**PH.1.12**

**Calculate The Dosage Of Drugs Using Appropriate Formulae For An Individual Patient Including Children, Elderly & Patient With Renal Dysfunction**.

**CALCULATION 1**

A 35 Years Old Man Was Admitted With H/O Diarrhoea & Vomiting. On Examination He Was Found To Be Dehydrated. He Needs 3 Pints Of Normal Saline. Calculate The Sodium Chloride To Be Used.

( 1 Pint= 500ml) ( Normal Saline = 0.9% Sodium Chloride Solution).

**N1 = N2**

**V1 V2**

**Required Volume (V1) = 3 Pints = 1500 ml N2 = 0.9 G**

**Required Strength(N1) = ? V2 = 100 ml**

N1 = 0.9 G

1500 100 ml

N1 = 0.9 g x 1500

100

= 13. 5 g

**13.5 g Of Sodium Chloride Is Needed .**

**CALCULATION 2**

An Adult Weighing 60 Kg Is To Be Given IV Thiopentone Sodium In Dose Of 5mg/kg. If The Strength Of The Solution Is 2.5 %, What Is The volume Of Drug You Will Use ?.

**N1 = N2**

**V1 V2**

**Required Strength Of Thiopentone sodium ( N1 ) = 5 x 60 = 300 mg N2 = 2.5 g (2500mg)**

**Required Volume (V1) = ? V2 = 100 ml**

300 mg = 2500 mg

V1 100 ml

V1 = 300 X 100

2500 mg

= 12 ml

**Volume Of The Drug Required = 12 ml**

**CALCULATION 3**

Calculate The Dose Of Paracetamol For A Child Aged 4 Years. The Adult Dose Is 500 mg Four Times A Day . Paracetamol Syrup Is Available As 125 mg/ 5 ml.

As Age Of The Child Is Given , The Paediatric Dose Is Calculated using **Young’s Or Dilling’s Formula.**

**Dilling’s Formula**  **= Adult Dose X Age In Years**

**20**

= 500 X 4

20

= 100 mg

**Dose Needed For The Child Is 100 mg Four Times A Day**.

Volume Of Paracetamol Syrup Needed ?.

**N1 = N2**

**V1 V2**

**Required Strength ( N1 ) = 100 mg Given Strength( N2) = 125 mg**

**Required Volume ( V1 ) = ? given Volume ( V2) = 5 ml**

100 mg = 125 mg

V1 5 ml

V1 = 100 X 5

125

= 4 ml

**The Child Needs 4 ml Of Paracetamol Four Times A Day.**

**CALCULATION 4**

Calculate The Dose Of Amoxicillin For A Child Weighing 12 kg Suffering From Acute Tonsillitis, While The Adult Dose Is 500mg Three Times A Day . Amoxicillin Is Available As Powder For Oral Suspension ( 125 mg/5ml ).

As Weight Of The Child & Adult Dose Are Given, Paediatric Dose Is calculated Based On

**Clark’s Formula .**

**Clark’s Formula = Adult Dose X Body Weight In Kg**

**70**

**= 500 mg X 12 kg**

**70**

**= 86 mg (Approx)**

Dose Needed For The Child Is 86 mg Three Times A Day. What Is The volume Of Amoxicillin Suspension Required ?.

**N1 = N2**

**V1 V2**

**Required Dose (N1) = 86 mg Given Strength(N2) = 125 mg**

**Require Volume ( V1 ) = ? Given Volume (V2) = 5 ml**

86 mg = 125 mg

V1 5ml

V1 = 3.5 ml

**The Child Needs 3.5 ml Of Amoxicillin Suspension Three Times A Day.**

**CALCULATION 5**

A Normal Saline Infusion Of 500 ml Is Administered At The Rate Of 40 Drops/ min . How Long Will It Last ?.

Infusion Rate if Only Volume Of The Drug Given :

**Infusion Rate** ( Drops/Min ) = **Volume Of The Fluid X 20 Drops ( 1ml = 20 Drops)**

**Duration In Minutes.**

40 / Min = 500 X 20

? In Min

Duration In Min = 500 X 20

40

= 250 Min = 4 hrs 10 min

**The Infusion Will Last For 4 hrs & 10 min.**

**CALCULATION 6**

Calculate The Infusion Of Dopamine In Drops/min For A Patient Weighing 60 kg Suffering From Cardiogenic Shock . The Required Therapeutic Dose Is 5 mcg /kg/min. The Drug Is Available As

40 mg/ ml In 5ml Ampoule & It Should Be Delivered Through 245 ml Of Normal Saline.

Infusion Rate If Conc Of The Drug & volume Given :

**Infusion Rate ( Drops/ mt ) = Desired Cocentration infusion X Body Wt In kg**

**Conc Of Drug In Solution ( mcg/ml )**

Desired Concentration Infusion = 5 mcg/kg/min

Dopamine Present In 5ml Ampoule = 40 X 5 = 200 mg

Volume To Be Infused = 245 + 5 = 250 ml Of Normal Saline .

Concentration Of Drug In Solution/ ml = 200 mg

250 ml

= 0. 8 mg = 800 mcg/ml

Infusion Rate In Drops/ min = 5 X 60 = 0.375 ml ( 1 ml = 20 drops)

800

= 0.375 ml X 20 Drops = 8 Drops/min.

**Infusion Rate Of Dopamine Is 8 drops/min.**

**CALCULATION 7**

Calculate The Infusion Rate Of Insulin In Drops/Min For A Patient Weighing 70 kg Suffering From Diabetic keto Acidosis. Required Therapeutic Dose Is 0.1 units/kg/hr. The Given Vial Contains

40 units/ml. The Drug Should Be Delivered Through 250 ml Of Normal Saline.

**Infusion Rate ( Drops/ mt ) = Desired Cocentration infusion X Body Wt In kg**

**Conc Of Drug In Solution ( Units/ml )**

Desired Concentration Infusion = 0.1 units/ kg/ hr

= 0.1 units /kg/min

60

Insulin Present /ml = 40 units

Volume To Be Infused = 250 ml Of Normal Saline .

Concentration Of Insulin In Solution/ ml = 40 units

250 ml

= 0. 16 units/ml

Infusion Rate In Drops/ min = 0.1 X 70 = 0.73 ml ( 1 ml = 20 drops)

60 X 0.16

= 0.73 ml X 20 Drops = 15 Drops/min.

**CALCULATION 8**

Calculate The Dose Of Amikacin In A 40 yrs Old Female With Weight 55 kg Having Impaired Renal Function & Serum Creatinine 2.1 mg/L , While The Normal Dose Of Amiikacin Is 15mg/kg/day.

