract to the proximal interphalangeal (PIP) joint or all the way to the palm
- Rupture of the FDP is caused by a sudden, forceful hyperextension of the distal interphalangeal (DIP) joint
- Physical examination
  - pain and swelling at the palmar DIP joint or along the volar aspect of the involved finger and
  - inability to flex the DIP joint.
- Surgical referral
  - **All** jersey finger injuries should be referred urgently to a hand surgeon. Definitive treatment is surgical in all cases, and some injuries require surgical repair within 7 to 10 days.
- Misdiagnosis and complications
  - Jersey finger may be misdiagnosed initially as a "sprained finger" or present late if a patient does not appreciate the extent of injury. Complications are more likely with late presentations.

#### .tibial plateau fracture

- Mechanism:
  - Proximal tibial fractures usually result from a fall, motor vehicle crash, vehicle pedestrian collision, or an injury during participation in a contact sport.
- Concomitant injury

- Concomitant injury to the stabilizing ligaments and/or the medial or lateral meniscus often occurs with proximal tibial fractures. These additional injuries should be suspected, assessed by physical examination, and further evaluated by MRI when clinically indicated.
- Indications for referral
  - Displaced fractures, depressed tibial plateau fractures, intraarticular fractures, associated ligamentous tears, and/or meniscal damage warrant orthopedic referral within 48 hours. (See 'Indications for orthopedic referral' above.)
  - Open fractures and those with vascular injury or suspected compartment syndrome require immediate orthopedic referral
- Management
  - initial treatment
    - Compression, icing, appropriate analgesics,
    - Splinting for tibial plateau fractures is in full extension, while splinting for intercondylar fractures is in 5 to 10 degrees of flexion.
    - Strict non-weight bearing initially
  - follow-up care, if non-operative:
    - After brace fitting, the patient returns weekly for the first three weeks following injury. If there is no displacement at two weeks, the patient begins working on knee flexion in the brace with a goal of achieving 90 degrees by four weeks. Plain radiographs are repeated weekly for three weeks and then on a two to three week basis depending on radiographic appearance.
    - Strict non-weight-bearing is the norm for six weeks, but this period may be adjusted based on the injury and clinical progress. Partial weight-bearing in the brace can begin once there is adequate radiographic healing
- Outcomes
  - When managed promptly and appropriately, non-displaced and uncomplicated proximal tibial fractures in individuals less than age 40, even those involving an open physis, have good outcomes, including return to sport and occupational activities. However, patients with more complicated injuries who require surgical repair often develop complications, which may include gait abnormalities, knee osteoarthritis, ankle osteoarthritis, and overall diminished function and quality of life.

## .shoulder dislocation.dislocation of shoulder

- Shoulder reduction: there are many methods
  - Cunningham method
    - should show the patient the technique on their uninjured shoulder to reduce anxiety. the idea is to relax the muscles so that the shoulder reduces itself painlessly, without requiring sedation.
    - if patient's right shoulder dislocated, put their right arm on your right shoulder, while you face them.
    - lay your right hand on antecubital fossa of their injured right limb to provide gentle traction
    - massage their trap, then deltoid, then biceps. for 3-4 minutes
    - then ask patient to straighten their back and pull their shoulders back.
  - Upright technique
    - Place the head of the bed at 90 degrees. Have the patient dangle their legs over the side of the gurney and rest their unaffected shoulder against the upright portion of the bed. Encourage the patient to relax their shoulder muscles.
    - Stand behind the patient and locate the scapula. Next, simultaneously push the inferior angle medially and the acromion inferiorly using your thumbs, thereby rotating the scapula.
    - 
    - •While you are doing this, an assistant provides gentle forward or downward traction on the arm [70,71]. To exert downward traction, the assistant grabs the patient's wrist with one hand and the already flexed elbow with the other hand and pushes down on the elbow while holding the wrist in place (picture 5 and movie 2). Downward traction helps to prevent movement of the patient's arm and may increase success rates.
- Immobilization
  - immobilizing the shoulder in the traditional position of adduction and internal rotation. A collar and cuff, sling and swathe, or a commercially available shoulder immobilizer are equally effective.
  - Age <30: shoulder is immobilized for three weeks

- age >30: early mobilization after 1 week
- Gentle pendular motion exercises should be performed during the immobilization period to reduce the risk of frozen shoulder
- aftercare: sling until comfortable. avoid abduction and external rotation.
- Patient self reduction: Patients can be taught to reduce their own shoulder dislocation by clasping their hands together around the flexed ipsilateral knee from a seated position. The patient then leans back slowly and extends the hip, pausing whenever the pain is too much, until reduction occurs

## .hamstring tear

- Indications for orthopedic referral
  - The great majority of hamstring injuries can be managed successfully with rest and physical therapy. However, in some circumstances, operative repair may yield favorable results. Orthopedic consultation should be obtained in such circumstances, which include:
    - Complete (grade III) proximal hamstring rupture.
    - High-grade (grade II or III) distal hamstring tears.
    - In addition, hamstring avulsion injuries should be evaluated by an orthopedic surgeon or sports medicine specialist. (See 'Indications for orthopedic consultation' above.)
- management
  - protection, rest, ice, compression, and elevation (PRICE).
  - Eccentric strengthening exercises.
  - NOT suggested
    - glucocorticoid injection. may cause tendon degradation and increase the risk of tendon rupture

## .compartment syndrome

- occurs when increased pressure within a muscle compartment bounded by unyielding fascial membranes compromises the circulation and function of the tissues within that space
- causes
  - most often develops soon after significant trauma, particularly involving long bone fractures of the lower leg or forearm.
  - may occur following penetrating or minor trauma, or from nontraumatic causes, such as ischemia-reperfusion injury, coagulopathy, certain animal envenomations and bites, extravasation of IV fluids, injection of recreational drugs, and prolonged limb compression.
- Clinical presentation
  - progressive pain out of proportion
  - tense swollen compartments
  - pain with passive stretching of muscles
  - rapid progression of symptoms and signs over a few hours
- lab investigations
  - compartment syndrome is diagnosed based on clinical findings. Lab values not used for diagnosis.
  - ACS may cause muscle breakdown. Including elevated serum creatine kinase.
- surgical consultation
  - Immediate surgical consultation should be obtained whenever acute compartment syndrome is suspected based upon the patient's risk factors and clinical findings.
  - Serial or continuous measurements of compartment pressure are important when patient risk is moderate to high or clinical suspicion persists.
- management
  - relieve all external pressure on compartment. Remove dressing, splint, cast, restrictive covering
  - limb kept at level with torso. Not elevated or lowered
  - fasciotomy is definitive treatment.

## .scoliosis - child

- Presentation
  - usually present with truncal asymmetry noted by patient or caregivers
- history and physical
  - symptoms: back pain, neurologic symptoms, SOB
  - examine
    - curvature of spine. Differences in level of shoulders. Asymmetry of waistline. Forward bend test for rotational component of scoliosis
    - leg length discrepancy
- imaging
  - radiographs to confirm diagnosis. Also determine curve pattern and curve magnitude
    - considered scoliosis if Cobb angle > 10 degrees
- indications for referral
  - angle of trunk rotation (ATR)  $\geq 7$  degrees if BMI <85th percentile.
  - ATR  $\geq 5$  degrees if BMI >85th percentile
  - Cobb angle between 20 and 24 degrees in males or premenarchal females age 12-14 years
  - Cobb angle > 25 degrees in any patients
  - Progression of Cobb angle of  $\geq 5$  degrees
- treatment goal
  - goal is to have a Cobb angle of <40 degrees at skeletal maturity
- management
  - Cobb angle > 50 degrees:
    - refer for surgery
  - substantial growth remaining
    - Cobb angle  $\leq 10$  degrees:
      - reassure patient such a small curve is common and has no clinical significance. Repeat imaging is not indicated.
    - Cobb angle 11 - 19 degrees
      - observation. Follow clinically q6-9 months until skeletal maturity. May consider serial radiographs. Bracing may be indicated if Cobb angle increases by  $\geq 5$  degrees or progresses to  $\geq 20$  degrees during observation
    - Cobb angle 20-24 degrees
      - observation. Patients are followed clinically every four to six months until skeletal maturity. Bracing may be indicated if the Cobb angle increases by  $\geq 5^\circ$  over a three- to six-month period.
    - Cobb angle 25 to 39 degrees
      - bracing. monitor patients clinically and radiographically every five to six months until skeletal maturity. Surgery may be indicated if Cobb angles progress to  $\geq 50^\circ$  during bracing
  - Skeletally mature patients
    - Cobb angle <40 degrees:
      - provide reassurance. Do not need regular follow-up because curves are not likely to progress
    - Cobb angle 40-49 degrees
      - managed on individual basis

## .scoliosis - adult

- Defined as lateral curvature of spine that is >10 degrees by Cobb angle in adult. Less than 10 degrees is considered within normal limits of spinal asymmetry
- cause in adults:
  - new scoliosis due to degenerative changes in patients with no history of scoliosis
  - progression of adolescent scoliosis
- clinical features
  - often asymptomatic
  - may present with:



- back pain,
- postural imbalance with difficulties standing
- walking, symptoms of spinal stenosis (neurogenic claudication, radiculopathy),
- neurologic deficits
- conservative treatment
  - analgesic
  - physiotherapy for scoliosis
- indications for referral
  - persistent pain despite conservative measures
  - radicular pain: neurogenic claudication or sciatica
  - unexpected height loss and posture change. Or documented curve progression >4 degrees during adulthood
  - progressive weakness, numbness, loss of bowel/bladder control
- specialist management
  - serial monitoring
  - epidural glucocorticoid injection
  - surgical intervention
  -

### .spinal stenosis

- Commonly caused by degenerative spondylosis
- Clinical presentation
  - neurogenic claudication: a syndrome of bilateral, often asymmetric pain, sensory loss, and/or weakness affecting the legs,
    - produced or exacerbated by walking or prolonged standing in an erect posture.
  - Physical exam often normal. SLR present in only a minority of patients
- Neurogenic vs vascular claudication
  - neurogenic
    - quality: pain/numbness/tingling/weakness
    - relieved walking flexed with a cart
    - relieved sitting/lying within minutes
    - increased with back extended
    - bicycling typically better tolerated than walking
  - vascular
    - pain/cramping/tightness
    - relieved with standing erect
    - relieved sitting/lying immediately
    - increased with back flexed
- imaging
  - MRI of L-spine is test of choice
- conservative treatment
  - physiotherapy is mainstay of conservative management
  - pharmacotherapy:
    - NSAIDs
    - pregabalin not more effective than placebo for neurogenic claudication in a small trial
  - no evidence to support epidural injections of corticosteroids

### .bunion.hallux valgus deformity

- Lateral deflection of the hallux on the first metatarsal. Very common. Potentially painful
- pathophysiology, etiology
  - increased pressure under head of first metatarsal. Causes first ray to move medial dorsally.

- Precise etiology unknown. May be due to abnormal foot mechanics, joint hypermobility, genetic influences
- footwear probably exacerbates underlying bony/mechanical abnormalities
- painful complication:
  - Inflammation of a medial bursa protecting the joint (most common).
  - Degeneration of the crista on the plantar surface of the metatarsal head
  - Hammertoe deformity of the second toe
  - Central metatarsalgia
  - Degeneration of the cartilage covering the metatarsal head
  - Synovitis of the MTP joint
- imaging
  - not routinely recommended
  - for patients with severe or refractory symptoms
- initial conservative treatment
  - footwear: low heeled shoes with wide toe box
  - orthotics to improve foot mechanics
  - stretching: in flexion, in extension, toe curls
  - analgesics: tylenol, NSAIDs for pain
- severe or refractory symptoms
  - refer for surgery. Refer to foot surgeon. Suggest 3 months of conservative therapy

## .bursitis

- Bursa is a fluid filled sac-like structure which forms in clefts between mobile structures in the MSK system.
- Etiology
  - direct injury or trauma, prolonged pressure, overuse or strenuous activity, crystal induced arthropathy
- clinical presentation
  - swelling, inflammation
  - pain with active motion of muscles adjacent to involved bursa
- ddx
  - septic bursitis: consider if systemically unwell
- diagnosis
  - bursa aspiration to rule out infection or to diagnose gout
  - imaging typically not necessary.
- Management
  - NSAIDs
  - intrabursal injection of glucocorticoids for deeper bursa

## .syndesmotic ankle injury.high ankle sprain

- injury to one or more of the ligaments comprising the distal tibiofibular syndesmosis. causes pain more proximally, just above the ankle joint, and is associated more often with significant morbidity
- mechanism of injury. Usually a high intensity athletic activity
  - An external rotation force applied to a dorsiflexed ankle is the most common mechanism. This can happen when the leg is rotated forcefully against a planted foot or toe.
- Clinical presentation
  - History
    - occurred during intense athletic activity
    - forceful external rotation of dorsiflexed ankle
    - pain at anterolateral ankle
    - pain with weightbearing
  - physical exam

- squeeze test: place a heel of each hand just proximal to the midpoint of the calf, and compress the tibia and fibula by squeezing in an anteromedial to posterolateral direction. A positive test is marked by reproduction of pain in the distal syndesmosis, just above the ankle joint.
  - Painful squeeze test is a specific finding
- Sensitive signs for syndesmotic injury:
  - tenderness over the AITFL
  - inability to perform a single-leg hop
  - painful dorsiflexion-external rotation test.
    - the injured leg is stabilized by grasping the upper calf or front of the knee with one hand. The other hand grasps the foot, dorsiflexes the ankle to its endpoint, and then gently but firmly externally rotates the foot.
- Evaluation
  - [https://www.uptodate.com/contents/image?imageKey=SM%2F122417&topicKey=SM%2F16229&search=high%20ankle%20sprain&rank=1~10&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=SM%2F122417&topicKey=SM%2F16229&search=high%20ankle%20sprain&rank=1~10&source=see_link)
  - start with X-ray
    - if fracture: treat based on fracture pattern
    - if no fracture but diastasis present: likely grade 3 syndesmotic injury. Refer to orthopedic surgeon
    - no fracture or diastasis present: likely grade 1 or 2 syndesmotic injury.
      - Perform ultrasound to assess extent of tendon injury
        - if AITFL partial tear: likely grade 1 syndesmotic injury. Non-operative treatment
        - AITFL complete tear: likely grade 2 syndesmotic injury. Refer to orthopedic surgeon
- indication for surgical referral
  - if grade 2 or grade 3 syndesmosis injury
  - if grade 1 injury with a fracture
- DDx
  - ankle fracture
  - ligament sprain
  - anterior ankle impingement
- -

### .trigger finger

- Flexor tendon catches as it glides through stenotic sheath. Unable to smoothly flex or extend finger
- diagnosis
  - history of locking or clicking during finger movement
- DDx
  - Dupuytren's contracture, MCP joint sprain, infection of tendon sheath, calcific peritendinitis or peri arthritis, tenosynovitis
- management
  - acute: activity modification, NSAIDs
  - persistent: if don't improve after 4-6 weeks of conservative therapy. Local glucocorticoid injection
    - Methylprednisolone or triamcinolone with local anesthetic.
    - If persistent pain and locking despite conservative therapy and 1-2 glucocorticoid injections. Surgical therapy may relieve symptoms.

### .proximal phalanx fracture

- Referral
  - immediate consult for open fracture or involving tendon/nerve injury
  - intra-articular, unstable, rotated, shortened, significantly angulated fractures should be referred
- management
  - nondisplaced, stable proximal phalanx fracture: immobilization with splint and buddy taping or splint alone

- angulated transverse fracture: closed reduction
- displaced proximal phalanx fracture: gutter or Burkhalter splint
- 

### .Baker's cyst

- Generally arise in association with underlying joint disease, such as degenerative or inflammatory arthritis or joint injury. The cyst is influenced by communication between posterior joint capsule and bursa
- management
  - treat the underlying intraarticular inflammatory or degenerative process
  - if painful symptomatic cyst despite usual management of joint disease: suggest glucocorticoid injection of knee joint
  - if cyst is large and symptoms mostly in posterior knee, consider direct injection of popliteal cyst using imaging assistance

### .fifth metatarsal fracture

- 3 different fracture types
- tuberosity avulsion fracture
  - Avulsion fractures occur in the tuberosity (styloid), proximal to the intermetatarsal joint
  - They occur with forced inversion of the foot and ankle, while they are in plantar flexion
  - For nondisplaced avulsion fractures, symptomatic therapy alone. In most cases, this can be achieved with a hard-soled shoe, but occasionally more definitive immobilization (eg, casting) is required for pain control.
  - Refer to ortho if:
    - There is displacement, a step-off of more than 1 to 2 mm on the articular surface with the cuboid, other associated fractures, or symptomatic nonunion.
  - Follow-up
    - f/u at one week after diagnosis and every two to three weeks thereafter until healing is achieved and full function returns.
    - Most patients are asymptomatic, or nearly so, within three weeks, with radiographic union in eight weeks. Follow-up radiographs should be obtained approximately eight weeks after injury to document healing.

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### .foot pain

- DDx:
  - stress fracture, traumatic fracture
  - gout
  - plantar fasciitis
- if possible fracture: wear walking boot for comfort and repeat X-ray in 2-3 weeks
- consider refer to orthopedic minor injury clinic: whitby urgent care: 905-436-2263. regular referral letter
- toe fracture
  - if no separation of the fracture in toe, could do just buddy taping, otherwise, needs walking boot.
    - need walking boot for displaced or separated fracture. want to protect fracture.
    - same if fracture extending into MTP joint.

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### .Radius fracture.Ulna fracture.Colle fracture

- Reduction of fracture
  - Propofol 1-1.5mg/kg
  - reduce: 3 points. push with thumb
  - splint:
    - stockinette, cotton wrap.

- plaster: hole for thumb. along radius.
- kling wrap
- mould with 2 hands.

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## .Heel pain

### • DDx

- plantar fasciitis, calcaneal stress fracture
- enthesopathy, Haglund deformity (at insertion of achilles)
- tarsal coalition, accessory ossicle
- anterior impingement syndrome, osteochondral injury of talus
- fibularis tendinopathy, sinus tarsi syndrome (anterior, inferior to lateral malleolus. space between medial neck of talus and superior aspect of anterior calcaneus)
- retrocalcaneal bursitis
- tarsal tunnel syndrome (compression of nerve, tendons in the canal below medial malleolus)
- piezogenic papules

### • P:

- orthotics
- physio
- NSAIDs

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## .Haglund's deformity

- bony enlargement on back of heel
- causes
  - genetics: high foot arches, tight achilles
- nonsurgical treatment
  - NSAIDs
  - exercises: stretching to relieve tension from achilles
  - heel pads, shoe modification (soft, open back)
  - other
    - orthotic devices, immobilization
- surgical indication
  - if nonsurgical treatment fails to provide adequate relief

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## .JOINT/LIMB PAIN:

- S: Location, quality, intensity, duration, pattern (small vs large joints; number involved; swelling, redness, warmth); associated symptoms (constitutional, red eye, oral or genital ulceration, diarrhea, dysuria, rash, focal numbness/weakness, morning stiffness); exacerbating and alleviating factors; trauma (including vigorous exercise); medications; DVT risk factors; alcohol and drug use; family history of rheumatic disease; skin rash or bruises.
- O: Vital signs; HEENT and musculoskeletal exams (i.e., palpation of the joint, passive and active range of motion, Phalen maneuver, Tinel sign, Finkelstein test); relevant neurovascular exam (motor, sensation and reflex testing in affected area); skin exam.
- DDX: carpal tunnel, radiculopathy, SLE, rheumatoid arthritis, psoriatic arthritis, parvovirus infection, arthritis from IBD, gout, hip fracture, pelvic fracture, osteoarthritis, ligament damage, septic arthritis, trauma, plantar fasciitis, tennis elbow, disseminated gonorrhea, claudication, spinal stenosis, DVT, angina, shoulder dislocation, polymyositis

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## .Leg cramps

- often idiopathic
- secondary causes: prolonged sitting,
  - neuro: Parkinson's, myopathies, neuropathies, radiculopathies

- metabolic: volume depletion, pregnancy → low magnesium, diabetes, alcoholism, hypothyroid
- exercise associated, due to muscle fatigue.
- DDx: restless leg syndrome, periodic limb movements of sleep,
- Investigations: not routinely needed
  - Na, K if on diuretics
  - Iron if suspect RLS
  - Mg in pregnant women
  - Ca to r/o hypocalcemia if diffuse, severe muscle cramping
- Management
  - Try to avoid quinine, although it is effective
  - Initial: Daily Stretching
  - Then Supplements: B complex, vitamin E,
  - Then Diphenhydramine 12.5-50mg qhs,
  - Then diltiazem 30mg or verapamil 120 to 180mg,
  - Then gabapentin 600-900mg daily
  - If resistant to above: may try tonic water instead of quinine. Risk of cardiac arrhythmia, thrombocytopenia, HUS, TTP
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### .Leg pain

- DDx
  - DVT
  - fracture
  - venous insufficiency
- S:
  - bed ridden, unilateral calf swelling, pitting edema, leg tenderness, hx of DVT
  - pain with activity or at rest, tender to palpation, redness, swelling, trauma
  - better with leg elevation
- 

### .LOW BACK PAIN:

- S: Location, quality, intensity, radiation, onset (moving furniture, bending/twisting, trauma), timing (disturbs sleep); associated symptoms (especially constitutional symptoms, incontinence, focal muscle weakness); exacerbating and alleviating factors; history of cancer, recurrent UTIs, diabetes, renal stones, IV drug use, smoking.
- O: Vital signs; neurologic exam (especially of L4-S1 nerve roots); straight leg raise test; back palpation and range of motion (although rarely of diagnostic utility); hip exam (can refer pain to the back); examine gait; consider rectal exam.
- DDx: disc herniation, lumbar muscle strain, compression fracture, ankylosing spondylitis
- A/P:
  - Vimovo 500-20mg 1 tab po bid. 20 tablets
  - baclofen 10mg 1 tab po qhs. 10 tablets
  - if no spinal tenderness. vertebral fracture is unlikely. and X-ray not needed.
- management
  - physical activity
  - CBT
  - other treatments
    - oral NSAIDs
    - TCAs
    - SNRIs
    - spinal manipulation??
- bad treatments
  - unclear benefit
    - acupuncture

- capsaicin
- evidence of no benefit
  - epidural corticosteroids
- harms exceed benefit
  - opioids
  - cannabinoids

## .low back pain etiology

- Serious etiology
  - spinal cord or cauda equina compression
  - metastatic cancer
  - spinal epidural abscess
  - vertebral osteomyelitis
- less serious causes
  - degenerative disc disease: caused by normal wear and tear . Development of small cracks/tears, loss of fluid from discs. These changes occur with normal aging. While the changes in the discs can cause back pain, there are many older people with degenerative disc disease who have no symptoms.
  - Bulging, herniated discs
    - wear and tear on spinal discs can lead to the bulging of a disc,
    - wear and tear can less commonly lead to herniation of a disc, in which the outer covering becomes weakened or torn and the soft inner tissue is pushed out. Herniated discs usually heal over time because the body breaks down the excess disc material, relieving pressure or irritation on the nerve.
  - OA: facet joint arthropathy, can lead to bone spurs around the joint and may cause low back pain
  - spondylolisthesis: vertebrae of the lower spine "slips" forward in relation to another. Spondylolisthesis is usually caused by stress on the joints of the lower back and may be associated with facet joint arthropathy. Although this condition can cause low back pain and sciatica, it may cause no symptoms at all.
  - spinal stenosis
  - ankylosing pspondylitis
  - compression fracture

## • .Elbow pain.Tennis elbow.Golfers elbow.Elbow tendinopathy

- tennis elbow: tenderness at wrist extensor tendons at lateral epicondyle
  - pain with passive wrist flexion, resisted wrist extension
- golfers elbow: tenderness at wrist flexor tendons at medial epicondyle
  - pain with passive wrist extension, resisted wrist flexion
- worse with repetitive movement
- management
  - if diminished elbow mobility, bony abnormalities, or other signs consistent with injury or intra-articular pathology
    - X-ray, U/S
  - initial interventions
    - activity modification; avoidance of provocative work/sport
    - counterforce brace (applied pressure just distal to common extensor tendon origin) or compression sleeve
    - oral analgesics
    - eccentric strengthening exercises
  - if no improvement: X-ray and U/S
  - if elbow tendinopathy confirmed:
    - reassess exercise program and compliance
    - topical nitroglycerin
    - continue: counterforce bracing, activity modification
    - may use iontophoresis
    - may give local glucocorticoid injection once for short term relief. avoid repeat injections

- if still no improvement, may try the following unproven therapies. should be referred to a specialist such as sports med at this point
  - percutaneous needle tenotomy
  - PRP
  - prolotherapy
  - referral to surgery (possible debridement or tenotomy)

## .MSK pain

- P:
  - physio
  - Flexeril 10mg bid x 10days.
  - Naproxen 500mg bid. 7 days. mit: 14 tabs
  -

## .Neck pain

- S:
  - weakness, numbness
  - OPQRST
- O:
  - vertebral tenderness
- P:
  - physio,
  - Naproxen 500mg bid. 7 days. mit: 14 tabs

## .Back pain

- red flags:
  - weakness, numbness, foot drop
  - bowel incontinence, bladder incontinence, saddle anesthesia, loss of rectal tone
  - IVDU, cancer
  - fever, night sweats, weight loss
- if fever or elevated WBC count
  - consider blood cultures, urine cultures, MRI
- terms
  - Spondylosis: Arthritis of the spine

## .acute back pain.back pain - acute – lower back

- We typically suggest nonpharmacologic therapy with superficial heat. Massage, acupuncture, and spinal manipulation are other reasonable options depending upon patient preference and their cost
- We do not refer most patients with acute low back pain for exercise or physical therapy. However, we selectively refer patients with risk factors for developing chronic low back pain
- Pharmacologic therapy
  - NSAIDs for 2-4 weeks
  - Acetaminophen is an acceptable alternative option in patients with a contraindication to NSAIDs, although it has limited efficacy.
  - If refractory to initial NSAIDs/acetaminophen: add muscle relaxant.
    - E.g. cyclobenzaprine, methocarbamol, carisoprodol, baclofen,
  - Limited role for opioids. Consider only if refractory or severe pain.
    - Recommend limiting to less than 3 - 7 days.



- Prognosis
  - The prognosis for acute low back pain is excellent; only one-third of patients seek medical care at all. Of those who present for care, 70 to 90 percent improve within seven weeks
  - Recurrences are common, affecting up to 50 percent of patients within six months and 70 percent within 12 months
  - Predictors of disabling chronic low back pain at one year include maladaptive pain coping behaviors, functional impairment, poor general health status, presence of psychiatric comorbidities, or nonorganic signs.
- Prevention
  - Exercise interventions may have some value in preventing recurrences of low back pain.

## .back pain – subacute, chronic - lower

- Exercise
  - recommended for all patients.
  - Exercise therapy is safe, readily available, helps alleviate pain symptoms, and improves function in all patients with low back pain.
- If at risk for developing chronic low back pain
  - refer for CBT to address psychosocial contributors to pain
- passive therapies
  - consider referring for short-term interventions such as spinal manipulation, acupuncture, or massage.
  - May provide short-term symptomatic improvement, allowing them to participate in active therapies
- pharmacotherapy – subacute low back pain
  - The goal of medications is to provide symptomatic relief of pain symptoms while allowing the patient to participate in active therapies, including exercise, psychological, and/or mind-body interventions.
  - Suggest NSAIDs. Acetaminophen if NSAIDs not tolerated
  - if inadequate response to NSAIDs, we add skeletal muscle relaxants.
- Pharmacotherapy – chronic low back pain
  - Suggest NSAIDs. Acetaminophen if NSAIDs not tolerated
  - if inadequate response to NSAIDs, try duloxetine or a tricyclic antidepressant
  - may also try muscle relaxants
  - last option if severe, persistent, disabling: opioids
    - Opioids should not be used routinely for the management of chronic low back pain given poor or modest efficacy and the potential for harm.
    - For patients who are already taking long-term opioid therapy for chronic low back pain, we attempt to lower the morphine milligram equivalent (MME) dose by maximizing nonpharmacologic therapies and utilizing first-line pharmacotherapy.
- Other treatments. Not recommended by uptodate
  - gabapentinoids: widely used, but poor evidence
  - cannabinoids

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## .hand fracture.hand injuries

- reasons to refer to plastics
  - open fracture
  - fracture displaced
  - intra-articular fracture
  - nerve and tendon injuries
- physical exam findings
  - neurological status
  - vascular status
- DDx for decrease range of motion in fingers
  - mallet finger: extensor tendon injury at distal phalanx from sudden flexion of extended DIP

- central slip: extensor tendon injury at middle phalanx from forced flexion of extended PIP
- jersey finger: sudden hyperextension of flexed DIP

- 

### .fingertip amputation.

- management options
  - reattachment of amputated fingertip
  - healing by secondary intention
  - revision amputation

- 

### .Phalanx fracture

- P

- non displaced
  - if non-displaced, buddy taping for the first 4-6 weeks
    - if ring finger fractured, tape to little finger
  - can add short term immobilization with dorsal/volar finger splint
  - recheck with radiographs within 1 week, if no malalignment, continue buddy taping for 4-6 weeks
  - encourage ROM of DIP, PIP, and MCP joints
- displaced
  - closed reduction with local anesthesia
  - ulnar or radial gutter splint with buddy taping to an adjacent finger. splint at: wrist in 20-30 degrees extension, MCP 70-90 degrees of flexion, PIP and DIP 5-10 degrees flexed.
  - 4 weeks of splinting

- 

### .metacarpal fracture

- Non-displaced
  - gutter splint with MCP at 70 degrees of flexion
    - or soft wrap and buddy tape for 5<sup>th</sup> metacarpal neck fractures
  - repeat X-rays in 1 week
  - recheck X-ray if increased pain
  - heal within 4-6 weeks
- displaced
  - refer to fracture clinic

- 

### .Plantar fasciitis

- DDx:
  - calcaneal fracture
  - stress fracture
  - spondyloarthropathies
  - calcaneal apophysitis in children: inflammation of the growth plate in the calcaneus
- S:
  - better with sitting, typically no night pain
  - pain in medial insertion of plantar fascia into calcaneus
  - heel pain worse with their first steps in the morning or after a period of inactivity. The pain typically lessens with gradually increased activity but worsens toward the end of the day with prolonged weight bearing.
  - Tenderness is best elicited by the examiner dorsiflexing the patient's toes with one hand in order to pull the plantar fascia taut, and then palpating with the thumb or index finger of the other hand along the fascia from the heel to the forefoot
- O:
  - palpate foot. dorsiflex pt toes.
- Initial management
  - rest, icing

- short course of NSAIDs. 2-3 weeks
- exercises
  - stretching of plantar fascia and calf muscles
  - toe curls
- avoid flat shoes. Avoid barefoot walking
- Using prefabricated, over-the-counter, silicone heel shoe inserts (arch supports and/or heel cups)
  -
- activity modification: Decreasing physical activities that may be causative or aggravating (eg, excessive running, dancing, or jumping)
- next management
  - may try glucocorticoid injection if symptoms greater than 3-4 weeks
    - should be used judiciously since repeated injection may cause heel pad atrophy. May also predispose to plantar fascia rupture
  - consider custom orthotics. Efficacy controversial
- management for resistant disease
  - surgery: consider if poor response to 6-12 months of nonoperative therapy
- Treatments with Poor evidence
  - Extracorporeal shock wave therapy
  - PRP injections
  - botox
  - topical corticosteroid
  -

## ● .Plantar fasciitis - other info

- risk factors
  - BMI > 27
  - excessive running
  - foot and calf muscle tightness
  - leg length discrepancy
  - occupation with prolonged standing/walking
  - pes cavus. i.e. high arch
  - pes planus. excessive foot pronation
  - sedentary lifestyle

## ● .Toe fracture

- S: weight bearing, joint ROM, sensation
- P:
  - if fracture extends to MTP joint or if separation of fracture
    - walking boot
  - else
    - buddy taping
  - refer to orthopedic minor injury clinic (at Whitby urgent care)

## ● .ACL injury

- start with knee U/S. consider MRI if diagnostic uncertainty.

## ● .Knee pain

- Knee X-ray, U/S

- pennsaid 1.5% apply topically bid. 1 bottle. refills: 1

- 

## .meniscus injury.meniscal injury of knee

- Initial management
  - rest, ice, crutches if pain severe
  - may start physical therapy when pain improving
    - straight leg raise for quad strengthening.
- persistent symptoms
  - MRI should be obtained if symptoms persist for 3-4 weeks despite initial management
- Conservative vs surgery
  - Factors suggesting conservative therapy will be successful
    - symptoms develop over 24-48h after injury, as opposed to immediately after
    - swelling is minimal
    - knee has full ROM with pain only at or near full flexion
    - pain with McMurray testing
  - suggest surgery required
    - severe twisting injury occurred
    - knee locked or motion severely restricted
    - pain with mcmurray testing involving minimal knee flexion
    - little improvement in symptoms after 3-6 weeks despite proper conservative treatment

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## .Joint pain

- ddx
  - infectious: septic, lyme, osteomyelitis
  - inflammatory: reactive arthritis, psoriatic, IBD, rheumatoid
    - juvenile idiopathic arthritis in kids
  - gout, pseudo gout
- investigations
  - joint aspiration
    - cell count
    - crystals
    - culture
  - WBC            r/o infection
  - uric acid        r/o gout
  - CRP            inflammatory marker
  - GFR            ensure good kidney function for NSAIDs

- 

## .Knee osteoarthritis.Knee OA.OA of knees

- commonly see patients with medial compartment osteoarthritis develop a secondary hamstring tendinopathy or pes anserine bursitis because of chronic hamstring spasm
  - topical NSAID for distal hamstring pain
  - shockwave therapy
- imaging
  - X-rays: standing AP, lateral, skyline, notch
- management
  - physiotherapy
    - strengthening to stabilize the joint.
  - cortisone injection

- can do 2-3 per year. maybe 4.
- do not become less effective over time. but do become less effective as the arthritis progresses.

○PRP

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## [.Knee osteoarthritis.Knee OA.OA of knees - other info](#)

- tool to measure burden of disease
  - Lequesne index: pain, maximum distance walked, ADLs

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## [.OA.osteoarthritis](#)

- risk factors
  - elevated BMI
  - occupation
  - joint injury
  - age
  - female gender
- OA and physical activity
  - some evidence that very vigorous physical activity increases risk of OA.
  - recreational running not associated with OA.
  - moderate daily recreational or sport activities likely not associated with OA. but evidence uncertain
- management
  - physical activity
  - CBT
  - other treatments
    - intra-articular corticosteroids
    - SNRIs
    - oral NSAIDs
    - topical NSAIDs
- bad treatments
  - unclear benefit
    - glucosamine, chondroitin, viscosupplementation
  - evidence of no benefit
    - acetaminophen
  - harms exceed benefit
    - opioids
    - cannabinoids

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## [.Calcific tendinosis](#)

- NSAIDs, physio, glucocorticoid injections

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## [.Trochanteric injection](#)

- 2cc Lidocaine without epinephrine and Kenalog 40mg
- injection
  - injection slightly posteriorly. 8 o clock position.
  - hit bone,then pull back

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## .Hip pain

- lateral hip pain: likely trochanteric pain syndrome
  - MRI not helpful for trochanteric hip pain
- anterior hip and groin pain
  - ddx: labrum tear, femoral acetabular impingement
  - need imaging. start with X-rays. consider MRI.

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## .Knee Joint injection.Knee injection.injection of knee

- steroid options: all equivalent
  - Triamcinolone 40mg
  - Methylprednisolone 40mg
  - betamethasone 3mg
- injection
  - lateral approach.
  - 1mL lidocaine with 1mL of 40mg/mL depo medrol (methylprednisolone)
    - withdraw lidocaine first. Inject into depo medrol container, then withdraw
  - use 25 gauge, 1.5 inch needle to inject
  - get bandaid ready
  - use needle cap or pen cap to landmark, then clean
- Counselling
  - Take it easy for 24 hours post-injection.
  - Should feel improvement in 2-3 days
  - Can inject 3-4 times per year. preferably 2-3.
  - Can't get knee replacement within 6 months of injection
- Procedure note
  - explained risk of infection, bleeding
  - landmarked medial joint space, cleaned with chlorohexidine x 3, infiltrated 40mg of depomedrol and 2cc of 1% lido, no blood withdrawn, tolerated well

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## .Shoulder injection

- glenohumeral injection
  - indication: osteoarthritis, adhesive capsulitis, rheumatoid arthritis
  - technique: posterior approach
    - 2cm inferior and medial to posterolateral corner of acromion. aim in direction of coracoid
- subacromial injection
  - indication: subdeltoid bursitis, rotator cuff impingement, rotator cuff tendinosis, adhesive capsulitis
  - technique: lateral approach
    - inject just inferior to posterolateral edge of acromion. needle directed towards opposite nipple

•

## .Joint injection.injection of joint

- injection note
  - glenohumeral injection completed today using standard technique
  - 1 mL kenalog (40 mg/mL) + 2 mL lidocaine 1% without epinephrine
  - tolerated well without any untowards effects
  - follow up as needed, esp. if pain fails to improve
- longer injection note
- The risks of corticosteroid injection were reviewed. These include, but are not limited to, bleeding (1:20,000), infection (1:20,000), skin depigmentation, fat atrophy, and transient rises in blood glucose. With repeated injections, there is a small risk of articular cartilage degeneration and tendon rupture.

•

- The patient provided verbal consent to proceed with injection. The area was landmarked, draped appropriately, and cleansed with isopropyl alcohol. Using a no-touch technique, a 25-gauge needle was used to inject 1 mL of triamcinolone (40mg/mL) and 2 mL of 1% lidocaine into the right greater trochanteric region, especially along the posterior cortex. The procedure was tolerated well with no immediate complications.
- 
- Aftercare was reviewed: the patient was advised to avoid excessive loading, keep the area clean, and avoid soaking in standing water for 48 to 72 hours. Signs and symptoms of infection were reviewed, and the patient was instructed to seek emergency medical care if any arise.
- 

## .achilles tendon tear.achilles tendinopathy

- Clinical presentation
  - tendinopathy: Pain or stiffness 2-6cm above posterior calcaneus. Usually from athletes who have recently increased their training intensity
  - rupture: sudden forces on achilles that involve sudden pivoting on foot or rapid acceleration. May hear pop
- physical exam
  - palpation of tendon
  - calf squeeze: with patient's feet hanging over edge of table. Squeeze calf muscle. If complete achilles tendon rupture: no plantar flexion with squeezing.
- Imaging
  - imaging not necessary for achilles tendinopathy. But U/S may be used to rule out other conditions. e.g. stress fracture or tendon rupture.
- Indication for surgical Referral
  - complete tendon rupture: refer to surgery. Should be evaluated by surgeon within 1-2 days of injury
  - partial tendon tear that fail to improve with 3-6 months of conservative treatment: refer to ortho or sports med.
- Management
  - tendinopathy:
    - acute: rest, ice, NSAIDs for 7-10 days, tendon support (heel lift)
    - physiotherapy: eccentric exercise training
  - tendon rupture
    - see: Indication for surgical referral.

## .Rotator cuff tear

- Physio
  - strengthening exercises are key
  - external rotation exercises, rows
- Surgery
  - often several months for recovery
    - often 6 week in sling, 6 weeks difficulty with abduction.
  - who to refer to surgery.
    - young, active, acute tear
      - refer to surgery. send U/S, X-ray
      - may consider MRI for surgical planning if certain they need surgery
    - old, chronic tear
- surgical indication
  - acute full thickness traumatic tear
  - acute on chronic tear: suddenly loses ability to abduct/flex shoulder. Indicates full thickness tear
- management
  - if acute

- if full thickness tear: refer for surgery
- if partial thickness: try physio for 6 weeks minimum. Re-evaluate at 2-3 months. If no improvement, consider refer to surgery
- if chronic
  - try physio for 6 weeks minimum. Re-evaluate at 2-3 months. If no improvement, consider refer to surgery
- acute on chronic
  - if significant loss of function or intractable pain. And no major comorbidities: refer to surgery
  - else: physio, glucocorticoid injections
- full thickness tear
  - note: full thickness tear doesn't automatically mean surgery.
  - full thickness tear doesn't mean entire tendon is disconnected. it means some individual fibers have been entirely torn, not that all the fibers are completely torn.

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### .Ankle pain

- ddx: impingement of avulsion fragment, osteochondral defect, sinus tarsi dysfunction, ankle sprain
- avulsion fractures of distal fibula in ankle
  - no casting necessary
- ankle inversion injury
  - probably ok.
- other ankle injuries (not inversion)
  - likely more serious.
  - get X-ray, U/S
- external rotation ankle injury
  - high ankle sprain. need walking boot for a few weeks

### .Ankle sprain

- Around 90% of ankle sprains involve an inversion injury to the anterior talofibular (ATFL) and calcaneofibular (CFL) ligaments — the lateral ligaments on the outside of the ankle.
- Physical exam
- DDx
  - tendon rupture, tendinopathy, fracture, stress fracture, tendon subluxation
  - peroneal tendinopathy/peroneal tendon subluxation
  - high ankle sprain
- physical exam
  - special tests
    - squeeze test: squeeze fibula and tibia at mid calf. Pain indicates syndesmotic sprain
    - External rotation stress test: externally rotate ankle. Pain in ATFL indicates syndesmotic sprain
    - talar tilt: With the ankle in the neutral position, a gentle inversion force is applied to the affected ankle, and the degree of inversion is observed and compared to the uninjured side. tests integrity of calcaneofibular ligament.
    - anterior drawer: Excessive anterior displacement suggests ligamentous injury.
- Indications for referral
  - Unstable fracture
  - Dislocation or subluxation
  - Syndesmosis injury
  - Tendon rupture
  - Wound penetrating into the joint
  - Uncertain diagnosis
  - Chronic ankle instability unresponsive to appropriate physical therapy (including proprioceptive and strength training)
- even complete ligament tears (grade 3) will heal without surgical repair if immobilized and rehabilitated appropriately



- phase 1:
  - early weight bearing as tolerated
  - grade 2: walking boot for support
  - grade 3: short leg cast or cast brace for 10-14 days
- phase 2
  - function rehabilitation: ROM exercises, isometric strengthening, proprioception exercises
- phase 3
  - advancement of strengthening and proprioception exercises and the gradual return to pre-injury activities.

## .MCL sprain

- Ddx: meniscus injury
- try 6-8 weeks of physio before considering MRI/ortho.

- 
- 

## .MSK assessment.MSK examination

- Knee
  - ACL, PCL, MCL, LCL
  - Meniscus:
    - Apley
      - prone position. knee at 90 degrees.
        - apply compression: then rotate tibia
          - if pain, more likely tear of meniscus
        - apply traction: then rotate tibia
          - if pain, more likely MCL/LCL
    - McMurray: extend knee with:
      - internal rotation of tibia and varus
      - external rotation of tibia and valgus
      -
    - joint line tenderness
- 
- Ankle
  - palpate joint line and ligaments
  - ROM and strength testing
    - plantar and dorsiflexion
    - internal and external rotation
    - inversion and eversion
  - anterior drawer
  - assess for high ankle injury
    - press middle of shin. this splays out the distal fibula/tibia.
    - externally rotate the foot
- 
- Shoulder
  - test strength of all rotator cuff muscles
  - empty can for supraspinatus
  - quantify ROM for abduction, ext rotation, int rotation
  - biceps testing: speeds, yergasons, flexion
  - impingement testing
  - long head biceps tenderness
- 
- hip

- test ROM: flexion, extension, abduction, adduction, internal/external rotation.
- palpate trochanter, anterior hip
- hip flexor tendinopathy
  - testing:
    - test hip flexor with hips and knees at 90 degrees
    - test hip flexor with hips and knees extended
- intra-articular
  - FADIR
    - hip 90 degrees flexed
    - adduct hip with internal rotation
    - positive if pain in groin
  - FABER
    - leg in figure 4 position. push down on knee

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### [.Spondylolysis.Spine stress fracture](#)

- think an active child/adolescent person with back pain
- pain with extension of back. pain with extension plus rotation
- imaging
  - X-ray: AP and lateral of lumbar spine. Oblique view no longer recommended.
  - if not responding to conservative care: MRI
- management
  - if no red flags: rest for 2-4 weeks
  - if not resolved: get radiographs of lumbosacral spine
  - if X-ray shows spondylolisthesis beyond Grade I, refer to spine surgeon
  - If the LS radiographs show spondylolysis or Grade I spondylolisthesis, we recommend a 90-day period of relative rest with monthly follow-up.
    - no intense activity. allowed to do training that doesn't cause pain
  - if patient refuses 90 day rest or doesn't improve with rest: get MRI
  - if signs of neurologic injury at any time, refer to spine surgeon immediately.
- symptom control
  - acetaminophen
  - topical capsaicin
  - stretches/exercises from physio
- follow-up
  - every 20-30 days during period of relative rest

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### [.C-spine precautions.C spine precautions](#)

- use CT C spine rule to determine if needs CT in the first place
- if CT C-spine ok, can remove the collar
- clinically rule out C-spine precautions if all of following met:
  - The victim has calmed down and is fully cooperative
  - The victim is not intoxicated
  - There are no signs of symptoms of neurologic dysfunction (motor, sensory, DTR, autonomic)
  - There is no bony midline tenderness
  - There is no marked muscle spasm
  - There is no severe midline pain with movement.
  - There are no distracting injuries

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## .pulled elbow.nursemaid's elbow

- most often in children age 1-4
- partial separation of the radiocapitellar joint
- investigations
  - not needed
- management
  - flexion and supination

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## .rhabdomyolysis

- symptoms
  - muscle pain, myalgia
  - weakness
  - dark urine
  - fever, tachycardia, nausea/vomiting, abdo pain
- complications
  - compartment syndrome
  - AKI
  - electrolyte abnormalities: hyperkalemia, hyperphosphatemia, hypocalcemia
  - end organ failure
  - myoglobinuria
  - death
- investigation
  - CK
  - urinalysis
  - CBC
  - BUN, Cr
  - Ca, Phos, albumin
  - ECG
- diagnosis
  - CK >5x ULN. usually CK > 5000
- management
  - fluids
  - rest
  - exercise restriction
  - may give Lasix to avoid volume overload with aggressive volume administration
  - monitor electrolytes such as potassium and Ca

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## .rib fracture

- presentation
  - point tenderness
  - deep breath elicits pain at fracture site
- if no rib fracture seen on X-ray, but lots of pain in ribs, likely still possible to be a rib fracture
- treatment
  - NSAIDs ± opioids
  - hug pillow to brace self when coughing
  - take deep breaths (or incentive spirometry) to prevent atelectasis and pneumonia
    - rib belts/binders not recommended as they compromise respiratory function
- follow-up
  - most rib fractures take 6-8 weeks to heal
  - routine follow-up CXR not recommended
- complications

- liver/spleen lacerations, mediastinal injury
- pneumothorax, hemothorax, flail chest, pulmonary contusion
- pneumonia as a result of atelectasis

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## .Other

### .hiccups

- Evaluation: if >48h
  - history
    - ADLs, medications, recent surgery,
  - physical: HEENT, abdo palpation for mass
  - labs: electrolytes, blood urea nitrogen (BUN), creatinine, calcium, liver function tests and, if abdominal symptoms are present, amylase and lipase.
- Ddx
  - GERD
  - post-operative phrenic nerve irritation
  - medication: (eg, dexamethasone, diazepam, midazolam, barbiturates, tramadol, alpha methyl dopa, and certain anticancer drugs such as levofolinate, fluorouracil, oxaliplatin, carboplatin, irinotecan).
  - central nervous system disease, intrathoracic or neck mass, foreign body in the external ear canal, acute heart disease, intra-abdominal processes, emotional stress/excitement, metabolic derangements including kidney failure and electrolyte abnormalities
- Management
  - <48h
    - breath holding for 5-10s
    - Valsalva maneuver
    - Sipping on or gargling with very cold water.
  - >48h
    - assess for causes of persistent hiccups: see above
    - if no cause, try PPI for 3-4 weeks
    - if not better, then switch to one of following for 10-15 days:
      - Baclofen 5-10mg po tid. Max 45mg/day
      - Gabapentin 100-400mg po tid
    - if not better, then switch to Metoclopramide for 10-15 days:
      - Metoclopramide 10mg 3-4 times daily
    - if not better, then switch to Chlorpromazine for 10-15 days:
      - Chlorpromazine 25mg po tid. Start at 10mg po tid in older adults
    - if not better, refer for interventional measures
      - vagal nerve stimulation, phrenic nerve stimulation, phrenic nerve block, and positive pressure ventilation.
- [https://www.uptodate.com/contents/hiccups?search=hiccough&source=search\\_result&selectedTitle=1~150&usage\\_type=default&display\\_rank=1#H1213673819](https://www.uptodate.com/contents/hiccups?search=hiccough&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1#H1213673819)

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### .narcolepsy

- clinical syndrome of chronic daytime sleepiness, cataplexy, hypnagogic hallucinations, and sleep paralysis.
  - disorder of sleep-wake control in which elements of sleep intrude into wakefulness and elements of wakefulness intrude into sleep.
  - The result is the classic tetrad of the following. Only one third of patients have all the below.
    - chronic daytime sleepiness with varying amounts of
      - cataplexy: emotionally-triggered transient muscle weakness. cataplexy almost always begins in the face, manifesting as ptosis and a slack, hypotonic face with an open mouth

- hypnagogic hallucinations: vivid, often frightening visual, tactile, or auditory hallucinations that occur as the patient is falling asleep.
- sleep paralysis: complete inability to move for one or two minutes when awakening or when falling asleep.
- typically begins in the teens and early twenties, but may occur as early as five years of age or after 40 years of age.
- History
  - Are you sleepy most of the day? Sleepiness present, but could be caused by a variety of conditions
  - Do you feel rested upon waking in the morning? Are your naps refreshing? Sleepiness probably not caused by poor quality sleep (eg, sleep apnea, etc)
  - Do you have vivid dreams during daytime naps? Possible REM sleep during naps
  - Do you ever have muscle weakness when you tell a joke or laugh? Cataplexy
  - Do you ever see, hear, or feel things that you know aren't there as you are falling asleep? Hypnagogic hallucinations
  - Are you ever unable to move when you first awake or just before falling asleep? Sleep paralysis
  - Over the last two weeks, how often have you fallen asleep when you did not intend to? Functional impact of daytime sleepiness; complements the Epworth Sleepiness Score
- investigations
  - Polysomnogram
  - multiple sleep latency test
- referral in BC
  - Leon Judah Blackmore Centre for Sleep Disorders - UBC Hospital
  - consider referring to internal medicine first, if not sure?

## .excessive daytime sleepiness.sleep disorder

- Causes
  - insufficient sleep
  - sleep disorders: OSA, circadian rhythm sleep-wake disorder, narcolepsy
  - chronic pain
  - medications: benzos, non-benzo sedatives, antihistamines, opioid analgesics, anticonvulsants, antipsychotics
- investigation
  - polysomnogram
    - alternative: home sleep apnea test if suspect OSA.
- referral in BC
  - Leon Judah Blackmore Centre for Sleep Disorders - UBC Hospital
  - Pathways → Sleep → Consultants → Sleep disorders - adult

## .TMJ.temporomandibular disorder

- Cause
  - trauma: cspine injury, teeth grinding, injury to jaw
  - cervicogenic: poor head and cervical posture
  - pain threshold and processing: abnormal central pain processing
- Clinical manifestation
  - dull, unilateral facial ache. Waxes and wanes in intensity. Worse with jaw motion
  - earache, headache,
  - TMJ dysfunction: decreased mandibular range of motion, clicking with jaw movement
- evaluation, diagnosis
  - advise against routine X-rays of TMJ
  - diagnosis based on history
- initial management

- TMJ physical therapy
- occlusal splints. Can be over the counter or custom made by dentist
  - may be useful if evidence of bruxism
- CBT if comorbid psychological conditions
- pharmacotherapy
  - NSAIDs. 10-14 course of NSAID
    - Naproxen 500mg po bid for 10-14 days
  - if tenderness to muscles of mastication. Add muscle relaxant in addition to NSAID for 10-14 days
    - Cyclobenzaprin 5-10mg qhs for 10-14 days
  - if still persistent pain. Add TCA
    - Nortriptyline 10mg. Max 25-50mg.
- refractory symptoms
  - refer to oral surgeon experienced in TMD. Trigger point muscle injections, botox, intraarticular injections

### .cramps - nocturnal.nocturnal leg cramps

- Nocturnal leg cramps are common. Can disturb sleep
- cause: most commonly idiopathic
  - may be associated with leg positioning, fluid/electrolyte disturbances, certain medications
- DDx
  - RLS, neurologic disorder, vascular insufficiency, myalgia from other causes
- evaluation
  - labs
    - Calcium to exclude hypocalcemia.
    - Potassium, sodium. Especially if taking diuretics-
    - iron, ferritin for suspected RLS
    - Magnesium
- diagnosis
  - based on history
  - involuntary muscle hardness or tightness.
  - Occur during time in bed
  - relieved by forceful stretching of affected muscles
- Management
  - acute leg cramps
    - stretch affected muscle. Walking or leg jiggling
  - prevention of recurring leg cramps
    - daily stretching
    - medication to try: trial 1 month
      - vitamin B complex with 30mg of vit B6 tid
      - vitamin E 800 IU before bed
      - diphenhydramine 12.5 to 50mg qhs
      - CCB: diltiazem 30mg qhs or verapamil 120-180mg qhs
      - gabapentin 600-900mg. Dose divided between dinnertime and before bed
  - resistant to initial drug therapy
    - Quinine
      - may try 180mL of tonic water
      - best studied drug for nocturnal leg cramps. Not routinely recommended due to adverse effects (cardiac arrhythmias, thrombocytopenia, HUS)
- Refer
  - refer sleep specialist when pharmacotherapy ineffective or experience distress with nocturnal leg cramps

## .electrocution.electrical injury

- Disposition, investigations
  - severely injured patients: admit to ICU
  - significant electrical burns: transferred to burn center when stable
  - suspect exposure to high voltage: 12-25h of cardiac monitoring despite apparent absence of injury
  - low voltage:
    - if history of cardiac disease, active chest pain, loss of consciousness: also consider cardiac monitoring
    - asymptomatic with normal physical examination: do not require ancillary diagnostic tests. can be reassured and discharged
    - mild persistent symptoms or minor cutaneous burns and a normal ECG and urinalysis (no hemoglobinuria) can be observed for a few hours and discharged with appropriate follow-up based upon the severity of their wounds and any comorbidities.
    - Pregnant patients: obstetric consultation is reasonable.
- Severe injuries
  - if cardiac arrest: CPR
  - trauma evaluation/resuscitation: airway, cardiopulmonary status, secondary assessment
  - cardiac monitoring for high voltage injury
    - if high voltage (>1000V). should have cardiac and hemodynamic monitoring due to high incidence of arrhythmia and autonomic dysfunction. especially if there have been arrhythmias in the field or emergency department, loss of consciousness, or if the initial ECG is abnormal. In most cases, telemetry is adequate. Patients with signs of instability (eg, recurrent arrhythmia or hypotension) require more intensive monitoring
  - monitor for acute compartment syndrome, rhabdomyolysis, and acute kidney injury
    - such patients often require aggressive IV fluid replacement
  - Management of skin wounds
    - The treatment of skin wounds from electrical injuries is similar to that for thermal burns.
- Electrical weapon injuries and patient disposition
  - Electrical weapons (e.g. stun gun, Taser) rarely cause cardiac arrhythmias or other dangerous injuries when used appropriately by law enforcement officers and exposure lasts 15 seconds or less.
    - Prolonged observation and diagnostic testing are not necessary in such patients who are otherwise asymptomatic and alert following the exposure.
- 

## .heat stroke

- Severe nonexertional hyperthermia
- ddx:
  - infection: sepsis, meningitis, malaria, brain abscess
  - drug related: malignant hyperthermia, neuroleptic malignant syndrome, cocaine, serotonin syndrome
  - neurologic: hypothalamic stroke, cerebral hemorrhage
  - environmental: high temperature and humidity
  - endocrine: thyroid storm, pheochromocytoma
- mortality risk
  - heat stroke has high mortality rate. Correlates with degree of temperature elevation, time to initiate cooling measures
- diagnosis
  - elevated core body temperature
  - altered mental status
  - exposure to severe environmental heat
  - no other explanation for hyperthermia
- management
  - maintain ABCs

- rapid cooling: evaporative or convective techniques. Do not suggest cold water immersion

## .sports physical

- Targeted medical and family history. Particular emphasis on MSK and CV system
  - review of symptoms:
    - MSK: pain, previous injuries
    - cardiac: syncope, dizziness, chest pain, SOB, palpitations, respiratory complaints
  - family history
    - hypertrophic cardiomyopathy, sudden or unexplained death before age 50
  - physical exam
    - BP, HR
    - cardiac auscultation
- if abnormalities detected during screening history, physical. Routine screening ECGs not recommended in North America
  - cardiac
    - echo: heart murmur and/or suspected structural heart disease
    - exercise treadmill testing: exertional chest pain, exertion-induced syncope
    - ECG/Holter: palpitations or syncope
    -

## .ABG.Acidosis.Alkalosis.Metabolic acidosis

- Pure anion gap metabolic acidosis:
  - AG increase from normal = bicarb decrease from normal values. this is what we expect from pure anion gap metabolic acidosis
  - normal AG = 10-12
  - normal bicarb = 24
- respiratory compensation
  - bicarb decrease from normal = pCO<sub>2</sub> decrease from normal values. this is what we expect from normal compensation.
  - normal CO<sub>2</sub> = 40
- Anion gap = Na - Bicarb - Cl
- DDx respiratory acidosis: "can't breathe or won't breathe"
  - lung disease, chest wall disease, trauma
  - opioid overdose, CNS disease
- DDx for anion gap metabolic acidosis
  - MUDPILES
    - methanol, uremia, DKA, paraldehyde, isoniazid, iron, lactic acidosis, ethylene glycol, salicylates.
  - KARMEL
    - ketoacidosis, aspirin, renal failure, methanol, ethylene glycol, lactic acidosis.
- DDx of respiratory alkalosis: hyperventilation
  - anxiety
  - early asthma exacerbation
  - anemia
  - pregnancy
  - infection/fever
- DDx metabolic alkalosis
  - vomiting, diarrhea, diuresis



- excess mineralocorticoid activity: Cushing's, hyperaldosteronism, renin-secreting tumors
- DDx non anion gap metabolic acidosis
  - normal saline infusion
  - resolving DKA
  - gastrointestinal bicarbonate loss
    - diarrhea
  - renal insufficiency (usually when GFR between 20-50 mL/min)
  - exogenous acid (e.g. TPN, CaCl)
  - renal tubular acidosis

## ● .FATIGUE

- S: Duration; sleep hygiene, snoring, waking up choking/ gasping, witnessed apnea; overexertion; stress, depression, or other emotional problems; lifestyle changes, shift changes at work; diet, weight changes; constitutional symptoms; changes in appetite; symptoms of thyroid disease; history of bleeding or anemia; medications; alcohol, caffeine, and drug use.
- O: Vital signs; ENT exam (conjunctival pallor, oropharynx/palate, lymphadenopathy, thyroid exam); heart, lung, abdominal, neurologic, and extremity (pallor, coolness at distal extremities) exams; consider rectal exam and occult blood testing.
- DDX:
  - psychiatric: depression, anxiety, somatization
  - pharmacologic: antihypertensives, hypnotics
  - endocrine: T2DM, hypothyroidism, adrenal insufficiency, chronic renal failure, hepatic failure, hypercalcemia
  - neoplastic
  - infectious: endocarditis, tuberculosis, mononucleosis, HIV, CMV
  - cardiopulmonary: anemia, CHF, COPD
  - rheumatological: polymyalgia rheumatica, vasculitis
  - sleep disorder: OSA, shift work sleep disorder
- Red Flags
  - Recent onset in a well elderly person
  - Focal neuro deficits (CNS malignancy, MS)
  - Inflammatory signs or joint pain (autoimmune)
  - Lymphadenopathy, weight loss (Malignancy)
  - Chest pain/Dyspnea
  - Fever
- investigations. consider delaying until symptoms >4 weeks
  - CBC
  - Electrolytes (glucose, creatinine). Extended electrolytes. e.g. Ca, Mg, Phos
  - LFT
  - TSH
  - Pregnancy test
  - ESR/CRP
  - UA
  - Consider
    - Celiac screen (Anti-TTG, IgA)
    - CK if pain or muscle weakness
    - Tuberculosis, HIV, Hepatitis C (born 1945-1965)
    - sleep study

## ● .FEVER:

- S: timing - duration, recorded variation; general malaise, n/v, diarrhea, pain, rash; recent travel, exposure to farm animals, blood transfusion, IVDU, trauma, sick contacts; symptoms of URTI, UTI, gastroenteritis

- DDX: **infection** - external, internal, systemic; **malignancy** - leukemia, lymphoma, myelodysplastic syndromes, metastatic cancer; **autoimmune/inflammatory** - vasculitis, RA, IBD, sarcoidosis, thyroid; **post-surgical** - wound (atelectasis, pneumonia), water (UTI), walking (DVT, PE), wound (surgical wound infection), wonder drug (anesthetic, transfusion reaction); **misc** - allergic reaction, EtOH withdrawal, drug induced, heat stroke.

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### .fever of unknown origin in adults

- definition
  - Fever higher than 38.3°C on several occasions
  - Duration of fever for at least three weeks
  - Uncertain diagnosis after one week of study in the hospital
- DDx
  - systemic rheumatic disease
  - infection
  - malignancy
  - no diagnosis
- investigations
  - CBC
  - blood cultures
  - Electrolytes, LFTs, bilirubin
  - urinalysis, urine culture
  - CXR

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### .fever in returning traveler.fever travel

- DDx
  - Malaria
  - dengue fever
  - rickettsial disease
  - typhus
  - travellers diarrhea

•

### .fever of unknown origin in children

- A consensus definition of fever of unknown origin (FUO) in children is lacking. Uptodate defines FUO in children as fever >38.3°C (101°F) at least once per day for ≥8 days with no apparent diagnosis after initial outpatient or hospital evaluation.
- Cause
  - Infection, rheumatologic diseases and neoplastic disorders
- History
  - fever, associated complaints, and exposures (eg, to ill contacts, animals, insects, travel, drugs)
- Physical
  - vital signs, growth parameters, the skin, scalp, eyes, sinuses, oropharynx, chest, abdominal, and musculoskeletal and genitourinary systems
- Initial investigations
  - Complete blood count and peripheral smear
  - Erythrocyte sedimentation rate and C-reactive protein
  - Blood cultures
  - Urinalysis and urine culture
  - Chest radiograph
  - Tuberculin skin testing
  - Serum electrolytes, blood urea nitrogen, creatinine, and hepatic aminotransferases
  - Combination antigen/antibody HIV immunoassay

- Empiric treatment
  - Empiric treatment with anti-inflammatory medications or antimicrobial agents generally should be avoided in children with FUO.

#### .NIGHT SWEATS:

- S: Onset, duration, severity (eg. sweating requiring changing of clothing or sheets), frequency, timing. patterns (escalating. waxing. waning), precipitants (eg. food, medications); associated diseases and symptoms (fever, recent URIs, associated cough, hemoptysis, pleuritic chest pain); lymphadenopathy, rash, malaise, weight loss, itching. diarrhea, nausea/vomiting. early satiety, anorexia; presence of significant risk factors (eg. traveling to or emigrating from areas with endemic infections, IV drug use, incarceration, working in health care); alcohol history, sexual exposure, sick contacts, exposure to high-risk populations such as prisoners or homeless people; menstrual history, menopausal status, travel history.
- O: Vital signs; HEENT exam, including inspection of the throat and other areas for lymphadenopathy; heart and lung exam; abdominal exam for hepatosplenomegaly; skin exam; musculoskeletal exam for joint pain.
- DDX: TB, lymphoma, leukemia, hyperthyroidism, pheochromocytoma, carcinoid
-

## .Capacity Assessment

- may send patient to an official capacity assessor. however, it costs \$500-\$700
- more difficult to assess capacity in mild dementia, especially if the patient has understanding when you speak to them each time, but doesn't remember past decisions.

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## .Tube feeds

- higher rates of tube feeds means higher risk of reflux and aspiration

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## .Weakness

- DDx:
  - intracranial pathology, cauda equina
- O:
  - full physical exam. neuro exam
- S:
  - consider referral to ER if acute

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## .WEIGHT GAIN:

- S: Amount, duration, timing (relation to medication changes, smoking cessation, depression); diet history; hypothyroid symptoms (fatigue, constipation, skin/hair/nail changes); menstrual irregularity, hirsutism; medical history; sexual history; alcohol and drug use.
- O: Vital signs; complete exam (HEENT, cardiovascular, pulmonary, abdominal, musculoskeletal, and neurologic exams), including signs of Cushing syndrome (hypertension, central obesity, moon face, buffalo hump, supraclavicular fat pads, purple abdominal striae); look for edema resulting from water retention in renal disease.
- DDX: smoking cessation, drug side effect, hypothyroidism, Cushing syndrome, PCOS, Insulinoma,

## .WEIGHT LOSS:

- S: Amount, duration,  $\pm$  intention; diet and exercise history; body image, anxiety or depression; constitutional symptoms (fatigue, malaise, fever, chills); hyperthyroid symptoms (palpitations, tremor, diarrhea); blood in urine or stool; family history of thyroid disease; HIV risk factors; tobacco, alcohol, and drug use; medications; history of cancer;
- O: Vital signs; HEENT, cardiovascular, pulmonary, abdominal, musculoskeletal, and skin exam.
- DDX: hyperthyroidism, cancer, HIV infection, dieting, anorexia nervosa, malabsorption
- definition of weight loss in elderly
  - reduction  $>5\%$  body weight in 1 month OR reduction 10% over 6 months

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## .Rib pain

- P
  - Rib X-ray
  - Bloodwork: CBC, Lipase, GGT, ALP, ALT

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## .Rib pain after trauma

- can't rule out pneumothorax. need urgent chest X-ray.
- if no chest X-ray open, go to ER.

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## .Work note

- absentee note

- date assessed
- when will go back to work
- Patient will be assessed prior to return to work.
- work modification note
  - modification made
  - when will return to regular duties
  - Patient will be assessed prior to return to regular duties.
- Work note for family member
- Re: family member
- To whom it may concern:
- I am writing this letter in support of <family member>, who is the daughter of <patient, DOB>, a patient in hospital at LHO on supportive care unit for end of life care.
- This letter serves as confirmation of <family member>'s father's status in hospital and to support her receiving a compassion leave of absence from her place of employment at <employer>.
- It is my hope that <employer> can support <family member> and her family during this difficult time.
- Yours truly
- 
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#### .MVA trauma.car accident

- S:
  - mechanism: speed, thrown out of car
    - car type, air bag, seat belt, which seat
  - spinal tenderness,
  - headache, LOC,
  - abdominal pain, chest pain, SOB
  - neurologic symptoms. neuro exam
- P:
  - MSK pain
    - Baclofen 30mg po
    - Toradol 30mg
- 
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#### .Splinters.Thorn stuck in skin

- if possible, reactive objects such as wood, thorns spines should be removed before inflammation or infection or infection occurs
  - glass, metal and plastic are relatively inert and don't need to be removed as urgently.
- Deeper splinters, especially those close to important structures such as nerves, tendons, blood vessels, or vital organs, should be referred for removal.
- If not removed completely, splinters may cause complications such as inflammation, infection, toxic reactions, and granuloma formation.
- can place light directly on skin to see presence of deeper splinters
- get tetanus status
- after removal
  - irrigation under high pressure
  - avoid sutures if possible
  - follow-up in 48 hours
  - for subungual splinter removal: use occlusive dressing and topical antibiotic
- X-rays
  - metal and glass are radioopaque

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## .Gallium scan.Bone scan

- Gallium scan: given 1-2 days before.
  - looks for swelling (inflammation), infection, or cancer in the body.
  - <https://radiopaedia.org/articles/gallium-67-scintigraphy-1>
  - Good for FUO, TB, spinal osteomyelitis
- Bone scan: given 1-2 hours before. most commonly Technetium
  - <https://radiopaedia.org/articles/technetium-99m-methyl-diphosphonate?lang=us>
  - Osteomyelitis, fractures, bone malignancy

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## .Hospitalist consult.Internal medicine consult

- template
  - Name, age, gender
  - PMHx, Meds, Allergy, Soc Hx (ADLs, living situation, drugs, Code status)
  - HPI, VS, Phys Ex,
  - Labs, Imaging, Issues
- Workflow for admissions
  - Look through previous notes in PCI: LH transcriptions
  - Fill out PMHx in Viadoc as I read.
  - Copy in Home meds to Viadoc from PCI
  - Start a note: enter in labs, vitals, imaging. Start creating issues list based on abnormal investigations
  - Then see the patient. Get HPI, social hx, allergies, code status, physical exam

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## .Homeless

- interventions
  - access to housing
  - income assistance
  - case management
  - substance use programming
  - referral to mental health resources
- 4 types of homelessness
  - unsheltered
  - emergency sheltered
  - provisionally accommodated
  - precariously housed and at risk of homelessness

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## .Parking permit

- in Ontario
  - pull up parking permit form on PS suites EMR
  - fill out form. give to patient. they can then go to Service Ontario.

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## .Travel medicine

- injuries
  - MVA are leading cause of death in travelers

- Travelers who are visiting friends/family are at higher risk for travel-related infectious diseases, than do other groups of international travelers for several reasons:
  - Lack of awareness of risk
  - Impression that they are “immune”, particularly to malaria
  - Lack of access to medical care
  - Last minute travel plans (e.g. funerals) and longer trips
  - High risk trip characteristics. E.g. staying in homes and living the local lifestyle, which may include lack of safe food and water and not using bed nets.
- bug bite prevention
  - avoid outdoor exposure between dusk and dawn
  - Wear clothes that reduce amount of exposed skin
  - Use insect repellent on exposed skin. E.g. DEET
  - Sleep in well screened or air conditioned rooms
  - Sleep with bed nets treated with insecticide (e.g. permethrin)
- VTE and travel
  - >8 hour flights have three-fold increased risk of DVT
  - Thrombosis Canada recommendations
    - Ambulation every 1-2 hours
    - Calf muscle exercise
    - Aisle seat if possible
    - Some evidence that below-knee compression stockings reduce DVTs in low-medium risk patients
    - Recommends DOAC or LMWH for high risk patients, although there is a lack of evidence for this.
- Scuba diving
  - After scuba diving, wait 12-48 hours before boarding a commercial aircraft to avoid decompression sickness.
  - Treatment of decompression sickness: hyperbaric oxygen therapy in a recompression chamber

## • High altitude illness

- Cerebral/pulmonary syndrome from exposure to elevations above 2500m. Due to hypoxic stress, with symptoms due to extravascular fluid accumulation in brain or lungs.
- Milder forms include acute mountain sickness (AMS): headache plus one of following: GI upset, fatigue or weakness, lightheadedness or insomnia.
- More severe forms include high-altitude pulmonary edema (HAPE) and high altitude cerebral edema (HACE).
  - HAPE: AMS symptoms plus persistent cough and decreased exercise tolerance. Red flag for this is shortness of breath at rest.
  - HACE: ataxia, confusion and altered level of consciousness.
- Risk factors:
  - Rapid ascent and prior history of HAI
  - Home elevation: living at sea level is higher risk, than living at higher elevation
  - Strenuous exercise prior to and during ascent
  - Children are more susceptible
  - Pre-existing cardiac or pulmonary disease
- Prevention
  - Behavioral prevention
    - Ascend as slowly as possible. Sleeping elevation is most important.
    - Take 2 days to arrive at 2500-3000m. Subsequent increases in sleeping elevation should be <500 per day.
    - Avoid over-exertion
    - Take medication prophylaxis if at moderate to high risk of HAI
  - Medication prophylaxis
    - Acetazolamide 125mg bid. Start the day before ascent. May discontinue after staying at same elevation for 2-3 days or if descent initiated.
- Basic Management
  - Early recognition is key.

- If mild AMS: stop ascent and acclimatize at the same altitude. May take up to 4 days until symptoms abate. Begin acetazolamide if not already started. Once symptoms resolve, may resume ascent, but continue acetazolamide.
- If HACE or HAPE symptoms, or symptoms do not improve, descend 500m below where symptoms began.
- If does not respond to simple descent, go to hospital.

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## .Traveler's diarrhea

- Most common infectious illness among travelers. 20-60% will experience this, particularly if visiting low/middle income countries.
- Most commonly caused by bacteria, followed by viruses, then parasites. Enterotoxigenic E. coli (ETEC) is the most common cause of TD.
- Prevention
  - Vaccine: Dukoral, which prevents cholera, is not routinely recommended due to limited benefit. May consider if a brief episode of TD is intolerable (e.g. elite athletes, business/political travelers) or if high risk travelers (chronic illness, history of repeated severe TD).
    - Oral: 2 doses given at intervals of  $\geq 1$  week and completed at least 1 week prior to trip to endemic/epidemic areas; restart primary immunization schedule if interval between doses  $> 6$  weeks.
  - Advise on food and water safety
- Prophylaxis
  - Bismuth subsalicylate (BSS) 2 tablets (524mg) qid. Reduces incidence of TD by 50-64%. Avoid if: ASA allergy, renal insufficiency. If already taking ASA or salicylates, need to ensure taking less than maximum dose of salicylates (4g daily). Should not take for  $> 3$  weeks.
  - Insufficient evidence for probiotic use for prophylaxis.
  - Prophylactic antibiotics not recommended for most travelers, due to adverse effects of antibiotics on gut microbiota and risk of acquiring resistant organisms (e.g. ESBL, C. difficile) . May consider in immunocompromised patients or patients for whom dehydration is particularly dangerous (e.g. CKD).
- Treatment
  - Mild diarrhea:
    - Oral rehydration is cornerstone of treatment. Most patients can use half diluted apple juice. Those at greater risk of dehydration can use commercial ORS (e.g. Pedialyte). If this is unavailable, can DIY: 6 teaspoons of sugar,  $\frac{1}{2}$  teaspoon salt in 1L water.
    - Antibiotics not recommended
    - Use loperamide or BSS for symptomatic treatment. Avoid loperamide if severe abdominal pain or bloody diarrhea (invasive/inflammatory diarrhea).
  - Severe diarrhea
    - Treat with Azithromycin if fever with bloody/mucoid diarrhea.
    - Dosing: single 1g dose or 500mg/day for 3 days
    - May also treat with fluoroquinolones, but they have a higher rate of resistance.
  - Moderate diarrhea
    - May consider treat with azithromycin 1g single dose.
    - May also add loperamide

## .Malaria

- Should suspect in setting of fever and travel to area where malaria endemic.
- Travelers to malarious areas should be counseled that fever during/after travel is a medical emergency. Serious infection can be fatal after just several days of illness.
- Uncomplicated malaria symptoms: fever, rigors, headache, myalgias, anorexia
- Severe malaria: confusion, seizures, renal failure, pulmonary edema, anemia, jaundice
- Investigations
  - thick and thin blood smear. Do 3 smears 12-24 hours apart before ruling out malaria.
    - Thick smear more sensitive. Thin can determine species.



- Rapid antigen test: gives results in 15-20 minutes. Does not provide information about parasite density.
- chemoprophylaxis
  - Note that chemoprophylaxis does not guarantee protection.
  - May administer antimalarial drugs for as long as needed for prevention.
  - Atovaquone-proguanil (malarone)
    - 250mg po daily. Begin 1-2 days prior to exposure. 7 days following
    - Contraindications: severe renal impairment, pregnant/breastfeeding
  - Doxycycline
    - 100mg po daily. Begin 1-2 days prior to exposure. 4 weeks following.
    - Contraindications: pregnant/breastfeeding
  - Chloroquine
    - 300mg po weekly, starting 1-2 weeks prior to exposure. 4 weeks following
    - High degree of chloroquine resistance. Useful in choloquine-sensitive areas .
    - Useful in pregnant or very young patients
- bug bite prevention
  - avoid outdoor exposure between dusk and dawn
  - Wear clothes that reduce amount of exposed skin
  - Use insect repellent on exposed skin. E.g. DEET
  - Sleep in well screened or air conditioned rooms
  - Sleep with bed nets treated with insecticide (e.g. permethrin)

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## [.Zika](#)

- Transmitted by mosquitoes.
- Only 20% of patients will develop symptoms when infected, which include: arthralgias, non-purulent conjunctivitis, low grade fever, headache, pruritic maculopapular rash. Rarely can cause Guillain-Barre.
- Diagnosis: use PCR if < 7 days from symptom onset. If > 7 days, use serology.
- Treatment: supportive.
- Zika infection during pregnancy is associated with microcephaly and developmental anomalies
  - Female travelers
    - If pregnant: use condoms or avoid sex for duration of pregnancy if partner has travelled to area with Zika virus
    - If planning on becoming pregnant: wait 2-3 months after returning home before trying to conceive.
  - Male travelers
    - Use condoms or abstain for at least 6 months after returning from area with Zika virus

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## [.Travel vaccines.Vaccines and travel](#)

- Ensure routine immunizations are up to date
  - Influenza, Tdap, MMR, poliovirus and varicella
- Common diseases (occurs 1-10 per 10,000 travelers per month)
  - Oral cholera vaccine for Travelers Diarrhea: not routinely recommended. May consider for high risk travelers
  - Influenza: if not already received, consider one dose > 2 weeks before departure
  - Hepatitis A: two doses 6-36 months apart. Give one dose as soon as travel is considered.
    - Vaccination protection unknown. At least 20 years.
  - For Combined Hep A/B vaccine (Twinrix): three doses at 0, 1, 6 months.
    - accelerated schedule: 4 doses at 0,7,21,365 days
- Moderately common diseases (occurs 1-10 per 100,000 travelers per month)
  - Hepatitis B: three doses at 0, 1, 6 months
  - Typhoid fever:
    - oral live vaccine: four doses on Day 1,3,5,7. protection induced 7 days later.
    - IM inactivated vaccine: single dose. Protection 14 days later.

- Rabies: three IM doses on day 0, 7, and 21 (or 28).
- Tick-borne encephalitis: vaccine only available in countries where the disease is present. Travelers need to discuss with health care provider at destination.
- BCG vaccine for TB. BCG vaccine is not effective.
- Rare diseases (occurs <1 per 100,000 or <1 per 1,000,000 travelers per month)
  - Meningococcal disease: one dose of conjugate vaccine covering strains A,C,Y,W-135
  - Japanese encephalitis: two doses. 28 days apart.
  - Poliomyelitis: booster for adults who had their primary polio vaccine series in childhood but no booster.
  - Yellow fever: live vaccine. single dose.

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## .Pain

### .Chronic pain.Pain control for OA.back pain

- Pharmacotherapy
  - Step 1: Tylenol arthritis: quick and long release. Acetaminophen 650mg. Take 2 tabs (1300mg) Bid.
  - Step 2: NSAIDs.
    - Be cautious if HTN, CKD.
    - Limited Use code: for patients age >65 and Failed tylenol.
    - Celebrex
    - 30 days with 2 repeat. Can be kept on indefinitely if helpful.
    - Tell patient to stop if develops bleeding or stomach irritation.
  - Step 3: Duloxetine 30mg. f/u in 4-6 weeks. Can increase to 60mg
- Physio 6-8weeks
  - Then consider MRI. then refer to ortho as needed.
- even for acute pain, be wary of prescribing opioids. try to optimize other medications first.
- try to keep opioid dose below 90 morphine equivalents

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## .Coccydynia

- physiotherapy
- pelvic physiotherapy

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## .Anal pain

- ddx: skin trauma, external hemorrhoids, perianal abscess, perianal neoplasms
- for fissures or proctalgia fugax:
  - topical nifedipine,
  - topical nitroglycerine

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## .Post herpetic neuralgia

- Lyrica
  - look for drowsiness
- Amitriptyline 10mg
- Capsaicin bid x30 days. 60g

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## .Opioid

- fentanyl transdermal patch half life: 13-25h
- Conversion: Morphine 10mg po equals
  - morphine 5mg sc/iv
  - codeine 100mg po
  - hydromorphone 2mg po

- hydromorphone 1mg sc/iv
- oxycodone 7.5mg po
- fentanyl 25mcg/h patch = Morphine 60mg po (to 100mg) in 24h
  - before switching to fentanyl, should be on Morphine 60mg po for 1 week
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## .acupuncture

- low back pain
  - American College of Physicians recommended this as first-line therapy for acute and chronic nonradicular low back pain along with other nondrug therapy including stretching, heat application, massage, and manual spinal manipulation
- sham acupuncture and acupuncture may have similar efficacy
- when to avoid acupuncture
  - non-sterile needles used
  - overlying skin infection or into site of malignancy
  - Electroacupuncture should be avoided in patients with an automatic implantable cardioverter-defibrillator (AICD) or pacemaker
  - Acupuncture should be avoided in patients with severe neutropenia as seen after myelosuppressive chemotherapy
- 

## .Oncology.Cancer

### .Cancer survivor

- screen for the following
  - pain
  - depression/anxiety
  - fatigue
- 
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### .Fear of cancer recurrence

- screening: Fear of cancer recurrence inventory. maximum score of 36
  - how frequently thoughts related to cancer returning
  - thoughts difficult to control
  - routinely scan or pay attention to physical sensation in body
  - how strongly do you believe cancer will return
- management
  - refer to psychotherapy
- 

### .breast lump causes

- Fibroadenoma: smooth, mobile, hormone dependent most common < 30 y/o nodule imaging with mammo/US FNA helps confirm Dx excise if rapid growth or if > 5 cm (risk for phyllodes tumor)
  - Carry a small increased risk of CA esp if “complex” features – refer to gen surg
- Fibrocystic Disease:
  - simple cysts – no risk CA and US/aspiration/obs - hormone dependent
  - complicated cysts – very low risk CA (<1%) and should be aspirate or followed with u/s to ensure gone
  - complex cysts – higher rate CA and core Bx/referral
- Breast Pain: Some suggestions and anecdotal evidence that avoiding caffeine/cola and chocolate can help with pain; for severe dis OCP/danazol. Supportive brassieres may also help.
- Intraductal Papilloma: unilateral breast DC/bloody mammo/US and core Bx to confirm Dx – surgical excision as may be assoc with DCIS
- Ductal/Lobular Hyperplasia: pathological Dx found on core biopsy; management is based on presence of atypia in the pathological specimen. Increased lifetime risk of breast CA

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## .Breast lump

- patients age < 30
- <https://www.uptodate.com/contents/image?imageKey=ONC%2F54674>
  - Start with U/S
    - lesion not visualized: perform mammogram
    - Cyst
      - Asymptomatic and simple
        - Observe over 2-4 months
      - symptomatic and simple
        - may offer therapeutic aspiration
      - not simple cyst
        - BIRADS 3: follow-up U/S every 6-12 months for 2 years
        - BIRADS 4,5: FNA or core needle biopsy
    - Solid, indeterminate or suspicious
      - same algorithm as not simple cyst, above
      - also do mammogram
- patients age ≥ 40
- <https://www.uptodate.com/contents/image?imageKey=ONC%2F74666>
  - start with mammogram
  - BIRADS 1
    - perform breast U/S
  - BIRADS 2
    - return to annual screening mammogram
  - BIRADS 3
    - perform breast U/S
    - if seen on U/S, repeat U/S every 6-12 months for 2-3 years; biopsy if enlargement
      - if not seen on U/S, do above with mammogram
  - BIRADS 4,5
    - perform breast U/S
    - get Core needle biopsy with U/S or stereotactice depending on whether visualized or not,
      - Benign: mammogram in 6-12 months
      - Else: excision
- patients between age 30-39
  - either breast U/S or mammography can be used as initial imaging modality
  - U/S may be preferred given its higher sensitivity. if U/S is negative, mammography should still be performed.

## .breast cancer

- treatment
  - Radiation over a 6-week period usually – shown to reduce local recurrence by 75% at 15 yrs
  - Hormonal Therapy: indicated for hormone receptor positive tumors
    - Tamoxifen (SERM) pre-menopausal 20 mg od x 5 yrs
    - Arimidex (aromatase inhibitor) post-menopausal 1 mg od x 5 yrs greater reduction than tamoxifen – s/e hot flashes, small risk osteoporosis, fatigue (9% greater disease-free survival – ATAC trial Lancet Oncol 2010: 11 1135)
    - Femara (aromatase inhibitor) post-menopausal 2.5 mg od x 5 yrs s/e as for arimidex (14 % greater disease-free survival and 13% greater overall survival – BIG 1-98 trial Lancet Oncol 2011: 12 1101)
  - Chemotherapy:

- Monoclonal Ab therapy (Herceptin - 20% of cancers over-express the HER2 oncogene – Trastuzumab therapy)), breast reconstructive therapy, and most recently mAb/drug conjugates (trastuzumab-emtansine) that target microtubule toxicity to malignant HER2 positive breast cancer cells (NEJM 2012: 367 1783)
- Prevention:
  - Regular physical activity
  - Early age for first pregnancy
  - Breast feeding for 6 months
  - Limit EtOH consumption
  - Minimize exposure to HRT
  - Maintain a healthy weight
  - Enter a breast CA screening program (however consider concerning issue of overdiagnosis)
  - High risk patients should consider Tamoxifen (Lancet Oncol 2011: 12 486 not approved in Canada but is in USA)
- Breast Cancer Follow-Up
  - From 2016 DRCC discharge instructions to primary care provider
  - Clinical exam q6months for 2 years then annually (include breast, LN, chest, abdo)
  - Annual mammogram
  - Avoidance estrogens, raloxifene, HRT
  - Patients on tamoxifen – be aware increased risk DVT, endometrial cancer
  - Patients on aromatase inhibitors (eg letrozole) – be aware increased risk osteoporosis (baseline and regular BMDs)
  - Signs of recurrence: new mass, rash, nodule, lymphadenopathy, bone pain, cough or dyspnea, hepatomegaly
  - Urgent signs/symptoms: cauda equina
  - Bisphosphonates have been found to be associated with a reduction in breast cancer recurrence in bone
    - Current guidelines suggest that postmenopausal women with intermediate- or high-risk cancers should receive zoledronic acid every 6 months for 3 years

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## .Palliative

### .LTC Palliative orders

- stop oral medications, vital signs
- Versed 0.5mg sc q4h prn
- scopolamine 0.4mg q4h sc prn
- Hydromorphone 0.5mg q4h prn

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### .Opioid toxicity

- Symptoms: Myoclonus, twitching, decreased LOC, delirium
- If pain controlled: decrease opioid.
- If not yet end of life and pain not controlled, may consider switching opioid, then decrease by 25-50%
  - also consider other adjuncts for pain
- If pain not controlled and end of life
  - Midazolam 1mg q4h sc routine

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### .Spiritual care

- Asking the patient about spiritual care:
  - Are you religious? Do you have any spiritual care needs?
  - Connected to faith group in past?
  - Do you think the patient would want prayer? Anything religious she would want?