Formula For Calculating Dose In Renal Dysfunction Is :

**Dose In Renal Dysfunction ( RD) = Normal Dose X CL RD**

**CLN  ( Normal )**

Formula For Calculating Creatinine Clearance In Female :

**Creatinine Clearance In Women** = **0.85 X [ 140 -- age In yrs ] X Body Wt**

**72 X Serum Creatinine Conc mg/L**

= 0.85 X [ 140 – 40 ] X 55

72 X 2.1

= 4675

151.2

Creatinine Clearance = 30. 92 ml/ min

Dose Of Amikacin Needed = 15 mg X 30.92 ml/min

120ml/min

= 463.8

120

= 4 mg/kg/day ( Approx)

**Dose Of Amikacin Needed 4 mg/kg/day**

**CALCULATION 9**

If The Clearance (CL ) & The Volume Of Distribution ( Vd ) Of Chloroquine Are 0.75 L/hr/Kg &

200 L/Kg Respectively , What Will Be The Half-life Of The Drug ?. How long Will It Take For The Drug To Achieve Steady State On Repeated Dosing ?.

Clearance (CL) = 0.75 L/Hr/Kg

Volume Of Distribution ( Vd ) = 200 L/Kg

**Plasma Half Life (t ½ ) = 0.693 X Vd**

**CL**

= 0.693 X 200

0.75

= 0.693 X 267 = 185 hrs

t 1/2 = 7 days 17 hrs

Time Taken To Achieve Steady State Conc = 5 x t ½ = 5 X 185 = 925 hrs

= 38 Days & 13 hrs

**CALCULATION 10**

Calculate The IV Loading Dose & Maintenance Dose Of Theophylline For A Woman With 6o kg Weight Suffering From Acute Severe bronchial Asthma. A Target plasma Theophylline Concentration Of 10mg/L Is Desired For Relief . The Clearance & Volume Of Distribution Of Theophylline Are

0.04L/ hr/ kg & O.5 L/Kg Respectively. What Would Be The Oral Maintenance Dose In The Same Person If Bioavailability By Oral Route is 70% ?

Bioavailability By IV = 100 % = 1

Clearance (CL ) = 0.04 L /hr/KG

CL For 60 kg = 0.04 X 60Kg

= 2.4 L /hr/ 60 Kg

Volume Of Distribution ( Vd ) = 0.5 L/Kg = 30 L/60 Kg

Target Plasma Conc ( Tc ) = 10 mg/L

**IV Loading Dose = Target Plasma Conc X Vd**

**Bioavailability**

= 10 mg X 30 L

1

= 300 mg

**IV** **Maintenance Dose = Target Plasma Conc X CL**

**Bioavailability**

= 10 mg X 2.4 L/Hr

1

= 24 mg /Hr

**Oral Maintenance Dose** = 10 mg X 2.4 L/Hr

0.7

= 34 mg/Hr

**PH 1.3**

**Drug Formulations & Drug Delivery System**

**DOSAGE FORMS**

**1.SOLUTION**

**1.Identify & Describe The given Dosage Form :**

Solution For IV Use. Solutions Are Liquid Preparations Containing Soluble Substances Dissolved In Suitable Vehicles.

**2. What Are The Different Types Of Solutions ?. Give 2 Examples Of Each.**

* Solutions For Oral Use : Mixtures, Syrups
* Solutions For IV Use : Normal Saline , 5% Dextrose Solution.
* Solutions For External Use : Lotions, Liniments
* Solutions For Instillation Into Body Cavities : Enema, Ear Drops.

**3. What Is 1% (W/V) Solution ?**

1 g Of Solute Dissolved In 100 ml Of Solvent.

**2. SUSPENSION**

1**. Identify & Describe The Given Dosage Form :**

Suspension For Oral Use. Suspension Is A Liquid Preparation Containing Insoluble Solids Uniformly

Distributed In The Vehicle, With Or Without The Aid Of A Suspending Agent. Suspensions Can Be

Used For Oral, Parenteral & External Administration.

**2. Name Two Suspending Agents ? Why Are They Added In Suspensions**

Gum Acacia, Starch, Methyl Cellulose. Suspending Agents Increase Viscocity Of Vehicle & There by

Prevent Aggregation Of Insoluble Ingredients & Ensure uniform distribution Of Active Ingredients

In The Vehicle.

**3. Advantages & Disadvantages Of Oral Suspensions ?**

Advantages : Quick Absorption, Suitable For Administration To Children

Dis Advantages : Large Bulk, Less Stability

**3. EMULSION**

**1. Identify & Describe The Given Dosage Form :**

Emulsion For Oral Use An Emulsion Is A Heterogenous System Consisting Of Two Immiscible

Liquids, One Of Which is Dispersed As Minute Globules Into The Other With The Help Of An

Emulsifying Agent. Emulsion Can Be Used For Oral, Topical & Parenteral Administration.

**2. What Are The Types Of Emulsion ? Write 2 examples**

**Oil In Water (o/w) Emulsion** : Oil Is Distributed In The Form Of Globules In Water.

Milky White Appearance. Used For Oral & IV Adminisration .

E.g., Milk & Castor Oil Emulsion (Oral), Propofol --IV

**Water-In-Oil Type (w/o) :** Water Is Distributed In The Form Of Globules In Oil. Waxy & Translucent.

Appearance. Used For Topical & IM Depot Administration.

E.g., Cold Cream & Gamma Benzene Hexachloride Emulsion (Topical) ,

IM Depot Testosterone Propionate Injection.

**3. What Are The Advantages & Disadvantages Of Oral Emulsion ?**

Advantages : Masks The Unpleasant Odor, Rapid Absorption

Dis Advantages : Less stability, Large Bulk.

**4. LOTION**

**1. Identify The Given Dosage Form**

Lotion. Lotions Are Liquid Preparations For Application To The Skin Without Friction. They Commonly

Contain Antiseptics, Astringent, And Soothing Medicaments.

**2. Mention 2 Differences Between Lotions & Liniments**

Lotions : Applied Over Skin Without Friction. Antiseptic, Soothing,cooling & Protective In Nature.

Liniments : Applied over Skin With Friction. Analgesic, Counter-irritant, & Rubefacient

**3.Write 2 uses Of Lotions**

--- Lotions Are Used As Protective in Sunburns

---Soothing & Moisturising Agent In Dry,Rough,Scaly & Itchy Skin.

**5. OINTMENT**

**1. Identify & Explain The Given Dosage Form**

Ointment For Application over Skin. Ointments Are Semisolid Prepartions Meant For Topical

Application To Skin Or Mucous Membrane. Used For Local Effects & Systemic Effects By Their

Percutaneous Absorption.