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## .Acute pain

- opioids
  - Morphine 5mg q1h
  - hydromorphone 1mg q1h

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## .Palliative admission criteria

- DNR
- Comfort care
- Prognosis <3 months
- No life prolonging treatments.
  - No feeding via G tube. Can use G tube for venting

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## .Palliative General.General Palliative

- PPS score, Frailty score
- how people die
  - weaker and more tired, oral intake decreases, sleep more and eventually die.
- Gold Standards framework prognostic indicator
  - <https://www.goldstandardsframework.org.uk/cd-content/uploads/files/General%20Files/Prognostic%20Indicator%20Guidance%20October%202011.pdf>
  - would you be surprised if the patient were to die in the next year?
  - general indicators of decline: deterioration, advanced disease, decreased response to treatment, choice for no further disease modifying treatment, weight loss > 10% in past 6 months
  - specific clinical indicators: cancer, organ failure (e.g. COPD, heart disease, renal disease, etc.), frailty/dementia
- Speakup Ontario, Pallium
- How much time patient has left
  - generally, for patients with cancer
    - if walking: have months of life left
    - if in bed all the time and can't walk: then weeks of life left.
    - if sleeping all the time or confused: days left.
    - if breathing changes to become irregular: hours of life left
- at end of life, don't need fluids, just drink if thirsty. People like ice chips
- Oral secretions
  - patient is too weak to clear it themselves
  - sounds uncomfortable for family and observers, but often doesn't bother the patient
  - Scopolamine 0.4mg sc q4h prn for terminal congestion or secretions
- agitation
  - Haloperidol 1-2mg sc q1h prn for delirium
  - Midazolam 1-2mg sc q2h prn for anxiety/agitation/restlessness
  - Lorazepam 1mg sl q4h prn for restlessness/anxiety
- transition to hospice
  - Stop IV, high flow oxygen
  - Switch to butterfly needle for subcutaneous medications
- consider forcing a DNR-C onto the patient if they have a life limiting illness, and you feel CPR is not an appropriate treatment option.
- when to refer to palliative
  - life limiting illness

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## .Palliative Consult

- do you know why we're here?
  - role of palliative care: symptom management, and planning for the future (advance care planning)
- History of main diagnosis: past/present treatments, patient understanding of prognosis

- PMHx/PSHx, Medications
- Social history: living situation, names of important people, names of children
  - third party drug coverage, primary pharmacy
  - smoking, alcohol, substance use
- function: ADLs, baseline mobility, current supports, PPS score
- symptoms
  - pain, nausea, constipation, sleep, drowsiness, mood, SOB
- Advance care planning
  - are you ok if we talk about the future and what the future hold with your illness?
  - what's your understanding of the illness? is it curable?
  - normalize: I talk to all my patients about this. I don't know anything else about your health that you don't know.
  - relevance: increases sense of control during your illness. protects your SDM from a stressful decision on your behalf
  - confirm the SDM.
    - Who do you trust to make decisions about your health?
    - is there a POA for personal care?
  - Goals of care
    - prolonging vs quality of life. our goal is to provide both. but at some point the paths diverge. if you had to choose, which would you choose?
    - if quality of life: alertness vs pain/symptom control
  - code status
  - end of life care plan: DNRC, EDP, SRK, back up 4F consent
    - die at home or hospice
      - When you decline, where do you want to be at end of life?
      - If home, and we can't get enough supports at home, what's your second choice?
      - Other options: hospice, LTC, RH, palliative care unit
    - EDP: DNRC, funeral home, notification form, expected death form
    - CCAC orders
    - SRK; to Bayshore, Markham

## • .palliative consult - abbreviated

- SocHx: living situation, names of important people, names of children
- function: ADLs, baseline mobility, current supports, PPS score
- symptoms: pain, nausea, constipation, drowsiness, mood, SOB
- ACP: code status, end of life, POA
  - other interventions: TPN, chemo, transfusions, G-tube

## • .Palliative outpatient

- Durham region
  - Palliative care f/u at home: call locating at the hospital, ask for palliative care. PCCT will also connect with appropriate service.
  - Palliative care community team (PCCT): connect with services. e.g. CCAC vs doctor.
    - Can send letter to them in PSS, asking them to assess the patient before discharge (give date).

## • .palliative interventions - life prolonging.TPN.transfusion.Code status

- transfusion
  - pros: prolongs life, can improve dyspnea
  - cons: can cause volume overload, can be a hassle to go to hospital to get transfusions, body builds up antibodies so matching eventually becomes difficult
  - consider asking patient to reconsider transfusions if getting it very frequently (1-2 per week), especially if not improving dyspnea anymore.
- TPN

- pros: prolongs life
- cons: can cause volume overload, can cause veins to be non-functional after some time and so is not long term, body doesn't absorb nutrients as effectively as through the gut
- code status
  - pros: prolongs life
  - cons: chance of breaking ribs, high chance of worse function/QOL after resuscitation,
  - if you were to become very sick and your heart and breathing were to stop. would you want CPR/intubation?
  - after a successful resuscitation, the best case scenario we can bring you back to your current quality of life. but often we can bring back the heartbeat and breathing, but you end up with worse function than before. any medical issues that were present before resuscitation, will still be present afterwards. the more sick and more frail you are at baseline, the lower your chances of maintaining your quality of life after resuscitation.
    - patients over 70 years old: less than 19% survive hospital discharge. of these survivors, >80% die within 1 year.
    - if your heart was the first thing to stop, the chances of survival are high. if your heart is the last thing to stop, the chances of survival are very low.
  - if patient has life limiting illness, may consider withdrawing CPR as a treatment option. Inform the patient that CPR is not an intervention that we recommend and we will not offer it at this time.
    - apparently legal in Ontario: <https://www.allaboutestates.ca/new-guidelines-provision-cpr-hospitals/>
      - Wawrzyniak v. Livingstone
      - Dialogue. College of Physicians and Surgeons of Ontario. ISSUE 3, 2019 page 29.
        - <https://viewer.joomag.com/dialogue-volume-15-issue-3-2019/0014603001571765586>
        - <https://s8cdn.joomag.com/pdf/0/122/122548/2045701.pdf?md5=EqkvOvhiKLEkXCGSpBDNw&expires=1647308484&name=Dialogue+Volume+15%2C+Issue+3+2019&1571924422>

## Expected death package - Ontario

- Forms to send to home care
  - Palliative care plan for expected death notification form
    - Checklist.
  - CCAC form
    - orders
      - Goals: Death at home and comfort care
      - EDITH
      - DNRC #
- Forms to send home with patient in yellow package
  - DNRC form
- Filling out the forms
  - Palliative care plan for expected death
    - Telephone: LHO/LHB number. Ext: 33200
    - Box A: check all. Patient and family aware of death in home. DNR. Funeral home transfer service for completed.
    - Box B:
      - RN may pronounce.
      - MD/NP to make arrangement with funeral home to complete death certificate
    - Box C: can leave empty
    - Box D: enter in funeral home name here.
  - Funeral transfer service form
    - Fill out Part A
      - After hours num: LHO/LHB number. Ext 33200
      - Alternate physician: Palliative Care LHB
    - Leave Part B empty
  - Information for family. Green page



- Home care to help patient fill out.
- Add DNR C number to the patient's chart.
- 
- 

#### .Palliative G tube.G-tube

- G tubes can be used to apply suction for bowel obstructions, for comfort.
- Can also allow feeding with fluids for comfort, since some people find eating/drinking to be a meaningful part of their life.
  - Patient can drink fluids, then suck the fluids out, so that the fluid does not get obstructed and cause vomiting.
  - Can't eat food however, since it would get clogged in the G tube.
- 
- 

#### .Substitute Decision Maker.SDM

- Hierarchy
  - legally appointed SDMs
    - court appointed guardian
    - attorney for personal care
  - automatic family member SDMs
    - spouse/partner
    - parents or children
    - parent with right of access only
    - siblings
    - any other relative
  - SDM of last resort
    - Public Guardian and Trustee
- Power of attorney for personal care
  - outranks the automatic family hierarchy
  - can be chosen by the patient
- 

#### .Palliative Nausea.Nausea in palliative

- Metoclopramide, then Haldol, then ondansetron. If on chemo, use Ondansetron first
- ok to stack Haloperidol and Metoclopramide in palliative patients, since we accept the risk for symptom control
- routine
  - Metoclopramide 5mg bid po
- prn
  - Haloperidol 1-2mg sc q1h prn for nausea
  - Metoclopramide 5-10mg sc q4h
- 
- 

#### .Palliative delirium

- Haldol 0.25mg sc bid routine
- Haldol 0.25-0.5mg sc q2h prn
- 

#### .Palliative Pain.Pain in palliative

- taking up to 3 prns is ok.
- routine
  - morphine 2.5mg bid
  - percocet half tab bid
- cancer, bony pain
  - Dexamethasone 2-4mg bid po
  - NSAIDs: Naproxen 500mg po bid

- CADD pump
  - lowest dose is 0.1mg/h.
  - Max subcut volume is 2-4 mL/h continuous.
  - Order parameters
    - Opioid concentration: if opioid requirements low, use 1mg/mL. else 5mg/mL
    - Starting dose: based on 24h opioid requirements.
    - max: if 1mg/mL concentration, max 2mg/h. if 5mg/mL concentration, max 10mg/h
    - Titrate: 0.1mg every 1-4 hours. or 0.5mg every 1-4 hours. depending on concentration of bag.
      - can be titrated by nursing.
    - bolus: same dose as the drip. can give q30-60min.
      - can be controlled by patient or nursing
  - Example
    - Hydromorphone 0.6mg/h sc
    - may adjust continuous dose by 0.1mg/h every 4h when pain is poorly controlled and using frequent breakthrough doses, prn to maximum rate of 1.5mg/h
      - can be titrated by nursing
    - may give 0.5mg q30min prn to maximum of 2 boluses per hour
      - can be controlled by patient or nursing
- Non-verbal signs of pain
  - Groaning, Grimacing

### • Palliative sedation

- Intended to induce decreased state of awareness to relieve burden of otherwise intractable suffering.
- Should be considered in last few days/weeks of life
- Can also be used for seizures, especially when patient unable to take oral seizure prophylaxis medication.
- RASS score to target amount of sedation. Snowed vs rousable.
- Dosing
  - RASS -2: Midazolam 1mg/mL. 0.5 mg/h, Titrate 0.1mg q60min. max 2mg/h. 5mg bolus. 12 boluses per hour.
  - RASS -4: Midazolam 5mg/mL at 2 mg/h. Titrate 0.5mg q60 min. Max 10mg/h. 5mg bolus. 12 boluses per hour.

### • Palliative dry mouth

- Mouth care.
  - Mouth swabs, drink water if able to
- Avoid oxygen by face mask/oxygen if no subjective shortness of breath
  - could get oxygen that is humidified.

### • Palliative dyspnea. Palliative shortness of breath

- SOBOE: Ventolin pre activity
- SOB at rest: opioids
  - Morphine 0.5mg bid

### • Palliative radiation

- often good for bony pain. 70-90% effective
- gets worse before it gets better. can take up to 4-5 days before it gets better.

### • Metastatic cancer

- reasons for getting biopsy
  - directs palliative treatment
  - also may be useful for informing family history

## .MAID

- Midazolam 10mg iv. Propofol 400mg iv, then rocuronium 100mg iv.
- reasons for accessing MAID
  - loss of autonomy and control
  - unacceptable quality of life
  - suffering/fear of suffering
  - loss of independence or physical abilities
- MAID criteria
  - age 18 or older and decision making capacity
  - voluntary request. not result of external pressure
  - advanced state of irreversible decline
  - enduring and intolerable physical or psychological suffering that cannot be alleviated under conditions the person considers acceptable
  - serious and incurable illness, disease or disability

•

## .Comfort care.GOC.Goals of care.DNR.DNI

- consider transitioning a patient to comfort care once medical therapy has been optimized for their code status, but patient does not continue to improve or deteriorates.
  - case:
    - patient was on Optiflow, but then was titrated down to oxygen by nasal prongs
    - Ask if pt were to decline again, would want to go back on Optiflow?
- Discussing DNR
  - Normalize: we discuss this with everyone admitted to hospital and it's not a reflection of your medical status.
  - Ask patient if they want CPR as an intervention, which is only done during cardiac arrest.
  - Risks/Benefits of CPR
    - Risk of inadequate perfusion to brain despite compressions
    - Risk of fracturing ribs
    - 80-95% of admitted patients do NOT survive to discharge without neurologic injury. i.e. the majority of people either do not survive CPR or do not get back to their functional baseline.
    - Note: if do not receive CPR with cardiac arrest, patient will pass away.
- Discussing DNI
  - If patients require oxygen, we start with nasal prongs, then face mask, then high flow, where patient is still alert. However, if oxygenation continues to worsen, intubation may be needed.
  - Intubation
    - Need to be sedated and tube down throat
    - 3 options: no intubation, give trial of a few days, or ok with intubation indefinitely

## .Peds.Pediatrics

### .biliary atresia

- progressive, idiopathic, fibro-obliterative disease of the extrahepatic biliary tree that presents with biliary obstruction in the neonatal period and is the most common indication for liver transplantation in children.
- Clinical presentation
  - Most infants with BA are born at full term, have a normal birth weight, and initially thrive and seem healthy.
  - Scleral icterus and/or generalized jaundice typically develop by eight weeks of age.
  - Infants may also have acholic (very pale-colored) stools (see "stool color card" for examples), dark urine, and/or a firm liver and splenomegaly.
- Investigations
  - Laboratory testing reveals elevation in serum conjugated bilirubin ( $>2$  mg/dL [34 micromol/L]) and mild or moderate elevations in serum aminotransferases, with disproportionately increased gamma-glutamyl transpeptidase (GGTP).

- total and conjugated Bilirubin      To evaluate for conjugated hyperbilirubinemia (cholestasis) versus unconjugated hyperbilirubinemia.
- ALT, AST      To assess for hepatocyte injury.
- ALP, GGT      assess for biliary injury
- Total protein, albumin      assess hepatocyte function. Low albumin suggests poor nutrition, renal losses, or poor hepatic synthetic function.
- Lytes, bicarbonate, glucose      To assess for metabolic disease.
- CBC      To assess for infection and/or splenic sequestration. Elevated WBC is suggestive of infection. Low WBC and platelet count could indicate portal hypertension (with splenic sequestration).
- PT/INR, PTT      To assess hepatocyte function and/or vitamin K deficiency. Abnormal results indicate impaired liver synthetic function and/or vitamin K deficiency.
- Abdo U/S.      to exclude other anatomic causes of cholestasis
- The definitive diagnosis of BA is made by a cholangiogram
- Management
  - Surgery: recommend that all infants with BA undergo a Kasai HPE (Hepatoportoenterostomy). This surgery should be performed as soon as the diagnosis of BA can be made and preferably before 60 days of age.
  - Nutrition and monitoring –
    - If jaundiced: treat with supplements of fat-soluble vitamins and monitored for fat-soluble vitamin deficiencies
    - high-calorie formula or other nutritional supplements as required to sustain normal rates of growth.
  - Medications
    - treated with ursodeoxycholic acid (UDCA) after Kasai HPE
    - Glucocorticoids not recommended
  - Liver transplantation
    - If persistent jaundice three months after Kasai HPE: refer for transplantation
    -
- Prognosis
  - At least 60 to 80 percent of patients with BA will eventually require liver transplantation.

### [.sensory processing disorder](#)

- not currently recognized as a distinct medical diagnosis.
- Treatment for sensory processing problems is called sensory integration.
  - usually conducted by an occupational therapist or physiotherapist,
  - May refer to OT. May write a report to school to assist with this process.
- Experts recommend that children who show signs of a sensory problem be checked for other conditions, such as autism spectrum disorder or an anxiety disorder.

### [.infantile colic](#)

- Define: crying for no apparent reason. Lasts  $\geq 3$  hours per day.  $\geq 3$  days per week. Otherwise healthy infant  $<3$  months
- Management
  - change feeding technique. Try to prevent air swallowing. Bottle feed in vertical position
  - soothing techniques
    - pacifier
    - rocking
    - swing
    - warm bath
    - rubbing baby's abdomen
    - white noise
  - dietary change: if suspect milk protein allergy
    - try 1 week of hydrolysate infant formula

- if breastfed: try hypoallergenic maternal diet. e.g. no milk, eggs, nuts, wheat

### .gassy baby

- Passes gas, then better afterwards
- causes
  - swallowing air when feeding or crying
  - underdeveloped digestive system
  - hypersensitivity to certain types of formula or foods in mom's diet
- management
  - burp baby twice
  - avoid swallowing air. Feed baby in upright position. Make sure baby is properly latched
  - encourage tummy time
  - do baby bicycles
  - rub baby's belly
  - if breastfeeding: mom may cut out certain foods such as dairy products, caffeine, onions, cabbage
  - may try
    - gripe water
    - simethicone. Infant gas drops. Breaks up gas bubbles.

### .teething

- mandibular central incisors typically are the first primary teeth to erupt, usually between 6 and 10 months of age
- teething symptoms
  - cranky, chew on objects, excessive symptoms
  - gingival irritation, irritability, drooling common
  - associated with increase in temperature, but no fever
- management
  - may use teething ring that is one piece
  - not recommended
    - teething necklaces, bracelets should be avoided due to risk of choking, strangulation, injury to mouth
    - topical analgesics

### .umbilical hernia

- Due to persistent opening of umbilical ring
- closure of umbilical ring is complete in most children by five years of age. But may not be closed even into teens.
- clinical findings
  - vast majority are asymptomatic. In rare cases can interfere with feeding. Rarely can become incarcerated
- management
  - most umbilical hernias spontaneously resolve
  - asymptomatic children with umbilical ring that continues to decrease can be observed.
  - Surgery before 4 years not recommended
  - surgical intervention indications:
    - incarcerated or strangulated hernia at any time
    - children <4y of age
      - large trunk like hernia
      - hernias associated with genetic/syndromic conditions: e.g. Ehlers Danlos, Down syndrome
      - behavioral concerns: poor feeding, pulling on hernia, bullying, shame
    - children ≥4years:
      - large defects (>1.5cm in diameter)
      - no decrease in size during year or so of observation
      - behavioral concerns

## .hand foot mouth disease.coxsackie

- Clinical features
  - typical HFMD
    - painful oral lesions on tongue, buccal mucosa
    - macular, vesicular lesions on hands, feet, buttocks, extremities
    - prodroma symptoms usually absent: may include fever
  - Coxsackievirus A6
    - higher fever
    - wider distribution of lesions
    - longer duration
    - nail dystrophy, palmar/plantar desquamation
  - herpangina
    - abrupt onset with high fever
    - oral lesion on anterior fauces, tonsils, soft palate
    - vomiting, anorexia, irritability or fussiness
- Management
  - management is supportive. Pain and discomfort managed with ibuprofen or acetaminophen
  - don't suggest routine topical oral therapies for children
- back to school
  - Exclusion of infants and children from child care does not prevent the spread of HFMD. The viruses that cause HFMD can be spread by children without symptoms and children whose symptoms have resolved.
  - keep out of school or daycare if fever or don't feel well enough to go.
  - Keep home if excessive drooling (as may require more care, compromising care for other children) or have open sores (to prevent secondary skin infection).
- Prognosis
  - complete resolution typically occurs within 7-10 days

## .limp in a child.child with a limp

- DDx
  - life threatening: septic arthritis, malignancy, osteomyelitis, testicular torsion
  - common: acute myositis, fracture, soft tissue injury, transient synovitis
  - other: legg calve perthes disease, JIA
- definitions of limp
  - antalgic gait: most common. Short stance phase in affected extremity due to pain
  - toe walk
  - stooping gait
  - trendelenburg gait
- history
  - trauma, current fever
  - severity of pain, location of pain
- physical
  - observe gait. Examine hips, knees, spine
  - examine abdomen to r/o appendicitis
- investigation
  - if obvious cause for limp (e.g. superficial soft tissue injury, insect bite, plantar wart, friction blister), no need for further investigation
  - acute limp: new limp within 48h
    - if signs of infection (fever, localized redness/warmth, joint tenderness with marked limitation of motion):
      - CBC, ESR, CRP, blood cultures.
      - Consider Lyme serology

- can get Xray to rule out other diagnoses
- if localized findings, but no signs of infection:
  - get X-ray
- no localized findings, no signs of infection
  - AP and lateral X-ray of tibia and fibula to rule out toddler's fracture
  - may also X-ray hip to toe.
- Subacute, chronic or intermittent limp

## .BEHAVIORAL PROBLEMS IN CHILDHOOD:

- S: Onset, severity, duration, triggers; physical violence or use of weapons; substance use, developmental history, changes in environment or school performance; change in personality, anhedonia.
- O: Vital signs; neurologic exam.
- DDX: ADHD, oppositional defiant, adjustment disorder, substance abuse, age-appropriate behaviour
- 

## .CHILD WITH FEVER:

- S: Severity, duration; associated localizing symptoms such as rash, wheezing, cough, runny nose, and ear discharge; poor appetite, convulsions, lethargy. sleepiness; sick contacts, day care, immunizations.
- O: Vital signs; HEENT, neck, heart, lung, abdominal, and skin exams.
- DDX: neonatal sepsis, meningitis, pneumonia, pyelonephritis, URI, acute otitis media, measles, gastroenteritis

## .CHILD WITH GI SYMPTOMS:

- S: Onset, location, quality, intensity, duration, radiation, timing (relation to meals); associated symptoms (constitutional, GI, cardiac, pulmonary, renal, pelvic); changes in weight, skin rash, bloody/mucoid stools, change in stool color; exacerbating and alleviating factors; history of similar symptoms; history of abdominal surgeries; medications; sick contacts, day care, immunizations.
- O: Vital signs; exam for signs of dehydration (BP, heart rate, mucous membranes, sunken fontanelle, capillary refill time); heart and lung exams; abdominal exam; rectal exam; pelvic exam (women).
- DDX: pyloric stenosis, duodenal atresia, gastroenteritis, UTI, Hirschsprung disease, hypothyroidism, celiac disease, intussusception, appendicitis, enterocolitis,

## .CHILD WITH RED EYE:

- S: Onset, location, duration, affecting one or both eyes; eye discharge, itching, pain, photophobia, tearing; associated symptoms (constitutional, dermatologic, GI, cardiac, pulmonary, renal, pelvic, rheumatologic); exacerbating and alleviating factors; medications; sick contacts, day care, immunizations; history of similar symptoms.
- O: Vital signs; HEENT exam.
- DDX: bacterial conjunctivitis, keratitis, uveitis, orbital cellulitis, pre-septal cellulitis

## .CHILD WITH SHORT STATURE:

- S: Associated symptoms (constitutional, GI, cardiac, pulmonary, renal, pelvic, endocrine); medications; prenatal and birth history, growth history; past medical history; family history; cognitive abilities, school performance.
- O: Vital signs; height, weight; HEENT, heart, lung, abdominal, and neurologic exams.
- DDX: constitutional short stature, GH deficiency, hypothyroidism, genetic
- 

## .Fever in children.Fever pediatric.Pediatric fever

- don't need to treat the fever itself. may give Tylenol or Advil for comfort. don't give aspirin.
  - Don't recommend alternating them, due to risk of dosing errors.
- dosing
  - Acetaminophen 10-14mg/kg q4-6h. max 75mg/kg/day
  - Ibuprofen 5-10 mg/kg q6-8h. max 40mg/kg/day
- DDx
  - resp: URI, pneumonia
  - ENT: pharyngitis, otitis media
  -

- 

### .Fever without source in children

- fever unknown origin duration 5-8 days. fever  $> 38.3^{\circ}\text{C}$  daily for  $\geq 8$  days
  - DDx: infection, rheum, neoplastic
  - investigations
    - CBC diff
    - ESR, CRP
    - blood cultures
    - urine culture
    - CXR
    - Electrolytes, BUN, Cr
    - AST, ALT
- perform full sepsis evaluation in the following
  - ill appearing infants
  - younger than 28 days
  - findings suggesting HSV infection
  - infants younger than 60 days and: rectal temp  $\geq 38.6^{\circ}\text{C}$ , congenital/chromosomal defects, dependent on home O2/ventilator/indwelling central line, antibiotic therapy in past 3-7 days
  - infants 29 to 90 days of age with focal infection and ill appearance
- full sepsis evaluation
  - CBC diff
  - serum glucose
  - CRP
  - blood culture
  - urinalysis, urine culture
  - CXR
  - stool culture if diarrhea or stool with blood
  - LP: Cxfr cell count with diff, glucose, protein, bacterial culture and gram stain
  - if septic: fibrinogen, d-dimer, PT/INR, lactate, bilirubin, ALT, iCa
- less extensive evaluation for following patients
  - well, appearing, febrile 28-90 days of age and have recognizable viral infection (e.g. bronchiolitis, croup, influenza, enterovirus)
    - still need full septic workup for less than 28 days of age, even if recognizable viral infection
  - well appearing febrile 61 to 90 days of age without focal bacterial infection
  - well appearing, not febrile infant 0 to 90 days of age with acute otitis media
- fever within 48 hours after immunization
  - may consider no testing with close follow-up
  - or get urinalysis, urine culture.

- 

### .Fever without source in children - age under 28 days, age 29-60 days

- should be evaluated in the ER
- well-appearing, under 28 days of age, rectal temp  $\geq 38^{\circ}\text{C}$ 
  - full sepsis evaluation
  - urine culture, blood culture, LP, CBC, CXR
  - CRP, urinalysis
  - start parenteral antimicrobials
  - observe in hospital
- well-appearing, 29 to 60 days of age, temp  $\geq 38^{\circ}\text{C}$ 
  - CBC diff
  - CRP, pro calcitonin
  - blood culture



- urinalysis, urine culture
- chest radiograph if respiratory symptoms

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#### .Fever without source in children - age 3 to 36 months

- completely immunized age 3 to 36 months
  - considered immunized if had 2-3 doses of Prevnar and 3 doses of Pediacel. So, if hadn't received 6 month vaccines, not considered fully immunized.
  - rectal Temp > 39C and appears well and duration < 5 days
    - UpToDate graphic: Approach to fever without a source in completely immunized\* children 3 to 36 months of age
    - rectal temp > 39C at home still counts as relevant.
    - if girl < 24 months, uncircumcised boy < 12 months, circumcised boy < 6 months, or history of UTI, or urogenital anomaly, or symptoms of UTI
      - get urine dip and urine culture and treat empirically with antibiotic for UTI
    - if well and good oral intake, and can follow-up in 24-48 hours, then discharge to caregiver. Else, admit to hospital
- incompletely immunized age 3 months to 36 months
  - rectal Temp > 39C and appears well and duration < 5 days
    - UpToDate graphic: Approach to fever without a source in children 3 to 36 months of age, either unimmunized or incompletely immunized\*
    - evaluate in ER
    - investigations
      - procalcitonin
      - CBC diff
      - blood cultures if elevated WBC
      - catheterized urine for urine dip and culture
    - if positive urine dip, treat empirically with antibiotic for UTI
    - if WBC > 20, get CXR. then get blood cultures, and treat empirically for strep pneumo
    - if WBC > 15. then get blood cultures, and treat empirically for strep pneumo.
    - if well and good oral intake, and can follow-up in 24-48 hours, then discharge to caregiver. Else, admit to hospital

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#### .Newborn weight gain.Well baby weight gain.weight gain in baby

- Term neonates may lose up to 10 percent of their birth weight in the first few days of life and typically regain their birth weight by 10 to 14 days
  - max weight loss by day 4-5.
- Newborns gain approximately 30 g per day (1 oz per day) until three months of age. the 30g/day weight gain only applies after the newborn has hit their weight nadir.
- Infants gain approximately 20 g per day (0.67 oz per day) between three and six months of age and approximately 10 g per day between 6 and 12 months

- 

#### .Newborn physical exam findings.Well baby physical exam findings

- fontanelles
  - posterior closed by 2 months, anterior closed by 18 months
- umbilical cord
  - cord will fall off on its own in 7-10 days.
  - no need to use alcohol swab to dry it.
- dry skin: first 12-24h. no need to do anything
- murmur: maybe due to PDA. f/u in 2 days. consider echo if persists
  - 15% incidence
- eyes: do red reflex, corneal light reflex, cover-uncover
- hips: examine until walking

- 0-3 months: ortolani, Barlow
- testicles:
  - Refer if undescended (palpable, ectopic, nonpalpable) at 6 months
    - Consider earlier if ascended testis, bilateral nonpalpable, or associated hypospadias/ambiguous genitalia
    - Ultrasound not recommended as unhelpful
    - Retractable testis can be followed until puberty

## .Newborn feeding.Newborn nutrition.Well baby feeding

- amount of milk baby needs
  - 1-2 days: 10 to 100mL
  - 3-5 days: 200mL
  - to 6 months: 700 to 800mL per day
- frequency of feeding
  - first month: 8-12 feeds per day. every 1.5-3 hours
  - by 2 months: 6-8 feeds per day. every 3-4 hours
  - no harm in feeding more frequently, but it's just very tiring.
- feeding: first 12 hours of life, ok if not q3h
- if breastfed: often need to be fed more frequently. 8-12 times in 24 hours.
- once regain birthweight, don't need to be fed q3hours. Can be fed on demand.
- may introduce water at 6 months. no juice or cows milk in first year. because water doesn't have calories and makes the baby full.
- milk
  - Exclusive breastfeeding recommended for first 6 months and continued into second year of life
    - Breastfed babies should receive Vitamin D 400 units PO daily
      - Vitamin D 800 units daily if high risk (limited sun exposure, darker skin, obesity)
    - Express breast milk can refrigerate up to 3d and freeze up to 6mo
      - Warm milk by placing in warm water
  - Switch from formula to homogenized milk at 500-750 mL/day at 12 months
    - Discontinue bottle by 18 months; switch to cups. because it's bad for teeth. sucked from a bottle, the sugar stays on teeth longer than cups.
  - Transition to 1-2% milk (500mL/day) at 2-3 years
- may start solids at 4-6 months. WHO recommends 6 months
  - baby is ready when can sit without support and have good control of neck muscles.
  - open mouth when sees food coming. can let you know doesn't want food.
  - No beets, carrots, spinach, turnips before 6 months (nitrates)
- introducing food
  - introduce foods one at a time q3days and monitor for reactions.
  - do NOT start with rice cereal, as new research suggests this primes kids to love carbs and thus huge risk for obesity, start with whole grain cereals and meats and other iron rich foods
  - Ensure mixed textures, not just pureed. OK to mash, ok lumpy
  - may add single ingredient pureed foods, including meats, vegetables, fruits one at a time, every few days.
- food to avoid:
  - avoid honey until age > 12 months
  - avoid added sugar, salt. limit juice intake
  - choking hazard. solid round smooth dry/stick foods.

## .Newborn sleep.Well baby sleep.Safe sleep

- Safe sleep
  - back to sleep for all sleeps; until baby able to roll on own.
  - other risk factors: bed sharing, overheating, maternal smoking, 2<sup>nd</sup> hand smoke, alcohol use

- sleep in a bassinet/crib/cradle for infants.
- Firm mattress
- no loose sheets, no pillows, no stuffed animals
- should not sleep in car seat unsupervised
- should share room with parents. but don't bed share.
- swaddling: ok if done properly. but could be associated with adverse events if misapplied. should have free movement of hips and legs and head uncovered. Stop once baby shows signs of attempting to roll around 3 months
- may stop safe sleep: when baby able to roll over on their own. Usually can stop safe sleep by 9-12 months
- Sleep training
  - safe to start sleep training at 4-6 months if normal baby development
  - turn off screens 60 minutes before bedtime. No screens in bedroom.
  - parent education: bedtime routine, consistent sleep schedule. put baby to bed drowsy but awake.
  - graduated extinction: ignore bedtime crying and tantrums for specified periods. start with short intervals between interventions. intervals increase over time. each check is usually comforting child for a brief period, 15s to 60s. goal is to help child develop self soothing skills.
    - e.g. put down baby. leave and let baby fuss for 2 minutes. then comfort baby for 15-60s; don't pick up baby. leave and let baby fuss for 4 minutes. repeat cycle. increasing wait time by 2 minutes each cycle. repeat until baby sleeps or baby's next feed time and the process is started again
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## [.Newborn.Well baby](#)

- how to know when diaper is wet or full?
  - full will feel heavy
  - blue stripe if there is urine
  - or can pull apart diaper to reveal urea crystals
- difficulty waking baby
  - Undress and change baby. It doesn't wake up baby, go to ER. Although baby might not be ready to feed, should be able to wake baby up.
- upset stomach
  - reassure that babies will be gassy. Can massage baby's abdomen clockwise.
  - bottle fed babies will need to be burped
- GERD
  - keep baby upright after feed
  - consider PPI at 6 weeks
- safe sleep: see Safe sleep
  - can sleep with blankets by 9-12 months
  - Don't need pillow until age 3-4
- Soothe baby
  - 5 S's:
    - swaddle,
    - side stomach position: lay baby over your shoulder, or across your forearm
    - Shush
    - Swing back and forth
    - Suck: breast feed or pacifier
- stool colour
  - gray is ok. green is ok, even if exclusively breastfeeding
  - only concerned if acholic or melena, or bright red blood

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-

## .Noisy breathing in kids.mouth breathing

- DDx
  - asthma, allergies, adenoid hypertrophy
  - can be caused by chronic nasal obstruction/congestion (eg, from allergies or asthma), adenoidal hypertrophy, or anatomic abnormalities (eg, cleft palate), or it may be a learned habit
- P
  - adenoid hypertrophy: humidifier, saline nasal spray. if continues, refer to ENT
  - asthma: flovent puffer.
  - If allergies: may consider antihistamines or nasal spray if age > 2.

## .OSA in children.apnea in children - obstructive

- Evaluation of suspected OSA in children
  - [https://www.uptodate.com/contents/image?imageKey=SLEEP%2F119308&topicKey=SLEEP%2F6373&search=tonsil&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=SLEEP%2F119308&topicKey=SLEEP%2F6373&search=tonsil&source=see_link)
  - if habitual snoring (≥ 3 nights/week), loud snoring, witnessed apnea:
    - refer to ENT or sleep medicine or sleep study
      - sleep study: diagnose OSA if shows apnea hypopnea index (AHI) >1, hypoventilation (carbon dioxide >50 mmHg for >25 percent total sleep time) or significant hypoxia
      - if OSA confirmed or strongly suspected by specialist:
        - ENT may offer adenotonsillectomy

## .tonsillectomy.adenoidectomy

- Indications for tonsillectomy
  - OSA: refer to ENT or get sleep study if suspect
  - recurrent throat infection:
    - suggest tonsillectomy if severely affected (ie, ≥7 episodes in one year, ≥5 episodes in each of two years, or ≥3 episodes in each of three years)
    - For most mildly or moderately affected children, episodes of recurrent infection can be treated with symptomatic care and antimicrobial treatment (as indicated).
  - Peritonsillar abscess: if have significant upper airway obstruction. or previous episodes of recurrent pharyngitis or PTA
- Indications for adenoidectomy
  - Nasal obstruction: mouth breathing, hyponasal speech, and impaired olfaction
    - severe obstruction: absolute indication
    - moderate obstruction: whose obstructive symptoms (mouth breathing, hyponasal speech, impaired olfaction) have been present for ≥1 year and have not responded to conservative measures.
      - Conservative measures include trial courses of antimicrobial treatment for one month [30] and of nasal glucocorticoids for six weeks (continued for up to six months if prompt initial improvement is realized)
  - Chronic sinusitis: that is refractory to medical therapy

## .Labial adhesions.Vaginal adhesions

- child
  - Premarin cream 0.625mg/g. apply 1-2 per day. once adhesions have resolved, switch to Vaseline to prevent recurrence

## .Pediatric Milestones (90<sup>th</sup> percentile)

- Language
  - 4 months: cooing

- 6 months: turns toward voices
- 9 months: polysyllabic babbling (e.g. mama, baba, dada)
- 12 months: responds to name. uses pointing, or gesturing.
- 15 months: uses single words other than mama, dada.
- 18 months: has at least 5 words. follows one step commands.
- 24 months: at least 50 words. Puts two words together.
- 36 months: follows two-step commands. Uses 3 word sentences
- 48 months: follows three-step commands.
- Motor
  - 2 months: can raise head when prone
  - 4 months: can bring hands to midline
  - 6 months: tripod sit. Primitive reflexes absent.
  - 9 months: can roll both ways. can sit independently hands free. Can transfer objects between hands.
  - 12 months: can stand with support, pulls to stand
  - 18 months: walks independently. Walks up and down stairs with railing
- Social-Emotional
  - 4 months: smiling, enjoys eye contact
  - 6 months: smiles to initiate engagement, engages with facial expressions and eye contact
  - 12 months: Orientation to name, joint attention, plays peekaboo
  - 24 months: simple pretend play (e.g. toy broom, toy cup to self/doll, pushes car to work)
  - 36 months: symbolic pretend play (e.g. stick as broom, doll feeds self block, gives car gas then washes windows), initiates peer interactions
  - 48 months: preferred friend, elaborate fantasy play (e.g. superhero)

## .puberty – normal

- Sequence and timing
  - girls
    - breast/areolar development (thelarche) is typically first.
      - 15% of girls have pubic hair as initial manifestation (pubarche).
    - Menarche occurs on average 2-2.5 years after onset of puberty. Median age 11-12.
    - peak height velocity occurs, on average, 0.5 years prior to menarche
  - boys
    - increase in testicular volume is typically first.
      - Testicular volume  $\geq 3$ : median age 9-10.
    - most have an increase in testicular size 6 months prior to penile growth and pubic hair
      - pubic hair stage 2: median age 10-12
    -

## .Precocious Puberty

- types: Central, peripheral, benign
- S:
  - signs of puberty: menses, breast development, axillary hair, pubic hair, body odour
  - younger than 8F, 9M
- O:
  - testicular volume
- P:
- investigations
  - LH, FSH, estrogen, testosterone
  - assess bone age: X-ray of non-dominant hand
- counselling parents

- main concern with early puberty is an early growth spurt, but then early closure of growth plates resulting in short stature as an adult.

- 
- 

### .Short stature

- suspect when height falls off 2 lines of growth curve
- Investigations
  - Bone age
  - TSH, tTG, IGF-1, CBC, Cr, lytes, ESR

- 

### .Pediatric rashes

- Measles: rash + 3 Cs + 1 K (cough, coryza, conjunctivitis, Koplik spots)
  - rash begins on head, then spreads over 24h. accompanied with high fever
- Mumps
  - fever, myalgias, headache, pain and swelling in parotid glands (lasting 3-7 days)
  - complication: meningoencephalitis, orchitis
- Rubella: Rash+ occipital/retroauricular LN + Forchheimer spots (petechiae on soft palate)
  - low grade fever or none, sore throat, conjunctivitis
- Roseola: high fever → rash
- Fifth's disease: slapped cheeks + lacy rash
  - once you see rash, no longer infective
  - first week: fever, myalgia, headache, malaise. then rash, arthritis
  - rash can last for weeks.
  - pregnancy: risk of fetal hydrops. approximately 30-50% of women are immune. should consider check parvovirus titres.
- Scarlet fever: sandpaper rash + Pastia lines
- HFMD: oral lesions → refusal to eat
- Varicella - itchy rash, multistage crops
  - treatment supportive unless immunocompromised, then refer to children's hospital for antivirals.

- 

### .Umbilical cord - newborn

- normal umbilical cord
  - keep the cord dry and clean, and then will fall off.
  - usually falls off in 1-3 weeks
  - keep diaper folded below the cord
  - avoid tub baths to keep the umbilical cord dry. use sponge baths (lie on towel instead of tub)
- after falls off
  - navel will gradually heal after falling off
  - normal for navel to ooze some secretion. not normal for redness to spread like cellulitis
  - keep umbilicus clean and dry
  - normal: red, raw looking spot right after stump falls off, with some blood oozing. normal to last up to 2 weeks after stump falls off.
- minor infection
  - keep clean and dry
  - can use antibiotic ointment

- 

### .Newborn follow-up

- weight checks
  - q2 days until feeding established and gaining weight.
- at 2 days, 1 week, 1 month, then vaccine schedule

-

- 

#### .Normal number of voids, stools - newborn

- voids: 1/day of life. then 6 wet diapers per day
- stools: 1/day of life. then 4 per day.
- normal weight loss after birth: 7-10%

- 

#### .erythema toxicum neonatorum

- reaction to the outside world. related to activation of immune system.
- improves within 1-2 weeks

- 

- 

#### .Baby with nasal congestion.Nasal congestion in baby

- use saline rinse. e.g. Hydrasense
- use Nose Frida. this is safe for babies
  - parents can suck the snot out of baby's nose.

- 

#### .Pacifier

- benefits
  - use in first year of life decreases risk of SIDS
- problems
  - can lead to problems with breastfeeding, teeth
- advice
  - don't start using until breastfeeding is going well
  - replace every 2 months
  - only use when child needs comfort. using all day long can affect ability to learn to talk and cause problems with teeth
  - give it up by 4 years of age to prevent dental problems
  - don't force child to give up using a pacifier
  - once stopped, if child asks for pacifier again, don't give in.

- 

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#### .Poor weight gain in babies.Failure to thrive

- babies should only be breastfeeding for 10-15 minutes. then another 10-15 minutes of formula supplementing.
  - this is so that baby isn't burning calories just feeding
- formula supplementing, top ups every feed, after breastfeedings
  - day 2: 20mL
  - day3: 30mL
  - day 9: 90mL
  - 2nd week of life, 100-120mL top up. 3rd week of life: 160-180mL top ups.

- 

- 

#### .Poor weight gain in children.Failure to thrive

- Definitions
  - weight less than 2nd percentile for gestation corrected age and sex
    - AND decreased velocity of weight gain that is disproportionate to growth in length.
  - other considerations
    - weight <80% of ideal weight for age.
      - find length percentile. this is ideal weight percentile.
    - rate of weight change that causes a decrease of two or more major percentile lines.

- note: The height percentile shifts during the first two years of life in nearly two-thirds of normal infants. Approximately one-third of infants cross one major percentile line (eg, 10th, 25th, 50th, 75th, 90th), one-fourth cross two major percentile lines, and one-tenth cross three major percentile lines [28].
- etiology
  - inadequate caloric intake: GERD, ineffective latching, incorrect formula preparation, mechanical feeding difficulties, neglect or abuse, poor feeding habits
  - inadequate nutrient absorption: iron deficiency anemia, biliary atresia, celiac disease, cystic fibrosis, IBS, IBD, milk protein allergy
  - increase metabolism: chronic infection (HIV, TB), chronic lung disease of prematurity, congenital heart disease, hyperthyroidism, inflammatory condition, malignancy, renal failure
- correcting for prematurity
  - correct for weight through 24 months of age. for height through 40 months of age. for head circumference through 18 months of age.
- History
  - vomiting, diarrhea, abdominal pain
  - infections, wheezing
  - polyuria, polydipsia, polyphagia
  - picky eating, food refusal. avoidance of foods with certain textures.
  - fruit juice consumption
  - dietary restrictions
- mid-parental height
  - average of mother and father's height. add 6.5 for boys. subtract 6.5cm for girls
- growth trajectory and proportionality
  - normal growth parameters at birth with subsequent deceleration in weight. weeks to months later then deceleration in stature. then deceleration in head circumference
    - inadequate nutritional intake
  - decrease length with proportionate weight
    - may be nutritional, genetic or endocrine
  - head circumference is affected at least as much as weight or length
    - intrauterine infection, teratogenic exposure, congenital syndrome and other causes of microcephaly are more likely than inadequate intake
- Initial Investigations
  - CBC, CRP, ESR
  - urinalysis and culture to screen for protein or carbohydrate loss
  - Electrolytes
  - BUN, Cr
  - serum iron, TIBC, saturation, ferritin
  - Calcium phosphorus, ALP
  - Liver enzymes (AST, ALT GGT)
  - lead testing
  - anti TTG and total IgA
  - TSH
- management
- strategies to increase intake
  - [https://www.uptodate.com/contents/image?imageKey=PEDS%2F80726&topicKey=PEDS%2F2874&search=failure%20to%20thrive%20infant&rank=2~150&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=PEDS%2F80726&topicKey=PEDS%2F2874&search=failure%20to%20thrive%20infant&rank=2~150&source=see_link)
  - young infants
    - lactation consultant if breast feeding problem
    - younger than 4 months: frequent feedings: 8-12 per day
    - older than 4 months: 4-6 feedings per day
    - add 2.5mL of infant formula powder to 90mL of pumped breast milk
    - add less water to formula. don't concentrate beyond 24 kcal per 30mL



- older infants and children
  - eat often. every 2-3 hours but not constantly. 3 meals with snacks on consistent schedule. snack time should not occur within one hour of mealtime.
  - add rice cereal or formula powder to pureed foods. add cheese butter or sour cream to vegetables
  - see section on Picky Eating for more dietary and behavioural modifications.
- follow-up
  - ranges from weekly to monthly
- refer to pediatrics, dietician
- 

### .Picky eating

- <https://www.cps.ca/en/documents/position/toddler-preschooler-who-does-not-eat>
- [https://www.caringforkids.cps.ca/handouts/healthy-living/when\\_your\\_child\\_is\\_a\\_picky\\_eater](https://www.caringforkids.cps.ca/handouts/healthy-living/when_your_child_is_a_picky_eater)
- picky eating is common at around 2 years of age.
- offer a variety of healthy choices
- Don't make it a battle. avoid forced feeding. avoid bribing or punishment. use positive reinforcement and praise for eating well.
  - be flexible. parents choose which foods are offered to eat. child chooses how much to eat.
- reduce liquid intake like juice and milk. limit juice consumption to less than 120mL per day
- snacks should be midway between meals. at least 1 hour away from meals.
- time at table limited to 20 minutes. when mealtime over, remove the food.
- minimize distractions during meals (e.g. TV, tablet, toys)
- eat as a family
- encourage child to have small portions of each food item at every meal.
  - encourage child to try at least a few bites of different foods at each meal.