**2. Name & Explain Other Semisolid Preparations For Topical Application**

**Creams** : Semisolid Emulsions Having lighter Consistency, less Greasy, Easier To Spread & Are Quickly

Absorbed By Skin.

**Pastes** : Semisolid Preparation Containing More Solid Particles. They Are Non- greasy, Stiffer &

preferred For Exudative/ Moist Lesions.

**3.Give 2 Examples For Ointment/Creams Applied Topically To Produce Systemic Effects**:

Nitroglycerine Ointment For Relief Of Angina.

Estradiol cream For Relief Of Menopausal Symptoms.

**6.ENTERIC COATED TABLETS**

**1. Identify The Given Doaage Form. Define Tablets.**

Enteric Coated Tablets. Tablets May Be Defined As Solid Dosage Forms Meant For oral

Administration, prepared By Compression/Moulding Of One Or More Medicaments.

**2. Enumerate Different Types Of Tablets:**

Simple Uncoated oral Tablets

Sugar Coated Tablets

Enteric Coated Tablets

Mouth Dissolving Tablets

Dispersible Tablets

Chewable Tablets

Sublingual Tablets

Sustained Release Tablets

Lozenges

**3. What Are The Advantages Of Enteric Coated Tablets ?. Give 2 Examples**

They Resist Dissolution In Gastric Juice & Release The Drug In The Intestine. They Are Employed When

The Drug Is Destroyed By Gastric Acid Or Is Irritant To Gastric Mucosa.

Eg., Enteric Coated Aspirin --- To Prevent Irritation To Gastric Mucosa

Enteric Coated PPI --- To Prevent Degradation By Gastric Acid

**7. SPANSULES**

**1. Identify & Describe The Given Dosage Form:**

Spansules( Sustain Release Capsules ). They Are Hard Gelatin Capsules Filled With Granules With

Specific Formulation To Disintegrate & Dissolve At Different Times & Thereby Providing Uniform

Medication Over A Prolonged Period Of Time.

**2.What Are Capsules? Describe Different Types Of Capsules**

Solid Oral Dosage Forms That Contain One Or More Medicaments Enclosed Within Shells Of Gelatin.

**Hard Gelatin Capsules** : Made Up Of 2 pieces Fit Together –A long Body & A Shorter Cap. Used For

Packing Powders & Granules.

**Soft Gelatin Capsules** : One Piece Capsule . Contains Liquids/Semisolids.

**3. What Are The Advantages Of Sustained Release Capsules ?**

Maintain Consistent Therapeutic Effect For A Longer Time

Less Frequent Dosing

Reduction In Adverse Effects.

**8. SUPPOSITORIES**

1**.Identify & Describe The Given Dosage Form**

Rectal Suppositories. Suppositories Are Solid Dosage Form Intended For Insertion Into body Cavities

Like Rectum, Vagina & Urethra Other Than Mouth.

**2. What Are The uses Of Suppositories?**

To produce Local Action --- Eg., Bisacodyl Rectal Suppository For constipation.

To Produce Systemic Action --- Eg.,Diazepam Rectal Suopository For Febrile Convulsions In Children.

**3. What Is A Pessary?**

It Is Solid Dosage Form Specifically Shaped To Be Inserted Into The Vagina With The help Of An

Applicator. It is intended For Local Action. It Is Also Called A Vaginal Suppository Or Vaginal Tablet.

Eg., Clotrimazole Pessary For Vaginal Candidiasis.

**DRUG DELIVERY SYSTEM**

**1.ROTAHALER WITH ROTACAPS**

**1. Identify & Describe The DDS**

Rotahaler With Rotacap. It Is A Device That Delivers The Drug Present In The Rotacaps To The lungs By

Inhalation. A Rotacap Contains Single Dose Of The Drug To Be Administered.

**2 . What Are its Advantages?**

--- No Propellant & hence No Environmental Risk.

---Portable, Easy To Use & Less Cost

---Being Transparant has Added Advantage Of Allowing Patients To See Whether Has fully Inhaled

The Drug.

**3. What Are Its Disadvantages?**

--- Can Be Used Only By Children ≥ 6yrs who Could Generate Sufficient Inspiratory Flow Rate

Required For Inalation.

--- Capsule Soften & Do Not Break In Humid weather

--- Only Single Dose Can Be given Each Time.

**TRANSDERMAL DRUG DELIVERY SYSTEM ( TDDS)**

**1. Identify The DDS & Describe With Examples**

Transdermal Patch. It Is An Ahesive Patch Which Permits Absorption Of Drug Through Skin & Deliver It

Into Systemic Circulation At Controlled Rate.

Eg., Nitroglycerine Patch For Relief Of Angina

Scopolamine Patch For Motion Sickness

Estradiol patch For Postmenopausal Osteoporosis.

**2. What Are Its Advantages?**

---Bypass First Pass Metabolism & Hence Increased Bioavailability.

---Produces Sustained Drug Level.

---More Convenient & Improved Patient Compliance

**3. What Are Its Disadvantages?**

--- Local Irritation & Erythema

--- Cannot Be Used To Deliver Polar Drugs.

**PH 1.8**

**IDENTIFY & DESCRIBE THE MANAGEMENT OF DRUG INTERACTIONS**

**IN THE FOLLOWING CASE SCENARIOS**

1. **A 35 Year Old Male, Type I Diabetes Mellitus On Insulin Was Treated With Propranolol As A Prophylactic Therapy For Migraine.**
2. Explain The Potential Drug Interaction In This Patient:

Propranolol Blunts the Recognition Of Hypoglycemia & Delays Recovery From Insulin Induced Hypoglycemia. Propranolol A Non—Selective β—Blocker Blocks β2  mediated Glycogenolysis & Neoglucogenesis In Liver & Aggravates Insulin Induced Hypoglycemia.

It Also Suppresses The Warning Signs Of Hypoglycemia Like Tremors, Tachycardia, Palpitation, Sweating Mediated Through Sympathetic Stimulation By blocking β—Adrenergic Receptors.

1. How Will You Manage ?

Patient Can Be Prescribed Selective β1 --blockers Like Metoprolol/ Atenolol Or Calcium Channel Blocker Like Flunarizine As Prophylactic Drug Therapy. These Drugs Are Less

Likely To Blunt Symptoms & Delay Recovery From Hypoglycemia.

1. **A 65 Year Old Male Was Complaining Of Pain In Both Knee Joints For Which Diclofenac Twice Daily Was Prescribed By His Physician . He Was A Known Hypertensive Well Controlled With Enalapril 10mg/day. When He Came For Review After 3 Weeks, his BP Was 160/100 mm Hg.**
2. Comment On The Possible Drug Interaction. Explain The Reason For Raised BP.

Dicofenac A NSAID Reduces The Antihypertensive Effect Of Enalapril By Blocking The production Of Vasodilator & Natriuretic PG Production In Kidney. This Results In Increased BP.

Hyperkalemia Produced By Combination Of NSAID & ACE—I Can Produce Marked Bradycardia Leadinng To Syncope especially In Elderly & In Patients With Hypertension, DM, & IHD.

1. What Is The Interaction Of NSAID With Other Antihypertensives ?

NSAIDS Attenuate The Antihypertensive Effect Of ACE –I, ARB, Diuretics & β –blockers.

They Are Less Likely To Attenuate The Antihypertensive Effect Of Calcium Channel Blockers & Centrally Acting Antihypertensives Whose Actions Are Unrelated To Renal/Extra Renal Production Of PG.

1. **A 30 Year Old Female Patient Was Prescribed Erythromycin 500mg Qid For Upper Respiratory Infection. She Was A Known Case Of Bronchial Asthma Maintained On Salbutamol Inhalation & Oral Theophylline 300mg Three Times A day. After 5 Days She Presented With Restlessness, Irritabilitty, Insomnia & Palpitation.**
2. How Would You Explain These Signs & Symptoms:

The Signs & Symptoms Are Due To Increased Plasma Level Of Theophylline Causing CNS Stimulation. Erythromycin Inhibits hepatic Metabolism Of Theophylline By Inhibiting Microsomal CYP 3A4 .

1. What Is The Line Of Management ?

The Dose Of Theophylline Should Be Reduced Or Erythromycin Should Be Stopped & Replaced

By Azithromycin Or β—Lactam Antibiotics Like Ampicillin/Amoxicillin.

4**) A 45 Year Old Male Patient Was On Isosorbide Dinitrate 10mg bd For Angina. A Quack Prescribed T.Sildenafil For Erectile Dysfuction. The Patient Fainted At Home & Was Rushed To The Hospital. On Examination The Patient Was Dyspnoeic With Pulse Rate 115/mt & BP 80/60mmHg .**

1. Explain The Potential Drug Interaction In This Patient**:**

Sildenafil Potentiate The Vasodilator Action Of Nitrates Producing Dangerously Low BP Resulting In Severe Hypotension, MI & Death. Sildenafil Retard The Degradation Of cGMP By Inhibiting PDE—5 . ↑ In cGMP Results In Vascular Smooth Muscle Relaxation & Increased Blood Flow To Corpora Cavernosa Causing Penile Erection .

1. What Advice Will You Give To The Patient ?

Administration Of Sildenafil Is Contraindicated In Patients With IHD & In Those Receiving Organic Nitrates.The Patient Is Advised Not To Take Sildenafil.

**5. A 30 Year Old Female Was Diagnosed As Having Pulmonary TB And Was Put On First Line Anti—tubercular Drugs ( RMC + INH + EMB + PZ ). She Has Been On Oral Contraceptive Pill Since 2 Years.**

a) Comment On Possible Drug Interaction In This Patient:

OCP Are Fixed Combination Of Estrogen & Progesterone. Rifampicin Is A Microsomal Enzyme Inducer Which Enhances The metabolism Of OCP resulting In Decreased Effect Of OCP. This May Result In Failure Of Contraception/ Breakthrough Bleeding And Spotting.

b) How Would You Manage ?

OCP With Higher Dose Of Estrogen + Progesterone Should Be Used Or Couples Should Use

Other Mode Of Contraception.

**6.** **A 40 Year Old Female Had Been On Lithium Carbonate 300mg Daily Since 3 Years For Maniac**

**Depressive Illness. Recently She Was Diagnosed As Having Stage I Hypertension For Which She**

**Was Prescribed Hydrochlorothiazide 25mg Daily. 4 Weeks Later She Came To The Emergency**

**Department With severe Tremors, Ataxia, Muscle Rigidity, Nystagmus And Hyperreflexia.**

1. Explain The Reason For The Above Signs And Symptoms:

The Above Signs And Symptoms Are Due To Increased Plasma Level Of Lithium.

Hydrochlorothiazide Is A Thiazide diuretic Which Cause Sodium Loss By Inhibiting Na+  Cl--

Co-Transporter In DCT. Lithium Being A Monovalent Cation is Handled By The Kidney In The Same

Way As Na+ . Hence Na+  Loss By Diuretics Promote Reabsorption Of Lithium In PCT.

b) How Will You Manage ?

Lithium And diuretics ( Furosemide,Thiazides) Are Not Given Together. The Woman Should Be

Prescribed Other Anti-hypertensives Like Ca2+  Channel Blockers. ACE-I And ARBs Also Cause

Lithium Retention.

**7. A 30 Year Old Female, Known Epileptic Was Well Controlled With Sodium Valproate. She Was Prescribed Ciprofloxacin With Paracetamol For Enteric Fever. After 4 Days She Developed Seizures.**

1. Comment On The Possible Drug Interaction:

Paracetamol ( NSAID ) Augment Displacement Of GABA from Its Receptors By Ciprofloxacin (Quinolones) . This Reduces Seizure Threshold And Precipitate Seizures In Epileptic Patients.

1. Name 2 Drugs That Precipitate Seizures In Epileptics:

Methyl Xanthines --- Theophylline, Aminophylline

CNS Stimulants --- Cocaine , Amphetamine

Opioids --- Tramadol

Anti tubercular Drug --- INH

Tricyclic Antidepressants ---Imipramine, Clomipramine,Amitriptyline

Atypical Anti psychotics --- Clozapine,Olanzapine

**8. A 35 Year Old Obese Female Was On Warfarin Therapy For Deep Vein Thrombosis . She**

**Developed Pelvic Infection For Which She Was Given Amoxicillin + Clavulanic acid . On The 4th**

**Day She Started Bleeding PV And Passing Dark Urine. INR Was 5.6.**

a) What Is The Reason For Raised INR & Bleeding Symptoms ?

Warfarin Is An Oral Anticoagulant Which Acts By Inhibiting Hepatic Synthesis Of Vit K Dependent

Coagulation Factors (II,VII,IX,X). Amoxicillin + Clavulanic Acid Is Extended Spectrum Penicillin. It

Causes Inhibition Of Gut Flora Resulting In Reduction In Synthesis Of Vit K. Therefore ↓ In Vit K

Level Enhances Warfarin Toxicity And Increases INR.

b) How Will You Manage ?

Reduction In Warfarin Dose And INR Monitoring

**9 . A 30 Year Old Female Was Diagnosed To Have Urinary Tract Infection . Urine Culture Showed**

**Growth of E.Coli Organisms Sensitive To Ampicillin. The Physician Prescribed Ampicillin +**

**Probenecid**.

a) Why Did The Physician Prescribe Probenecid ?