### .GERD in babies.GERD newborn

- lifestyle changes
  - avoid tobacco smoke exposure
  - feed smaller amounts more frequently
  - keep baby upright for 20-30 minutes after feed
- other management options
  - if lots of reflux and discomfort and poor weight gain, consider cows milk protein allergy causing gastritis.
    - Infants who respond to the dietary change are generally maintained on a milk-free diet until one year of age, at which time many (although not all) infants will have become tolerant to the protein.
- when to start PPI
  - only treat with PPI for discomfort; for patients with irritability, feeding refusal, poor weight gain, and tried avoiding cows milk protein. will get better with age
  - limited trial of 2 weeks. if better, consider treatment for 3-6 months
- 

### .Cows Milk Protein Allergy.CMPA

- Management
  - try hydrolyzed formula if formula fed. if breast fed, ask mom to cut out dairy. will take 1-2 weeks to see improvement. there is also some cross reactivity from other foods, so mom may also need to cut out soy, eggs, beef
- most common cause of blood in stool of babies
- 

### .Spitting up blood.Blood reflux in babies

- if baby is well, most likely from mom and nipple blood
- 
-

### .Cradle cap.Seborrheic dermatitis in babies

- baby shampoo daily. may use mineral oil to soften the scale
- may use hydrocortisone cream or ketoconazole shampoo
- 

### .Sunset eyes

- could be physiologic if baby is well
- if unwell, could be increased ICP.
- 

### .Developmental Dysplasia of Hip.DDH

- screening for infants at 4-6 weeks of age
  - breech at  $\geq 34$  weeks
  - family history of DDH
  - clinical instability on examination
- clinical findings
  - 0-3 months
    - Ortolani/Barlow
  - 3-12 months
    - shortening of femur (Galeazzi sign)
    - limited hip abduction in 90 degrees of hip flexion
- Management :
  - Pediatric orthopedic referral is appropriate; Pavlik harness (bracing) is the medical treatment option
  - Plain X ray/ US/ CT/ MRI helpful imaging modalities
  - Children < 6 months usually wind up in the harness
  - Children > 6 months or those who have failed Pavlik harness are considered for ORIF
  - Long term prognosis is variable
- 

### .Febrile seizure

- seizure in context of fever. cannot be prevented. seizure doesn't cause brain damage. usually until age 4-5
  - Use of antipyretics at the first sign of fever does not prevent recurrent febrile seizures. but there is evidence it can reduce seizures within the same fever episode
- uncomplicated febrile seizure
  - Generalized seizure
  - once in 24 hours
  - Lasting less than 15 minutes
  - No residual neuro deficits
  - Normal brain. No cerebral palsy. No developmental delay.
- if seizure beyond 3-5 minutes. call 911
- if no fever and gets seizure, may need more testing
- in the ER
  - need to make sure child comes back to cognitive baseline. if at baseline, no investigations are necessary
  - if not at baseline even after 1 hour: consider brain imaging and investigations.
- aboutkidshealth.ca
  - febrile seizure.
- 

### .Kawasaki

- refer to ED for urgent treatment, if suspect this diagnosis
  - IVIG and ASA
- suspect if
  - 5 days of fever
  - conjunctivitis present in 90 percent of patients

- less common features
  - cervical lymphadenopathy least consistent feature. absent in 50-75% of patients with Kawasaki's.
  - the strawberry tongue is less common.
  - extremity change usually last manifestation to appear.
- diagnostic criteria
  - fever  $\geq 5$  days plus 4/5 of following
  - oral mucosal changes: cracked/erythematous lips, strawberry tongue (red, swollen, bumpy tongue)
  - bilateral conjunctival injection
  - polymorphous rash
  - peripheral extremity changes: palm/sole erythema, desquamation
  - cervical lymphadenopathy
- complications
  - coronary artery aneurysm
  - myocarditis, pericarditis, pericardial effusion, valvular dysfunction, LV dysfunction, arrhythmia
- ask about COVID exposure to rule out MIS-C. ask about recent vaccinations.
- investigations
  - albumin, D-dimer, CRP, CBC, blood cultures, LDH, ferritin, ESR, ALT, PTT, INR, triglycerides, fibrinogen, troponin, pro BNP, ECG
  - echocardiogram
- management
  - refer to ED for urgent treatment and assessment by pediatrics
  - IVIG 2g/kg iv over 8-12 hours
    - most effective if administered within first 10 days, before aneurysms typically develop.
  - high dose ASA: 30-100mg/kg/day in 4 divided doses. max 4g per day
- follow-up
  - repeat echo at 6-8 weeks

## .Transient synovitis

- history/physical:
  - assess full ROM of hip. assess gait. ask about advil, Tylenol usage
- plan: advil 200mg tid x2 days. no running, jumping. f/u in 3 days
- for kids, MSK injuries should improve quickly in 1-2 weeks
- if no improvement after 1 week. consider MRI, bone scan.

## .JIA. Juvenile Idiopathic Arthritis

- Diagnosis
  - fever for over 2 weeks
  - Arthritis for over 6 weeks
  - Intermittent daily fever
  - Evanescent rash
  - must be before age 16
- DDx
  - Infection. Get blood and urine cultures
  - IBD.
  - malignancy
    - SJIA is not associated with thrombocytopenia, lymphocytosis, neutropenia, or bone pain.
- investigations
  - A limited work-up for fever of unknown origin is recommended prior to treatment to exclude infection, inflammatory bowel disease (IBD), and malignancy, such as blood and urine cultures and radiographs of the chest and affected bones and joints.

- Obtaining computed tomography (CT) of the abdomen and pelvis, as well as a bone marrow aspiration, prior to treatment is advised, especially if a pediatric rheumatologist is unavailable to confirm the diagnosis.

•

### .Vomiting in babies

- Baby well and not dehydrated. Give small amounts more frequently to build up tolerance to oral intake.
  - E.g. 5mL q5min for 30 min. Then 10mL q5min.
- Mild to moderate dehydration. 50-100mL/kg over 4h with pedialyte

•

### .Bronchiolitis.Reactive airway disease

- clinical presentation
  - hypoxia, wheezing, respiratory distress
- if age <12-24 months
  - more likely bronchiolitis. Usually no puffers
- If recurrent episodes, such as 3rd or 4th episode, or wheezy:
  - consider treating as asthma with puffers
- treating bronchiolitis
  - supportive treatment. no steroids, no puffers
  - may treat with oxygen if low O2 sats.
- treating reactive airway
  - Flovent 1 puff bid x6 months,
  - Ventolin 2 puffs q4h x24h, then 2 puffs qid.
  - Dexamethasone po x5 days
  -

•

### .Fever of unknown origin children

- definition:
  - fever > 38.3C for ≥ 8 days with no apparent diagnosis
- DDX
  - infections - common: cat scratch disease, malaria, salmonella, TB, viral infection
  - localized infections: infective endocarditis, intra abdominal abscess, osteomyelitis,
  - rheumatologic: JIA, SLE, vasculitis
  - malignancy: leukemia, lymphoma
- History
  - fever, associated complaints, exposures
- investigations
  - CBC and peripheral smear
  - ESR, CRP
  - blood cultures
  - urinalysis and urine culture
  - CXR
  - TB skin test
  - electrolytes, BUN, Cr, AST, ALT
  - HIV testing

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### .Well Child visit.Well Baby visit

- Measure baby height by marking the sheet

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### .Well Child Counselling.Well Baby Counselling

- Discussion: discuss diet, safety, family, development
- See Rourke Baby record

- Newborn:
  - Ask about Sleeping: reassure that there is lots of variation.
    - There is the Ferber method, Cry it out method. There is no single method that is best
  - Ask about feeding
- Nutrition
  - Vit D 400 IU/day for children as long as breastfed. Breastfeeding mothers should consume Vit D
  - Exclusive breastfeeding recommended for first 6 months. May continue up to 2 years and beyond.
  - introduce solids based on infant readiness:
    - sit up without support, good neck control, can pick up food and put in mouth, hold food in mouth without pushing it out right away, open mouth when food coming
    - first foods: pureed/minced/diced cooked meat, fish, tofu, mashed beans, peas, iron containing cereal. not rice cereal. mix cereal with milk to start
  - may start homogenized milk at 12 months of age
  - avoid all sweetened drinks. maximum fruit juice of 125mL per day.
  - avoid honey until 1 year of age
  - dietary fat: don't restrict dietary fat
- Environmental health
  - sun protection: sunscreen when age > 6 months. SPF > 30. wear protective clothing. minimize sun exposure.
  - no safe level of 2nd hand smoke exposure. advise caregivers to stop smoking or reduce 2nd hand exposure.
  - insect bites: Prevent insect bites. No DEET < 6 months. 6-24 months 10% DEET max once daily. 2-12 years 10% DEET max TID.
- Injury prevention
  - Car seat:
    - infant/toddlers in rear facing car seat.
    - if > 10kg forward facing seat with harness.
    - >18kg in booster seat.
    - children <13 year should be in rear seat, away from airbag
    - strap should be at armpit level
  - wear bike helmets
  - Safe sleep
    - back to sleep for all sleeps; until baby able to roll on own.
    - other risk factors: bed sharing, overheating, maternal smoking, 2<sup>nd</sup> hand smoke, alcohol use
    - sleep in a bassinet/crib/cradle for infants.
    - Firm mattress
    - no loose sheets, no pillows, no stuffed animals
    - should not sleep in car seat unsupervised
    - should share room with parents. but don't bed share.
    - swaddling: ok if done properly. but could be associated with adverse events if misapplied. should have free movement of hips and legs and head uncovered. Stop once baby shows signs of attempting to roll.
    - may stop safe sleep by 9-12 months.
  - supervised tummy time while awake. can lay on parent's chest at first.
  - choking: avoid hard, small, round, smooth solid foods until age 4. use safe toys.
  - drowning: never leave young child alone in bath.
    - water safety: use adult supervision, swimming lessons
  - burns: smoke detectors in home on every level. keep hot water at temperature < 49C to avoid accidentally burning baby.
  - poisons and toxins: keep medicine and cleaners and other toxic substances locked up and out of child's reach. Have poison control number
  - falls: never leave baby alone on change table or other high surface. window guards and stair gates. ensure stability of furniture and TV.
  - firearms: remove firearms or in safe storage
- other

- avoid OTC cough/cold medications
- fever: fever  $>38^{\circ}\text{C}$  in an infant  $<3$  months needs urgent evaluation.
- oral health:
  - teething: manage discomfort with gum massage, acetaminophen (all ages), ibuprofen if  $> 6$  months. don't use teething necklaces or numbing gels.
  - dental cleaning:
    - age  $<3$  years: brushed daily by adult. only use rice grain sized fluoride toothpaste if high risk for cavities, otherwise just water. problem with fluoride toothpaste is risk of excessive swallowing of the toothpaste.
    - age 3-6: assist with brushing using pea sized fluoridated toothpaste. start flossing
  - avoid sweetened liquids
  - consider first dentist visit by 1 year of age.
- behaviour
  - sleep training: turn off screens 60 minutes before bedtime. No screens in bedroom.
    - graduated extinction: ignore bedtime crying and tantrums for specified periods. start with short intervals between interventions (e.g. 5 minutes). intervals increase over time. each check is usually comforting child for a brief period, 15s to 60s. goal is to help child develop self soothing skills.
    - parent education: bedtime routine, consistent sleep schedule. put baby to bed drowsy but awake.
  - siblings: ask how siblings are adjusting to baby. if bad behaviours, parents need to be vigilant. ok to have some protective time with older toddler.
- at 1 year, ask parents about returning to work. reassure. ask about concerns
- 

## .Bronchiolitis

- definition
  - LRTI usually caused by RSV. may also be influenza, rhinovirus, adenovirus
- epidemiology
  - most common LRTI in children  $<2$
  - affects 1/3 of children  $<2$  yo
- signs, symptoms
  - 2-3 days of URTI, fever, cough, rhinorrhea
  - wheezy cough, inspiratory crackles, expiratory wheeze, tachypnea
- DDx
  - pneumonia, asthma, foreign body, CHF
- investigations
  - usually diagnostic tests not needed
  - CXR, NP swab, bacterial culture
- management
  - O<sub>2</sub> to keep Sats  $> 90\%$
  - hydration
  - equivocal evidence
    - nebulized epinephrine
    - nasal suctioning
  - not recommended
    - salbutamol, systemic corticosteroids, antibiotics, antivirals
- 

## .Croup

- epidemiology
  - usually 6 months to 3 years
- signs, symptoms
  - barking cough, usually at night, inspiratory stridor, fever
    - like a barking seal?
  - can be preceded by URTI

- usually lasting 3-7 days
- investigations
  - imaging typically not useful. no need for viral testing
- DDx
  - epiglottitis: toxic appearance, dysphagia, drooling, no barking cough
  - peritonsillar abscess: high fever, dysphagia, drooling, respiratory distress
  - foreign body: croupy cough, choking episode
- management
  - supportive care
    - make child comfortable
  - dexamethasone 0.6mg/kg po x1. max 10 mg
    - even for mild croup
    - improvement within 2-3 hours and persists for 24 to 48 hours
    - reduces rates of intubation, hospitalization, return to medical care, reduces duration of symptoms
  - no antibiotics, no decongestants
  - nebulized epinephrine in moderate to severe croup. improvement within 10-30 minutes, effect disappears after 2 hours
    - 5mL 1:1000 L-epinephrine via neb over 15 minutes
  - admission
    - respiratory compromise persisting >5h after treatment with steroids

## • .Diaper dermatitis. Diaper rash

- Management
  - skin care
    - increase frequency of diaper changing and gentle cleansing.
    - fragrance free and alcohol free baby wipes can be used.
    - cleansing: overzealous cleansing can promote irritation and delay skin healing. avoid excess friction.
      - ensure wipes are alcohol and fragrance free.
      - No need to wipe off barrier cream completely with each diaper change.
  - topical barrier ointments for mild to moderate diaper dermatitis are firstline
  - Hydrocortisone 1% bid x3-7 days. for severely inflamed irritant diaper dermatitis
  - topical clotrimazole
    - Clotrimazole 1% bid for 7-14 days.
    - indications:
      - clinical evidence of Candida infection (beefy red plaques, satellite papules, superficial pustules, involvement of skin folds)
      - dermatitis present for at least three days
  - avoid
    - powders: e.g. cornstarch or talcum powder
    - neosporin, bacitracin (polysporin) ointment, as are common inciting allergen for allergic contact dermatitis

## • .Legg Calve Perthe

- Idiopathic osteonecrosis of the capital femoral epiphysis
- presentation
  - hip/groin pain
  - may be limp only
- investigations
  - hip X-ray
- Management :
  - Conservative (>50% do well)
  - Bracing x 2 or 3 yrs in flexion/abduction

- Pelvic / femoral osteotomy
- Physiotherapy to maintain hip ROM and msk strength
- NSAIDs/ Tylenol prn

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### .SCFE.Slipped capital femoral epiphysis

- Type I fracture through the capital femoral epiphysis
- Presentation :
  - Sudden acute hip/thigh pain
  - Chronic limp with medial knee/thigh pain referred
  - Pain in all ranges of motion
- Investigations :
  - AP pelvis/ hips lateral hips and frogs legs view to see a slip of femoral head (posterior/medial)
  - CT MRI if difficult diagnosis 25% are missed initially on plain films
- Management :
  - Non wt bearing bed rest until seen by orthopedics
  - Most are ORIF and a single cannulated screw through the physis to lock head in place without a reduction
  - 30 to 60% of kids will slip the contralateral physis later and must have a high index of suspicion

•

### .Transient tenosynovitis

- Most common cause of acute hip pain in children 3 to 10 y/o
- Presentation :
  - Painful limp or non-wt bearing 50% will have a history of recent URI
  - Crying in bed low grade fever (very unusual to have high grade fever and if so think septic hip joint ) may be a trauma preceeding pain
  - Pain with ROM affected hip is the most common; not toxic looking
  - Often will not bear wt maybe signs URI
- Investigations :
  - CBC ESR CRP hip x rays (may see widening of joint space) hip US (collection of fluid) MRI (less likely)
  - Kocher – non wt bearing, fever (38.5), WBC > 12, and ESR >40 99.6% chance of septic arthritis
- Management :
  - Pain control – NSAIDs/Tylenol
  - Bed rest till symptoms have settled; majority better in 2 to 7 days

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### .Osgood schlatter disease

- Generally a benign self-limited condition associated with traction apophysitis of the tibial tubercle due to repetitive strain
- Etiology :
  - Chronic microtrauma to the tibial tuberosity secondary to overuse of quadriceps muscle
- Clinical Findings :
  - Unilateral or bilateral swelling of tibial tubercle
  - Pain on stress of quadriceps
  - Tenderness to palpation of tibial tubercle
  - Redness/ warm to palpation
  - Quadriceps atrophy
- Investigations :
  - Most if time there is no need as physical exam and history make the diagnosis; some patients may require plain X rays – bone scan and MRI also helpful in a few select cases
- Management :
  - RICE
  - NSAIDs/analgesics
  - Knee immobilizer for short term for comfort



- Avoid aggravating activities – not usually well taken !! may need x months
- Physiotherapy for a stretching and strengthening program once acute symptoms have settled
- Complications :
  - Quadriceps tendon avulsion
  - Non-union of the tibial tubercle
  - Patella-femoral syndrome
  - Patellar subluxation
- Prognosis :
  - 90% resolve with conservative management (mostly within a year)
  - 10% come to operative repair after skeletal maturity (pegs, tendon incision, drilling tubercle ect)
- Medicolegal Issues :
  - Failing to warn/document advice to cease aggravating sport and tendon rupture
  - Missing a tumor or fracture

## • .undescended testes

- classification
  - normal scroal position
  - retractile testis
  - palpable undescended
  - nonpalpable undescended
  - acquired undescended
  - ectopic testis
- no need for imaging to confirm location of testicle
- referral
  - by 6 months if testis are still nonpalpable or undescended

## • .Limping child

- DDx
  - Legg Calve Perthes disease
  - osteomyelitis
  - ewing sarcoma
  - fracture
  - SCFE
  - transient synovitis

## • .CAST fracture

- childhood accidental spiral tibial fracture. caused by twisting injury while tripping
- treatment
  - immobilized with controlled ankle motion (CAM) boot or short leg back slab. not with a cast

## • .Neonatal jaundice. Jaundice in newborn

- evaluation if jaundice and elevated unconjugated bilirubin level
  - get CBC, reticulocyte count and blood film
  - if elevated retic count, decreased/normal Hb: then get DAT
    - if DAT positive
      - immune hemolytic anemia: rH, non-ABO and ABO incompatibility
    - if DAT negative
      - RBC enzymopathy or membranopathy: e.g. G6PD deficiency, hereditary spherocytosis

- if normal retic, normal Hb, normal blood film
  - non-hemolytic, DAT not necessary
- HDFN: hemolytic disease of fetus and newborn
  - incompatible blood types between infant and mother
    - e.g. RhD pos infant with RhD neg mother. group A or B infant with group O blood type mother
      - note that group O neg is universal donor blood type for RBCs because the red cells have no antigens on them. but compatibility is reversed with plasma, since O neg plasma will have lots of antibodies. So, an O neg blood from mom will have lots of antibodies, which could hemolyze the baby's RBCs.

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## [.Henoch schlein purpura.HSP.IgA vasculitis](#)

- most common systemic vasculitis in childhood. primarily between age 3-15
- presentation
  - palpable purpura
  - arthritis
  - abdominal pain
  - kidney disease
- diagnosis
  - clinical diagnosis. no diagnostic lab tests
- investigations
  - urinalysis
  - Cr
  - imaging: abdominal ultrasound
- management
  - can be managed as outpatient
  - oral hydration, bed rest,
  - use NSAIDs for symptomatic relief of joint, abdominal pain
  - systemic glucocorticoids (prednisone 1-2mg/kg/day po) for severe abdominal pain. taper slowly, 25% per week
    - routine glucocorticoids not recommended.
- indications for hospitalization
  - fail to maintain oral hydration and need IV fluids
  - significant GI bleeding, severe abdo pain, altered mental status, severe joint pain
- complications
  - <1 percent develop long term complications
  - kidney disease. no known regimen to prevent kidney involvement
- follow-up
  - urinalysis
  - Cr
  - BP monitoring weekly for 1-2 months
  - refer to peds nephro if persistent proteinuria, hypertension, or kidney insufficiency
  - annual well child visits: continue screening with BP and urinalysis

•  
•

## [.Prescribing.Notes.Logistics.Practice management](#)

### [.lab requisitions](#)

- If lab requisition was emailed to patient, they can either print it out, or just forward the email to lifelabs once they arrive in person.

## .home care

- VCH: Vancouver home and community care referral

## .Massage letter.Physio letters

- example: insert Letter  
Massage Therapy  
Indication: Neck, Shoulder, Back Pain & Stress Relief  
Assess & Treat, As indicated.
- example 2  
Private Chiropody  
Indication: Left Foot Pain, consider orthotics
- 

## .Firing patients

- patient threatens to leave your practice
  - once they say they're leaving, You write them a letter write away confirming they have decided to leave your practice and don't have trust in you
    - And you give 90 days of meds
    - And you inactivate their chart

## .BP Cuff prescription

- insert Letter  
Automatic BP cuff: 1 device.  
Indication: home monitoring of BP for diabetes and HTN.
- prescription  
BP cuff  
Use as directed. Diagnosis: hypertension  
1 device.
- 
- 

## .Mask exemption

- Mask breaks
  - Please allow this patient to take mask breaks when they are feeling anxious. They may take their mask off as long as they keep appropriate distance (>6ft) from other people.
  -
- 
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## .Booking follow-ups

- message office staff to book follow-up appointment
- if need follow-up bloodwork in several months
  - send delayed message to office staff to ask the patient to do bloodwork and send the posted lab requisition to the lab.
  - post-date the posted lab requisition.
  - E.g: Book f/u appointment in office/over the phone. Needs bloodwork before. Req on chart.
  - e.g. 2:
    - Schedule appointment  
Please schedule appointment after patient completes the attached bloodwork.
- 

## .Prescription writing

- need to give exact amount for controlled substances. for refills, state how much to dispense at a time
- need to always specify unit for dispensing

- for liquid formulations:
  - can just state total number of mg.

- 

## .Referral to ER

- if considering referring patient to ER, ask about:
  - BP, glucose
  - chest pain, shortness of breath
  - fever, weakness, dizziness

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## .WSIB - Ontario

- form 8: done at first point of medical contact for a work related injury. can be at WIC, ER, FP office
- FAF: done at the patient/employer's request
- Form 26: done at WSIB's request

- 

## .Emotional Support Animal

- <https://www.aafp.org/afp/2020/0301/p302.html>
- not the same as service animals
- can write letter that the patient needs it, but don't write letter that allows them in public places.

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## .Driving restrictions

- no driving 4 weeks post MI or stroke
- dementia
  - report if loss of  $\geq 1$  ADL or loss of  $\geq 2$  IADLs due to cognitive problems
  - if suspect cognitive problems, refer for functional driving assessment
  - trails B to screen: 3 minute or 3 error cutoff.
- stroke
  - no driving at least 1 month
  - may resume if
    - no significant motor, cognitive, perceptual or vision deficits.
    - and underlying cause addressed.
    - no post stroke seizure.
- seizures
  - single, unprovoked seizure before a diagnosis
    - no driving for at least 3 months. 12 months if commercial driver and no epilepsy
    - need EEG, MRI
  - epilepsy
    - 6 months seizure free. 5 years seizure free for commercial drivers
  - medication withdrawal or change
    - seizure free for 3 months
- symptomatic brain aneurysm
  - if untreated: should not drive
  - after surgical treatment: can drive when symptom free for 3 months. 6 months if commercial driver
- Acute coronary syndrome
  - STEMI
    - no driving for 1 month post discharge. 3 months for commercial driver
  - NSTEMI
    - minor: only elevated troponin and no new wall motion abnormality.
      - no driving for 48 hours after PCI. 7 days for commercial.
      - or 7 days after discharge. 30 days for commercial

- major: same as STEMI
- Parkinsons
  - during early stages, Parkinsons only affects fine coordination and doesn't affect fitness to drive
  - with progression, affect speed of gross movements and reaction time. Can be worsened with cognitive impairment and side effects of medications.
  - Assessment
    - ok to drive if gross movement intact. Test coordination
    - and cognition intact. Consider MOCA.
    - Refer for road test if concerned

## • .Disability tax credit

- to qualify
  - need impairment even with supports
  - mental health: need to try multiple treatments
- more likely to qualify if have supporting documents from specialists
- can tell patient that we will fill out the form, but there is a cost, and there's no guarantee that it will be accepted.
- 
- 
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## .Medication.Side effects

### .medication and pregnancy

- Topical estradiol
  - There appears to be little or no increased risk of birth defects in children born to women who have used estrogens and progestins as an oral contraceptive inadvertently during early pregnancy.
  - If pregnancy occurs, this drug should be discontinued.
  - For breastfeeding
    - Estrogen administration to nursing women has been shown to decrease the quantity and quality of breast milk.

### .champix.varenicline

- Side effects
  - common: nausea, disordered sleep, abnormal dreams
  - there were early concerns about neuropsychiatric and cardiovascular side effects. subsequent data have not supported these concerns. Varenicline is generally considered safe.

### .nasal decongestants

- Example brand name:
- they cause vasoconstriction. Swelling in nose decreases. Effect lasts 8 hours.
- Ok for the short term. Max 5-7 days
- long term usage can result in rebound decongestion when the effects wear off
- 

### .nasal steroid spray.steroid nasal spray

- Technique
  - head down
  - spray: aim towards eye on the same side as the nostril
  - then small sniffs

## .duplicate prescription.controlled substances

- See Drug Schedules regulation
  - [https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/9\\_98#section1](https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/9_98#section1)
- can prescribe tylenol #3 without a duplicate prescription.

## .Medication refills

- if patient story doesn't match up with EMR, ask patient to tell pharmacist that they have refills. If pharmacy has issues, the pharmacist can contact us
- if not sure when patient last filled prescriptions, contact the pharmacy
- 

## .Medication prices

- <https://www.drugsearch.ca/>
- 

## .prednisone.Steroids.Glucocorticoids.Corticosteroids

- chronic
  - adrenal suppression
  - cardiovascular: hypertension, dyslipidemia, fluid retention
  - CNS: agitation, delirium
  - cushings: truncal obesity, weight gain
  - GI: peptic ulcer, ulcerative esophagitis
  - hyperglycemia
  - infection
  - MSK: osteoporosis, osteonecrosis
  - ocular: increased intraocular pressure, glaucoma, cataracts
- short term, within 30 days
  - mood alterations/emotional lability, insomnia, hyperglycemia, and dyspepsia
- 

## .steroid eye drops

- potential serious side effects
  - glaucoma
  - cataracts
  - optic nerve damage
- 

## .antihypertensives

- side effects
  - renal dysfunction
  - hypotension
  - falls
- safe to use in pregnancy
  - labetalol
  - nifedipine extended release
  - methyldopa
  - other beta blockers: acebutolol, metoprolol, pindolol, propranolol
  - others: hydralazine, thiazide diuretics
- 

## .antipsychotic

- deprescribing in elderly
  - deprescribe antipsychotics after 3 month for BPSD, whether stabilized or didn't respond.
    - 25%–50% dose reduction every 1–2 wk
  - reasons to continue

- attempted deprescribing in the past without success
- taking for psychosis
- baseline investigations
  - CBC, FPG/A1c, lipids, lytes, Ca, LFTs, Bili, INR, PTT, Cr, TSH,
  - ECG, preg test, prolactin,
  - urinalysis, urine drug screen
- monitoring: q6-12 months
  - FPG/HbA1c, lipids
  - office measurements
    - weight, height, BMI
    - waist circumference
    - blood pressure

## • .antipsychotic - side effects

- key side effects
  - metabolic syndrome: weight gain, inc lipids, diabetes,
  - tardive dyskinesia: tics, chewing. May occur several months after medication initiation
  - EPS: spasms, akathisia, Parkinsonism
- Metabolic syndrome
  - Monitor weight, waist circumference
  - Encourage exercise, healthy diet
  - May consider metformin (dec weight by 3kg), ? GLP1 agonists (ozempic)
- EPS
  - Prevent by using low doses, titrate cautiously, choose low risk antipsychotics
  - Risk of medications
    - Lowest risk: clozapine, quetiapine, aripiprazole
    - Mod risk: olanzapine
    - High risk: paliperidone, risperidone
  - EPS types
    - Dystonia:
      - Sudden, sustained involuntary muscle spasms. Onset 1-3 days
      - Benztropine 1-2mg IM q15-30min. Diphenhydramine 50mg IM q15-30min
    - Pseudoparkinsonism
      - Resting tremor, cogwheel, shuffling gait. Onset days to weeks
      - Pseudoparkinsonism is a risk factor for progression to tardive dyskinesia. So need to lower dose or switch antipsychotics. The meds only for symptom management. They don't prevent progression to TD.
      - Benztropine 0.5-2mg po OD-BID. Diphenhydramine 50mg po tid
    - Akathisia
      - Restlessness, inability to sit still. Onset days to weeks
      - Anticholinergics unhelpful
      - Propranolol 10-20mg po tid. Lorazepam 0.5-2mg po bid-qid.
    - Tardive dyskinesia
      - Involuntary facial movements, choreiform movements of extremities. Onset months to years
      - Nothing curative. Best treatment is prevention (low dose, choose low risk medications). Pseudoparkinsonism is a risk factor for progression to tardive dyskinesia.
- side effects
  - metabolic syndrome: weight gain, diabetes, hyperlipidemia
  - tardive dyskinesia: possibly irreversible. hyperkinetic movement disorder. oral, facial, lingual dyskinesia most common
  - anticholinergic: dry mouth, constipation, blurred vision, urinary retention
  - CV: prolonged QT
  - extrapyramidal symptoms: akathisia, rigidity, bradykinesia, tremor, dystonia

- neuroleptic malignant syndrome: fever, autonomic dysregulation, rigidity, altered mental status
- prolactin elevation
- increased risk of death, cerebrovascular adverse events
- gait disturbances, falls, somnolence

- 
- 

## .Z drugs.BZRA

- side effects
  - somnolence, dizziness
  - falls risk
  - memory/cognition
  - addiction
  - sleep quality
- deprescribing
  - offered to elderly adults age >65
  - offered to adults age 18-64 after 4 weeks

- 

## .PPI.Proton pump inhibitor

- adverse effects
  - diarrhea
  - impaired B12 absorption
  - hypomagnesiumia
  - C. Difficile infection
  - hip fractures
  - pneumonia

- 

## .bleeding risk

- OTC
  - ASA
  - NSAIDs
  - vitamin E
  - high dose omega 3
  - ginkgo
  - ginseng
  - garlic

- 

## .methotrexate

- how long to discontinue methotrexate before trying to conceive
  - at least 3 months in both males and females
- absolute contraindications
  - pulmonary disease, hepatic dysfunction, renal dysfunction, breast feeding, intrauterine pregnancy, rupture ectopic (requires surgery, no medications)

## .lithium

- key side effects
  - polyuria, polydipsia, tremor, weight gain
  - avoid in renal impairment
- side effects
  - cardiac: bradycardia



- GI: vomiting, diarrhea
- neuro: myoclonic jerks, ataxia, confusion, tremor
- endocrine: hypothyroidism, hypercalcemia, hyperparathyroidism
- skin: acne, psoriasis
- renal: decreased kidney function, polyuria/polydipsia, nephrogenic diabetes insipidus
- weight gain
- lithium toxicity symptoms. Usually at levels >1.5
  - tremor, ataxia, tinnitus, nausea, diarrhea
- investigations with lithium toxicity
  - betaHCG: Li is teratogenic
  - lithium levels
  - Ca: Li affects parathyroid gland
  - TSH: Li can affect thyroid gland
  - Cr: Li is excreted by kidneys
- Monitoring: q3-6 months
  - 12h trough Lithium level
  - Cr, TSH, Ca, Na
  - weight
- when to check lithium levels
  - 3-5 days after initiation
  - when dose changed
  - every 3-6 months while treated with Lithium
- therapeutic level: 0.6-1.2 mmol/L

•

#### .Divalproex.valproic acid

- key side effects
  - common: n/d, weight gain, tremor
  - hepatotoxic,
  - pregnancy: neural tube defect
- Start: 250mg with food. Titrate to serum level.
- Monitor: valproate trough level, CBC, LFTs q3-6 months
- Levels: target 400-700mcmol/L. draw trough 8-12h after last dose. 5 days after dose change

•

#### .warfarin

- target: INR 2-3
- side effects
  - bleeding
  - skin necrosis
  - teratogenic
  -

#### .Warfarin dosing

- initial: 2.5-5mg

○

**Warfarin initiation nomogram**

Day	INR	Warfarin dose (mg)
1		5
2		5
3	<1.5	10
	1.5-1.9	5
	2-3	2.5
	>3	0
4	<1.5	10
	1.5-1.9	7.5
	2-3	5
	>3	0
5	<2	10
	2-3	5
	>3	0
6	<1.5	12.5
	1.5-1.9	10
	2-3	7.5
	>3	0

This nomogram applies to warfarin initial dosing in an otherwise healthy adult without comorbidities that could affect warfarin metabolism. Evidence to support this nomogram was derived in a young, mostly male population with venous thromboembolism. Lower initial dosing may be appropriate for individuals who are frail, elderly, or malnourished; who have liver or kidney disease or heart failure; or who are receiving a medication known to increase warfarin sensitivity. Higher initial dosing may be appropriate for individuals who were previously receiving warfarin and had higher dose requirements. Refer to UpToDate topics on the use of warfarin and specific clinical indications for further details.

● **warfarin adjustment**

○

**Adjustment of maintenance warfarin dosing based on the RE-LY trial**

INR	Adjustment in total mg of warfarin per week
≤1.5	Increase 15 percent per week
1.51 to 1.99	Increase 10 percent per week*
2 to 3	No change
3.01 to 4	Decrease 10 percent per week
4.01 to 4.99	Hold one dose; restart with dose decreased by 10 percent per week
5 to 8.99	Hold until INR is 2 to 3; restart with dose decreased by 15 percent per week

The table provides an algorithm for monitoring and adjustment of maintenance warfarin dosing with a goal of maintaining the INR between 2 and 3. The maintenance dose algorithm requires that INR measurements are made at a maximum interval of every four weeks, with at least weekly monitoring for out of range INRs (<2 or >3). All percent changes in warfarin dosage are adjusted based on the current INR value and calculated based upon the sum of the previous seven days of warfarin doses (also known as mg of warfarin per week). The increase or decrease in warfarin dose per week is distributed over the following week, preferably as evenly as possible to avoid large fluctuations.

This algorithm is not applicable to selecting a warfarin starting dose or for adjusting the starting dose during the first week of treatment. Refer to UpToDate content on the use of warfarin for details.

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**.phenytoin**

- dosing should be guided primarily by effect (seizure control) and tolerability
- goal concentration:
  - phenytoin level: 10-20mcg/mL
  - free phenytoin levels: 1-2.5mcg/mL

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**.levothyroxine**

- 

**.carbamazepine**

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## .HIV medication

- 
- 

## .serotonin syndrome

- drug classes that increase risk of serotonin syndrome when combined
  - SSRI
  - SNRI
  - MAOI
- symptoms
  - autonomic: mydriasis, diaphoresis, tachycardia, tachypnea
  - neuromuscular: tremor, hyperreflexia, clonus
  - altered mental status: agitation, confusion, delirium

- 

## .neuroleptic malignant syndrome

- suspect if 2 of 4 cardinal features (FARM)
  - fever
  - autonomic instability: tachycardia, high BP, tachypnea
  - rigidity
  - mental status change
- DDx
  - serotonin syndrome: shivering, hyperreflexia, myoclonus
  - malignant hyperthermia: after anesthetics such as succinylcholine
  - malignant catatonia
- investigation
  - CK
  - brain imaging and LP to rule out neurologic cause
- management
  - hold antipsychotics
  - admit to ICU if significant hyperthermia and rigidity
  - if CK elevation/hyperthermia and not responding within 1-2 days: use benzodiazepines, dantrolene, bromocriptine, amantadine
  - consider ECT if no response within a week to treat malignant catatonia

- 

## .vitamin K prophylaxis in newborns. Vit K newborns

- purpose: prevent vitamin K deficiency bleeding. as there is a deficiency in breast milk
- dose: 0.5-1mg IM
  - IM administration most effective
  - alternatively, may give it PO: 2mg at birth, repeated at 2-4 and 6-8 weeks of age

## .vitamin D measurement

- Many experts recommend a level between 20 and 40 ng/mL. Others recommend a level between 30 and 50 ng/mL.
- Routine vitamin D testing or screening for vitamin D deficiency is not recommended.
- Measurement of vitamin D levels is not generally required prior to or after initiating vitamin D supplementation.
- Vitamin D testing is indicated in patients who are at high risk for vitamin D deficiency such as those with malabsorption syndromes, renal failure, unexplained bone pain, unusual fractures, or other evidence of metabolic bone disorders.
- Vitamin D testing is only covered under the BC Medical Services Plan (MSP) when the patient is <19 years or when the test is ordered by a specialist.

## .pepto bismol. bismuth salicylate

- side effects

- black tongue
- black stools
- tinnitus
- constipation

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#### .aromatase inhibitors

- prevent conversion of certain steroids into estrogen
- side effects
  - osteoporosis

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#### .SGLT2i

- side effects
  - increased urinary frequency and volume
  - reduced GFR
  - postural hypotension
  - genital candidiasis
  - UTIs
  - electrolyte disturbances
- benefits
  - decreased CV mortality
  - nephroprotective effect
  - BP lowering
  - weight reduction

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#### .metformin

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#### .tetracycline

- should not be used in following, due to potential for discolouration of permanent teeth
  - pregnant women
  - children < 8 y.
- side effects
  - skin photosensitivity
  - dental discolouration
  - bone growth suppression
  - esophageal injury
  -

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#### .Stimulants.Adderall.Amphetamine.Methylphenidate

- screen for family hx of sudden death before age 50
- cardiac hx before prescribing
  - congenital heart disease, syncope, palpitations, SOB, palpitations,
- precautions: cardiac disease (moderate hypertension, advanced atherosclerosis, cardiac structural abnormalities. consult cardiology first), arrhythmia, bipolar, psychosis, pregnancy

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#### .Anticoagulants.DOAC

- classes of anticoagulation medications
  - Vit K antagonist: warfarin

- Factor 10a inhibitors: rivaroxaban, apixaban
- direct thrombin inhibitors: dabigatran
- heparin: UFH, LMWH
- alternatives to anticoagulation for Afib
  - left atrial appendage occlusion
  - ASA plus clopidogrel
  - ASA

## • .Statin

- side effects
  - myalgias. rhabdomyolysis
  - diabetes 1/250
  - LFT elevation

## • .methimazole

- side effects
  - agranulocytosis
  - liver: hepatotoxicity, acute hepatic failure
  - lupus like syndrome, vasculitis
  - acute pancreatitis
  - Teratogenic

## • .NSAIDs

- side effects
  - GI: GI bleed, GI ulcer
  - CV: stroke, MI, hypertension, heart failure
  - prolonged bleeding
  - renal: AKI

## • .Colchicine

- side effects
  - nausea, vomiting diarrhea

## • .allopurinol

- side effects
  - acute gout attacks in early stages: usually recommend anti-inflammatory prophylaxis for 3-6 months
  - delayed hypersensitivity reactions: SJS, TEN
  - hepatotoxicity

## • .tPA.fibrinolytic.thrombolytic

- TPA criteria
  - Onset within 4.5h, no ICH, no prior ICH, no head trauma or stroke within 3 months, no intracranial neoplasm, AVM or aneurysm, no recent intracranial /intraspinal surgery,
  - no active bleeding, BP < 185/110, not on Xa inhib, INR >1.7P:

## • .TMP SMX.Septra.Trimethoprim Sulfamethoxazole

- increased risk of hyperkalemia
  - risk factors: kidney impairment, older patients, on medications that cause hyperkalemia (e.g. ACEi/ARBs)

## .penicillin allergy in kids

- <https://cps.ca/en/documents/position/beta-lactam-allergy>
- [https://cps.ca/uploads/documents/EN\\_Clinical\\_Algorithm\\_\(Supplementary\\_file\)\\_With\\_Copyright.pdf](https://cps.ca/uploads/documents/EN_Clinical_Algorithm_(Supplementary_file)_With_Copyright.pdf)
- Definitions
  - low risk for penicillin allergy:
    - symptoms (macular rash OR maculopapular rash OR urticaria)
    - AND Onset after 1st day of therapy or over 2h after most recent dose
    - AND duration of symptom: longer than 24h
    - AND NO severe systemic or cutaneous adverse drug reaction (mucous membrane involvements, skin desquamation, arthritis/arthralgia, lymphadenopathy, ongoing, unexplained fever, kidney/liver involvement)
  - suspected IgE-mediated allergy
    - onset: 2h or less after most recent dose was administered
    - AND Symptoms: urticaria, angioedema, wheeze, dyspnea, throat tightness, voice change, dizziness, syncope, hypotension, vomiting/diarrhea
    - AND duration of symptoms: ;less than 24h after discontinuing antibiotic
  - severe systemic or cutaneous adverse drug reaction
    - mucous membrane involvements, skin desquamation, arthritis/arthralgia, lymphadenopathy, ongoing, unexplained fever, kidney/liver involvement
- Individuals at low risk for penicillin allergy can safely have the medication prescribed again.
  - Mild, delayed exanthems do not contraindicate further use of these antibiotics.
  - Administration of a single test dose of amoxicillin (15 mg/kg) with a 1-hour observation period can provide reassurance and confirm that no allergy is present.
  - These individuals can be prescribed cephalosporins (with similar and dissimilar side chains), carbapenems, and monobactams, without monitoring dose administration.
- If suspected IgE-mediated allergy or severe systemic or cutaneous delayed adverse reactions:
  - refer to a paediatric allergist for assessment.
  - Avoid cephalosporins with similar side chains
- Individuals who have been diagnosed with penicillin allergy by an allergist should be re-assessed by a paediatric allergist after 5 years. This allergy can be outgrown and avoiding penicillin for life may not be necessary.

## .penicillin allergy in adults

- If unsure about allergy, refer to allergist for testing.

## .Procedures

### .vandenbos

- when the skin is the problem not the nail. skin is too swollen.
- procedure: digital block, cut out tissue with scalpel (cut around edge, then hold blade along the nail to finish it off), cauterize, put on gauze with antibiotic ointment, wrap with coban wraps

### .wedge resection of toenail

- digital/local block, lift nail, cut nail with scissors, grasp with forceps and put nail out, phenol alternate with NS for 1 min each x3, then cauterize.