Ampicilin A B –lactam Antibiotic, Is Excreted Unchanged By Tubular Secretion Through Organic

Anion Transporter In The PCT. Probenecid Competitively Bocks OAT And Inhibits The Excretion Of

Ampicillin Resulting In Higher Plasma Concentration And Prolonged Half life. The Advantage Is

Reduced Dose And Reduced Frequency Of Administration.

b) Give 2 Examples Wherein Probenecid Is used For Similar Purpose:

Amoxicillin + Probenecid

Ceftriaxone + Probenecid

Cefuroxime + Probenecid

**10. A 40 Year Old Alcoholic Was Treated With Metronidazole 400mg Thrice Daily For Amobic**

**Dysentry. He Presented Next Day With Severe Flushing, Throbbing Headache, Nausea, And**

**vomiting.**

a) Explain The Possible Reasons For These Symptoms.

Ehanol -------------------------------> Acetaldehyde----------------------------------🡪 Acetic Acid

Alcohol Dehydrogenase Aldehyde Dehydrogenase

Metronidazole Inhibits Aldehyde Dehydrogenase And Prevents The Conversion Of Acetaldehyde To

Acetic Acid .The Concentration Of Acetaldehyde Raises In the Body Giving Raise To

The Above Signs And Symptoms. This Reaction Reinforces Aversion To Alcohol. Hence This Reaction Is

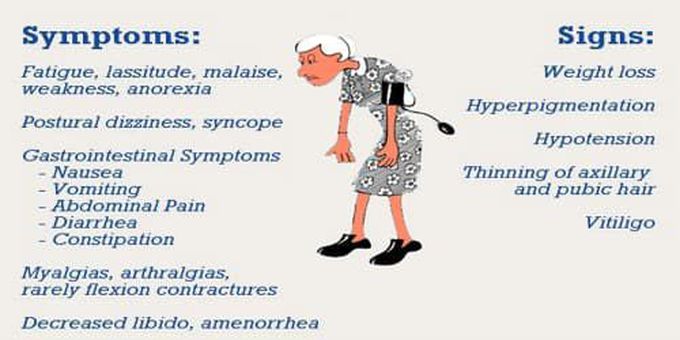
Called Antabuse Reaction.

b) Mention 2 Drugs Which Produce Similar Reaction With Alcohol:

Chlorpropamide, Tolbutamide

Nitrofurantoin

Griseofulvin



**Dehydration, Vascular Collapse,Renal Shut Down,**

**↓ Serum Na+, ↑ Serum K +**

**PH 1.8**

**DEFINE, IDENTIFY & DESCRIBE THE MANAGEMENT OF ADVERSE DRUG REACTIONS (ADR)**

**CHART –1 ( Spina Bifida)**

1. **Identify & Describe The ADR**:

Spina Bifida.

Type—D ADR . This Is Neural Tube Defect Due To Drug Teratogenecity.

1. **Mention The Drug responsible**

Sodium Valproate

**C) What Is The Line Of Management?**

Avoid Sodium Valproate In Ist Trimester. If Valproate Is To Be Continued In 2nd & 3rd Trimester, Supplement With Folic Acid & Vit K.

**CHART –2 ( Gum Hyperplasia )**

1. **Identify & Describe The ADR:**

Gum Hyperplasia..

Type –A ADR . Undesired Side Effects Occuring With Therapeutic Dose. It Is Due To Over Growth Of Gingival Collagen Fibres Occuring In 20% Of All Patients Receiving Chronic Therapy With Phenytoin.

1. **Mention The Drug Responsible:**

Phenytoin Sodium.

1. **How Do You Treat?**

Good Oral Hygiene With Periodontal Procedures Like Scaling & Root Planning.

Folic Acid Supplementation.

**CHART –3 ( Anaphylaxis )**

1. **Identify & Describe The ADR:**

Anaphylaxis.

Type—B ADR. Bizzare , Unpredictable Type & Not Related To Pharmacological action.

1. **Mention The Drugs Responsible :**

Beta Lactam Antibiotics ---PenicillinG, Cephalosporins

Iodine Containing Agents---Radiocontrast Dye, Povidone Iodine

Sulphur Containing Agents--- Sulphonamides

Fibrinolytics ---Streptokinase.

**C) What Is The Line Of Management?**

* + Inj. Adrenaline – 0.3 To 0.5 ml Of 1in1000 By IM( Or O.5 To 1 ml Of 1 In 10,000) . May Be Repeated Every 10 To 20 min For 3 Doses Until The Patient Improves
  + Inj. Hydrocortisone –100mg IV every 6 hrs
  + Inj. Diphenhydramine –50 To 100mg IM . May Be Repeated Every 4 to 6 hrs.
  + Infuse Normal Saline 1 To 2 L In 30 minutes
  + Nebulise Salbutamol 2.5 To 5mg + Ipratropium Bromide 0.5 mg in 2.5ml of Normal saline. Repeated Every 4 hrs
  + Inj. Aminophylline 5mg/kg IV loading Dose Followed By 1mg/kg/hr Infusion As Maintenance.

**CHART—4 ( Oral Thrush )**

The Picture Is Oral Cavity Of A 60 Year Male Patient , Known Diabetic For 10 years, has

Been Undergoing treatment With Inhalant Ciclesonide For Bronchial Asthma For The Past

2 years.

1. **Identify & Describe The ADR :**

Oral Thrush.

Type—C ADR. Due To Immunosuppression Due To Prolonged Use Of Inhalant Corticosteroids .

1. **Mention The Drugs Responsible :**

Inhalant Corticosteroids --- Beclomethasone, Ciclesonide, Budesonide etc

Immunosuppressants ----Cyclosporine, Tacrolimus, Methotrexate, Cyclophosphamide.

1. **How Do You Treat ?**

Topical Application Of Clotrimazole, Nystatin

**Precaution** : Gargle/Rinse The Mouth After Using Inhalant Corticosteroids.

Patient’s blood Sugar Should be Monitered Periodically.

**CHART---5 ( Gouty Tophus)**

1. **Identify & Describe The ADR :**

Gouty Tophus.

Type –A ADR. This Is A Undesired Side Effect Occuring Due To Drugs Which cause Hyperuricemia & Precipitates In patients With Gout.

1. **Mention The Drugs Which can Precipitate:**

Thiazides, Furosemide, Pyrazinamide, Ethambutol, Anticancer Drugs Etc.

1. **How Do You Treat?**

Avoid The Drugs Which Cause Hyperuricemia In Gout Patients.

Continue The Other Drugs For Gout.

**CHART—6 ( Yellowish Brown Discolouration Of Teeth)**

1. **Identify & Describe The ADR :**

Yellowish Brown Discolouration Of Teeth.

Type A – ADR. Undesired Side Effect Due To Tetracycline

1. **Explain How Tetracycline Produces The Above ADR?**

Tetracyclines Chelate Calcium From Bone &Teeth In Children Less Than 7 Years ( When Teeth Are Being Calcified). Calcium—Tetracycline Chelate Gets Deposited In Developing Teeth Causing Brown Discolouration, Ill—formed Teeth Which Are More Susceptible To Caries. Given During Late Pregnancy, tetracyclines In Addition To Causing Brownish Discoloration Of Teeth, It Can Cause Temporary Suppression Of Bone Growth In Children.

1. **What Is The Line Of Management?**

Avoid Tetracyclines In Pregnancy & In Children Less Than 7 Years.

**CHART –7 ( Cleft Lip & Cleft Palate)**

1. **Identify & Describe The ADR:**

Cleft Lip & Cleft Palate.

Type—D ADR. This Is Due To Drug Teratogenicity.

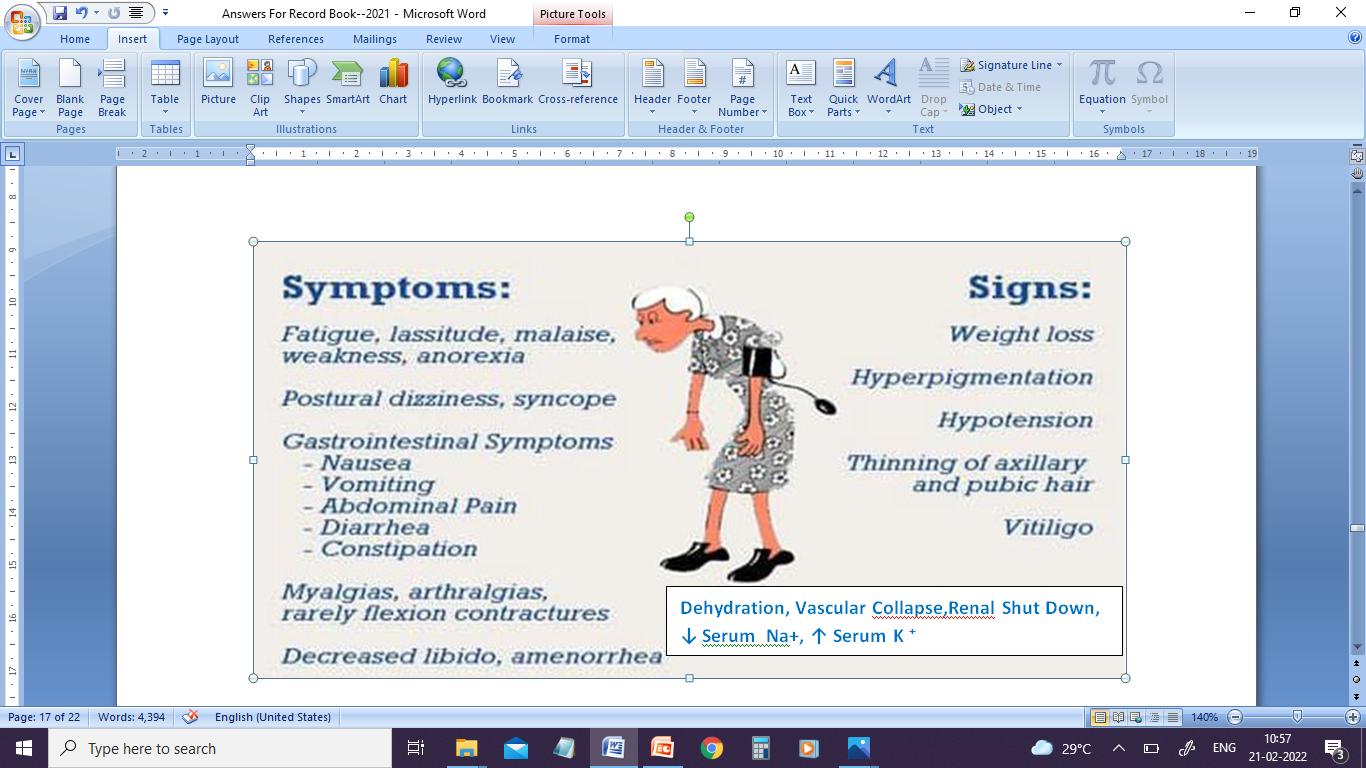
**Mention The Drugs Responsible:**

Phenytoin Sodium & Metho trexate.

1. **How Do You Manage?**

Above Drugs Should Be Avoided During Pregnancy.

**CHART—8 ( Acute Adrenal Insufficiency )**

****

1. **Identify & Describe The ADR :**

Acute Adrenal Insufficiency.

Type---E ADR. Due To Abrupt Cessation Of Corticosteroid. Exogenous Steroid For Longer Than

2 To 3 Weeks Suppresses Hypothalamo—Pituitary—Adrenal Axis. Hence Stoppage Of Exogeous

Steroids Precipitates Acute Adrenal Insufficiency.

1. **Mention Other Drugs Which Should Not Be Withdrawn/Stopped Abruptly:**

Beta -- blockers, Clonidine, Anti-epileptic Drugs, Alcohol, Benzodiazepines, Opioids, CNS Stimulants Like Cocaine, Amphetamine, Methamphetamine.

1. **What Is The Line Of Management?**

Acute Adrenal Insufficiency Is Treated By IV Hydrocortisone & IV Isotonic Saline In Glucose Solution. Any Patient Who Has Received Steroids For > 2 To 3 Weeks Should Be Put On A Scheme Of Gradual Withdrawal.

**PH 4.2**

**DEMONSTRATE THE EFFECTS OF DRUGS ON BP USING CAL**

**GRAPH 1**

1. **Explain the action of adrenaline & calcium chloride on heart**

**Adrenaline:** Increases heart rate,↑ amplitude of contraction(height ) & ↑ tone of the myocardium (state of partial contraction of muscle at rest. Demonstrated by observing shift in base line).There is complete contraction & relaxation of the muscle in every cardiac cycle.

**Calcium chloride** : Heart rate is Increased in low dose. At high dose there is ↓heart rate, but amplitude of contraction & tone of the myocardium increase. As there is no calcium free period, there is no complete relaxation of heart & heart stops in systole (calcium rigor).