### .B12 injection

- Intramuscular
  - upper glute
  - deltoid
  - middle third of vastus lateralis muscle of thigh

## .Procedural Sedation

- Ketamine vs Propofol
  - Ketamine has lower risk of hypotension. better chance of patient protecting their airway.
  - Ketamine has risk of nightmares. Risk of violent outbursts from patients while sedated. Bette for kids since they can be more easily restrained.

## .Anticoagulant and procedures

- <https://thrombosiscanada.ca/tools/?calc=perioperativeAnticoagulantAlgorithm>
- minor dental procedures.
  - defined as:
    - dental extractions: 1 or 2 teeth
    - root canal
    - scaling or cleaning
  - Options for DOAC:
    - hold DOAC on day of procedure and resume next day
    - continue DOAC including day of procedure. BUT delay that day's dose for 4-6 hours after procedure and use 5mL tranexamic acid mouthwash 3-4 times daily before and after procedure.
  - options for warfarin
    - hold warfarin for 2-3 days before procedure and resume evening after the procedure.
    - continue warfarin up to and including day of procedure and use 5mL tranexamic acid mouthwash 3-4 times daily before and after procedure.
- DOACs: perioperative management
  - [https://thrombosiscanada.ca/wp-uploads/uploads/2021/11/22.-DOACs-Perioperative-Management\\_07August2021.pdf](https://thrombosiscanada.ca/wp-uploads/uploads/2021/11/22.-DOACs-Perioperative-Management_07August2021.pdf)
  -
- warfarin: perioperative management
  - [https://thrombosiscanada.ca/wp-uploads/uploads/2021/09/14.-Warfarin-Perioperative\\_14Sept2021.pdf](https://thrombosiscanada.ca/wp-uploads/uploads/2021/09/14.-Warfarin-Perioperative_14Sept2021.pdf)
  - note: for dental procedures: in patients having 1-2 dental extraction or root canals, warfarin can be safely continued. Can take oral tranexamic acid mouth wash (5mL just before procedure, and 2-3 times daily after procedure until bleeding subsides)
  - indications for bridging anticoagulation
    - high thromboembolic risk
      - mechanical prosthetic mitral valve, older generation (cage-ball, tilting disc) mechanical aortic valve, chronic atrial fibrillation with CHADS2 score of 5-6, recent (within 3 months) arterial thromboembolism (stroke, systemic embolism, TIA), or recent (within 3 months) VTE, prior thromboembolism during interruption of warfarin, severe thrombophilia with history of VTE (e.g. deficiency of protein C, protein S or antithrombin, antiphospholipid syndrome), rheumatic valvular heart disease
  - Algorithm
    - interruption of anticoagulation needed?
      - if minimal bleed risk procedure: can continue anticoagulation
    - if bridging anticoagulation not needed
      - stop warfarin 5 days before procedure. check INR day -1 to ensure 1.5 or less. If INR >1.5, administer vitamin K1 1-2 mg orally
    - if bridging needed
      - stop warfarin 5 days before procedure. check INR day -1 to ensure 1.5 or less. if INR >1.5, administer vitamine K1 1-2mg orally
      - use therapeutic LMWH 3 days before surgery
      - last preoperative dose 24h before surgery
      - resume therapeutic dose LMWH according to bleeding risk after surgery
        - if low/moderate bleed risk procedure: therapeutic dose LMWH day after surgery

- high bleed risk procedure: therapeutic dose LMWH 48-72h after surgery
- resume warfarin postoperatively when patient drinking fluids, consider bolus dose of warfarin
- prevention of post-op VTE in orthopedic surgical patients
  - high risk of VTE in post-op hip and knee replacements
  - for THA, TKA, HFS: recommend pharmacologic VTE prophylaxis for minimum of 10 to 14 days, and suggest continue for up to 35 days

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#### .Lumbar puncture.LP

- patient should be off blood thinners prior to procedure.
- need CBC and PTT, INR before procedures.

- 

#### .IR procedures.interventional radiology

- General pre-procedure orders
  - NPO at midnight
  - Hold blood thinners starting previous day AM
  - INR, APTT, CBC, Cr previous day AM
- Liver biopsy
  - Evaluate coagulation status: CBC, PTT/INR
    - If platelets  $\geq 60000/\text{mCL}$ , proceed with biopsy
    - If  $\text{plt} < 60000$ ; may consider transjugular approach. May try thrombopoietin receptor agonists or platelet transfusion to improve platelet count
    - INR thresholds
      - General population:  $\text{INR} < 1.5$  to  $1.8$
      - With chronic liver disease:  $\text{INR} < 2.5$

#### .Excision biopsy

- knife perpendicular to skin, push blade straight down until hit subcutaneous fat layer, trace out the ellipse, pull up tissue with forceps and dissect along the fatty layer plane.
- Make sure are prepared with lots of gauze
- supplies needed
  - lidocaine, needle, alcohol swab
  - scalpel
  - gauze
  - suture kit: needle driver, scissors, forceps
  - sutures
  - formulin container
  -

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#### .digital block.ring block

- inject about 2cc of lidocaine to the lateral and medial aspects of the proximal phalanx at a 45 degree angle, about 1cm distal to the web space. I would inject right next to the bone and wait 10-15 minutes for full anesthesia.

- 

#### .Wedge excision for ingrown toenail

- This is done for an ingrown toenail which may or may not be actively infected at the time of excision.
- indication: remove either the entire toenail or part of it that is growing into the surrounding tissue, so that it won't continue to cause pain and inflammation in that area.
- risks: infection, pain and bleeding with the procedure, as well as recurrence or nail dystrophy. If we use phenol to destroy the nail matrix, this helps prevent recurrence but does create a risk of nail spicules that can grow into the tissue of the toe surrounding the nail.



- Alternatives would be to use conservative measures like warm water soaks, putting cotton or dental floss underneath the embedded corner of the nail daily, nail taping, and acrylic artificial nails.
- materials: including sterile gloves and drapes, syringe, 2% lidocaine with epinephrine, alcohol swabs, gauze soaked in chlorhexidine, ringed forceps, a tourniquet, hemostat, needle driver, splitting scissors, forceps, scalpel or curette, cotton swabs, phenol, and dressing materials.
- Procedure
  - anesthetize the toe using a proximal digital block. may also try wing block
  - Once the patient was fully anesthetized, I would change to sterile gloves and cleanse the toe x 3 with gauze soaked in chlorhexidine
  - I would then place the tourniquet on the base of the toe.
  - Next, I would use a hemostat to separate the nail from the nail bed and gently lift the lateral nail bed to disarticulate it from the nail plate edge.
  - I would cut the lateral edge of the nail plate using heavy scissors up to the nail fold.
  - I would grasp the cut nail fragment with a hemostat and pull the fragment out of the nail plate. Then, I'll examine to ensure no nail fragments are left behind. If necessary, I will remove any granulation tissue using a scalpel or curette.
    - If we are doing matrixectomy with phenol, I would then apply 80% phenol to a cotton tipped applicator and carefully apply to the nail matrix under the proximal fold. I would hold it there for 30-60 seconds for 2-3 times.
    - Once completed, I would wash out any residual phenol by thoroughly rinsing with 70% isopropyl alcohol or saline.
  - Finally, I would apply Vaseline or polysporin to the exposed nail bed and wrap with plenty of gauze and secure with tape to form a dressing.
- The procedure is done. Please rest the toe and elevate as much as possible for the next 12-24 hours. Use tylenol or advil for discomfort and change the dressing in 1-2 days. You can walk as usual after a day or two. There may be some clear drainage of the area for 2-3 weeks. If you notice any signs of infection like warmth, redness, swelling, increased pain or purulent discharge, let me know.

## ● .Vandenbos

- treatment for ingrown toenail. preferable to wedge resection when the nail isn't too wide, but the tissue is still very thick and inflamed.
- procedure
  - digital block. and possible local anesthetic as well.
    - may also try wing block instead of digital block
  - consider tourniquet
  - cut out the large section
  - cauterize with silver nitrate or electrocautery
  - apply bandage and wrap with coban wraps for pressure.

## ● .bleeding laceration

- try a figure 8 stitch (figure 8 stitch)
  - how to perform
    - take a deep bight across both side 1 and side 2 of the laceration like a simple interrupted.
    - now instead of tying the knot, then go back to take a bight from side 1 and then side 2. with a diagonal line connecting the two pairs. all bights are in the same direction, like a simple interrupted, but unlike a horizontal mattress suture.
    - now tie the knot.
  - uses
    - to stop bleeding
    - can help bring together wounds when there is a lot of tension and when the first throw of a surgeon's knot doesn't hold in a simple interrupted suture.

## ● .Laceration.Suturing

- Indication for suturing

- Clean, uninfected lacerations on any part of the body in healthy patients may be closed primarily for up to 18 hours following the injury without a significant increase in the risk of wound infection.
- Because of the lower risk of infection or poor wound healing, facial wounds may be closed primarily up to 24 hours following the injury in all patients. In selected patients (no signs of infection, otherwise healthy patient, and easily approximated wound), closure of facial wounds may occur up to 48 to 72 hours after injury.
- **Contraindications**
  - **Absolute:**
    - Lacerations through infected skin
    - Deep puncture wounds
    - Lacerations that have been grossly contaminated with foreign debris that cannot be completely removed by irrigation and debridement at the bedside
  - **Relative:**
    - Human, dog, and cat bites (except facial and other potentially cosmetic wounds)
    - Wounds, other than facial wounds, that are older than 24 hours in patients with risk factors for infection or poor wound healing
    - Lacerations with significant tissue loss in which suturing will cause too much tension across the suture line
- **aftercare**
  - **dressing:**
    - has wound drainage: Sterile gauze dressing or adhesive bandage (open dressing).
    - no wound drainage: open or semioclusive dressing such as a polymer film (eg, Tegaderm, Cutifilm, Blisterfilm, or Bioculside)
    - leave dressing in place for 24 hours. Then can leave wound open to air.
  - An antibiotic ointment can be applied to the wound as well, with instructions to apply the ointment two times per day at home until suture removal.
  - **Bathing**
    - non-absorbable sutures: gentle cleaning 24h after closure. To prevent crusting over suture knots
    - absorbable sutures: may also be gently cleaned 24 to 48 hours after placement, although some experts advise keeping the stitches dry until the suture is mostly absorbed (typically, five days for fast-absorbing gut or 7 to 10 days for Vicryl Rapide).
  - **swimming:** Prolonged soaking of stitches including swimming in chlorinated water should be avoided because of the theoretical risk of premature loss of suture tensile strength with wound dehiscence. Patients with sutures should also not swim in natural bodies of water, because of a potential increased risk of infection.
  - tetanus prophylaxis as indicated.
- **Antibiotics prophylaxis**
  - For healthy patients with uncomplicated traumatic skin lacerations, we recommend local wound care without prophylactic antibiotics
  - consider antibiotic prophylaxis if: animal/human bites, intraoral lacerations, excessive wound contamination, nailbed injuries
- **Suture removal**
  - Face – 5 days
  - Eyelids – 5 days (3 days for low-tension wounds and up to 7 days for high-tension wounds)
  - Neck – 5 days
  - Scalp – 7 to 10 days
  - Trunk and upper extremities – 7 days
  - Lower extremities – 8 to 10 days
  - Digits, palm, and sole – 10 to 14 days

## Laceration.Suturing - technique

- **glue**
  - make sure laceration is not taut. otherwise won't hold
  - < 4cm long
  - can use hair to tie together

- glue with steri-strips
  - clean first
  - steristrip along the laceration. then glue through the steristrips. then steristrips perpendicular
  - steristrips for 3-5 days. don't get wet. afterward, can get them wet, and will fall off on own
- time to remove sutures. and size of sutures
  - scalp, face: 5 days
    - 5-0 nylon
  - over joint: 10-14days
  - shoulder: reassess at 14 days
  - chest, abdomen: 7-10 days
  - hands: 7-10 days
    - 4-0 nylon
- if large laceration, use 1% lidocaine, since can use more volume
  - 4mg/kg allowed of lidocaine
- lidocaine max dose
  - without epinephrine: 3-4.5mg/kg
  - with epinephrine: 6-7 mg/kg
- can repair laceration 12hours
- digital block
  - base of palmar. midline 2-3cc
  - if thumb. volar
- tendon: if can see, grab either end, do figure 8 stitch
  - splint in neutral after
  - refer to plastics

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## .local anesthetic

- Injection technique
  - local block: look for bleb. so inject superficially
  - digital block: inject needle perpendicular to skin, inject distal to MCP/MTP on dorsal side. 1-2mL each side.
- alternatives to injected local anesthetic
  - procedural sedation
  - patient distraction
  - topical anesthetic. e.g. EMLA cream
- methods to reduce pain of lidocaine injection
  - buffering lidocaine with bicarbonate
  - warming the lidocaine
  - inject slowly at perpendicular angle to skin
- alternative to lidocaine if allergy. allergy likely due to preservative, so may use preservative free lidocaine
  - other options: procaine, tetracaine

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## .Psychiatry

### .PMDD.premenstrual dysphoric disorder.PMS

- Presentation
  - premenstrual syndrome (PMS) include affective symptoms (such as depression, irritability, and anxiety) and somatic symptoms (such as breast pain, bloating and swelling, and headache). The symptom(s) must impair functioning in some way and must remit at menses or shortly thereafter.

- PMDD is a more severe form
- diagnosis
  - women must be symptom free during the follicular phase.
- Management
  - mild symptoms: do not cause distress
    - lifestyle measures: regular exercise, stress reduction.
    - CBT may be beneficial and has not been studied well
  - moderate to severe:
    - SSRI is first line. May be continuous daily therapy OR luteal phase only (start cycle day 14) OR symptom onset therapy
      - if doesn't respond, may try different SSRI or switch to OCP
    - OCP is another option if wants contraception as well.
      - Can use OCP containing drospirenone with four day pill free interval
      - if symptom relief with monophasic OCP inadequate, SSRI can be added.
    - Suggest a 2-3 month trial
  - Persistent symptoms
    - may try GnRH agonist therapy with estrogen/progestin add-back
    - consider referral to Gyne

## .ABUSE:

- S: Establish confidentiality; directly question about physical, sexual, or emotional abuse and about fear, safety, escape plan/backup plan; history of frequent accidents/injuries, mental illness, drug use; question about if other family mem, hers are potentially involved (eg. children, elders); firearms in the home.
- O: Vital signs; complete exam looking for evidence of trauma (HEENT, cardiovascular, pulmonary, abdominal, musculoskeletal, skin) ± pelvic exam.
- DDX: domestic violence, substance abuse
- 

## .Anorexia.Bulimia.Eating disorder

- SCOFF questionnaire
- Clinical judgement re patient safety – admit if :
  - unstable VS and hypovolemia
  - bradycardia < 45 bpm
    - temp < 35.5
    - systolic BP < 80
    - orthostatic change in pulse > 20
    - orthostatic change in BP > 10
  - electrolyte abnormalities
  - < 75% of ideal body weight
  - suicidal
- eating disorder subtypes
  - anorexia nervosa
    - restriction of energy intake, intense fear of gaining weight, distorted perception of body weight/shape
  - avoidant, restrictive food intake
  - binge eating
  - bulimia nervosa
    - binge eating with sensation of loss of control, inappropriate compensatory behavior to prevent weight gain (e.g. vomiting, laxatives, excessive exercise), occurs ≥ 1/week for 3 months, excessive concern about body weight/shape
  - pica
  - rumination
- history
  - excessive dieting/fasting

- excessive exercise
- purging: vomiting, laxatives, diuretics, enemas
- complications
  - cardioresp: palpitations, arrhythmia, edema, chest pain, SOB
  - oral/dental: lacerations, dental erosions, parotid swelling
  - GI: GERD, epigastric pain, hematemesis
  - endocrine: osteoporosis, amenorrhea, decreased libido, infertility
  - derm: hair loss, lanugo hair, brittle nails
  - general: weak, dizzy, fatigue, syncope, cold
- anorexia vs bulimia
  - anorexia: restricted calories and low body weight. note: there can be binge/purge subtype, but if low body weight, we classify as anorexia instead of bulimia
  - bulimia: binge eating followed by compensatory behavior (vomiting, laxatives, diuretics, exercise)
- investigations
  - electrolytes, BUN, Cr, glucose, Ca, Phos, Mg
  - albumin
  - LFTs: AST, ALT, ALP
  - INR, CBC
  - TSH, 25-OH vit D
  - ECG

## ● .Adjustment disorder

- low mood, tearfulness, feeling of hopelessness that occur in response to identifiable stressor within three months of onset of stressor
- symptoms
  - significant distress that exceeds what would be expected given nature of stressor
  - impaired social/occupational functioning

## ● .Complicated grief

- prolonged acute grief lasting at least 6-12 months after loss
- complicating features
  - maladaptive rumination, dysfunctional behaviors (excessive seeking proximity to deceased, excessive avoiding reminders of loss), inadequate regulation of emotions

## ● .Depression.Anxiety

- DDX: MDD, substance-induced, dysthymia, normal bereavement, hypothyroid
  - organic causes: post MI, Parkinson's, dementia, MS, cancer, chronic pain, hypothyroidism, hyperparathyroidism, vit B12, cocaine, mononucleosis, OSA
  - psych DDX: GAD, bipolar, psychosis, personality disorders
- History
  - SIGECAPS (mood, sleep, interest, guilt, energy, concentration, appetite, psychomotor slowing, suicide)
    - PHQ2: feel down, depression or hopeless. little interest or pleasure in doing things
  - SI/HI
  - substance use
  - anxiety:
    - nervous, anxious, worried, on edge
    - poor sleep, irritable, low concentration, restless, fatigue, muscle tension
  - mania:
    - have you ever felt like you were on top of the world for several days in a row, while requiring little to no sleep?
    - have you ever felt you were high on cocaine without using drugs, for multiple days? ever felt driven by a motor, and didn't sleep because didn't feel tired?

- GST PAID: gradiosity, decreased need for sleep, talkative, pleasure and pain, increased activity, flight of ideas, distractibility
- psychosis
- other questions
  - OCD: look up MACSCREEN
    - obsession: recurrent, unwanted, intrusive thoughts/images/urges
    - compulsions: repetitive behaviours or mental acts to reduce anxiety generated by obsessions
  - stress, substance use, panic attacks
  - exercise
- O: Vital signs; head and neck exam; neurologic exam;
  - mental status exam, including documentation of appearance, behavior, speech, mood, affect, thought process, thought content, cognition (measured by the 30-point mini-mental status exam), insight, and judgment.
- Workup
  - bloodwork: CBC, Electrolytes, Cr, ALT, iron, ferritin, TSH, B12
- management
  - pharmacotherapy: see notes below
  - psychotherapy
  - contract for safety
  - ensure appropriate follow-up

## .Depression/Anxiety pharmacotherapy.SSRI.SNRI

- approach to pharmacotherapy - acute phase
  - reassess patient every 2-4 weeks. weekly for children/adolescents
  - choose first line medication
  - use scales to monitor improvement at each visit
  - if > 20% improvement: continue treatment and reassess after 6-8 weeks
  - if < 20% improvement:
    - if med tolerable: increase dose and reassess for 20% improvement in 2-4 weeks
    - if med NOT tolerable: switch to another 1st line med or add adjunct
      - choose to switch if: first antidepressant trial, poorly tolerated side effects, less severe/less functional impairment
      - choose adjunct if: ≥2 antidepressant trials, initial antidepressant well tolerated, more severe
- adjuncts
  - first line:
    - aripiprazole 2-15mg
    - quetiapine 150-300mg
    - risperidone 1-3 mg
  - 2nd line
    - Brexpiprazole 1-3mg
    - Bupropion 150-300mg
    - Lithium 600-1200mg
    - Mirtazapine 30-60mg
- approach to pharmacotherapy - maintenance
  - after achieving symptomatic remission: remain on stable dose for 6-9 months
  - for high risk patients: remain on stable dose for minimum of 2 years
    - high risk:
      - frequent or recurrent episodes
      - severe episodes (psychosis, severe impairment, suicidality)
      - chronic episodes
      - comorbid psychiatric or medical conditions
      - residual symptoms
      - difficult to treat episode

- discontinuation: slow taper over several weeks. discontinuation symptoms more common with paroxetine and venlafaxine.
- in children/adolescents
  - best evidence of fluoxetine.
  - then escitalopram, sertraline
  - citalopram with minimal evidence. no evidence for paroxetine.
  - venlafaxine 3rd line
- pregnancy/postpartum
  - citalopram, escitalopram, sertraline
  - bupropion, desvenlafaxine, duloxetine, fluoxetine, fluvoxamine, mirtazapine, TCA < venlafaxine
- elderly/late-life depression
  - note adverse effects: falls, hyponatremia, QT prolongation, GI bleeds, bone loss
  - consider AChEI in dementia patients
  - may take 10-12 weeks before see effect in elderly
  - L1: duloxetine, mirtazapine, nortriptyline
  - L2: bupropion, citalopram/escitalopram, desvenlafaxine, duloxetine, sertraline, venlafaxine
  - 2nd line
    - switch to nortriptyline, quetiapine/trazodone, bupropion
    - combine with aripiprazole, lithium
- general side effects
  - 7% of patients will develop any of the following s/e : N, V, D, abdo pain, HA, decreased sleep, decreased sex (this means that 93% won't !!)
  - SSRI: jitteriness, headache, GI upset, insomnia, sexual side effects
    - sexual dysfunction: ejaculatory delay, decreased libido, orgasm disturbance, erectile dysfunction
  - SNRI: similar to SSRI, plus sweating, dizziness
  - other serious adverse reactions
    - suicidality
    - QT prolongation: citalopram, escitalopram, quetiapine
    - falls, fractures: in SSRI: highest risk in first 6 weeks
    - hyponatremia in SSIRs in elderly
    - GI bleed: SSRI
    - elevated LFTs
- Specific medications
  - Sertraline
    - 25mg x 7 days
    - 50mg x 3 weeks
    - f/u in 4 weeks
  - Escitalopram
    - 5mg x 7 days
    - 10 mg x 3 weeks
  - fluoxetine
    - increase by 10mg every 1 weeks
  - Venlafaxine
    - 37.5mg x 2 weeks, then 75mg x 2 weeks.
    - less sexual side effects?
- Treatment resistant depression
  - DDx: general medical illness, complicated grief, ADHD, bipolar disorder, schizophrenia, adjustment disorder, sadness
  - When to add antipsychotics?
    - Max out SSRI, then can switch or augment.
      - partial benefit initially: can augment with Mirtazapine or Bupropion
    - no benefit or more side effects from initial: switch. cross taper over 1 week
    - may augment with Abilify, Quetiapine

- May consider augmenting with Pregabalin on top of SSRI ± antipsychotic.
- switching antidepressants.
  - [https://www2.gov.bc.ca/assets/gov/health/practitioner-pro/bc-guidelines/depress\\_appd.pdf](https://www2.gov.bc.ca/assets/gov/health/practitioner-pro/bc-guidelines/depress_appd.pdf)
  - Fluoxetine to other SSRI
    - stop fluoxetine, wait 4-7 days. Start new SSRI at low dose
  - SSRI to SSRI
    - taper and stop, then start new SSRI at low dose
  - SNRI to SSRI
    - cross taper cautious with low dose of SSRI
  - SSRI to SNRI
    - taper and stop, then start new SNRI at low dose
  - Bupropion to SSRI
    - taper and stop, then start SSRI (consider lower starting dose)

		GAD	PD	SAD	OCD	PTSD
NNT		5.5		3.57		
Citalopram ( <i>Celexa</i> )	20-40 mg	③	①	②	②	
Escitalopram ( <i>Cipralex</i> )	10-20 mg	①	①	①	①	③
Fluoxetine ( <i>Prozac</i> )	20-80 mg	③	①		①	①
Fluvoxamine ( <i>Luvox</i> )	100-300 mg		①	①	①	②
Paroxetine ( <i>Paxil</i> )	20-60 mg	①	①	①	①	①
Sertraline ( <i>Zoloft</i> )	50-200 mg	①	①	①	①	①
Venlafaxine ( <i>Effexor</i> )	75-375 mg	①	①	①	②	①
Duloxetine ( <i>Cymbalta</i> )	60-120 mg	①	③	③	③	③
Clomipramine	150-250 mg		②	③	②	
Imipramine	150-300 mg	②	②			③
Mirtazapine ( <i>Remeron</i> )	15-45 mg	③	②	③	②	②
Bupropion ( <i>Wellbutrin</i> )	150-300 mg	②	③	③		③
Risperidone			③			③
Olanzapine			③	③		
Quetiapine		②	③			③
Valproic Acid			③	③		
Pregabalin ( <i>Lyrica</i> )		①		①		
Gabapentin			③	②		

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- CBT:
  - <https://telecbt.ca/ohip/>
  - Bounceback
    - need to send in referral form to BounceBack team
    - needs GAD7 and PHQ9 from patient to fill out the referral
  - other resources
    - Wellness Together Canada:
      - [ca.portal.gs](https://ca.portal.gs)
    - Beacon digital:
      - [info.mindbeacon.com](https://info.mindbeacon.com)
    - Abiliti CBT
      - [ontario.abiliticbt.com/home](https://ontario.abiliticbt.com/home)
    - BounceBack
      - [bouncebackontario.ca](https://bouncebackontario.ca)
  - [psychologytoday.com](https://psychologytoday.com)



- Resources to refer to
  - AIMHS
  - MHDT
  - Ontario shores Metabolic clinic
  - Neuranova mindfulness based chronic pain management program
- general measures
  - encourage diet, exercise.
  - restless and poor sleep from SSRI
    - if taking at night, try taking it in the morning
    - slowly move the timing: late afternoon → noon → morning

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## .Eating disorder

- DDx
  - anorexia, bulimia, avoidant food intake, depression, OCD, body dysmorphia
- S:
  - meals, laxatives, provoking vomiting, eating by self, binge eating
  - height, weight, exercise
  - fear of weight gain
  - suicidality, NSSI
  - mood, anxiety, substances, stress
  - amenorrhea, syncope, hair loss
- P:
  - if medically unstable, pt should be hospitalized
    - HR < 40. BP < 80/60. orthostasis
    - cardiac dysrhythmia
    - dehydration, electrolyte imbalance, hypoglycemia, syncope
    - BMI < 15.
  - CBT
  - treat comorbid depression, anxiety if severe.
  - nutritional rehab. usually started inpatient or intensive outpatient.
  - refer to eating disorder clinic.

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## .Insomnia

- DDx
  - stress, caffeine/stimulant, MDD, OSA, shift work, pain
- S:
  - trouble falling asleep vs multiple awakenings vs early-morning awakening
  - sleep hygiene: regular sleep schedule, daytime naps, exercise, caffeine, screens before bed
  - daytime sleepiness;
    - important to ask about impact on function
  - pain, polyuria
  - loud snoring. nightmares, depression;
  - caffeine, alcohol, medication, and recreational drug use;
  - work or lifestyle (jet lag or shift work), stressors,
  - presence of psychiatric symptoms ( eg. grandiose delusions, irritability); daytime effects.
- O: Vital signs; mental status exam; thyroid exam.
- investigations
  - CBC, TSH

- sleep study
- Management
  - if depression/anxiety
    - SSRI
    - CBT
  - else
    - CBT-insomnia (CBTi)
      - <https://www.psychologytoday.com/ca/therapists/sleep-or-insomnia/on/oshawa>
      - mysleepwell.ca
        - CBTi coach
  - melatonin
  - exercise
  - sleep hygiene
  - meditation apps: e.g. Insight Timer.
- ask about effect of sleep on daytime function
  - if no effect on function, may reassure patient and readjust expectations.
- Investigations
  - bloodwork
  - consider sleep study to rule out OSA.
- Sleep hygiene
  - sleep only as much as needed to feel rested then get out of bed
  - keep regular sleep schedule. even on weekends
  - only use bed for sleep and sex.
  - avoid daytime naps
  - don't sleep unless feel sleepy. if unable to sleep after 20 min, get out of bed and do relaxing activity, such as reading or listening to music; avoid stimulating activities like eating or screens
  - exercise regularly, preferably 4-5 hours before bedtime
  - food/drugs: avoid caffeine after lunch; avoid alcohol near bedtime; avoid smoking, especially in evening; don't go to bed hungry
  - avoid screens before bed

## .insomnia - Pharmacotherapy

- Ensure patient is also doing CBTi. Pharmacotherapy alone not recommended
- safe prescribing practices
  - use lowest effective dosage
  - refill only if continued need, efficacy, tolerability established
  - Discuss risk of next-day impairment in alertness, memory, coordination, and driving
  - Discuss risk of complex sleep-related behaviors such as sleepwalking, eating, and driving
- treatment duration,
  - majority of placebo-controlled studies provide direct safety and efficacy data only for relatively short-term use
  - aim is to treat for long enough to improve symptoms and build confidence in nonpharmacologic strategies but to avoid treating for longer than is needed, in order to avoid unnecessary risk and side effects.
- Treatment discontinuation
  - Patients may experience rebound insomnia for several days following abrupt discontinuation of any insomnia medication, most commonly with BZRA hypnotics
  - should gradually taper over days to weeks
- shared warnings, precautions
  - CNS depressant effects: impaired alertness, motor incoordination, and next-morning impairment. Risk highest with BZRAs.
- choosing medications
  - sleep onset insomnia: difficulty falling asleep

- first line:
  - Melatonin receptor agonist: Ramelteon
  - BZRA: zopiclone, zolpidem
- off label/OTC
  - melatonin
  - sedating antidepressant: trazodone, mirtazapine
- sleep maintenance or mixed insomnia: difficulty sleeping through the night. Waking up too early
  - first line
    - DORA: lemborexant (Dayvigo), daridorexant
    - low dose doxepin
    - BZRA
  - off label/OTC
    - sedating antidepressant
    - gabapentin
    -
- BZRA
  - reasons to avoid: older age ( $\geq 65$ ), cognitive dysfunction, history of substance use disorder, or patient preference.
  - Caution with BZRA if also taking opioids due to risk of respiratory depression
  - side effects: somnolence, drowsiness, and dizziness.
  - Be aware of complex sleep related behaviors: sleepwalking, sleep driving/eating.
  - Zopiclone. Start 3.75mg. Max dose: 7.5mg.
- Doxepin
  - side effects: somnolence/sedation, nausea, and upper respiratory tract infection
  - dose: 3-10 mg in adults. 3-6 mg in older adults ( $\geq 65$ )
- dual orexin receptor antagonists (DORAs).
  - side effect: somnolence
  - contraindicated in narcolepsy
  - Lemborexant (Dayvigo) 5-10mg.
  - Suvorexant (Belsomra) 10mg. Max 20mg
- Ramelteon (melatonin receptor agonist)
  - side effects are somnolence, dizziness, fatigue, nausea, and exacerbation of insomnia.
  - dose: 8mg
  - avoid using with fluvoxamine, a strong CYP1A2 inhibitor
- Off label
  - mirtazapine
    - The typical dose range for depression is 15 to 45 mg in the evening. Lower mirtazapine doses tend to be more sedating than higher amounts, so 7.5 to 15 mg is most often prescribed for insomnia symptoms.
  - Trazodone
    - dose: 50-100mg in adults. 25-100mg in older adults.
    - side effects: most common problematic side effects are syncope, edema, blurred vision, diarrhea, nasal congestion, and weight loss. It has the potential to cause cognitive and motor impairment.
  - atypical antipsychotics
    - should avoid due to metabolic risks and risk of falls
  - gabapentin
    - Limited evidence has shown improvement in sleep duration with gabapentin. The most appropriate use may be in patients with substance use disorders such as alcohol use disorder
  - Benzos
    - alprazolam, clonazepam, and lorazepam are not well studied for safety and efficacy for the indication of insomnia.
- benzo, z-drugs useful for short duration.  $<7$  nights
  - long term risk of cognition and fall risk
- Consider CBD. 2.5-5mg. Then titrate up
  - Ask pt to go to Ontario cannabis website

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## [.Suicidal Ideation.suicide](#)

- S:
  - passive vs active (better off dead vs want to kill self), prev attempts or self harm
  - are thoughts controllable; frequency, intensity; how powerful is the urge;
  - plan; where, when, would it work
  - access to weapons, gun, razor or means to kill self
  - alcohol and drugs
  - support of family, friends
  - family hx of suicide.
- P:
  - outpatient treatment
    - inform patient that SSRI increases SI risk
    - pt to seek medical attention if worsening SI
    - f/u in 1 week
  - inpatient treatment if high risk: suicide attempt or severe SI with plan and intent.
    - patient who thought about slitting own throat that morning, but has no plans currently is still considered actively suicidal.
    - if unlikely to go to ER on own
      - keep patient in room. observed by staff member
      - call ambulance to transfer to hospital
    - if patient willing to go to ER, no need to form the patient
      - ask family member to bring patient to the ER. get family member to call to confirm patient is at ER.
      - ideally, family member would stay until patient gets assessed by someone from mental health team.
      - if no contact from patient or family member, may need to contact police and get a form 1 or 4.
    - follow-up:
      - should schedule a f/u visit within 7 days of discharge from psych hospitalization
  - safety plan
    - know warning signs and precipitants
    - secure or remove lethal agents
    - individual coping: review reasons for living, relaxation, exercise
    - interpersonal coping: identify friends and trusted individuals
    - professional resources:
      - Durham crisis line: 1-800-742-1890
      - ER

- 

## [.Suicidal Ideation.suicide - other info](#)

- risk factors: SADPERSONS
  - sex: male
  - age: young or elderly
  - depression
  - Past history of suicide attempt
  - EtOH use disorder
  - rational thinking loss
  - suicide in family history
  - organized plan
  - no social supports
  - sick with chronic disease/pain

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## .Borderline Personality

- Criteria (5 of 9)
  - Abandonment
  - Mood/affect instability
  - Suicidal gestures/self-harm
  - Unstable, intense relationships
  - Impulsive (min. self- damage ways, e.g. sex/drugs/spending)
  - Control of anger
  - Unstable self image
  - Dissociation / paranoia under stress
  - Emptiness (chronic feeling)
- unstable moods and behaviour, feel alone in the world, problems with self-image.
- quick questions to ask
  - Take rejection personally
  - SI under stress
  - Sees things as black/white
  - Chaotic childhood
  - Quick mood changes

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## .PTSD

- screening:
  - PC-PTSD-5
    - history of trauma. if no, stop here.
    - in the past month:
      - **intrusive:** nightmares or thought about the event when you didn't want to
      - **avoidance:** tried hard to not think about the even or tried to avoid situations that reminded you
      - **arousal/reactivity:** constantly on guard, watchful or easily startled
      - **dissociative:** felt numb or detached from people, activities, surroundings
      - felt guilty or unable to stop blaming yourself or others for the event
    - cut off point of 4.
- acute stress disorder
  - when within 1 month of traumatic event
  - suggest treatment with trauma focused therapy as opposed to medication or other psychotherapies
  - psychological debriefing has NOT been found to be effective preventing PTSD

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## .Sleep Hallucinations

- ddx: schizophrenia, hypnagogic hallucinations
- Investigations
  - Sleep study
- sleep apnea may make them worse.

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## .Pseudoseizure.PNES.Psychogenic nonepileptic seizures

- factors suggesting PNES
  - events frequent from onset. multiple events per day if patient appears well
  - long events
  - events on emerging from anaesthetic. events with onset in pregnancy.
  - in patients with epilepsy

- no response to multiple antiseizure medication
- unexplained exacerbation of seizures
- Investigations
  - may consider EEG/MRI to rule out epilepsy and reassure patient
  - video recording during events
- epileptic seizures vs psychogenic nonepileptic seizures
  - epileptic seizures
    - usually <2 min
    - eyes open/half open
    - postictal phase is drowsy, confused
  - PNES
    - postictal: often back to alertness quickly
    - injuries: less commonly reported/observed
- usually have high burden of psychiatric disease, epilepsy, developmental disabilities, somatic complaints

## .Tics.Tourettes

- Clinical feature
    - Tics: sudden, brief, intermittent movements (motor tics) or utterances (phonic tics).
    - Onset: typically between ages 2 and 15 years and occurs by 11 years of age in 96 percent of patients.
    - common comorbid conditions in TS include attention deficit hyperactivity disorder (ADHD), obsessive-compulsive disorder (OCD), and other behavioral and psychosocial problems.
  - Classification of tics
    - Pathologic tics
      - Primary
        - Sporadic: Transient motor or phonic tics (<1 year). Chronic motor or phonic tics (>1 year). Adult-onset (recurrent) tics. Tourette syndrome
      - Secondary ("Tourettism")
        - Inherited: Huntington disease. Neuroacanthocytosis. Neurodegeneration with brain iron accumulation. Tuberous sclerosis . Wilson disease
        - Infections: Encephalitis, Sydenham chorea
        - Drugs: Stimulants, levodopa, carbamazepine, phenytoin, phenobarbital, antipsychotics (tardive tics)
        - Toxins: Carbon monoxide
        - Developmental: Static encephalopathy, intellectual disability, chromosomal abnormalities
        - Other: Head trauma, stroke, neurocutaneous syndromes, schizophrenia, neurodegenerative disorders
    - Related disorders
      - Stereotypies
      - Self-injurious behaviors
      - Hyperactivity syndrome
      - Compulsions
      - Excessive startle
      - Jumping Frenchman, Latah, Myriachit
- management of Tourettes
  - Mild, nondisabling tics – Patients with TS who have tics that are mild and nondisabling should receive education, counseling, and supportive care; behavioral or pharmacologic tic suppression therapy is not clearly indicated.
  - Treat comorbid conditions, including ADHD and OCD
  - debilitating tics:
    - Comprehensive Behavioral Intervention for Tics
    - antidopaminergic drugs
    - some anecdotal evidence that cannabis can be helpful
    - if only focal motor or phonic tics, we suggest treatment with botulinum toxin injections into the affected muscles
- Prognosis – Tics often decline during adolescence and young adulthood and even resolve in a substantial minority.

## .ADHD

- [https://www.caddra.ca/wp-content/uploads/CADDRA-Guidelines-4th-Edition\\_-Feb2018.pdf](https://www.caddra.ca/wp-content/uploads/CADDRA-Guidelines-4th-Edition_-Feb2018.pdf)
  - DDx
    - MDD, bipolar, anxiety, OCD, ODD, substance abuse
    - thyroid, hypoglycemia, anemia, B12 deficiency, liver disease, sleep disorder (e.g. OSA), FAS
    - learning disorder, hearing difficulties
  - Approach
    - Questionnaire: ASRS in adults, SNAP IV in kids
      - ASRS:
        - Part A: 4 marks in often/very often, then highly consistent with ADHD.
        - Part B: no total score or diagnostic likelihood utilized with these questions.
    - adults
      - ADHD symptoms should usually start as a child, but may not be disabling until adult
    - investigations
      - CBC, electrolytes, Cr, TSH, LFTs, lead levels
      - routine ECG NOT recommended if no cardiac disease history
    - History: get collateral from patient, parents
      - age of onset, duration of symptoms,
      - degree of impairment
      - multiple settings: work, school, relationships
      - cardiac history
        - syncope, palpitations, congenital heart disease, family history
  - Behavioural strategies
    - task lists, timers, schedules
  - Pharmacotherapy
    - prior to treatment
      - remember to screen for sudden cardiac death
      - try to avoid psychostimulants <6yo
      - precautions: cardiac disease (moderate hypertension, advanced atherosclerosis, cardiac structural abnormalities. consult cardiology first), arrhythmia, bipolar, psychosis, pregnancy
    - first line
      - Adderall IR: start: 5-10mg. increase 5mg q7days.
        - Covered by Plan G
      - Adderall XR: start: 10-20mg. increase 10-20mg q7days.
      - Biphentin: start: 10-20mg. increase 5-10mg q7days
      - Concerta: start: 18mg. increase 8-19mg q7days.
      - Vyvanse: start 20-30mg. increase 10mg q7 days.
    - second line
      - Dextroamphetamine
        - Oral: Initial: 5 mg once or twice daily with first dose in the morning; increase daily dose by 5 mg increments at weekly intervals until optimal response is obtained, usual range 5 to 20 mg/day; maximum daily dose: 40 mg/day in 2 to 3 divided doses; use intervals of 4 to 6 hours between doses.
      - Dexedrine, Ritalin, Strattera
    - other
      - Focquest. Start 25mg. Titrate up (by 10mg) q5days. Max 100mg.
  - follow-up while on stimulants
    - target symptoms, sleep, appetite
    - height/weight, HR/BP
  -
- ## .ADHD - other info
- diagnosis

- inattention
  - makes careless mistakes
  - difficulty organizing tasks
  - easily distracted
  - forgetful
- hyperactivity-impulsivity
  - fidgets
  - difficulty staying seated
  - talks excessively
  - often on the go
  - difficulty waiting turn
  - blurts out answers
  - interrupts others
- prenatal risk factors
  - smoking during pregnancy
  - alcohol during pregnancy
  - low birth weight
- risk factor
  - family history
- comorbidities
  - ODD
  - tic disorders
  - substance use disorder
  - anxiety
  - depression
  - ASD
  - learning disorders
  - intellectual disability

•

## [.Bipolar.mania](#)

- investigations
  - CBC, FPG/A1c, lipids, lytes, Ca, LFTs, Bili, INR, PTT, Cr, TSH,
  - ECG, preg test, prolactin,
  - urinalysis, urine drug screen
- Criteria
  - abnormally, persistently elevated mood and abnormally, persistently increased energy/activity.
    - for 1 week, most of day.
  - Mania: > 1 week of elevated mood, grandiosity, dec need for sleep, racing thoughts, increased talking, increased pleasure
  - Hypomania: ≥ 4 days of mania but without impairment of functioning or need for hospitalization
  - 3/7 criteria
    - grandiosity
    - decreased need for sleep. well rested after only 3 hours
    - talkative. pressured speech.
    - flight of ideas. racing thoughts
    - distractible
    - increased activity or psychomotor agitation
    - activities with painful consequences (buying spree, sexual indiscretion, foolish business investments)
- DDx
  - Neurosyphilis, AIDS, Cancer, epilepsy, MS, ADHD, substance abuse, medications (steroids, methylphenidate, levodopa, antidepressants, cyclosporine)
- Pharmacotherapy



- Acute mania: hospitalization often required
  - First line
    - Monotherapy: Lithium, Quetiapine, Divalproex, Asenapine, Aripiprazole, Paliperidone, Risperidone
    - Combination: Li/DVP + (Quetiapine OR Aripiprazole OR Risperidone OR Asenapine)
- Acute depression: note increased suicide risk
  - Quetiapine, Lithium, lamotrigine, divalproex
- Maintenance
  - Lithium, divalproex, Quetiapine, lamotrigine
- Note: avoid valproate, lithium in women of child bearing age
- Example medications
  - Lithium: see Lithium notes
    - Start 300mg po qhs. Usual maintenance 300mg po bid. Titrate to serum target level
    - Monitor: 12h trough levels (5d after dose change), Cr, TSH, Ca q3-6 months
    - Levels: target 0.6-1.0 mmol/L. draw trough 8-12h after last dose. 5 days after dose change
  - Divalproex (not interchangeable with valproic acid)
    - Start: 250mg with food. Titrate to serum level.
    - Monitor: valproate trough level, CBC, LFTs q3-6 months
    - Levels: target 400-700mcml/L. draw trough 8-12h after last dose. 5 days after dose change
  - Quetiapine
    - Start 50mg qhs. . increase 50-100mg/day every week. Usual dose 150-300mg po bid
    - Monitor: BP, FPG/A1c, lipids q12 months

## [.Panic disorder](#)

- screening questions
  - have times when experience sudden rush of symptoms or uncomfortable physical feelings such as racing heart or dizziness
  - feeling of fear or panic at these time
  - these spells occur out of the blue, without obvious trigger or cause
- symptoms of panic attack
  - sweating, trembling, unsteadiness
  - depersonalization/derealization
  - excessive HR
  - nausea
  - tingling
  - SOB
  - fear of death
  - chest pain
  - chills
  - choking sensation

## [.agoraphobia](#)

- avoid any situations because you might experience these spells of symptoms or feelings of fear or anxiety
  - crowds, enclosed places, driving, leaving the house alone
- avoid places or situations that might cause you to panic and make you feel trapped

## [.Adjustment disorder](#)

- with depressed mood: dysphoria in context of psychosocial stressors (e.g. marital conflict, job loss, academic failure)

- Low mood, tearfulness, or feelings of hopelessness that occur in response to an identifiable stressor within three months of onset of the stressor.
- Symptoms are clinically significant as evidenced by at least one of the following:
  - Significant distress that exceeds what would be expected given the nature of the stressor
  - Impaired social or occupational functioning
- The syndrome does not meet criteria for another psychiatric disorder (eg, unipolar major depression)
- The syndrome does not represent an exacerbation of a preexisting psychiatric disorder
- The syndrome does not represent bereavement
- Other specifiers
  - Anxiety – Nervousness or worry
  - Depressed mood – Sadness, tearfulness, or hopelessness
  - Mixed anxiety and depressed mood – Both anxiety and depression
  - Disturbance of conduct – Behavioral symptoms
  - Mixed disturbance of emotions and conduct – Both emotional and behavioral symptoms
- Adjustment disorder vs depression
  - adjustment disorder has an identifiable cause. cause of depression is often unknown.
  - adjustment disorder typically resolve within six months. duration of depression varies
  - depression needs 5/9 criteria in two week period
  - adjustment disorder is treated with psychotherapy. depression is treated with psychotherapy and pharmacotherapy
- management
  - counseling

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#### .Intimate partner violence.IPV

- important to screen patients that present with suspicious symptoms/signs
  - Do you feel safe at home?
- management
  - support patient by expressing empathy
  - assess safety of patient and dependents
  - establish safety plan if patient decides to leave relationship

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#### .trauma informed care

- 4 steps
  - bear witness to patient's trauma experience
  - create safe space and recognize need for physical/emotional safety
  - include patients in healing process
  - believe in patient's strength and resilience

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#### .delusional parasitosis

- send for worm identification to public health
- respond well to Seroquel/risperidone
- determine if belief is shakable
  - If our investigations conclude that you do not have a parasite, how would you feel
- medical evaluation to rule out a true parasitic infection
  - CBC to look for eosinophilia
  - if skin manifestations: dermatologic evaluation
  - inquiry about travel
  -
-

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## .Resp

### .Acute bronchitis.bronchitis

- acute onset, persistent cough with or without sputum production. no findings suggestive of pneumonia (fever, tachypnea, parenchymal consolidation)
- usually resolves in 1-3 weeks. most frequently due to viral infection.
- P:
  - for cough: throat lozenges, honey, smoking cessation. OTC dextromethorphan, guaifenesin. avoid codeine
    - reserve SABA for wheeze
  - recommend no antibiotics, unless think it's pneumonia

- 

### .COUGH/SHORTNESS OF BREATH

- S: Acute/subacute versus chronic, increased frequency of cough if chronic; timing; severity; presence/description of sputum; presence of hemoptysis; associated symptoms (constitutional, ie. fever, night sweats, weight loss; URI, postnasal drip, dyspnea, wheezing, chest pain, heartburn); exacerbating and alleviating factors, environmental factors, exposures; previous episodes; smoking history; history of lung disease, post-tussive emesis, or heart failure; allergies; medications (especially ACE inhibitors).
- O: Vital signs± pulse oximetry; exam of nasal mucosa, oropharynx, heart, lungs, lymph nodes, and extremities (clubbing. cyanosis, edema).