1. **Enumerate 4 therapeutically used cardiac stimulants & their indications**:

Adrenaline : used in cardiac arrest

Dopamine : cardiogenic shock, Chronic heart failure (CHF)

Dobutamine : acute myocardial infaction, CHF

Digoxin : CHF

1. **How do you antagonize stimulant action of calcium on heart**

Magnesium competes with calcium & counteracts its stimulant action. Ensures heart cells to contract & relax properly.

1. **Explain the actions of propranolol on heart. Enumerate 4 cardioselective beta blocker:**

Propranolol is non selective beta blocker. So it ↓ heart rate , force of contraction & ↓cardiac output.

Cardioselective beta 1 blockers: Metoprolol, Atenolol, Bisoprolol, Celiprolol.

1. **Difference between cardiotonic actions of adrenaline & digoxin**

|  |  |
| --- | --- |
| **ADRENALINE** | **DIGOXIN** |
| ↑both HR & force of contraction & ↑COP | ↓HR but ↑force of contraction & ↑COP |
| ↑cardiac work &↑ o2 consumption | Does not ↑cardiac work , ↓o2 consumption |
| ↓ERP &↑ conduction through AV node | ↑ERP & ↓ conduction through AV node |
| Acts by stimulating beta 1 receptors | Acts by inhibiting Na+ K+ ATPase |
| Used to treat cardiac arrest , anaphylactic shock. Contra-indicated in heart failure. | Used as inotropic in systolic heart failure |

**GRAPH 2**

1**.Explain the cardiac actions of acetyl choline & potassium chloride**

**Ach** decreases the heart rate & amplitude of contraction. The tone of myocardium is unaffected or decreased.

**Potassium chloride** reduces the heart rate & amplitude of contraction. The tone of the muscle decreases till the heart is stopped in diastole. As extracellular K level increases, the resting membrane potential decreases, muscle fibres eventually become unexcitable, & the heart stops in diastole.

Normal plama K level --- 3.5 to 5 meg/l

5 to 6 (mild hyperkalemia) --- Peaked T wave

6.5 to 8 (moderate) --- QRS widening, prolonged PR interval

8 to 9 ( severe ) --- ↓Atrial activity, hence ↓P/ absent P

**2. Enumerate 4 therapeutically used cardiac depressants & their indications:**

Verapamil, Diltiazem : used to terminate & prevent recurrence of PSVT

Amiodarone : used in both ventricular & supraventricular arrhythmias

Lignocaine : used in ventricular tachycardia following MI

Esmolol : For urgent ventricular rate control of atrial fibrillation

3. **How do you antagonize the action of potassium on heart?**

IV calcium gluconate ( 10ml of 10% ). Calcium restores the resting membrane potential & thereby

↑ myocyte excitability.

**4. Enumerate 2 drugs which cause Hyperkalemia & 2 drugs which cause Hypokalemia:**

Hyperkalemia ---ACE—inhibitors,ARBs, K sparing diuretics, succinyl choline,Heparin, beta blockers

Hypokalemia --- Thiazide diuretics, Loop diuretics, beta2 agonists

GRAPH NO:3

**1. Explain the effect of adrenaline and noradrenaline on blood pressure and heart rate?**

Adrenaline is an agonist at α1 ,α2 , β1 ,β2 ,β3  receptors.

Rapid i.v. pharmacological dose produces biphasic response on BP i.e initial rise followed by fall in BP. At higher concentrations, adrenaline produces rise in BP by dominant action of alpha and beta1 receptors (α is predominant & sensitive at higher concentrations).

β1--- positive inotropic, positive chronotropic effect which results in increased cardiac output and increased systolic BP.

α1 ,α2 (post junctional) ---- vasoconstriction of arterioles resulting in increase in peripheral vascular resistance & vasoconstriction of veins resulting increased venous return and increased cardiac output.

As the concentration falls , α action wanes but β2 action persists and dominates which leads to vasodilatation of blood vessels(Skeletal muscle, abdominalviscera, coronary) and decreased peripheral vascular resistance and decreased diastolic BP. However The mean arterial pressure is not elevated by adrenaline.

Epinephrine increases the heart rate by acting directly on β1 receptors of myocardium.

Norepinephrine has good agonistic action at α1 ,α2 , β1 ,β3  receptors with poor β2 effect. Hence Norepinephrine increases both systolic (β1) and diastolic BP(α). So the mean arterial pressure is increased.

But Norepinephrine reduces heart rate. Raised MAP produces compensatory reflex vagal activity, overcoming direct cardiac stimulant activity of norepinephrine.

**2) Explain iso- prenaline effect on BP and heart rate?**

Isoprenaline is an agonist at β1 and β2 receptor. Isoprenaline produces fall in diastolic BP by β2

mediated vasodilatation. Mean arterial pressure also falls. Isoprenaline increases heart rate by direct

stimulation of β1 receptors of myocardium.

**3) Enumerate 2 therapeutically used vasopressors and their indications?**

Mitodrine and droxidopa used in orthostatic hypotension.

Norepinephrine used in life threatening hypotension following spinal anaesthesia, blood transfusion reactions and septic shock.

**4) Name a vasopressor used along with LA. Why it is added?**

Adrenaline is added with Local anaesthetics .

Why ?

The duration of anaesthesia is prolonged by preventing systemic absorption of local anaesthetic.

Systemic toxicity of local anaesthetic is also reduced.Local bleeding is reduced.

**5) What is the effect of adrenaline ,noradrenaline and isoprenaline on blood pressure & heart rate after giving propranolol. Explain?**

Propranolol is a non selective beta blocker. After giving Propranolol,β2 mediated fall in BP produced by adrenaline is blocked. There is only rise in BP (α action). The heart rate is also reduced due to blockade of β1 receptors.

In case of noradrenaline, there is no change in BP & HR because rise in BP is mediated by α receptors.

Propranolol also blocks the fall in diastolic BP ( β2) produced by isoprenaline. So BP remains unchanged. Blockade of β1 action of isoprenaline in the heart ,reduces the heart rate.

**GRAPH NO 4:**

1**. Explain the effects of Ach, Histamine, Mepyramine on blood pressure of dog**

Ach – agonist at muscarinic & nicotinic receptors.

It reduces both systolic & diastolic pressure by :

M2 receptor (Gi /Go ) action --Negative chronotropic & inotropic---↓ COP & ↓Systolic BP

M3 receptor ( Gq ) action On vascular Endothelial cells--->Ca2+ --calmodulin dependent activation of endothelial NO synthase ---> release of NO which diffuses into adjacent vascular smooth muscle causing vasodilatation & ↓diastolic BP.

Histamine----stimulate H1 & H2 receptors(Gq & Gs respectively)on vascular smooth muscles, causing vasodilatation & fall in diastolic BP with compensatory increase in heart rate.