- 

### .Cough - subacute, chronic

- <https://www.uptodate.com/contents/treatment-of-subacute-and-chronic-cough-in-adults>
- <https://www.uptodate.com/contents/image?imageKey=PULM%2F67147>
- DDX: asthma, GERD, upper airway cough syndrome, bronchitis, COPD, TB, pneumonia, lung cancer, pericarditis, CHF,
  - GERD, post nasal drip (upper airway cough syndrome) and asthma most common
- defined as cough  $\geq 3$  weeks
- Management
  - if presentation suggests post-nasal drip, asthma or GERD: treat accordingly
  - upper airway cough syndrome (post nasal drip) and post infectious cough:
    - allergic rhinitis: intranasal glucocorticoids. may also try oral antihistamines
    - non-allergic rhinitis: oral first generation antihistamine. second generation antihistamine less preferred. may also try intranasal antihistamine, nasal glucocorticoids or nasal ipratropium.
    - Should improve after 1-2 weeks of empiric therapy. Else look for another cause
  - asthma: get PFTs if not already done. steroid puffers and SABA prn.
  - GERD: PPI and lifestyle modification (weight loss, smoking cessation, avoid reflux inducing foods, avoid acidic beverages). if no improvement after 1-2 months of empiric therapy, try 24h esophageal pH probe monitoring.
  - If taking an ACEi. Stop the ACEi and switch to ARB. Cough will usually resolve within a couple weeks
  - Non-specific treatment: if undiagnosed chronic cough,
    - dextromethorphan
    - if doesn't respond to dextromethorphan, may try gabapentin or low dose opioid
    - inhaled glucocorticoids
    - ipratropium
    -
- Investigations to rule out etiology that would require additional evaluation/treatment (e.g. lung cancer)
  - treat if presentation suggests a cause. If presentation doesn't suggest a cause, do the investigations below
  - Chest X-ray
  - Sequentially treat or evaluate most common causes for cough
    - Upper airway cough syndrome: allergy testing, sinus CT
    - asthma: PFTs
    - non-asthmatic eosinophilic bronchitis: sputum eosinophilia
    - GERD: esophageal pH monitoring

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## .IPF. Interstitial pulmonary fibrosis

- DMARDs
  - Nintedanib, Pirfenidone

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## .COPD exacerbation

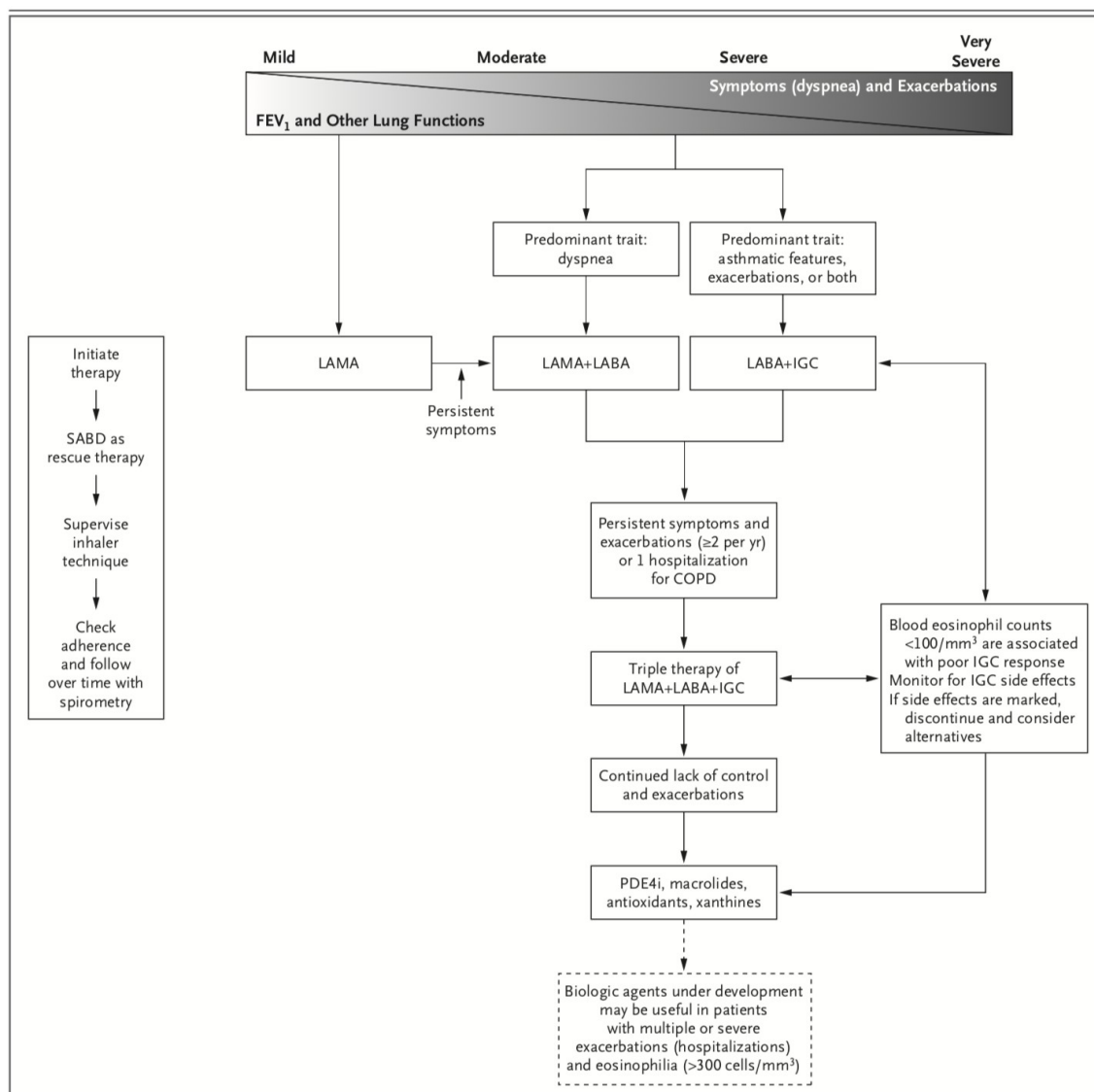
- Defined as 2/3 of : increased SOB increased sputum increased cough
- Classification
  - Mild: change in symptoms, but no abx or steroids needed
  - Moderate: abx +- steroids needed
  - Severe: hospitalization/ER visit
  - High risk of AECOP: if  $\geq 2$  mod or  $\geq$  AECOPD in last year
- treatment
  - if moderate to severe:
    - prednisone 30-40mg for 5 days. No taper
    - document risk of AVN of hip
  - if increased purulence (or moderate/severe symptoms):
    - give antibiotics
- Antibiotics
  - Simple: FEV1 $>50\%$ , mild/moderate,  $\leq 3$  exacerbations/year, no cardiac disease.
    - Treat for 5 days
    - Amoxicillin 500mg TID
    - Doxycycline 100mg bid x1 day then 100mg daily
    - Tetracycline 250-500mg qid
    - TMP/SMX 2 tabs bid OR 1 DS tab bid
  - Complicated/high risk: FEV1 $<50\%$ ,  $\geq 4$  exacerbations/year, has cardiac disease
    - Treat for 7-10 days
    - Amox-Clav 500mg tid or 875mg bid
    - Levofloxacin 500mg daily for 7 days or 750mg daily for 5 days
    - Moxifloxacin 400mg daily
  - At risk for pseudomonas (FEV1 $<35\%$  predicted, chronic steroid use, constant purulent sputum)
    - Ciprofloxacin 500-750mg bid
- assessment
  - Advised go to ER to be assessed in person. Can't assess O2 sat or work of breathing over the phone.
  - Assess puffer usage. Check if dyspneic over phone, full sentences

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## .COPD - chronic

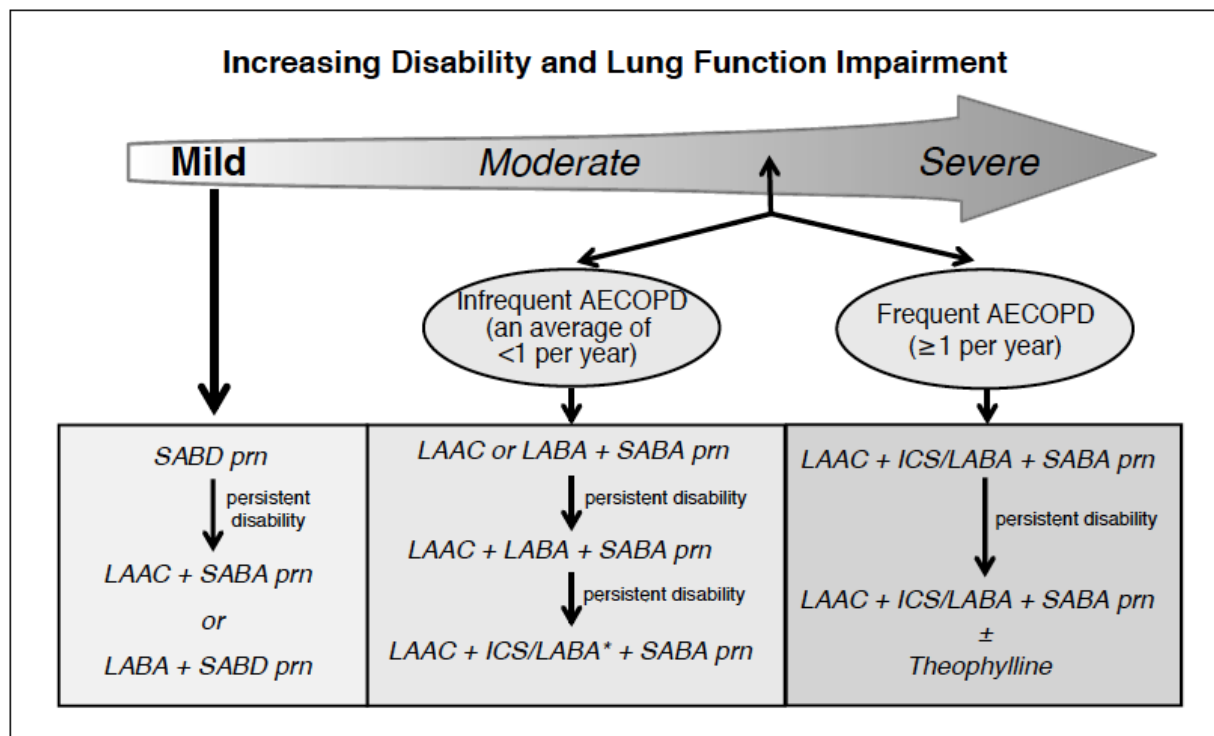
- Diagnosis
  - Spirometry
    - FEV1/FVC  $< 0.7$  post bronchodilator
- Investigations
  - Consider stress test, ABG, echo, CXR
  - Alpha1 antitrypsin serum level: if  $<65$ yo with COPD or smoking history of  $<20$  pack years
- Classification
  - Mild: SOB with hurried walk, FEV1  $> 80\%$
  - Moderate: SOB requiring rest  $\sim 100$ m (few min), limits in daily activities, exacerbations requiring corticosteroids +- abx, FEV1 50-79%

- Severe: breathless after dressing, resp/cardiac failure, FEV1 30-49%
- Treatment
  - Suggested trying each treatment step for 6 months
  - PRN SAMA/SABA should be used in all patients
  - Mild COPD (CAT<10, mMRC 1) (SOB with hurried walk, FEV1 > 80%)
    - SABA/SAMA prn only
    - LAMA (preferred) OR LABA
  - Mod/severe, low risk of AECOPD (CAT≥10, mMRC≥2, <= 1 mod AECOPD in past 12 months)
    - LAMA (preferred) OR LABA
    - LAMA/LABA combined
    - LAMA/LABA/ICS combined
  - Mod/severe, high risk of AECOPD (CAT ≥ 10, mMRC≥2, ≥2 mod AECOP or ≥1 severe AECOPD)
    - LAMA/LABA (preferred) OR ICS/LABA (consider if blood eosinophil ≥ 300/mcL or concomitant asthma)
      - Note increased risk of pneumonia with ICS use but no change in mortality
    - LAMA/LABA/ICS
    - Oral therapies (macrolide, roflumilast, N-acetylcysteine)
- Example puffers
  - SABA
    - Salbutamol 100mcg/puff. 1-2 puff qid prn
  - SAMA
    - Ipratropium 20mcg/puff. 2 puff qid prn
  - LAMA
    - Tiotropium (Spiriva) 2 puffs once daily
    - Umeclidinium (Incruse) 1 puff one daily
  - LABA
    - Salmeterol (Serevent) 1 puff bid
    - Formoterol (Oxeze) 1 cap/6-12mcg bid
  - LAMA/LABA
    - Umeclidinium + vilanterol (Anoro) 1 puff daily
    - Glycopyrronium + indacaterol (Ultibro) 1 puff daily
    - Tiotropium + Olodaterol (Inspiralto) 2 puffs daily
  - LABA/ICS
    - Formoterol + budesonide (Symbicort) 400mcg bid
    - Salmeterol + fluticasone (Advair) 250mcg bid
    - Vilanterol + fluticasone (breo) 1 puff daily



**Figure 3. Algorithm for Pharmacotherapy in Patients with a Confirmed Diagnosis of COPD.**

Integration of the lung-function compromise, severity of symptoms, and risk of exacerbations helps determine disease severity. Milder disease may benefit from a single inhaled, long-acting bronchodilator, preferably a long-acting muscarinic antagonist (LAMA). In patients with more compromised lung function and infrequent exacerbations of moderate intensity, a LAMA combined with a long-acting beta<sub>2</sub>-agonist (LABA) in a single inhaler or dual inhalers may be used. A history of asthma, allergies, or rhinitis or an elevated blood eosinophil count (>300 per cubic millimeter) favors the initial use of an inhaled glucocorticoid (IGC) combined with a LABA. If the symptoms and exacerbations persist (more than two exacerbations per year or one hospitalization for COPD), triple therapy consisting of a LAMA, a LABA, and an IGC is useful. An array of systemic therapies (azithromycin, roflumilast, xanthines, and antioxidants) may be considered as third-line agents. The use of biologic agents requires further studies to validate their efficacy. PDE4i denotes phosphodiesterase-4 inhibitor, and SABD short-acting bronchodilator.



**Figure 2)** Recommendations for optimal pharmacotherapy in chronic obstructive pulmonary disease (COPD). \*Refers to the lower dose inhaled corticosteroid/long-acting beta<sub>2</sub>-agonist (ICS/LABA). AECOPD Acute exacerbation of COPD; LAAC Long-acting anticholinergic; prn As needed; SABA Short-acting beta<sub>2</sub>-agonist; SABD Short-acting bronchodilator

- 
- case finding: consider PFT
  - >40yo. respiratory symptoms
- reasonable to get PFT q3 years.
- PFTs
  - FEV1 ≤ 0.5L is incompatible with life.
  - note: there is a subset of patients with preserved lung function (FEV1/FVC >70%), but still act like COPD.
- counsel on smoking cessation
  - has been shown to alter the decline in lung function and alter the course of the disease and is therefore the single most important strateg
- For frequent exacerbator phenotype on max therapy you might consider MWF zithromax 250 mg od (make sure QT < 450 msec, baseline hearing N, HR < 100, and no sig cytochrome p450 meds on board – reassess all this at 3 months
- Home O2
  - shown to improve survival/quality of life if following:
    - PaO2 < 55 mmHG or O2 sat < 88% or PaO2 56 to 60 mmHg and signs of cor pulmonale, persistent erythrocytosis, or pulmonary hypertension
- Immunization
  - Pneumovax 23
  - Prevnar 13 over 50
  - annual flu shot
- 
- 

#### .Post viral cough

- Flovent 250mcg 1-2 puffs bid for symptom management
- consider Salbutamol if wheeze
- advised pt he is unlikely to be contagious, but to follow his HR's recommendations
- advised pt to get another COVID test to be certain he has no infection.
- 
-

## Asthma

- S:
  - night symptoms, frequency of exacerbations, history of hospitalization, history of requiring systemic steroids
- evaluation
  - pulmonary function testing with spirometry pre, post bronchodilator, peak expiratory flow
- diagnosis
  - spirometry pre-post bronchodilator (preferred)
    - obstructive pattern:  $FEV1/FVC < 0.70$  of the LLN.
    - Increase in FEV1 or FVC of  $>10\%$  relative to predicted value, after 2-4 puffs of quick acting bronchodilator
  - bronchoprovocation: if spirometry normal, consider bronchoprovocation testing with methacholine.
  - Serial measurements of FEV1 or PEF: patients track peak flow at home. Variability of  $>20\%$  that corresponds to symptoms is strongly suggestive of asthma
  - history based diagnosis: if spirometry nor serial peak flow is not available, may diagnose probable asthma based on history, if symptoms respond well to therapy.
- definitions
  - well controlled
    - daytime symptoms  $\leq 2$  days/week. night time symptoms  $<1$  night/week and mild
    - physical activity normal
    - exacerbations mild and infrequent
    - no absence from work or school due to asthma
    - need for reliever (SABA or bud/form)  $\leq 2$  doses per week
    - FEV1 or PEF:  $\geq 90\%$  of personal best
    - PEF diurnal variation:  $<10-15\%$
    - sputum eosinophils  $<2-3\%$
  - higher risk for exacerbation
    - history of severe asthma exacerbation requiring systemic steroids, ED visit or hospitalization
    - poorly controlled asthma
    - overuse of SABA ( $> 2$  inhalers of SABA in a year)
    - current smoker
- management. source: 2021 Canadian Thoracic Society Guideline—A focused update on the management of very mild and mild asthma
  - well controlled and low risk for exacerbations:
    - PRN SABA or daily ICS + PRN SABA. if age  $\geq 12$  can also offer PRN bud/form
  - well controlled asthma and higher risk for exacerbations:
    - daily ICS + PRN SABA. if age  $\geq 12$ , can offer PRN bud/form. if poor compliance and age  $\geq 12$ , recommend PRN bud/form over daily ICS + PRN SABA.
  - poorly controlled:
    - daily ICS + PRN SABA. if poor compliance and age  $\geq 12$ , recommend PRN bud/form.
  - intermittent use of ICS with acute loss of asthma control is not suggested, given lack of evidence of benefit.
- if asthma symptoms are seasonal
  - may consider just using daily ICS and/or singulair for the season
- puffers
  - Symbicort 100 or 200 turbuhaler: 1-2 inhalations once or twice daily. max 4 inhalations per day for maintenance. up to maximum of 8 inhalations when worse.
    - Use as needed for asthma sx prn (max 6 puffs at a time, 8 puffs per day), rinse mouth after use
  - Flovent 125mcg 1 puff bid
- other medication classes for asthma
  - leukotriene modifiers: montelukast, pranlukast
  - steroids: po prednisone, dexamethasone
  - anti-IgE antibody: sc omalizumab
  - phosphodiesterase inhibitors: po theophylline
  - SCIT, SLIT



- prevention
  - environment
    - removal of pets from house/bedroom
    - no smoking in home
    - dusting/wiping down surfaces
    - avoid indoor air pollution
    - remove carpet
    - avoid outdoor allergens
  - lifestyle
    - exercise
    - weight reduction
    - breathing exercises
    - smoking cessation

#### Action plan recommendations based on age and maintenance controller therapy

Maintenance therapy	Recommended reliever*	Recommended controller step-up therapy for the Action Plan 'Yellow zone'
<b>Preschoolers (under 6 years of age ) and children (6 to 11 years of age)</b>		
No maintenance	SABA	1st choice: None 2nd choice: Consider starting regular controller therapy
ICS	SABA	1st choice: None 2nd choice: Prednisone/prednisolone 1 mg/kg × 3–5 days <sup>§</sup>
ICS/LABA <sup>†</sup>	SABA	1st choice: None 2nd choice: Prednisone/prednisolone 1 mg/kg × 3–5 days <sup>§</sup>
<b>Adults (12 years of age and over)</b>		
No maintenance	SABA	1st choice: None 2nd choice: Consider starting regular controller therapy
ICS	SABA	1st choice: Trial of ≥4-fold increase in ICS for 7–14 days <sup>†</sup> 2nd choice: Prednisone 30 mg to 50 mg for at least 5 days <sup>†</sup>
ICS/LABA		
BUD/FORM	SABA OR BUD/FORM	1st choice: Increase BUD/FORM to maximum of 4 inhalations twice daily for 7–14 days OR BUD/FORM as a reliever and a controller (maximum 8 inhalations/day) 2nd choice: Prednisone 30 mg to 50 mg for at least 5 days
FP/SALM or MOM/FORM	1st choice: SABA 2nd choice: BUD/FORM <sup>‡</sup>	1st choice: Trial of ≥4-fold increase in ICS (higher ICS strength of ICS/LABA combination or extra ICS) for 7–14 days <sup>†</sup> 2nd choice: Prednisone 30–50 mg for at least 5 days <sup>†</sup>

\*If regular need for reliever or frequent step-up therapy, identify reason for poor control, adjust (start or increase) maintenance therapy; <sup>†</sup>In individuals ≥15 years of age with a history of severe acute loss of asthma control in the preceding year; <sup>‡</sup>In exacerbation-prone individuals; <sup>§</sup>In children with a recent history of severe exacerbation and suboptimal response to SABA during index exacerbation; <sup>¶</sup>Does not apply to preschoolers. BUD/FORM Budesonide/formoterol; FP/SALM Fluticasone propionate/salmeterol; ICS Inhaled corticosteroid; LABA Long-acting beta<sub>2</sub>-agonist; max Maximum; MOM/FORM Mometasone/formoterol; SABA Short-acting beta<sub>2</sub>-agonist

#### Asthma exacerbation - ER

- management of status asthmaticus
  - O<sub>2</sub>
  - investigations: CXR, ABG < PEF
  - inhaled salbutamol
  - IV steroids
  - IV fluids
  - IV salbutamol if needed
  - if severe: admit to ICU, intubation

#### Asthma exacerbation - office/home

- If severe symptoms: send to ER
  - breathlessness at rest, drowsiness, agitation
  - unable to speak full sentences

- PEF  $\leq$  50% predicted or personal best
- home management
  - use FABA q20minutes x3
    - Salbutamol 2-4 inhalations
    - Symbicort 1-2 puffs
  - if good response: continue FABA q3-4h prn. Consider prednisone if: max dose of controller medication, recently completed course of prednisone, not improving after 24-48h of increased controller and reliever medications
  - if incomplete response: start prednisone 40-60mg daily for 5-7 days. Continue FABA q1-3h prn.
  - If worsening symptoms despite FABA: go to emergency department. While waiting, continue FABA q20min AND prednisone 40-60mg.

## .asthma - exercise induced.exercise induced asthma

- Non-pharmacologic Management
  - improve cardiovascular conditioning
- pharmacologic therapy
  - if asthma well controlled: prophylactic bronchodilator
    - SABA: Ventolin 1-2 puffs 5-20 minutes before exercise
    - Bud-form: Symbicort 1 puff 5-20 minutes before exercise
    - alternative: LTRA or inhaled ipratropium. But neither are as fast acting as a SABA
  - if symptoms ongoing despite SABA. Add regular ICS or LTRA. May indicate poor control of asthma
  - if needing daily therapy for exercise induced asthma. Suggest regular use of LTRA or ICS, rather than daily SABA alone.

## .URTI.upper respiratory tract infection.viral URI

- Investigation
  - if only 1-2 days, just fever, cough. But alert, taking in fluids: consider reassurance with follow-up
  - if symptoms >4 days: consider CXR, bloodwork
- symptom duration
  - incubation period (time of contact with infectious material until onset of symptoms) is usually 24-72h.
  - Usually persist 3-10 days, although clinical illness may last as long as two weeks in up to 25% of patients, particularly smokers. Cough can persist for weeks after resolution of other signs and symptoms
  - symptoms usually peak on day 2 to 3 of illness and then gradually improve over 10 to 14 days
- management
  - conservative management. No antibiotics needed.
  - OTC cough and cold medications should be avoided in children <6 years. We suggest not using OTC cough and cold medications in children between 6 and 12 years of age
  - Symptomatic therapy
    - Nasal symptoms: saline nasal drops/spray, humidifier
    - Cough: oral hydration, warm fluids (eg, tea, chicken soup), honey (in children older than one year), or cough lozenges or hard candy (in children in whom they are not an aspiration risk) rather than OTC or prescription antitussives, antihistamines, expectorants, or mucolytics
    - Unproven therapies – We suggest not using vitamin C, zinc, Echinacea purpurea, or homeopathy for the treatment of the common cold in children

## .Pneumonia - pediatrics

- expect to see improvement within 48h. repeat clinical and CXR assessment for complications/alternate diagnosis
- duration of therapy: 5days for outpatient. 7-10 days for inpatient
-

## .LRTI.Pneumonia

- S:
- investigations
- Management
  - if COPD:
    - Spiriva respimat 2 puffs once daily
    - Ventolin 2 puffs qid
  - CXR
  - follow-up in 2 days. if not possible, delayed antibiotic prescription.
  - antibiotics: as per Spectrum app.
    - no CURB 65
      - Amoxicillin 1g po tid x5 days
      - OR Cefuroxime 500mg po bid x5 days
      - OR if severe beta lactam allergy: Doxycycline 100mg po bid x5 days
    - has CURB 65. azithro or doxy no longer routinely indicated for non-severe CAP. Consider only if atypical bacteria expected
      - Amox-clav 875mg po bid x5 days
      - OR Cefuroxime 500mg po bid x5 days
      - OR Ceftriaxone 1g q24h iv x5 days
      - OR if severe beta lactam allergy: Moxifloxacin 400mg po daily x5 days
    - should be afebrile for 48 hours and clinically stable before therapy discontinued. persistence of dyspnea and cough is not indication to extend course of antibiotic therapy
- inpatient investigations
  - blood cultures
  - sputum gram stain and culture
  - legionella testing
  - respiratory viral panel, COVID 19 testing
  - HIV screening
- non-resolving pneumonia:
  - not improving after 3-5 days of treatment
  - tachycardia, hypotension usually improve in 2 days. fever, tachypnea, O2 usually improve within 3 days. cough and fatigue may take 14 days or longer to improve. CXR may take 30 days to improve
  - investigations
    - Chest CT
    - consider bronchoscopy
- post viral bacterial pneumonia
  - classical presentation: sick, get better, then get worse
  - chest pain from coughing vs empyema
    - if for long period of time, more worried about empyema. get CXR
    - empyema: need chest tube. antibiotics alone not enough.

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## .pneumothorax

- symptom
  - chest pain. pleuritic. radiates to ipsilateral shoulder
  - dyspnea at rest, cough
- management
  - O2, IV fluids
  - chest tube
- risk factors
  - asthma

- emphysematous bleb
- tobacco use
- congenital abnormality

•

## .Dyspnea.SOB.Desaturation - Acute

- DDx
  - PE, panic attack, Afib, SVT, CHF, anemia, pneumonia, MI
- Investigations
  - CBC
  - ECG
  - CXR
  - Consider
    - CTPA
    - Echo
    - TSH
- if volume overloaded: Lasix 40mg iv x1
- ABG, Lactate, CXR
- ECG, trop
- Blood cultures
- Stat COVID, flu swab

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## .Lung cancer

- screening
  - criteria
    - age 55 to 74
    - 30 pack year smoking history
    - current smokers, or quit smoking less than 15 years ago
  - low dose CT every year for 3 years

•

## .Kussmaul breathing

- deep, rapid breathing pattern
- DDx
  - metabolic acidosis, renal failure, hyperthyroidism
  - raised ICP, head trauma
  - anxiety
  - sepsis
  - heart failure, cardiogenic shock
  - croup, bronchitis, pneumonia, asthma, airway obstruction

•

## .Rheumatology

### .sjogrens

- Suspect if persistent dry eyes, mouth, parotid gland enlargement, , an unexplained increase in dental caries, or abnormal results of specific serologic tests
- diagnostic criteria
  - Objective marker of dry eye or salivary hypofunction/characteristic MRI or ultrasound
  - Characteristic autoantibodies or labial salivary gland biopsy or systemic autoimmune disease

- anti Ro/SSA antibodies. Positive labial salivary gland biopsy. Or well established systemic rheumatic disease(RA, SLE, scleroderma)
- DDx
  - dryness related to aging, medications, or environmental factors; autoimmune disorders such as systemic lupus erythematosus, which may sometimes be associated with SS; immunoglobulin G4 (IgG4)-related disease (IgG4-RD); sarcoidosis; infection; and lymphoproliferative disorders

### .Sicca – dry mouth

- Basic measures
  - good hydration
  - avoid: carbonated beverages, juices, water with additives
  - sip water regularly
  - drink sugar free liquids
  - use a humidifier
  - xylitol mints
- dental care
  - should undergo regularly scheduled preventative dental care to prevent caries
- if basic measures inadequate, suggest artificial saliva
  - Artificial saliva
    - Biotene Dry Mouth Gentle oral rinse: Swish and spit 15 mL up to 3 times daily.
    - Biotene Oral Balance gel: Apply one-half inch length onto tongue and spread evenly; repeat as often as needed.
    - Biotene spray, Entertainer's Secret: Spray as often as needed.
- If basic measures and artificial saliva inadequate, suggest muscarinic agonists
  - pilocarpine 5mg po up to 4 times daily
  - cevimeline 30mg po. Up to 3 times per day. Half hour before meals
  - may take several weeks for patients to notice a therapeutic effect
- should have high level of suspicion for oral candidiasis in patients with Sjogrens
  - suspect if mouth pain, burning, increased sensitivity, diffuse or patchy mucosal erythema, or white mucosal patches.

### .Dupuytren's Contracture

- common, benign, slowly progressive fibroproliferative disease of palmar fascia. as process progresses, nodules form on palmar fascia and finger gradually loses flexibility
- clinical presentation
  - typically complain of finger thickening or nodule in palm, then loss of motion in affected finger
- diagnosis is clinical
- Treatment
  - mild: gloves with padding for pain
  - intralesional glucocorticoid injection for local tenderness (with triamcinolone and lidocaine)
  - for flexion contractures: refer to plastics for release
  -
- 
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### .Inflammatory swelling vs infection

- e.g. rheumatoid arthritis vs infection
- infection is usually one joint
- 

### .Lofgrens

- Signs/symptoms
  - fever, BL hilar lymphadenopathy, ankle swelling, erythema nodosum.
    - 95% specific for sarcoid

- Investigations
  - get CXR
- Management
  - can be treated with NSAIDs
  - refer to rheum

- 

### .Raynaud's

- exaggerated vascular response to cold temperature. transient vasospasm of peripheral arteries and arterioles that classically results in triphasic colour changes in the affected region, and it is associated with a variety of medical conditions
- DDX
  - secondary raynaud's disease
    - SLE
    - mixed connective tissue disease
    - Sjogrens
    - systemic sclerosis:
- full blood work
  - CBC
  - iron, ferritin, B12, TSH
  - ESR, CRP, ANA, RF, CK
- physical exam
  - look for nailfold capillary changes, which suggests secondary Raynauds. usually done by specialist
- conservative management
  - warming exercises: e.g. windmill
  - dress warmly including the head and neck
  - warming devices in gloves/boots
  - stop smoking
  - avoid using vibrating tools
  -

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### .Fibromyalgia

- investigations
  - CBC, ESR/CRP
  - if concerning for inflammatory, rheumatic disease: ANA, RF
- clinical presentation
  - widespread MSK pain
  - fatigue and sleep disturbance, depression/anxiety, headache
- initial treatment
  - exercise
  - sleep hygiene
  - CBT
- Pharmacotherapy
  - initial
    - Amitriptyline 5-10mg qhs. titrate up by 5mg q2weeks. usual dose of 20-30mg. max 75mg in most patients
    - OR cyclobenzaprine 5-10mg qhs. titrate up to 30-40mg as required
  - if inadequate response after trial of 1-3 months, switch to other agents:
    - if prominent fatigue or depression: SNRI: Duloxetine. start 20-30mg at breakfast. titrate up to 60mg/day
    - if prominent sleep disturbance: Pregabalin. start at 25-50mg. titrate to 300-450mg/day.
- opioids
  - not appropriate for fibromyalgia.

- pre-existing patients on opioids can be forcefully tapered. 5-10% per week
- handouts
  - ACOR Fibromyalgia patient fact sheet
- - .PMR. Polymyaglia rheumatica. GCA. Giant Cell arteritis
- Clinical features
  - pain in bilateral shoulders, hips, buttocks, thighs. diffuse pain around shoulder girdle.
  - proximal joint and neck symptoms. worse with inactivity. Morning stiffness.
  - decreased ROM of shoulders, neck and hips.
    - unable to lift arms overhead
  - onset after vaccine/infection. bilateral symmetrical proximal muscle involvement. worse in morning. better with steroids.
- Investigations
  - CRP, ESR
- Diagnosis
  - [https://www.uptodate.com/contents/image?imageKey=RHEUM%2F130045&topicKey=RHEUM%2F8235&search=pmr&rank=1~112&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=RHEUM%2F130045&topicKey=RHEUM%2F8235&search=pmr&rank=1~112&source=see_link)
  - age > 50
  - bilateral shoulder and/or hip girdle pain
  - morning stiffness lasting longer than 45 minutes
  - duration > 2 weeks
  - elevated ESR/CRP
- Giant Cell arteritis (GCA)
  - need to assess for GCA when thinking of PMR
  - clinical features
    - new onset headache, temporal artery tenderness
    - abrupt onset of visual impairment,
    - jaw claudication,
    - unexplained fever, anemia or constitutional symptoms
  - start high dose steroids
    - if no visual loss: Prednisone 1mg/kg (max 60mg) po for 2-4 weeks.
    - If visual loss: methylprednisolone 500-1000mg IV daily x3 days
- Management
  - start low dose steroids: Prednisone 15mg/day
  - symptomatic response to glucocorticoid treatment is typically rapid. if symptoms not well controlled within one week, increase Prednisone to 20mg/day. Most patients with PMR will respond to 15-20mg/day of prednisone.
- Tapering
  - Maintain glucocorticoid dose that suppresses symptoms for 2-4 weeks. then taper
    - tapering
      - if dose > 10mg: reduce daily dose by 2.5mg every 2-4 weeks.
      - once dose <10mg: reduce daily dose by 1mg per month
- Relapsing/Recurrence
  - if symptoms develop following discontinuation, and CRP/ESR elevated: resume Prednisone at original dose that managed symptoms
  - if relapse while on treatment: increase prednisone to lowest dose that achieves symptomatic improvement.
  - if relapse several times: interval between dose reductions can be lengthened to 6-8 weeks.
- Monitoring
  - check CRP/ESR at baseline and 2 months after starting glucocorticoid therapy
  - repeat ESR/CRP every 3-6 months during glucocorticoid therapy
- Minimizing risks of glucocorticoid therapy
  - BMD at baseline. bisphosphonates if needed

- Ca and Vit D supplementation
- Monitor HbA1c and BP
- referral to rheumatology
  - if atypical features: younger patients, presenting fever
  - prominent peripheral arthritis
  - inadequate response to initial glucocorticoid treatment
  - difficulties with glucocorticoid tapering

## ● .Sarcoidosis

- Evaluation
  - Laboratory testing: CBC, LFTs, BUN, Cr, glucose, Electrolytes, Calcium, urinalysis
  - HIV testing
  - TB skin testing
  - Pulmonary imaging:
    - Bilateral hilar adenopathy on CXR.
    - CT chest
  - PFTs
  - Biopsy of nodules.

## ● .Gout

- risk factors
  - Meds : HCTZ, low dose ASA (<1 gm/day) cyclosporine
  - Increased purine intake: dense red meats and seafood
  - Dietary: EtOH, soft drinks and fructose
  - obesity, hypertension, hyperlipidemia, metabolic syndrome, diabetes, CKD
- acute management
  - Indomethacin 50mg tid
  - OR colchicine 0.6mg tid then taper
    - if renal disease and can't use NSAID
  - OR prednisone 30-50mg daily for 5 days
- prophylaxis
  - Wait at least 2 weeks. ideally patient should be symptom free for 30-60 days before initiating allopurinol.
  - start allopurinol 100mg daily. add colchicine 0.6mg daily routine for 3-6 months
    - add colchicine as allopurinol mobilizes uric acid. colchicine helps treat any inflammation from this.
    - May also use NSAID prophylaxis.
  - titrate allopurinol q4weeks, target uric acid <357 micromol/L. monitor uric acid monthly
  - continue colchicine for 3-6 months once at target allopurinol dose.
  - if patient requires allopurinol >500mg, refer to rheum.
- Before prescribing allopurinol, testing for the HLA-B\*5801 allele in patients at elevated risk for developing severe cutaneous adverse reactions (SCAR) (patients of Asian descent [eg, Korean, Han Chinese, Thai] and African American patients)
- lifestyle modification
  - weight loss, exercise
  - DASH/mediterranean diet: no need to severely restrict Purines due to impracticality
  - decrease alcohol use
  - consider switching thiazide diuretics to another antihypertensive

## ● .Gout - other info

- classes to prevent gout attacks
  - xanthine oxidase inhibitors: allopurinol



- uricosuric agents: probenacid

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## .Rheumatoid arthritis

- DDX
  - gout, CPPD, parvo B19, OA, serum sickness, Hep B/C, lyme
- diagnosis
  - combination of clinical and serological investigations
- clinical findings
  - joint line tenderness, morning stiffness lasting 60min or more
- investigations
  - CRP, RF, anti CCP
  - X-ray
- management
  - goal of treatment is to induce remission as soon as possible
  - NSAIDs for pain control but are not disease modifying
  - first line
    - methotrexate, leflunomide, sulfasalazine
      - give methotrexate with 5mg folic acid. monitor with CBC/LFTs q1-2 months
  - failing remission or dose limited by side effects, suggests start biologics
  - prednisone for acute flare control and as a bridge while DMARDs begin
- other management
  - gold salts
  - azathioprine
  - cyclosporine
  - adalimumab
  -
- 
- 

## .Spondyloarthritis.Axial spondyloarthritis.Ankylosing spondylitis

- 3 months of back pain, with age of onset <45 years
- clinical symptoms, investigations
  - sacroiliitis seen on X-ray
  - chronic, constant backpain. Usually for more than 3 months
  - improvement with exercise but not with rest. Pain at night
  - peripheral arthritis, IBD, uveitis
- if you see a kid with months of back pain, consider this diagnosis and referral to peds.
- MRI is best diagnostic test
- management
  - physiotherapy, NSAIDs
  - TNF blockers

## .Psoriatic arthritis

- seen in about 7% of psoriasis patients.
- classic finding is sausage digit.
- refer to rheumatology. will need DMARDs
- 

## .Pernio.Chilblains

- cutaneous disorder characterized by the development of cold-induced erythrocyanotic skin lesions

- Erythematous to violaceous edematous macules, papules, plaques, or nodules. typically on hands or feet
- often associated with cold exposure
- evaluation
  - no test to confirm diagnosis. investigations to rule out other disorders
  - initial workup: CBC, ANA, SPEP
    - other tests: ENA, RF, APLA, cryoglobulins
- management
  - avoid precipitating conditions. keep affected areas warm. minimize cold exposure
  - refractory pernio
    - oral nifedipine: 20mg tid
    - topical steroids

## .Primary prevention

### .Annual Health exam.AHE

- S: Annual health Exam patAge yo
- Issues of concern: «none» «•»
- 
- Current Problem List - «reviewed»
- Update Family History - «reviewed»
- Social History - «reviewed»
- Immunizations - «reviewed UTD»
- Nutrition - «eats well» «reviewed Canada Food Guide»
- Exercise- «yes» «reviewed benefits of vigorous exercise 20-30 minutes 3-4x weekly»
- Etoh- «yes • weekly»«no»
- Smoking- «yes» «no»
- THC - «yes» «no»
- other drugs - «yes» «no»
- 
- Review of Systems: «negative»
- 
- « CNS: «N» CVS: «N» RESP: «N» GI: «N» GU: «N» DERM: «N» PSYCH: «N»
- MSK: «N» ENT: «N» Opto: «N» »
- 
- 
- O: BP: (BP last time - pat.Vitals.BP\_[BP:].latest\_value )
- HR:
- Wt: (Wt last time - pat.Vitals.Weight\_[Wt:].latest\_value )
- Ht:
- «BMI» (Target 18.5-24.9 BMI)
- «LMP: »
- Ent - «ears n, ph n, no LN, neck supple, thyroid n»
- CNS - «grossly normal» «grips normal» «reflexes 2+ bilat»
- Chest - «clear, equal A/E Bilat, no wheezes, no crackles»
- CVS - «N S1S2, no S3S4, no M, N JVP, no edema» «ppp, no bruits»
- Abdo - «soft, non-tender, BS N, no Mass, LKKS N»
- Derm - «no rash, moles, lesions of concern»
- MSK - «no joint deformities, normal range of motion »
- G/U - «N male, rectal-•» «no» «hernia» «N ext genitalia, cx» «uterus, adnexae» «Pap done»
- Breast - «N bilat, axillae N» «deferred as no symptoms or concerns»
- 
- A/P:«well»

- «Bloodwork»
- «over 50 so
- «PSA»
- «Mammogram»
- «BMD»
- «FIT testing arranged»»
- «Discussed Advanced Care Directives: ««Has a Will» «Will consider getting a Will» «Will get a Will» » ««Has a POA for personal care and finances» «Will get a POA»» «Resuscitation reviewed and «DNAR» «Full resuscitation» «Resuscitation with criteria» «Explained important for POA/family to know your wishes so they can not be burdened with making a decision for you; but rather they are only voicing your wishes, from when you could still express those wishes.»»»»
- «meds renewed»
- «Medications Reviewed and list in CPP up to date»
- «Immunizations Reviewed»
- follow-up in «1 year for check-in» «1 year» «2 years» «3 years» « for repeat physical»
- «3 months» «6 months»
- «MMR if only 1 dose given and 18-25 yrs old»
- 

#### .Screening.Periodic health visit.Annual Health Exam

- List
  - BP ( $\geq 18$ ), lipids ( $\geq 40$ ), diabetes ( $\geq 40$ )
  - pap (25-69), mammogram (50-74),
  - colon cancer screening (50-75), BMD ( $\geq 65$ )
  - immunizations: Shingles ( $>50$ ,  $>60$ ), Tdap (q10y), Pneumo 23 ( $> 65$ )
    - see .Adult Immunizations
  - advance care planning (will, code status)
  - other screening
    - abdo U/S x1 (65-80)
    - low dose CT (55-74,  $\geq 30$  pack year, quit  $<15y$ )
- BP: annually
- weight: q3 years
- pap test:
  - start: age 25 if ever sexually active
  - stop: after age 70 if  $\geq 3$  consecutive normal pap tests
  - frequency: q3 years
- mammography
  - age 50-74
  - q2-3 years
  - for patient with increased risk
    - annual screening mammogram, annual breastMRI and clinical breast exam every 6-12 months
    - begin 10 years prior to youngest affected family, but not prior to age 30 for mammography. and not prior to age 25 for MRI.
- lung cancer
  - criteria
    - age 55 to 74
    - 30 pack year smoking history
    - current smokers, or quit smoking less than 15 years ago
  - low dose CT every year for 3 years
- colorectal cancer
  - average risk
    - age 50-74
    - FIT: q2 years

- Flex sigmoidoscopy: q10 years
- no colonoscopy for screening of average risk patient
- Increased risk
  - see Colon cancer notes
- search terms
  - colonoscopy,
  - occult blood, colon cancer
- prostate cancer
  - no indication for routine population screening.
- lipid profile
  - age > 40
  - q5 years if FRS <5%
  - q1 year if FRS >5%
- diabetes
  - age ≥ 40
  - q3 years
- Osteoporosis
  - BMD if age >65 or other risk factors
  - search terms: Bone mineral density, bone densitometry
- AAA screening
  - men aged 65-80. one time abdominal ultrasound

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#### .Refugee health screening

- infectious diseases
  - Hep B, TB, HIV, Hep C, Intestinal parasites
- mental health
  - depression
- chronic diseases
  - type 2 diabetes
  - iron deficiency anemia
  - dental caries
  - vision health
- women's health
  - contraception
  - cervical cancer

#### .immigrant health

- history:
  - past medical history, history of violence, immunization history, supports in Canada
- physical exam: skin (malnutrition, infectious lesions), thyroid (goitres), CV (rheumatic heart disease), teeth, lymphadenopathy, organomegaly, BMI
- lab testing:
  - stool O&P
  - HIV, VDRL, Hepatitis A/B/C
  - CBC
  - urinalysis, PPD
  - thin and thick smears for malaria
  - STD testing, pap, mammogram
  - CXR

- strongyloides serology
- immunity titres
- TSH, BUN, Cr, glucose, cholesterol, electrolytes, B12, iron studies, vitamin D
- discuss contraception and screen for mental health. ensure vaccinations up to date.

- 

## .Wilderness medicine

- Puttin an unconscious person into recovery position
  - When patient laying down. Have right arm over their head. Kneel on their right side. Flex their left knee. Their left hand on their right cheek. Support their right head with hand and Roll toward you by grabbing their left knee and pulling towards you. When you pull the leg, the rest of their body will follow. Then replace your hand that was supporting the head with their left hand.
- getting a mat under an unconscious person with C-spine precautions
  - when patient is on their side and want to roll patient onto their back While on their side, Scrunch mat against their back. Then roll them back onto their back
- preparation to go into wilderness
  - communication
    - satellite phone: current standard of care whenever you go places without consistent cell reception.
    - whistle
    - mirror to signal to overhead planes
    - flares
    - 3 smoky fires. bring a fire starter
      - note: planes probably won't see your fire unless they're looking for you
- psychological management
  - keep everyone engaged. try to give everyone a task, especially the injured patients
  - afterwards: be supportive. Don't criticize decisions already made.
- hypothermia
  - use layers. avoid sweating at all costs
  - cotton holds water and causes evaporative cooling. Wool holds water but insulates. Synthetics don't hold water
- emergency pack
  - the Cs: cut (knife, saw), cord, cover (tarp), contain (container for water/food), contact (method of communication such as sat phone), calories (food)
  - splinting fractures:
    - bring a package of fiberglass plaster for splinting. Use 4 layers of fiberglass for splinting.
    - Could also bring a Sam Splint, which is less stiff but reusable
  - plastic tarp
    - may use a mini tent
    - may also use as part of a stretcher. use two long sticks/tree trunks/2x4s as the stretcher of the frame. lay tarp on ground. lay the two sticks at the 1/3 and 2/3 mark on the tarp. fold the tarp in thirds: fold the left third of the tarp so it reaches the right stick and fold the right third of the tarp to the left stick.
- Shoulder reduction: there are many methods
  - Cunningham method
    - should show the patien the technique on their uninjured shoulder to reduce anxiety. the idea is to relax the muscles so that the shoulder reduces itself painlessly, without requiring sedation.
    - if patient's right shoulder dislocated, put their right arm on your right shoulder, while you face them.
    - lay your right hand on antecubital fossa of their injured right limb to provide gentle traction
    - massage their trap, then deltoid, then biceps. for 3-4 minutes
    - then ask patient to straighten their back and pull their shoulders back.
  - aftercare: sling until comfortable. avoid abduction and external rotation.
- wound care
  - wash area with soap

- pick out any foreign material
- irrigate
- cover with sterile layer
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## .Toxins

### .Poison ingestion

- history
  - weight
  - time of ingestion
  - amount ingested
  - name of product ingested
- reducing poison absorption
  - charcoal administration
- enhance poison excretion
  - diuresis
  - hemodialysis
  - acidification of urine

### •.acetaminophen poisoning

- need to monitor for 4 hours before can assess poisoning severity adequately
- investigations
  - acetaminophen plasma level
  - AST, ALT
  - bilirubin
  - PT, INR
- antidote
  - N-acetylcysteine

- 

### .Heavy metal testing

- most commonly test for lead
- if potential occupational exposure: patient can ask employer what heavy metals they are exposed to, and we can test for those.

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## .Urology.Nephrology

### .pearly penil papules

- small, skin-colored bumps that form around the head of the penis. 1-4mm in diameter.
- harmless and will tend to fade in appearance as you age.
- neither contagious nor painful.
- Management
  - no treatment necessary
  - if causes psychological distress: may treat with laser surgery, cryosurgery.

### .paraphimosis

- Paraphimosis refers to a retracted foreskin in an uncircumcised male that cannot be returned to normal position

- In the sexually active adolescent or adult, intercourse is a common precipitant.
- Causes
  - Phimosis – Patients at the greatest risk for developing paraphimosis typically have a partial phimosis (the preputial opening is too small to easily fit over the coronal sulcus of the glans penis). Subsequent retraction of the foreskin leads to entrapment and paraphimosis.
  - Genitourinary procedures – Paraphimosis can occur because of failure of medical personnel to return a fully retractable foreskin to normal position after cystoscopy or bladder catheterization
  - Sexual activity – There are numerous case reports in the literature about sexual causes of paraphimosis. Activities such as erotic dancing have also caused paraphimosis
  - Penile trauma – Paraphimosis following body piercing of the genitals in which the pierced glans or foreskin is too painful to allow foreskin retraction has been described
- Diagnosis
  - The diagnosis of paraphimosis is based upon clinical findings. Swelling of the penis and severe penile pain are the two most common complaints in uncircumcised males with paraphimosis. On inspection, the glans penis and distal foreskin appear swollen with a constricting band present at the coronal sulcus
- management
  - The primary management of paraphimosis consists of timely reduction of the foreskin back over the glans penis
  - pain control:
    - adolescents and adults may tolerate application of topical medications or injection of local anesthetic
    - while young boys often require intranasal or parenteral administration of opioids and procedural sedation in addition to local anesthesia.
  - Reduction – Manual reduction may be facilitated by methods to reduce swelling if time permits (see 'Methods to reduce swelling' above).
    - For patients without signs of penile ischemia or urinary obstruction, the practitioner should start with manual reduction
- referral to urologist
  - Penile necrosis
  - Complete urinary obstruction
  - Unsuccessful reduction by the manual technique
- aftercare
  - No retraction of the foreskin for one week
  - Reinforcement of proper hygiene, avoidance of forced retraction of the foreskin in the young boy, and avoidance of irritants
  - For patients with minor tears to the foreskin after reduction,
    - application of triple antibiotic ointment to the foreskin without performing retraction and prompt return for medical treatment if signs of infection (eg, redness, swelling, pain, or drainage) appear
  - In adolescents and adults, avoidance of sexual intercourse for several days
  - Follow-up with a urologist after paraphimosis reduction is indicated for patients with the following:
    - Significant trauma during minimally invasive reduction
    - Recurrent paraphimosis
    - Required invasive paraphimosis reduction

## peyronie's disease

- acquired, localized fibrotic disorder of the tunica albuginea resulting in penile deformity, mass, pain, and, in some men, erectile dysfunction.
- Presentation
  - penile pain, curvature, indentation, hourglass deformity, shortening, and/or sexual dysfunction.
  - Penile nodules, curvature, pain
- Ddx
  - congenital ventral curvature, chordee without hypospadias, or curvature associated with epispadias
- management

- if stable, mild curvature ( $\leq 30$  degrees), satisfactory erectile function: observation is an acceptable option. If worsens suggest medical/surgical management
- initial medical management
  - pentoxifylline po
  - collagenase injections

### .retractile testes.undescended testes

- Retractable testes
  - may be due to exaggerated cremasteric reflex (a superficial reflex found in human males that is elicited when the inner part of the thigh is stroked.)

### .epididymal cyst

- An epididymal cyst is generally asymptomatic and palpated as a soft round mass in the head of the epididymis or rete testis
- They do not generally require treatment, but spermatoceles may rarely necessitate surgical excision because of chronic pain.

### .foreskin care.uncircumscribed penis care

- Retraction
  - phimosis is inability to retract the foreskin
  - at birth, foreskin not retractable. Physiologic phimosis is seen in almost all newborn males
  - Incidence of patients able to retract foreskin increases with age
    - fully retractable: 8% at first grade, 21% at 4th grade, 58% at 7th grade
    - partial retraction with part of glans penis visible: 40, 41, 29 percent respectively
  - pathologic phimosis is due to scarring of foreskin, making it truly nonretractable
- routine care
  - wash penis routinely during normal bathing
  - avoid forcible retraction
- benign conditions
  - physiologic phimosis
  - preputial cysts due to smegma. Whit lumps under foreskin
  - transient ballooning of foreskin during voiding that resolves without manual pressure.
    - If urinary retention can only be resolved with manual pressure, parent should seek medical attention
- complications
  - pathologic phimosis. Treat with topical corticosteroid
  - paraphimosis: foreskin entrapment behind coronal sulcus. May result in venous/lymphatic congestion and ultimately arterial compromise
  - UTIs: risk of UTIs is higher than in uncircumcised male infants
  - balanoposthitis: inflammation of glans penis and foreskin
  - balanitis xerotica obliterans: chronic atrophic dermatitis characterized by white atrophic plaques on the glans and prepuce.

### .anejaculation.retrograde ejaculation

- common causes
  - previous prostate surgery
  - medications: SSRI, antipsychotics, alphablockers
  - diabetes
  - hx of pelvic surgery
- Evaluation



- semen analysis.
- If low semen volume on semen analysis:
  - and azoospermia (no sperm in ejaculate): suggests genital tract obstruction (ejaculatory duct obstruction). Diagnose ejaculatory duct obstruction with scrotal or transrectal U/S showing dilated seminal vesicles. Consider retrograde ejaculation as well.
  - and normal sperm concentration: consider retrograde ejaculation.
    - If presence of sperm in postejaculatory urine sample: likely retrograde ejaculation

## ejaculatory dysfunction

- Spectrum of disorders: delayed ejaculation, inability to ejaculate, anejaculation, retrograde ejaculation
- etiology
  - Any medical disease, drug, or surgical procedure that interferes with either central (including spinal or supraspinal) control of ejaculation or the autonomic innervation to the seminal tract, including the sympathetic innervation to the seminal vesicles, the prostatic urethra, and bladder neck, or sensory innervation to the anatomical structures involved in the ejaculation process, can result in delayed ejaculation, anejaculation, and anorgasmia
  - common causes
    - previous prostate surgery
    - medications: SSRI, antipsychotics, alpha blockers
    - diabetes
    - hx of pelvic surgery
  - associated factors
    - low serum testosterone. Relationship is not causal, however
    - LUTS
    - medications: alpha blockers, antidepressants (SSRIs)
    - TURP commonly results in retrograde ejaculation. Radical prostatectomy or cystoprostatectomy results in anejaculation.
- Evaluation
  - semen analysis. If low semen volume azoospermia (no sperm in ejaculate) and presence of sperm in postejaculatory urine sample: likely retrograde ejaculation
  - if normal testicular volume, palpable vasa deferentia, normal serum testosterone, FSH and LH and azoospermia. Likely obstructive azoospermia
    - ejaculatory duct obstruction: dx with scrotal or transrectal U/S showing dilated seminal vesicles

## premature ejaculation

- Rapid or early ejaculation
  - ejaculation occurs within one minute of vaginal penetration
  - loss of control. Unable to delay ejaculation on all or nearly all vaginal penetration
  - psychological distress in patient/partner
- Management
  - SSRIs,
    - Paroxetine 10-40mg/day. Sertraline 50-200mg/day. Escitalopram 10-20mg/day
    - if not tolerated or ineffective. Try TCA: clomipramine 12.5-50mg/day
  - Phosphodiesterase inhibitors may be effective in coexisting erectile dysfunction
  - topical anesthetics,
    - EMLA cream (Lidocaine-prilocaine)
  - psychotherapy

## .Erectile Dysfunction.ED

- S: onset; non-sustained erection; nocturnal/morning erection; difficulty with arousal, ejaculation, orgasms; prior treatments; erection with self stimulation; sexual hx - duration of relationship, condoms, STIs, sexual abuse; psychosocial - difficulties in relationship, stressors at work, depression, fatigue
- DDX: **vascular** - DM, CVD/PVD, HTN, pelvic radiation; **anatomical** - cavernous fibrosis, hypo/epispadias, pelvic trauma/surgery; **neurogenic** - MS, stroke, Alzheimers, parkinsons, spinal cord injury; **metabolic** - hypogonadism, hyperprolactinemia, hyper/hypothyroidism; **medication** - antihypertensives, antidepressants, diuretics, hormones, smoking, EtOH, marijuana; **psychogenic** - performance anxiety, depression/anxiety, stress
- Investigations
  - A1c, CBC, Cr, liver function tests, lipid profile, TSH, serum total testosterone (draw between 8 and 10 AM)
  - if no obvious cause (e.g. pelvic trauma) and no symptoms of coronary or vascular disease, consider exercise stress test if high or moderate cardiovascular risk.
    - if positive exercise stress test, refer to cardiology before initiating ED therapy
- Treatment
  - PDE5 inhibitors
    - Cialis (Tadalafil)
      - as needed dosing: 10mg. 30 minutes prior to sexual activity. not more than once daily. max dose 20mg daily
      - once daily dosing: 2.5mg daily. max 5mg daily.
    - Sildenafil (Viagra) 50mg once daily as needed 1 hour before sexual activity. Reduce to 25mg if side effects. Max dose 100mg.
  - Psychogenic erectile dysfunction: refer to certified sexual therapy counselor or psychologist
  - other treatment options
    - vacuum device, penile prosthesis
- 
- 

## .Hematuria - ER

- Management
  - Investigations
    - CBC, CHEM7, urine C&S, R&M
      - check Hb, GFR
      - ensure blood in urine and r/o infection
  - get outpatient CT
- if blood clots
  - continuous bladder irrigation.
  - if still not improving after 4 hours, refer to urology for admission.

## .Hematuria

- DDx:
  - exercise, menses, kidney stones, UTI, trauma
  - BPH
  - nephropathy, bladder pathology, malignancy
- S:
  - exercise, LMP, dysuria, urinary frequency
- anticoagulation and hematuria
  - anticoagulants are common causes of hematuria
  - the first time it occurs, may do the full workup
- Evaluation
  - repeat urinalysis in 6 weeks: in period with no exercise or menses or infection
  - get microscopic analysis and urine culture
  - if suspect:
    - if suspect kidney stone, then do CT or U/S.

- if suspect UTI, do urine culture.
- if evidence of glomerular bleeding, then refer to nephrology
  - acutely elevated Cr, albuminuria, hypoalbuminemia, dysmorphic RBCs, RBC casts, WBC casts, worse hypertension, worse edema
- unexplained hematuria 2
  - assess for renal disease: Renal U/S, urine microscopy, Cr/eGFR
  - if negative for renal disease.
    - Low risk: female <50y, male <40, never smoked or <10 pack years, no risk factors for cancer, no prior hematuria, 3-10 RBC/hpf
      - repeat urinalysis within 6 months or cystoscopy
    - intermed risk: female 50-59, male 40-59, 10-30y pack hx, ≥ 1 cancer risk factor
      - cystoscopy
    - high risk: >60 yo, >30 pack year, >25 RBC/hpf, gross hematuria
      - cystoscopy + CT urogram
- follow-up for initial negative evaluation
  - annual urinalyses.
    - if two consecutive negative urinalyses, this f/u can be stopped.
    - if hematuria persists for 3-5 years, repeat the full workup
  - if hematuria recurs, full evaluation must be repeated
  -

## .HEMATURIA:

- S: Amount, duration, presence of clots; associated symptoms (constitutional symptoms such as fevers, weight loss, or weight swings; renal colic; dysuria; irritative voiding symptoms); timing along the stream where blood appears (initial vs terminal vs throughout); medications (blood thinners, NSAIDs); history of vigorous or prolonged exercise, trauma, smoking, stones, cancer, or easy bleeding; skin bruising (purpura).
- O: Vital signs; lymph nodes (especially pelvic); abdominal exam; genitourinary and rectal exams; extremities.
- DDX: bladder cancer, renal cancer, renal stones, prostate cancer, UTI, glomerulonephritis, pyelonephritis

## .Kidney stones.Nephrolithiasis.Renal colic

- S:
  - pain typically waxes and wanes in severity. paroxysms of severe pain usually last 20-60 minutes
  - gross or microscopic hematuria is common (70-90 percent)
  - n/v, dysuria, urinary urgency
- imaging: look for stones and signs of urinary obstruction (e.g. hydronephrosis)
  - CT without contrast is preferred.
  - U/S of kidneys/bladder + X-ray is second line.
- management
  - conservatively with pain medication and hydration
  - NSAIDs effective.
- Refer
  - urgent urologic consultation if: urosepsis, AKI, anuria, unyielding pain
  - refer to urology if: stones >10mm, significant obstruction, not passed stone after 4-6 weeks.
- prevention:
  - consider straining urine for stone analysis
  - metabolic evaluation:
    - 24 hour urine collection with urine volume, pH, excretion of calcium, uric acid, citrate, oxalate, sodium, potassium, creatinine
    - urinalysis

- chemistry profile, serum calcium
- urine Calcium high: thiazide diuretic
- citrate low: potassium citrate (caution if urine pH is > 6.5)
- high urine oxalate: low oxalate diet.
- high urine uric acid: lifestyle modification, allopurinol
- urine volume < 2L in 24 hours: increase fluid intake

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## .Kidney stones.Renal colic - ER

- Management
  - Toradol IM 30mg x1
  - Investigations
    - CT renal colic.
    - bloodwork: CBC, Cr
    - urinalysis
      - will show hematuria
  - discharge script: Toradol 10mg po qid 16 tabs

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## .Circumcision

- Not routinely recommended
- Pros:
  - Decrease
    - Penile cancer (NNT 900-322,000)
    - Phimosis (NNT 67)
    - UTI (NNT 111)
    - HPV (NNT 5), HIV (NNT 298), HSV (NNT 16)
  - Decrease cervical cancer and STI in partner
- Cons:
  - Surgery risks: Infection (NNH 67), bleeding (NNH 67)
  - Meatal stenosis (NNH 10-50)
  - Ethical concerns
- Contraindicated: Hypospadias

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## .URINARY SYMPTOMS:

- S: Duration, obstructive symptoms (hesitancy [trouble starting to urinate or maintaining urine flow], diminished stream, sense of incomplete bladder emptying, straining, postvoid dribbling, leakage with cough or sneeze, incontinence), irritative symptoms (urgency, frequency, nocturia), constitutional symptoms (fevers, weight loss, night sweats); bone pain; medications; history of UTIs, urethral strictures, or urinary tract instrumentation; renal stones, diabetes, alcoholism.
- O: Vital signs; abdominal exam {including suprapubic percussion to assess for a distended bladder}; genital and rectal exams; focused neurologic exam.
- DDX: BPH, UTI, prostate cancer, urolithiasis, urethritis, pyelonephritis, stress incontinence, urge incontinence

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## .Penile Discharge

- DDx
  - STI, UTI, yeast infection
- S:
  - number of sexual partners in past year
  - characterize discharge (colour, consistency)

- redness, itchiness, pain
- dysuria, frequency, fever
- P:
  - urine test: urine culture, urinalysis, Gonorrhea, Chlamydia
  - if yeast infection: clotrimazole 1% topically bid
  - if gonorrhea/chlamydia: see Gonorrhea/Chlamydia section

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## .UTI. Urinary tract Infection

- DDx
  - vaginitis: yeast infection, trichomoniasis, BV
  - urethritis: chlamydia, gonorrhea, candida, HSV
  - interstitial cystitis
  - PID
- S:
  - fever, chills, back pain
  - dysuria, hematuria
  - vaginal discharge
  - in kids: nocturnal enuresis after toilet trained is indicative of infection
    - ask about balanitis in boys
- DDx
  - vaginitis, urethritis,
- P:
  - Fosfomycin 3g one dose.
  - Nitrofurantoin 100mg bid. 5-7 days
  - Amoxicillin 50mg/kg divided tid. 7 days
- reasons to treat asymptomatic bacteriuria
  - pregnancy
  - patients undergoing urologic intervention
  - renal transplant recipients
- sensitivities results
  - in the case where patient was prescribed empiric antibiotic that is resistant to the grown organism: if symptoms have resolved, continue with antibiotic. If still symptomatic, switch to a sensitive antibiotic.
- if urine culture negative
  - if symptoms improved, treat clinically and continue the antibiotic course to complete 5 days
  - if not improved, should be reassessed in person.
- prevention
  - increase daily water consumption to >1.5L/day

●

## .Pyelonephritis

- patient with dysuria, and maybe some flank pain
  - look at previous imaging. determine if history of kidney stones, which would increase risk for pyelonephritis
  - try to determine if flank pain is more MSK or CVA tenderness
  - better to over treat than undertreat.
- complicated UTI/Pyelonephritis: if fever, chills, flank pain, appear ill
  - Indications for hospitalization. Septic.
    - Persistently high fever: >38.4C
    - Marked debility
    - Inability to maintain oral hydration
    - Suspect urinary obstruction
  - Physical exam: important to do BP, temperature, and visual inspection to rule out sepsis
- outpatient pyelonephritis treatment:

- 1st line
  - Ciprofloxacin 500mg po bid. 7 days
- 2nd line
  - TMP SMX 1 DS (160mg -800mg) bid. 10 days
  - Amox-Clav 875mg bid for 10 days
- Cefadroxil 1g bid x10-14 days
- Other option
  - consider beta lactam: e.g. Keflex 500mg qid x5 days

## .UTI in kids.UTI in children

- Key causes of UTI
  - wipe front to back.
  - Constipation
- history
  - chills, fever
  - urinary incontinence, nocturia
  - abdominal pain
  - eating, drinking well
- UTI symptoms in kids
  - Blood
  - Smelly urine
  - Cry when peeing
- Antibiotics. treat for 7-10 days
  - first line: TMP/SMX 5-10mg/kg/d bid
  - 2nd line
    - Amoxicillin 40mg/kg/d tid
    - Cephalexin 25-50mg/kg/d qid
    - Trimethoprim 4mg/kg/d bid
  - 3rd line
    - Cefixime 8mg/kg/d once or twice daily
    - Amox-Clav 40mg/kg/d bid
- after First UTI
- imaging
  - renal bladder ultrasound: all children <2yo within 2 weeks of 1st febrile UTI
    - Rule out morphologic abnormality and hydronephrosis
  - Void cystourethrogram (VCUG)
    - If abnormal ultrasound, or age <2 and 2nd UTI
    - to rule out vesicoureteral reflux
- rationale for imaging
  - rule out obstructive uropathy, vesicoureteral reflux, posterior urethral valves
- 

## .candida in urine

- rarely treat this
- consider ultrasound to look for fungal ball
- likely due to multiple UTIs, where you kill all the bacteria
- 

## .Recurrent UTI.UTI - recurrent

- Prevention
  - lots of fluid intake

- avoid using spermicides
- frequent complete emptying of bladder
- postcoital voiding
- topical estrogen for postmenopausal women
  - thought to work due to normalization of vaginal flora
- antimicrobial prophylaxis
  - ensure diagnosis is confirmed and conservative measures have been tried
    - do not use prophylaxis for non-specific symptoms like mental status changes without GU symptoms or fever
  - options: postcoital prophylaxis or continuous
  - continuous: nitrofurantoin, trimethoprim-sulfa
    - duration: 3 months
  - should get an infectious disease consult before starting lifetime prophylaxis
- insufficient data
  - Data do not support a clear role for other non-antimicrobial agents, such as methenamine, cranberry products, probiotics, and D-mannose, in preventing recurrent cystitis.
- investigations
  - get bladder scan: ensure emptying bladder. rule out bladder stones which cause irritation and so its not a UTI
  - get cystoscopy to rule out structural abnormality
- 
- 

### .Balanitis - children

- [https://www.uptodate.com/contents/image?imageKey=EM%2F122790&topicKey=EM%2F122239&search=foreskin&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=EM%2F122790&topicKey=EM%2F122239&search=foreskin&source=see_link)
- Management
  - treat urinary retention if present. If pain interferes with urination. May apply topical lidocain or may urine while sitting in bathtub filled with warm water
  - general measures:
    - sitz baths 2-3 times daily. Proper foreskin hygiene
  - treatment by etiology
    - nonspecific or traumatic balanitis
      - Mupirocin bid
    - contact balanitis
      - withdraw precipitating agent (e.g. soaps, detergents)
      - apply aqueous emollient cream (e.g. Cetaphil, Cerave)
      - topical low potency steroid. e.g. hydrocortisone 1% cream bid for 7 days
  - fungal: consider in infants or toddler with diaper dermatitis
    - Clotrimazole 1% bid for 2 weeks
    - OR 1:1 1% clotrimazole and 1% HC powder to affected area. then 40% zinc oxide on top. apply this bid

### .balanitis - adult

- Cause: commonly caused by inadequate personal hygiene in uncircumcised males. Candidal infection most common
- symptom: pain, tenderness, pruritus with erythematous lesions of glans/foreskin
- management
  - hygiene: twice daily bathing of affected area with saline
  - empiric treatment: for candidal infection
    - clotrimazole 1% bid or miconazole 2% bid. If no improvement, try hydrocortisone 1% cream bid
  - treatment for other etiologies: topical antibiotics for bacterial infections, topical steroid creams for dermatologic conditions and potential ablation or excision of premalignant lesions
- complications
  - phimosis: constriction of opening of foreskin so cannot be retracted

- paraphimosis: trapping of foreskin behind glans penis and requires urgent reduction by urologist

- UTI in elderly. Urinary Tract Infection in elderly. UTI elderly

- <https://www.uptodate.com/contents/image?imageKey=PC%2F61419&topicKey=PC%2F14606>

- When the diagnosis of UTI is in doubt (eg, pyuria and bacteriuria in the setting of ambivalent symptoms), a reasonable management strategy in patients who do not appear seriously ill is to defer antibiotic treatment for one week with follow-up [39], since 25 to 50 percent of older women with UTI symptoms will improve without therapy in this time frame
- if altered mental status
  - may consider sending for urine culture.
  - despite evidence saying only to treat if patient has fever or urinary symptoms, may treat if culture is positive and has altered mental status. If cognition improves, then may treat in the future.
    - if urine culture positive, but patient didn't improve, then less likely to treat in the future, and probably shouldn't send urine culture in the first place as it may be asymptomatic bacteruria

- Vasectomy

- patient not interested in more children
- offer local urologist (7-8 month wait) or Toronto Vasectomy clinic (1-2 month wait)

- Dysuria

- DDX:
  - UTI, STI,
  - passage of kidney stone, balanitis, genital HSV
  - females: vaginitis
  - males: BPH
  - painful bladder syndrome/interstitial cystitis
- history
  - systemic symptoms, fever, local trauma
- physical exam:
  - genital findings: rash, vesicles
- initial investigations
  - UA then microscopy, urine culture
  - CT&GC NAAT, urine trichomonas
  - female: vaginal swab for BV/yeast
- next investigations
  - consider bladder PVR
- management for dysuria NYD
  - male: consider treating as BPH with alpha blockers
  - consider interstitial cystitis: see Interstitial Cystitis. Try NSAIDs/tylenol, pelvic floor training, TCAs.

- retention of urine. acute urinary retention.

- Clinical presentation
  - abrupt inability to pass urine
  - lower abdominal/suprapubic discomfort
  - if dementia, may have acute change in mental status
- diagnosis
  - bladder U/S, PVR
- initial management
  - if in the community, may send to ER for catheter insertion.
  - insert indwelling urethral catheter. If unable to insert catheter, call urology, who may consider suprapubic catheter.



- Subsequent management
  - In men with likely BPH: start alpha 1 blocker
  - catheter removal:
    - ideally: this would be managed by urology. So, patient would leave catheter in place until seen by urologist.
    - suggest trial of catheter removal in 1-2 weeks. If failed first trial without catheter, try a second trial after an additional two weeks with the catheter.
    - Voiding trial: remove catheter in the morning. Patient to hydrate aggressively. Check PVR in afternoon. PVR > 400 mL is a failure. PVR < 200 mL is a success. PVR between 200-400 mL: offer clean intermittent catheterization
  - surgical therapy: men who fail second trial of void may require surgical therapy.

## .retention of urine.Chronic urinary retention in women.Incomplete emptying

- Chronic urinary retention in women
- Presentation
  - Feeling of incomplete emptying or reduced urge to void
  - Slow or intermittent stream
  - Hesitancy in initiating flow of urine, straining to void.
- Causes
  - Detrusor underactivity
    - Aging, diabetes, neurologic disorders, medication (e.g. anticholinergic)
  - Obstruction
    - Urethral distortion from pelvic organ prolapse
    - External urethral compression (fibroids, constipation, malignancy)
    - Functional: abnormal contraction of periurethral muscle
- Evaluation
  - Elevated postvoid residual urine volume. Abnormal test should be repeated
  - Pelvic exam to assess for pelvic organ prolapse
  - Consider urodynamic evaluation
- 50-100mL is normal. PVR >200 is abnormal. PVR between 100-200mL requires clinical correlation
- management
  - consider referral to ER for catheter placement. Leave catheter in place until assessed by urology.
- treatment of urinary retention
  - Self catheterization for urinary retention
- treatment of etiology
  - Detrusor underactivity
    - Sacral neuromodulation, intraurethral valve pump
  - Obstruction
    - Correct the obstruction (e.g. prolapse, urethral stricture, foreign body)
    - Pelvic floor muscle training for functional obstruction
- 
- 
- 

## .Urinary incontinence.Incontinence of urine

- DDx
  - stress: leakage with increased intraabdominal pressure
  - urgency: overactive bladder.
  - overflow: leakage in setting of incomplete bladder emptying
- S:
  - when leak urine most often:
    - with physical activity: coughing, sneezing, lifting, exercise
    - urge or feeling that needed to empty bladder, but could not get to toilet fast enough
    - without physical activity and without sense of urgency

- about equally as often with physical activity and sense of urgency
- loss of urine without warning or triggers?
- medications: alcohol, caffeine
- Investigations
  - urinalysis and urine culture
  - bladder ultrasound with PVR to rule out overflow
- General Management
  - kegel exercises
    - 3 sets of 8-12 reps. 8-10 seconds each. 3 times per day. for 15-20 weeks
    - tighten the muscles as though trying to stop flow of urine or hold back a fart.
  - bladder training for urgency
    - [https://www.uptodate.com/contents/image?imageKey=PC%2F71150&topicKey=PC%2F114501&search=overactive%20bladder&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=PC%2F71150&topicKey=PC%2F114501&search=overactive%20bladder&source=see_link)
    - identify shortest voiding interval.
    - schedule voids at this interval (while awake, don't need to get up at night).
      - go even if don't feel the need.
      - if feel strong urge before schedule time. use distraction or relaxation. when you feel in control of your bladder, walk slowly to bathroom and go.
    - when can avoid leakage for 1 day at this interval, increase time between scheduled voids by 15 minutes
    - increase intervals until 3-4 hours without urinary incontinence or frequent urgency
    - can take up to 6 weeks
  - topical vaginal estrogen
- Stress incontinence
  - women may consider surgery with midurethral sling
- Overactive bladder
  - Myrbetriq (mirabegron) and Vibegron
    - Mybetriq
      - avoid in poorly controlled hypertension
      - no impact on cognitive or cardiac function
      - start at 25mg daily. may increase to 50mg at 4 weeks
      - can combine with oral solifenacin 5mg (Vesicare, an anticholinergic)
  - if still doesn't respond, with conservative measures and at least 2 pharmacologic therapies, refer to specialist

## • .nocturia

- definition
  - waking at night to void. Most often considered clinically significant if voids  $\geq 2$  times nightly
- history
  - rule out other medical causes
    - polydipsia
    - CHF
    - Poorly controlled diabetes
    - GERD/nighttime cough
    - OSA
    - Periodic limb movements/restless leg syndrome
  - Assess fluid and sodium intake, medications
  - Urinary tract symptoms:
    - obstructive symptoms (hesitancy, weak stream, incomplete emptying, or intermittency),
    - irritative symptoms (urinary frequency, urgency), and urinary incontinence.
- investigations
  - renal function, electrolytes, serum glucose, urinalysis
  - PVR if suspect urinary retention.
- Management

- Treat underlying medical conditions that may cause nocturia, if present (see above)
- initial conservative management
  - reduce evening fluid intake
  - avoid evening diuretic use
  - avoid evening caffeine and alcohol
  - double voiding at bedtime
  - avoid nocturnal hyperglycemia in patients with diabetes
  - address nighttime ambulation safety.
  - Suggest handheld urinal or bedside commode
- Next steps
  - Pelvic floor muscle exercise
- pharmacotherapy
  - men
    - if has BPH: see BPH notes
  - women
    - if frequent UTI: offer vaginal estrogen
  - bladder relaxant medications:
    - antimuscarinics: e.g. oxybutynin. Be aware of anticholinergic effects
    - beta 3 agonists: mirabegron
  - refractory nocturia
    - consider desmopressin
      - Baseline sodium levels must be normal, and patients must be able to recognize and report subtle fluid status changes and also be willing to undergo frequent monitoring of sodium levels in order to avoid severe hyponatremia. DDAVP is a potentially inappropriate medication according to Beers criteria for medications for older adults.

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## .Enuresis in children.urinary incontinence in children.incontinence of urine in children

- DDX:
  - UTI, anxiety, constipation, polyuria
  - overactive bladder, voiding postponement, underactive bladder, non-neurogenic dysfunctional voiding
- S:
  - frequency, dysuria, urgency, straining to urinate.
  - behaviour
  - previously toilet trained
  - daytime vs nighttime symptoms: bedwetting,
  - constipation: frequency, consistency, straining, blood
- P:
  - urine test: urinalysis, urine culture
  - conservative management: works better in age > 8
    - timed voiding. e.g. q2-3 hours
    - review need to avoid holding maneuvers. encourage urinating before sense of urgency.
    - reward system for following the program, and not necessarily for being dry.
  - if no improvement after months:
    - bladder ultrasound with post void residual.
    - refer to urology for urinary flow measurement.
  - if constipation: see Constipation section
- resources
  - <https://www.uptodate.com/contents/etiology-and-clinical-features-of-bladder-dysfunction-in-children>
    - Daytime urinary incontinence
  - <https://www.uptodate.com/contents/management-of-bladder-dysfunction-in-children>

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## .nocturnal enuresis

- bed alarm therapy. first line, before medication
  - continue therapy for at least 2-3 months
  - wear alarm every night. the sensor is activated by moisture.
  - both parents and child arise each time alarm goes off
  - void each time alarm goes off
  - inform family: first few weeks of therapy most difficult
- if no response to alarm, consider low dose desmopressin
  - 0.2mg po 60 minutes before bedtime

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## .Urinary Frequency - Child

- see enuresis
- P:
  - urine culture to rule out UTI.
  - Behavioural therapy for anxiety.
- Timed voiding: maybe start training when starting school. same for overactive bladder
  - start by voiding every 30 minutes, then 1h, then 1h30, then 2h. train up to 3 hours.
  - train bladder to hold longer.

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## .Hydronephrosis

- inpatient
  - call urology to get their opinion
  - likely won't be urgently seen unless infection.
- Bilateral hydronephrosis with severe AKI from post-renal obstruction
  - Will be discharged home on foley catheter
  - No urgent treatment needed in hospital. follow-up with outpatient urologist.

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## .PSA.Prostate cancer screening

- PSA is secreted by prostate.
  - semen changes from gelatin to liquid so sperm can swim through it. done by PSA.
- PSA screening
  - according to urology guidelines
    - PSA <1: every 4 years
    - PSA 1-3: every 2 years
    - PSA >3: more frequent testing
  - according to other guidelines
    - recommend not screening
- PSA ranges based on age:
  - 40-49: 0-2.5
  - 50-59: 0-3.5
  - 60-69: 0-4.5
  - 70-79
  - 80: 0-10
  - if elevated, get another reading in 4 weeks. if still elevated, refer.
- other causes of increased PSA
  - BPH
  - urethral trauma/instrumentation
  - prostatitis
  - DRE

- Ejaculation
- risk calculator
  - <http://riskcalc.org:3838/PCPTRC/>

●

## .prostatitis - acute

- DDx
  - UTI
  - BPH, overactive bladder
- presentation
  - acutely ill: fever, chills, malaise
  - dysuria
  - frequency, urgency, urge incontinence
  - obstructive symptoms: dribbling, hesitancy,
- diagnosis
  - tender prostate
  - urine culture
- management
  - empiric coverage against gram negative bacteria
  - trimethoprim-sulfamethoxazole 1 DS tab po bid
    - or fluoroquinolone 400mg bid
    - avoid nitrofurantoin due to poor penetration into prostate
  - treat with antibiotics for 4-6 weeks
- urinary retention
  - consult urology for consideration of suprapubic catheterization
  - passage of catheter through inflamed urethra with acute prostatitis risks septic shock.
- prognosis
  - fever and dysuria usually improves within 2-6 days
  - repeat urine culture at 7 days. if still positive, treat with alternative therapy based on sensitivity

## .BPH. Benign prostatic hyperplasia

- Presents with LUTS (lower urinary tract symptoms): storage symptoms often more bothersome.
  - voiding: bladder outlet obstruction secondary to BPH
    - urinary hesitancy (difficulty starting stream), weak stream, intermittence, straining
  - storage (irritative): OAB
    - urgency, frequency, urgency incontinence, nocturia
  - postmicturition
    - dribbling, incomplete emptying
- evaluation
  - physical exam: DRE to estimate prostate size.
    - If tender: consider prostatitis.
    - If asymmetric or nodular: consider malignancy
    - if presence of decreased sphincter tone or absence of perineal sensation: consider neurologic etiology
- Investigations to rule out other causes of LUTS. Or for PSA baseline
  - Urinalysis
  - Bladder ultrasound for PVR
  - PSA. if life expectancy >10 years and if CA dx would change management
    - need PSA if starting 5-ARI
- diagnosis
  - based on storage/irritative urinary symptoms. And lab findings do not suggest other causes.
- management of nocturnal polyuria

- if urine output >3L
  - decrease fluid intake, aim for urine output 1L
- if nocturnal urine output >33% of total daily urine, nocturnal polyuria diagnosed
  - consider desmopressin
- conservative management of BPH
  - mild: not bothered by symptoms
    - fluid restriction
    - avoid alcohol, caffeine, spicy foods
    - bladder training
    - pelvic floor exercises
    - treat constipation
- Pharmacotherapy: moderate symptoms
  - alpha blockers
    - for smaller prostates. usually the initial agent for LUTS/BPH
    - onset of effect: 3-5 days
    - Tamsulosin CR 0.4mg po daily
      - side effects: orthostatic hypotension, retrograde ejaculation
  - 5-alpha reductase inhibitors
    - for larger prostates. shrinks size of the prostate.
      - only if prostate >30g or PSA > 1.5
    - onset of effect: 4-6 months
      - often taken along with alpha blockers, which produce an effect within days.
    - Dutasteride 0.5mg po daily or Finasteride
      - side effects: decreased libido, erectile dysfunction
    - after 6-12 months, consider stopping alpha blocker, if patients asymptomatic.
      - but keep the 5-ARI
    - monitoring
      - need baseline PSA.
      - follow PSA every year. 5-ARI causes prostate to shrink and PSA should fall.
      - if PSA starts to rise again, should refer to urology.
  - consider PDE-5 inhibitors for LUT symptoms and erectile dysfunction. Tadalafil 5mg po daily
  - consider addition of anticholinergics (e.g. Mirabegron) if component of OAB. caution if PVR > 250mL
- Referral
  - failure of symptom control despite combination therapy
  - complications: hematuria, recurrent UTIs, urinary retention, renal failure
  - age < 45
  - suspect prostate cancer
    - PSA <10 low risk (routine), PSA 10-20 (semi-urgent), PSA >20 (urgent)

## overactive bladder.OAB

- Causes
  - neurogenic: CVA, parkinsons, SCI, MS
  - non-neurogenic: BPH, postoperative pelvic surgery, bladder foreign bodies
- investigation
  - PVR to rule out bladder obstruction.
  - Urinalysis, Cr, glucose, urine culture
- management
  - pelvic floor physiotherapy
  - bladder training
    - urinate as often as shortest voiding interval. Make these trips regularly while awake. Urinate at these intervals even if feel don't need to

- if strong urge before scheduled time. Don't run to bathroom. Relax. Distract self. When feel in control of bladder, walk slowly to bathroom and go
- keep this schedule until 1 day without urine leakage. Increase time between scheduled trips to toilet by 15 minutes.
- Keep increasing intervals until 4 hours between trips to toilet or comfortable with a shorter time interval
- medication:
  - first line: beta3 adrenoceptor agonists (Mirabegron)
  - second line: anticholinergic (oxybutynin), trospium, darifenacin
  - Contraindications
    - Beta-3 adrenergic agonists – Individuals with poorly controlled hypertension should avoid mirabegron but not vibegron. (See 'Adverse effects' above.)
    - Antimuscarinics – These medications are contraindicated in patients with uncontrolled tachyarrhythmias, myasthenia gravis, gastric retention, and narrow angle-closure glaucoma. Patients should be counseled on the risks of long-term exposure of high-dose anticholinergics as well as possible increased risk of dementia.
- reduce fluid intake
- follow-up
  - f/u in 4-6 weeks
  - if insufficient response to pharmacotherapy, maximize dosing. If cannot tolerate therapy with one agent, switch to the other class.
- Persistent symptoms
  - refer to specialist if symptoms despite lifestyle and trial of at least 2 pharmacologic therapies.

## .bladder training

- urinate as often as shortest voiding interval. Make these trips regularly while awake. Urinate at these intervals even if feel don't need to
- if strong urge before scheduled time. Don't run to bathroom. Relax. Distract self. When feel in control of bladder, walk slowly to bathroom and go
- keep this schedule until 1 day without urine leakage. Increase time between scheduled trips to toilet by 15 minutes.
- Keep increasing intervals until 4 hours between trips to toilet or comfortable with a shorter time interval

## .Interstitial cystitis

- DDx: bladder/urethral cancer, GU tract cancer, UTI, neurologic conditions, pelvic organ prolapse
- Clinical features
  - increase in discomfort with bladder filling and relief with voiding.
  - Symptoms for at least 6 weeks
  - usually gradual in onset and worsen over months.
  - may report frequent voiding; in contrast to overactive bladder, where patients void frequently to avoid incontinence, patients with IC void frequently to avoid discomfort.
- Evaluation: rule out other causes
  - STI, UTI testing
  - PVR to rule out urinary retention
  - if suggestive of urologic abnormality: urinary incontinence, elevated PVR, hx of bladder cancer, hematuria. Then refer to urologist for cystoscopy
- Indications to refer
  - hematuria,
  - incomplete bladder emptying,
  - neurologic disorder affecting bladder function, prior pelvic radiation/surgery/trauma, severe pelvic organ prolapse,
  - no response to initial treatment with oral medications.
- Initial Management
  - mild/moderate pain: NSAIDs, acetaminophen
  - if pelvic floor muscle tenderness, try physio

- suggest amitriptyline as initial oral medication
- should refer for urologist for cystoscopy if initial treatments not effective.
- Treatment for refractory symptoms: to be done by urologist
  - bladder hydrodistension
  - intradetrusor botox
  - urinary diversion as treatment of last resort.

## .AKI

- Definition: urine output  $<0.5\text{mL/kg/h}$  for .12h. Cr increased by  $>50\%$  within 48h.
- Prerenal
  - Hypovolemia: hemorrhage, GI loss, low cardiac output, sepsis
  - Decreased BP, increased HR. increased urea  $\gg$  increased Cr. urine Na  $< 10\text{-}20$
- Renal: ATN, AIN, glomerulonephritis, vascular
  - Urinalysis positive for casts.
  - ATN causes: sepsis, nephrotoxins (vancomycin, aminoglycosides, cisplatin, IVIG, mannitol etc.)
- Postrenal: especially if solitary kidney. Anatomic, neurogenic.
  - Solitary kidney, older man, anuria, palpable bladder, ultrasound shows hydronephrosis.
  - consider post-obstructive diuresis. Give fluids.
- Prerenal vs ATN
  - Urinalysis: epithelial cell casts in ATN.
  - Prerenal responds to fluids. This is the gold standard to distinguish them.
  - FENa:  $<1\%$  in prerenal and above  $2\%$  in ATN. urine sodium is low in pre-renal since body is trying to hold onto water (and salt)
  - BUN/Cr ratio is normal in ATN, but elevated in prerenal
- Investigations:
  - CBC, lytes, Cr, urea, Ca, PO4
  - fractional excretion of sodium (FENA)
    - low urine sodium is more likely to be pre-renal, since body is trying to hold onto sodium and water
  - urine osmolality
    - high urine osmolality  $> 500$ : prerenal. body secretes ADH to retain water
    - low urine osmolality: more likely ATN
  - BUN:Cr ratio
    - normal:  $10:1$  or  $15:1$ : more likely to be ATN
    - elevated BUN:Cr ratio suggests pre-renal
  - bladder scan and abdo ultrasound to rule out urinary obstruction
  - urinalysis
    - ATN: granular, epithelial cell casts
- Management
  - Fluid repletion:
    - Severe hypovolemia: 1-2L of isotonic saline as rapidly as possible
- Mild/moderate hypovolemia: NS iv  $50\text{-}100\text{mL/h}$  above ongoing fluid losses.
- 

## .Renal protection for contrast

- 1L NS over 1 hour. Then  $75\text{cc/h}$  maintenance until next morning. Check Cr next morning.
- 

## .CKD

- Defined as reduced GFR for  $\geq 3$  months.
- Initial evaluation



- Refer for urgent dialysis if:
  - refractory pulmonary edema, life-threatening hyperkalemia or metabolic acidosis, encephalopathy, or a pericardial rub
- determine duration of kidney disease.
- Causes of CKD
  - T2DM, hypertension, peripheral vascular disease, cardiovascular, cerebrovascular disease, obesity, HF, liver failure, autoimmune disorder (e.g. SLE, Sjogren syndrome), multiple myeloma, recurrent/complicated UTI or kidney stones, renal anatomical abnormalities (renal agenesis, nephrectomy), cancer treated with cytotoxic chemotherapy, prior urologic/pelvic/retroperitoneal surgery, exposure to nephrotoxins (e.g. NSAIDs, lithium, lead)
- Evaluation and identify cause
  - Physical
    - volume status, flank pain, peripheral neuropathy, rash, palpable purpura, abdominal bruit
  - Investigations
    - CBC, ferritin: r/o complication of CKD
    - A1c: r/o diabetes
    - Cr, BUN, Calcium, Phosphate, Electrolytes
    - urinalysis and microscopy: hematuria+proteinuria suggests glomerular disease
    - ACR: if proteinuria, get first AM void
    - SPEP, UPEP
    - kidney ultrasound. If abnormal, consider urologic evaluation
- Management
  - treat hypertension: BP target systolic 120.
    - ACE/ARB first line: monitor Cr, potassium 2-4 weeks after starting/changing. Reduce dose or stop if hyperkalemia or >30% increase in Cr
  - treat DM: HbA1c < 7%
  - lipid control: Target LDL < 2. or 50% reduction
    - start statin if: DM > 18. all patient ≥ 50 and pts FRS > 10%
  - lifestyle: smoking cessation, reduce alcohol use, exercise, weight loss, protein 0.8g/kg/d
- Monitoring Investigations
  - Cr q6 months, ACR q6-12 months.
  - Potassium with med change/clinical change
  - if eGFR < 30: annual CBC, iron, Ca, Phos, albumin
- referral to nephrology
  - eGFR < 30 OR ACR > 60
  - rapidly declining function (e.g. eGFR < 45 and declining at rate 20%/year)
  - RBC casts or hematuria suggestive of glomerulonephritis/renal vasculitis
  - help with cause of CKD
  - poorly managed HTN
  - complexities of renal disease (electrolytes, secondary hyperPTH, anemia, secondary erythropoietin deficiency)
  - urgent if new eGFR < 20 or Cr > 300mmol/L
- 
- treat reversible causes
  - hypovolemia, hypotension
  - nephrotoxic drugs: NSAIDs, radiographic contrast material, aminoglycoside antibiotics
  - urinary tract obstruction
- BP control: target 120 (see Hypertension)
  - if proteinuric (urine protein excretion greater than 500 to 1000 mg/day) and nondiabetic:
    - RAS inhibitor is first line (ACE/ARB)
  - if nonproteinuric, nondiabetic:
    - if has edema and volume overloaded: diuretic as firstline
    - if no edema: RAS inhibitors are first line
- slow rate of progression

- treat underlying cause
  - polycystic kidney disease, diabetes, obesity, glomerular disease, hematological disorders, cardiac, hepatic disorders
- if proteinuric
  - ACEi/ARB, SGLT2i
- other treatments
  - restrict dietary protein: optimal level of protein intake not yet determined
  - smoking cessation
  - Treatment of chronic metabolic acidosis with supplemental bicarbonate may slow the progression to end-stage kidney disease (ESKD).
  - Glycemic control

## CKD complications

- complications of CKD and management
  - volume overload
    - dietary sodium restriction and diuretic therapy, usually with a loop diuretic given daily.
  - Hyperkalemia
    - low potassium diet, avoid drugs that raise potassium such as NSAIDs
  - metabolic acidosis
    - Metabolic acidosis may be treated with bicarbonate supplementation. Bicarbonate supplementation requires careful monitoring of volume status because bicarbonate is administered with sodium.
  - mineral, bone disorders
    - Hyperphosphatemia is a common complication of CKD. May develop secondary hyperparathyroidism
    - Osteitis fibrosa results from secondary hyperparathyroidism.
      - Monitor PTH
      - treat with dietary phosphate restriction, the administration of oral phosphate binders, and the administration of calcitriol (or vitamin D analogs) to directly suppress the secretion of PTH.
  - hypertension
  - anemia
    - due primarily to reduced production of erythropoietin by the kidney
    - monitoring
      - if no anemia: check yearly if GFR 30-59, q6 months if GFR <29, q3 months if on dialysis
      - if has anemia and no Erythropoiesis-stimulating agents (ESA): check q3 months if GFR <59, q1 month if on dialysis
    - investigate to exclude other causes of anemia: red blood cell indices, absolute reticulocyte count, serum iron, total iron-binding capacity, percent transferrin saturation, serum ferritin, white blood cell count and differential, platelet count, B12 and folate concentrations if the mean corpuscular volume (MCV) is increased, and testing for blood in stool.
  - dyslipidemia
    - Abnormal lipid metabolism is common in patients with kidney disease. Common to have high triglycerides with normal total cholesterol
    - treat with statin with or without ezetimibe. Target LDL < 2
  - sexual dysfunction

## proteinuria. Elevated ACR. ACR elevation

- defined as proteinuria without abnormalities in the urinary sediment, including hematuria, or a reduction in glomerular filtration rate (GFR), as well as the absence of hypertension or diabetes.
- In most cases of isolated proteinuria, the patient is asymptomatic, and the presence of proteinuria is discovered incidentally by use of a dipstick during routine urinalysis.
- Rule out other causes of proteinuria
  - urine microscopy to rule out glomerular disease: such as hematuria with dysmorphic red blood cells, specifically acanthocytes; red blood cell casts; and white blood cells or white blood cell casts in the absence of infection.

- Rule out transient proteinuria. It is transient if repeat qualitative test no longer positive for proteinuria. No further evaluation needed.
  - can occur with fever and exercise, perhaps mediated by angiotensin II or norepinephrine-induced alterations in glomerular permeability,
  - can also occur with symptomatic urinary tract infection
- rule out orthostatic proteinuria
  - benign condition that does not require extensive evaluation (such as a kidney biopsy) or specific therapy
  - kidney function and proteinuria should be followed yearly to monitor for any evidence of progression.
  - method
    - patient empties bladder before going to bed
    - upon waking in morning, void into urine specimen. Measure ACR or PCR
    - normal UPCR in the first-morning voided urine confirms the diagnosis of orthostatic proteinuria.
- Persistent isolated proteinuria
  - start ACEi and refer to nephrology
  - investigations: ACR, GFR, Cr, UPEP, kidney ultrasound
    - other investigations: Electrolytes, CBC, A1c, lipids
  - kidney biopsy: consider if proteinuria more than 3.5g/day

### .CKD - other info

- classification
  - G1: normal: GFR  $\geq 90$
  - G2: mildly decreased: GFR 60-89
  - G3a: GFR 45-59
  - G3b: GFR 30-44
  - G4: GFR 15-29
  - G5: GFR  $< 15$
- risk factors
  - age
  - hypertension
  - DM
  - NSAID use
  - dyslipidemia
  - smoking
- 

### .scrotum pain - acute

- DDx
  - testicular torsion, acute epididymitis, Fournier's gangrene
- evaluation
  - fever, frequency, urgency, dysuria
  - physical examination of testes

### .scrotum pain - nonacute

- Causes
  - varicocele
  - epidymal cyst
  - chronic infectious epididymitis

## .epididymitis

- signs, symptoms
  - fever
  - unilateral testicular pain
  - tenderness/swelling of testicle
- investigations
  - first void stream for STIs
  - midstream urine culture
  - emergent testicular U/S if need to r/o torsion
- management
  - scrotal support, ice, analgesia
  - expect improvement within 48h of treatment initiation
  - counsel on STIs if suspected
  - antibiotics as per public health guideline. Treat empirically while awaiting test results
    - suspect chlamydia/gonorrhea
      - doxycycline 100mg bid for 10-14d AND (Ceftriaxone 250mg IM x1 OR Ciprofloxacin 500mg po x1)
    - suspected enteric organisms
      - Ofloxacin 200mg po bid for 14d
      - Ciprofloxacin 500mg po bid for 14d
    -
- follow-up
  - f/u in 3-7 days to ensure some improvement. can take up to 4 weeks to clear
- 

## .Varicocele

- caused by dilatation of pampiniform plexus of spermatic veins. generally left sided
- signs, symptoms
  - orange from left sided scrotal fullness on valsalva, to large, soft left-sided scrotal mass
  - dull, aching, left sided scrotal pain. worse with standing, better by laying down
  - decreased fertility
- management
  - <https://www.uptodate.com/contents/image?imageKey=PC%2F134175>
  - most don't require intervention
  - treat with surgical ligation if:
    - pain varicocele
    - evidence of testicular hypotrophy
    - semen analysis abnormal and patient wishes to retain fertility
  - if semen analysis normal: monitor q1-2y
- surgery: ligation of gonadal vein branches so that retrograde blood flow can no longer reach the plexus of veins in the scrotum
- 
- 
- 

## .Vaccinations

### .influenza vaccination.flu vaccination

- Flu vaccine timing
  - <https://immunizebc.ca/ask-us/questions/can-i-get-influenza-vaccine-same-time-other-vaccines-pneumococcal-or-shingles>

- Influenza vaccines can be safely given at the same time or any time before or after other vaccines, including the COVID-19 vaccine.
- Common side effects from the inactivated influenza vaccine include soreness, redness and swelling where the vaccine was given. Other symptoms, that may last 1 to 2 days, can include fever, headache, muscle soreness, fatigue, nausea, vomiting, diarrhea and chills. Babies and young children may be irritable, sleepy and have a decreased appetite.
- There is good evidence to show the inactivated influenza (flu) vaccine is safe for pregnant people and their babies.

### .Live vaccines

- Zostavax (not Shingrix)
- live attenuated influenza
- measles
- mumps
- rotavirus
- rubella
- smallpox
- varicella
- yellow fever
- oral typhoid
- timing
  - To minimize the possibility of vaccine interference, two or more live parenteral vaccines should be administered either on the same day or be separated by an interval of at least 28 days.
    - The exception to this is the administration of varicella vaccine and another live vaccine to high risk/immunocompromised clients.
  - rationale: Live attenuated vaccines must replicate in order to elicit an immune response. Agents that interfere with viral replication may affect the immune response.

●

### .TB skin test

- S:
  - previous BCG, contact with inmates or homeless,
  - no chronic diseases, no immunosuppressants
  - born in Canada
  - ask if needs two step or one step
  - pregnant?
- TB skin test and immunizations for school
- performing TB test
  - Withdraw from vial 0.1mL
  - Clean skin. Stretch the skin. Inject at 0-10 degree angle.
  - other notes
    - No band-aids. as can cause redness which throws off the result
    - other Vaccines
      - Can get TB test a few days after flu shot.
      - If live vaccine given. Need to delay TB test by 4-6 weeks.
- Causes for false positive tests
  - Nontuberculous mycobacteria
  - BCG vaccination
- causes for false negatives
  - immunosuppression
  - Measles vaccination may temporarily suppress tuberculin reactivity. Measles-mumps-rubella (MMR) vaccine may be given after, or on the same day as, the TST. If MMR has been given recently, TST should be postponed until four to six weeks after administration of MMR
- Interpretation

- size of reaction is measured by width of induration, not erythema
- positive cut-offs;
  - [https://www.uptodate.com/contents/image?imageKey=ID%2F67357&topicKey=ID%2F8005&search=tb%20skin%20test&rank=2~149&source=see\\_link](https://www.uptodate.com/contents/image?imageKey=ID%2F67357&topicKey=ID%2F8005&search=tb%20skin%20test&rank=2~149&source=see_link)
  - $\geq 5$  mm:
    - HIV infection,
    - close contact of active contagious case,
    - abnormal CXR consistent with old TB,
    - immunosuppressed patients
  - $\geq 10$ :
    - children less than 4 yo
    - Foreign born from countries with incidence  $>25/100,000$
    - Persons with clinical conditions that increase the risk of reactivation: including silicosis $\Delta$ , chronic renal failure requiring dialysis $\Delta$ , diabetes mellitus, some malignancies (leukemias, lymphomas, carcinoma of the head, neck, or lung), underweight ( $\geq 10$  percent ideal body weight), jejunioileal bypass, injection drug users
    - Residents and employees in high-risk settings, such as prisons, jails, healthcare facilities, mycobacteriology labs, and homeless shelters
  - $\geq 15$  mm:
    - Healthy individuals age 4 years and older with low likelihood of true TB infection
- if positive test
  - CXR to assess for active TB.
    - If imaging suggests TB and has clinical manifestations (cough  $>2$  weeks' duration, fevers, night sweats, weight loss):
      - three sputum specimens should be submitted for AFB smear, mycobacterial culture, and NAA testing
  - IGRA quantiferon TB test to confirm it is TB infection and not secondary to vaccine.
  - If confirmed TB: report to public health.
  - Refer to ID for TB treatment

### .Immunization forms for school

- check Varicella and Hep B titres
- baby immunization record: patient needs to contact public health if not already listed in EMR.

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### .Vaccine timing

- ok to do flu, Shingrix and Prevnar in same visit

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### .Pediatric Vaccines.Vaccinations.Vaccine.Peds Vaccines

- 2 months:
  - DtaP-IPV-Hib and HB;
  - PCV-13;
  - Rota (Rotarix at 2 month, 4 months. Rotateq 2,4,6)
  - Men C-C
- 4 months:
  - DtaP-IPV-Hib and HB;
  - PCV-13;
  - Rota (Rotarix at 2 month, 4 months. Rotateq 2,4,6)
- 6 months:
  - DtaP-IPV-Hib and HB;
  - Flu;
  - Rota (Rotateq 2,4,6)
  - hep A (indigenous only)

- 12 months:
  - MMR;
  - Var;
  - PCV13;
  - Men-C-C;
- 18 months:
  - DtaP-IPV-Hib;
  - HepA (indigenous only)
- 4 -6 years:
  - Tdap-IPV;
  - MMRV
- Grade 6:
  - HPV9 (2 doses 6 months apart)
- Grade 9
  - Men-C-ACYW
  - Tdap (booster)
- 
- vaccine technique
  - Parent to hug patient. Patient sitting sideways on lap. Parents squeezing patient's legs with their legs. Arm to be vaccinated facing outwards. Patient's other arm around parent's waist. Mom holds outward elbow.
  - NOTE: make sure that MMR is given SC. Know which vaccine is which.
  - Preparation
    - 1 dry cotton. 1 cotton ball soaked with alcohol. 1 band-aid
    - IM: 25 gauge. 1 inch length. 5/8" for kids
    - Vaccine
      - MMRV, MMR: need to inject dilutant into the powder to mix it yourself
      - Adacel, Pediacel: withdraw from the vial
      - Prevnar, Men-C: pre-drawn
      - Rotateq: oral vaccine. puncture the cap.
  - Wipe down skin with cotton swab soaked with alcohol
  - Injection
    - Deltoid:
      - 3 finger widths from acromion.
      - Pinch up skin. insert needle all the way. then inject. release the pinch. then withdraw the needle.
    - kids age  $\leq$  12 months: anterior lateral thigh
    - Subcutaneous: posterior triceps or anterolateral thigh if age  $\leq$  12 months.
      - pinch up skin. inject at a 45 degree angle
      - subcutaneous vaccines: MMR, MMRV, Varicella
        - live attenuated vaccines
    - Deltoid/posterior triceps vs anterolateral thigh
      - vaccines in leg at 12 months and younger. In arm at 15-18 months and older.
  - Order of vaccines to give: easiest to hardest
    - Rotateq, then Pediacel, then Prevnar. Prevnar last since it hurts the most.
- Opening glass ampules
  - supposed to break it at the neck. Can use paper towel or glove if worried about cutting self.
- 

• Expected list of vaccines

<ul style="list-style-type: none"> <li>• Rotateq/Rotarix</li> <li>• Pediacel</li> <li>• Prevnar 13</li> </ul>	<ul style="list-style-type: none"> <li>• 2 months</li> </ul>
<ul style="list-style-type: none"> <li>• Rotateq/Rotarix</li> <li>• Pediacel</li> </ul>	<ul style="list-style-type: none"> <li>• 4 months</li> </ul>

• Prevnar 13	
• Rotateq • Pediacel	• 6 months
• Priorix/MMR II • Neisvac-C/Menjugate • Prevnar 13	• 12 months
• Varivax III	• 15 months
• Pediacel	• 18 months
• Adacel-Polio • Priorix-Tetra/MMRV/ProQuad	• 4-6 years

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- Brand names
  - <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-1-key-immunization-information/page-15-contents-immunizing-agents-available-use-canada.html>
  - Pediacel: DtaP-IPV-Hib
  - Prevnar 13: Pneu-C-13
  - Rotateq (3 doses): Rot 5
  - Adacel: Tdap
  - Priorix: MMR
  - Priorix-Tetra: MMRV
  - Quadracel, Adacel-Polio: Dtap-IPV
  - Imovax Polio: IPV
  - MMR II: MMR
  - Varivax III: Varicella
- Vaccines
  - DtaP: Diphtheria, tetanus, pertussis
  - IPV: polio
  - Hib: haemophilus influenzae type b
  - Pneu-C-13: Pneumococcal conjugate
  - Rot-5: Rotavirus
  - Men-C-C: Meningococcal conjugate
  - MMR: Measles, mumps, rubella
  - Var: Varicella
  - Men-C-ACYW: Meningococcal conjugate
  - HB: Hepatitis B
  - HPV: Human Papillomavirus
  - Td: tetanus, diphtheria
- prescribing vaccines
  - Hep B
    - Engerix at 0,1, and 6 months
  - MMR
    - MMR II at 0, 1 month
- 
- [.Vaccination schedule.catch up schedule](#)
- Children 1-6 years of age (inclusive) when starting or resuming immunization
  - 1st visit
    - DTaP-HB-IPV-Hib (or DTaP-IPV-Hib and HB)
    - MMR
    - PCV13
    - Var (if susceptible)



- Men-C-C
- HA (Indigenous children only)
- Flu
- 2nd (4 weeks after first visit)
  - DTaP-IPV-Hib and HB
- 3rd (8 weeks after first PCV13)
  - PCV13
- 4th (16 weeks after 1st visit and at least 8 weeks after 2nd dose of HB)
  - DTaP-IPV-Hib and HB
- 5th (6 months after 1st visit)
  - HA (Indigenous children only)
- 6th (6 months after 3rd dose of DTaP-containing vaccine)
  - DTaP-IPV-Hib (or Tdap-IPV)
- age >4
  - see normal vaccine schedule
- adults age 18 and older when starting or resuming immunization
  - hep A: Indigenous persons 18 years of age only: 2 doses given at 0 and 6 months.
  - Hep B:
    - Individuals 18 and 19 years of age: 3 doses (0.5 mL each) given at 0, 1 and 6 months.
    - Individuals 20 years of age and older born in 1980 or later: 3 doses (1.0 mL each) given at 0, 1, and 6 months.
  - Meningococcal:
    - Individuals born before 2002 are eligible to 24 years of age (inclusive): 1 dose of Men-C-C.
    - Individuals born in 2002 or later are eligible to 24 years of age (inclusive): 1 dose of Men-C-ACYW-135
  - MMR
    - Measles Protection: up to 2 doses of MMR are recommended for all individuals born on or after January 1, 1970 (1957 for health care workers) who do not have a history of lab confirmed measles infection, lab evidence of immunity, or documentation of 2 doses of a live measles-containing vaccine at 12 months of age or older and given at least 4 weeks apart.
    - Mumps Protection: up to 2 doses of MMR are recommended for all individuals born on or after January 1, 1970 (1957 for health care workers) who do not have a history of lab confirmed mumps infection, or documentation of 2 doses of a live mumps-containing vaccine at 12 months of age and older and given at least 4 weeks apart.
    - Rubella protection: 1 dose of MMR is recommended for all individuals born on or after January 1, 1957 who have not received 1 dose of a rubella-containing vaccine or who do not have serologic evidence of rubella immunity.
    - If 2 doses of MMR vaccine are required, give at least 4 weeks apart.
  - IPV
    - Routine primary immunization against polio of adults living in Canada is not considered necessary. Primary immunization with polio vaccine is recommended only for unimmunized adults who are at higher risk of exposure to wild polioviruses: refer to Part 4 – Biological Products, Polio Vaccine.
    - 3 doses given at 0 and 1 month, followed by a 3rd dose 6-12 months after the 2nd dose.
    - If IPV is indicated, for those also requiring protection against tetanus, diphtheria or pertussis, Tdap-IPV can be used
  - Td/Tdap
    - Pregnant people should receive 1 dose of Tdap in every pregnancy, ideally between 27-32 weeks of gestation.
    - Adults receiving a primary immunization series should receive 1 dose of Tdap (to provide protection against pertussis) followed by 2 doses of Td. This series should be given at 0 and 1 month, followed by a 3rd dose 6-12 months after the 2nd dose.
    - For adults resuming an interrupted immunization series, provide additional doses of vaccine to ensure that the client has received at least 3 doses of a diphtheria and tetanus containing vaccine with at least one dose after the 4th birthday.
    - Individuals born in 1989 or later who missed their adolescent Tdap booster are eligible for 1 dose of Tdap
-

.Vaccination schedule.catch up schedule.minimum intervals between vaccinated doses

Vaccine (dose 1 minimum age)	Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5
DTaP-IPV-Hib (6 weeks)	4 weeks	4 weeks	24 weeks	24 weeks AND min age for this dose is 4 years
DTaP-HB-IPV-Hib INFANRIX hexa® (6 weeks)	4 weeks	16 weeks after dose 1 AND 8 weeks after dose 2 AND minimum age for dose 3 is 24 weeks		
Haemophilus influenzae type b (Hib) <b>4 doses</b> (6 weeks) D	4 weeks	4 weeks	8 weeks AND minimum age of 12 months	
Hepatitis A (24 weeks)	24 weeks			
Hepatitis B grade 6 program Recombivax HB® <b>2 doses</b> (11 years)	16 weeks			
Hepatitis B grade 6 program Engerix®-B <b>2 doses</b> (11 years)	24 weeks			
Hepatitis B <b>3 doses</b>	4 weeks	16 weeks after dose 1 AND 8 weeks after dose 2 AND minimum age for dose 3 is 24 weeks		
HPV (Gardasil®9 and Cervarix®) <b>3 doses</b> (9 years)	4 weeks	12 weeks after dose 2 AND 24 weeks after dose 1		
HPV (Gardasil®9 and Cervarix®) <b>2 doses</b> (9 years)	24 weeks			
Meningococcal C conjugate NeisVac-C® (8 weeks)	8 weeks			
Meningococcal quadrivalent	8 weeks	8 weeks		

conjugate Menveo® (8 weeks) I Nimenrix® (6 weeks)				
Meningococcal quadrivalent conjugate Menactra® (2 years)	8 weeks			
MMR (12 months)	4 weeks			
MMRV (4 years)	12 weeks			
Pneumococcal conjugate <b>4 doses</b> (6 weeks)	4 weeks	4 weeks	8 weeks	
Pneumococcal conjugate <b>3 doses</b> (8 weeks)	4 weeks	8 weeks		
Rotavirus <b>2 doses</b> (Rotarix®) (6 weeks)	4 weeks			
Rotavirus <b>3 doses</b> (RotaTeq®) (6 weeks)	4 weeks	4 weeks		
Td/Tdap (7 years)	4 weeks	24 weeks		
Varicella (12 months)	Age ≤ 12: 12 weeks age ≥ 13: 6 weeks			

### .School vaccination.Vaccination for school

- Pertussis
  - one time pertussis vaccine (Tdap or Tdap-Polio) 18 year or older
- Tetanus, Diphtheria, Polio
  - three dose: minimum one month between dose 1 and 2. minimum 6 months between dose 2 and 3.
  - last tetanus/diphtheria immunization must be within past ten years
  - serology not accepted for Tdap
- TB
  - two step TST
    - two separate tests, ideally 7-28 days apart. May be up to 12 months apart.
- MMRV
  - measles
    - 2 doses of live measles containing vaccine, 28 days or more apart. First dose given on or after 12 months
    - OR positive serology for measles antibodies
  - mumps
    - 2 doses of live mumps containing vaccine, 28 days or more apart. First dose given on or after 12 months
    - OR positive serology for mumps antibodies
  - rubella
    - 1 dose of live rubella containing vaccine. given on or after 12 months
    - OR positive serology for rubella antibodies
  - varicella

- 2 doses of live mumps containing vaccine, minimum 28 days (ideally 6 weeks) or more apart. First dose given on or after 12 months
- OR positive serology for varicella antibodies
- Hep B
  - 2 doses: minimum 24 weeks between dose 1 and 2. first dose given after 11 years old
  - 3 doses:
    - minimum 4 weeks between dose 1 and 2.
    - for dose 3: 16 weeks after dose 1 AND 8 weeks after dose 2 AND minimum age for dose 3 is 24 weeks

## .Adult Vaccination.Vaccination in Adults

- influenza: age all: 1 dose annually
- Tdap: age all: 1 dose Tdap, then Td or Tdap booster q10 years
- MMR: age <65: 1 or 2 doses.
- Varicella: born in 1980 or later: 2 doses. Born before 1980, then only if risk factors.
- Zoster recombinant (Shingrix): age > 50: 2 doses.
- HPV: age <26: 2-3 doses. age 27-45: Shared decision making.
- pneumococcal conjugate (PCV13): age 19-65: 1 dose if risk factor. age >65: shared decision making.
- pneumococcal polysaccharide (PPSV23): age 19-65: 1 or 2 doses if risk factor. age > 65: 1 dose.
- Hep A: age all: 2 or 3 doses if risk factor
- Hep B: age all: 2 or 3 doses if risk factor
- MenACWY: age all: 1 or 2 doses if risk factor
- MenB: age 19-23: shared decision making. age all: if risk factors
- H. influ b (HiB): age all: 1 or 3 doses if risk factor.

## .Pneumonia Vaccine

- Pneumo 23, Pneumovax, PPSV 23
  - Covered in Age 65 and older
  - Indication:
    - Age >= 65
    - Age 19-64 and at-risk (immunocompromise, chronic heart/lung/liver, smoking, etc.)
  - Revaccination:
    - if in at-risk group
      - age 19-64: at 5-10 year intervals
      - once reach age 65, give one more dose (if >5 years since last vaccine)
    - no revaccination if age > 65.
- Pneumo 13, Prevnar 13, PCV 13
  - Not routinely recommended >65. may consider on individual basis
  - Indication:
    - Age 19-64 and at-risk (e.g. immunocompromise, asplenia, cerebrospinal fluid leak, cochlear implant, or history invasive pneumococcal disease)
  - Revaccination not indicated.
- sequence of vaccines
  - ideally Pneumo 13 given first. give Pneumo 23 eight weeks later if high risk of infection, otherwise one year later
  - if Pneumo 23 given before Pneumo 13, wait 1 year between the two vaccines.

## .COVID Vaccine recommendations

- <https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/recommendations-use-covid-19-vaccines.html#b9>
- may be offered to the following patients, although not enough evidence:
  - immunosuppressed due to disease or treatment

- autoimmune condition
- pregnant/breastfeeding
- age 12-15: only Pfizer may be offered.
- allergies
  - may consider vaccine in individuals with mild to moderate allergic reactions
  - patients with severe allergy not related to COVID vaccine are ok.
- third dose eligibility
  - Transplant recipients (including solid organ transplant and hematopoietic stem cell transplants)
  - Patients with hematological cancers (examples include lymphoma, myeloma, leukemia) on active treatment (chemotherapy, targeted therapies, immunotherapy)
  - Recipients of an anti-CD20 agent (e.g., rituximab, ocrelizumab, ofatumumab).
- vaccine exemption
  - reasons for exemption
    - an allergist/immunologist-confirmed severe allergy or anaphylactic reaction to a previous dose of a COVID-19 vaccine or to any of its components that cannot be mitigated;
    - a diagnosed episode of myocarditis/pericarditis after receipt of an mRNA vaccine
  - notes need to specify:
    - the reason they cannot be vaccinated against COVID-19 (i.e., document clear medical information that supports the exemption); and
    - the effective time period for the medical reason (i.e., permanent or time-limited).
- administration with other vaccines
  - COVID-19 vaccines may be given at the same as, or any time before or after other vaccines, including live, non-live, adjuvanted or unadjuvanted vaccines.
- Interval between previous COVID infection and vaccination
  - <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-26-covid-19-vaccine.html#t5>
  - infection prior to completion of primary series:
    - not immunocompromised: vaccine 8 weeks after symptom onset or positive test
  - infection after primary series but before booster:
    - 6 months since previous infection unless a shorter interval of 3 to <6 months is warranted in the context of heightened epidemiological risk
  - can get booster 3-6 months after last dose or last COVID infection

## **.Paxlovid**

- antiviral for COVID. Nirmatrelvir/Ritonavir
- for patient with mild to moderate disease who are at high-risk of hospitalization and death. It should be prescribed within 5 days of symptom onset.
- eligibility:
  - patients at higher risk for severe outcomes
  - tested positive for COVID
  - mildly ill
  - within 5 days of symptom onset
  - no contraindications
- higher risk patients
  - immunocompromised
  - age > 70
  - age > 60 with less than 3 vaccine doses
  - age > 18 with less than three vaccine doses with one risk condition
    - risk condition: diabetes, obesity, heart disease, hypertension, CHF, chronic respiratory disease, moderate/severe kidney disease, developmental disability, cerebral palsy, sickle cell disease, moderate/severe liver disease, pregnancy

- if higher risk refer for testing. if positive, may be eligible for Paxlovid

- 

## .Vascular

### .peripheral artery disease.claudication.PAD

- Clinical presentation
  - intermittent claudication in lower extremity. Leg pain that is consistently reproduced with exercise and relieved by rest.
- Diagnosis
  - resting ABI (ankle brachial systolic pressure index). ABI < 0.9 has high sensitivity and specificity for PAD
- DDx
- management
  - risk factor modification: antiplatelets, smoking cessation, control diabetes and hypertension, lipid lowering therapy, dietary modification
  - pharmacologic therapy for claudication
    - Naftidrofuryl 100-200mg tid
    - cilostazol 100mg bid. Stop treatment if not improved after 3 months of therapy.
  - surgical revascularization

### .peripheral artery disease.PAD – chronic limb threatening ischemia

- presentation
  - Ischemic rest pain
    - pain across the base of the metatarsal heads at rest relieved by dependency
  - tissue loss: ulceration, gangrene
- diagnosis
  - ABI <0.4, toe pressure <30 to 40 mmHg, flat metatarsal waveforms on pulse volume recording, and low or absent pedal flow on duplex ultrasonography are consistent with severe CLTI
- management
  - control pain
  - appropriate wound care
  - pressure offloading
  - treat infection if present
  - secondary CV prevention
    - antiplatelets and statins for everyone
- revascularization
  - most patients can be offered a reasonable attempt at limb salvage.

### .compression stockings – venous insufficiency

- Goal of treatment: The goals of treatment in patients with chronic venous disease are reduction of discomfort and pain, reduced severity and extent of edema, improvement in skin changes (ie, lipodermatosclerosis), and healing of any associated ulcers
- When the patient is measured for stockings, it should preferably be done early in the morning when lower extremity edema levels are at their lowest.
- contraindicated in patients with:
  - peripheral artery disease: In patients with nonpalpable pulses or risk factors for peripheral artery disease (PAD), vascular evaluation including ankle-brachial index (ABI) should be performed. An ABI  $\leq 0.5$  has been proposed as an absolute contraindication to compression therapy, although caution should be exercised in any patient with an ABI  $\leq 0.9$

- acute lower extremity superficial or deep vein thrombosis, or in the presence of acute cellulitis, infection, or necrotic tissue.
- Caution with following: acute/chronic heart failure as may shift the fluid so as to affect cardiac function
- Knee-high stockings are sufficient for most patients and are generally well tolerated
- If an ulcer is present, compression stockings can be worn over a simple dressing covering the ulcer; however, compression stockings may be more painful to apply in this situation
- Use of compression stockings
  - Compression stockings absorb skin oils and cause the skin to dry out, so the skin should be moisturized in the evening after the stockings are removed.
- Complications
  - Skin necrosis: Excessive pressure over the instep and bony prominences of the leg and foot can cause skin necrosis. Additional padding prior to bandaging will alleviate pressure points
  - Fungal infection: Accumulation of exudate from the ulcer under compression dressings can lead to foul odor and predispose to fungal infection. If the bandage becomes soaked, all occlusive and compressive dressings should be removed and any fungal rash treated to resolution before reapplication. Increasing the frequency of bandaging may help to manage the drainage.
  - Contact dermatitis: Contact dermatitis can develop from one of the components in the bandaging system in susceptible individuals (eg, zinc in Unna boot, latex in elastic wraps). Latex-free elastic wraps are available
- compression stocking prescription

OTC¶	<15 mmHg	Minimal	Asymptomatic individuals as needed for comfort	0,1
I	15-20 mmHg	Mild	Minor varicosities; tired, aching legs; minor ankle, leg, or foot swelling	1,2,3
II	20-30 mmHg	Moderate	Moderate to severe varicosities, moderate swelling, phlebitis, following vein ablation	3,4
III	30-40 mmHg	Firm	Severe varicosities, severe swelling, management of active ulceration, following DVT, post-surgery	4,5,6
IV	>40 mmHg	Extra firm	Lymphedema	NA

## .Leg swelling.Leg edema

- DDx:
  - cellulitis, venous stasis, DVT
  - acute edema DDx
    - medications, CHF, nephrotic syndrome, venous thrombosis, acute worsening of chronic causes
  - chronic edema
    - venous insufficiency, CHF, renal disease, liver disease (early cirrhosis), premenstrual edema, pregnancy, malnutrition, pelvic compression, dependent edema, sodium/fluid overload, refeeding edema, inflammation, medications
  - chronic lymphedema
    - lymph node dissection, thyroid disease (myxedema)
- bilateral edema
  - DDx: CHF, sleep apnea, pulmonary hypertension, kidney disease, liver disease, venous stasis
  - Investigations
    - Urinalysis, Cr, albumin, LFTs, TSH
    - then Echocardiogram to r/o CHF, pulmonary hypertension
    - then Pelvic imaging to r/o venous outflow obstruction. U/S or CT

### .Leg swelling.Leg edema - Acute unilateral

- Ddx: medications, heart failure, nephrotic syndrome, VTE
- evaluation
  - rule out DVT
  - if DVT ruled out, common causes include: muscle strain, venous insufficiency, cellulitis, bakers cyst
- 

### .Leg swelling.Leg edema - Chronic Unilateral

- DDX: chronic venous disease, lymphedema, CRPS
- Evaluation
  - consider chronic venous disease, lymphedema, complex regional pain syndrome
    - chronic venous disease: characteristic pigmentary changes.
    - Lymphedema: hx of inguinal or pelvic lymph node dissection or radiation therapy
    - CRPS: usually 4-6 weeks after limb trauma.
  - If not consistent with above: compression U/S with doppler to confirm venous insufficiency (also, to rule out DVT)
    - If leg doppler suggestive of pelvic outflow obstruction (in female) get transvaginal ultrasound

### .Leg swelling.Leg edema - acute Bilateral

- Ddx: medications (e.g. CCB), acute heart failure, acute nephrotic syndrome, bilateral DVT
- evaluation
  - if DVT likely: get doppler U/S
  - if on meds that cause edema: consider stopping
  - if dyspneic, orthopnea: consider CHF
- investigations
  - urinalysis
    - if positive for protein: consider nephrotic syndrome. get urine protein to creatinine ratio and serum albumin.

### .Leg swelling.Leg edema - Chronic Bilateral

- Ddx: venous disease, CHF, pulmonary hypertension (often from sleep apnea)
  - other ddx: nephrotic syndrome, liver disease, pregnancy, pelvic compression, fluid overload, medications
- Evaluation
  - if dyspnea, orthopnea, PND: consider CHF
  - if excessive daytime sleepiness, loud snoring: consider OSA causing pulmonary hypertension, causing edema
- investigations
  - urinalysis, Cr, Albumin, PTT, LFTs, TSH: r/o renal, liver, thyroid disease
  - if above tests normal, get echocardiogram: to r/o CHF or pulmonary hypertension
  - if echo normal, consider venous disease: look for skin changes
  - skin findings of chronic venous disease are absent, we obtain imaging of the pelvis to exclude a pelvic neoplasm or other lesion-causing venous outflow obstruction. Consider CT pelvis

### .Lower extremity chronic venous disease.Venous insufficiency.Venous stasis

- Clinical features
  - Symptoms or findings include pain, leg heaviness, aching, swelling, skin dryness, tightness, itching, irritation, and muscle cramps.
  - Visible clinical signs of chronic venous disorders in increasing severity include dilated veins (eg, telangiectasia, varicose veins), leg edema, skin changes (lipodermatosclerosis; a fibrosing dermatitis of the subcutaneous tissue), and skin ulceration.
  - Significant symptoms (aching, swelling, heaviness) may be indicative of underlying venous insufficiency.
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- diagnosis



- Venous duplex – Symptomatic patients with lower extremity telangiectasias, reticular veins, varicose veins, skin changes, or venous ulceration should undergo further evaluation with venous duplex to identify the presence of superficial, perforator, or deep venous reflux, which alters treatment options.
- Management
  - Telangiectasia, reticular veins
    - Can be treated cosmetically: sclerotherapy and surface laser therapy of telangiectasias and reticular veins
  - Symptomatic
    - Initial treatment for most patients is conservative
      - limb elevation, exercise, and compression therapy.
    - If fail conservative therapy: consider referral to vascular surgery
    - If persistent symptoms AND superficial venous reflux seen on U/S: vein ablation.
  - approach based on type of reflux
    - No axial vein reflux: isolated varicose veins. Mainly cosmetic
      - treated with sclerotherapy or excision. Sclerotherapy generally thought to be superior to laser therapy.
    - Superficial venous reflux
      - may be candidate for superficial venous ablation.
      - Superficial venous ablation is thought to produce beneficial effects by reducing the venous volume in the limb and thereby the effects of venous hypertension on skin
    - deep venous reflux
      - options include: repair of damaged deep vein valves. Relieve central venous obstructions (e.g. iliofemoral/iliocaval obstruction) if present (with angioplasty/stenting)
    - perforator reflux:
      - options include perforator ablation with U/S guided sclerotherapy.
      - Incompetent perforators can contribute significantly to increased local venous pressure, reducing skin perfusion and inhibiting ulcer healing

## zzTodo

- PTSD
- constipation
- vomiting
- dizziness
- resistant depression
- BP and headache. BP urgency
- non-traumatic headache in ER
- hair loss
- chronic nausea
- fever in children
- croup
- sunset eyes
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