Mepyramine --- Selective H1 antagonist. Does not produce any change In BP . It blocks the effect of Histamine & not Ach & Adr.

**2. Enumerate 4 vasodilators/vasodepressor & their indications**

calcium channel blockers-- Nifedipine, Amlodipine used in hypertension

ACE inhibitors --- Captopril, Enalapril, used in CHF, Hypertension

Alpha blockers--- Pheochromacytoma, BPH

Hydralazine- -- Eclampsia.

**3 .Explain why Ach produces both decrease in BP &HR, But Histamine produces only fall in blood pressure associated with increased HR?**

Ach--- ↓BP & ↓ HR. The reflex baro- receptor mediated increase in heart rate is masked by direct cardiac depressant action on Ach. The vagomimetic action on SA node results in fall in BP & HR.

Histamine--↓ BP& ↑HR. The increase in heart rate is by reflex baro-receptor mediated increase in sympathetic activity ( Masks direct myocardial stimulant action of Histamine)

**4. Explain why Mepyramine blocks the effect of Histamine & not Ach & Adrenaline**

Mepyramine-- It is a Selective H1  antagonist. Hence it can only block the effect of histamine and not Ach/Adrenaline.

**5. What is the interaction between Histamine & Adrenaline**

They have opposite effect on the same physiological function by acting on different receptors. Histamine produces Bronchoconstriction by ↑ H1  receptors & Vasodilatation by acting on both H1 & H2 receptors in blood vessels.

Adrenaline produces bronchodilatation by stimulating ( **β2**) & vasoconstriction by stimulating  **α1 ,α2**  receptors. This is called as Physiological antagonism.

Adrenaline is the physiological antagonist of histamine.

**GRAPH NO 5**

**1. Which drug produces biphasic response on BP?**

Adrenaline produces biphasic response on BP. Mechanism – see previous answer

**2. What is Dale's vasomotor reversal?**

After the administration of a non selective alpha blocker like phentolamine, adrenaline produces only delayed fall in BP **ie β₂** action remains but **α** action is blocked. The biphasic response is converted to monophasic response. This phenomenon is known as Vasomotor reversal of Dale.

**3. Enumerate 4 selective ά₁ blockers and their uses.**

Alfuzosin,Terazosin, Prazosin, Doxazosin and Tamsulosin

They are used in Benign prostatic hyperplasia, Hypertension &Pheripheral vascular diseases.

**4. Enumerate 2 non-selective ά blocker and their uses**

Phentolamine is used :

* In hypertensive crisis following abrupt clonidine withdrawal or ingestion of tyramine containing foods during use of non selective MAO inhibitors
* For reversing the duration of local anesthesia
* To prevent dermal necrosis after the inadvertant extravasation of an alpha receptor agonist
* Pseudo obstruction of bowel
* Male sexual impotence (PIPE therapy)

Phenoxybenzamine is used in pheochromacytoma

**5. What is the effect of adrenaline, nor adrenaline and Isoprenaline after giving Phentolamine?**

ADRENALINE : Since the **ά** action is blocked, only **β₂** mediated fall in BP occurs

NOR ADRENALINE: Hypertensive effect mediated by **ά** receptors is blocked.

ISOPRENALINE : Fall in BP is maintained as there is no alpha action withisoprenaline.

**GRAPH 6**

**1. Explain the action of tyramine on BP**

Tyramine increases the Blood pressure of Anaesthetised dog. Tyramine is indirectly acting sympathomimetic drug. It acts by displacing NE from the adrenergic neurons (by facilitated exchange diffusion) which acts at alpha and beta adrenergic receptors of the effector cells & causes rise in BP.

**2.What happens on repeated administration? What is this phenomenon called?**

On repeated administration the effect decreases rapidly ( The initial response of rise in BP is not achieved ) This phenomenon is called tachyphylaxis or acute tolerance. Tachyphylaxis (Tachy-Fast; Phylaxis-Protection) is the rapid development of tolerance, progressive diminution in the response when a drug is repeated at short intervals.

**3. What is the underlying mechanism?**

As Tyramine acts by release of NE from adrenergic neurons, repeated administration within short intervals results in depletion of NE in the stores. Since the rate of synthesis is unable to match the rate of release at short intervals, there is diminution in response.

**4. Enumerate drugs that cause Tachyphylaxis**

Indirectly acting sympathomimetics like Ephedrine, Amphetamine, Nicotine.

**Difference between Tolerance & Tachyphylaxis**

|  |  |
| --- | --- |
| **TACHYPHYLAXIS** | **TOLERANCE** |
| Rapid ↓ response on repeated doses over a short period of time. It is an acute form of acquired tolerance. | Larger dose required to produce the same effect which was originally obtained at lower dose. |
| Develops rapidly within few minutes to few hours. | Develops slowly in days to months. |
| Large dose of the drug may not restore the effect. Effect is rate sensitive i.e withholding the drug for a short period restores the effect. | Effect is restored when large dose is given. |
| Eg:Tyramine,Ephedrine, Amphetamine  Nicotine. | Eg:Benzodiazepines,Barbiturates,Opioids,  Ethanol. |
| Due to depletion of NE in stores due to repeated administration of drug. | **PK or disposition tolerance:**  ↑rate of metabolism, changes in distribution, absorption & excretion on repeated administration.  **PD tolerance:**  Desensitisation or down regulation of receptors.↓ efficiency of receptor coupling to signal transduction pathway.  **Learned or behavioral tolerance**:  ↓ in effect due to compensatory mechanisms. |

**GRAPH 7:**

**1.What is the effect of Ach on BP before atropinisation? Explain the MOA.**

Before atropinisaton Ach produces fall in BP

Ach – agonist at muscarinic & nicotinic receptors. It reduces both systolic & diastolic pressure by :

M2 receptors (Gi /Go ) action -->Negative chronotropic &negatie inotropic---> ↓ COP & ↓Systolic BP

M3 receptors ( Gq ) action On vascular Endothelial cells---> Ca2+-calmodulin dependent activation of endothelial NO synthase ---> release of NO which diffuses into adjacent vascular smooth muscle causing vasodilation & ↓diastolic BP.

**2. What is the effect of Atropine on BP?**

No change in BP .

**3. What is the effect of Ach in low & high doses after atropinisation? Explain**

After giving atropine, Ach at low dose of 50microgram does not produce fall in BP because M3 receptors in blood vessels are blocked by atropine.

After atropinisation, Ach at high dose of 5mg produces rise in BP.

At very high dose. Ach directly stimulate the Nn receptor in Autonomic ganglia as well as adrenal medulla, releasing NA & Adr respectively which act upon α & β receptors to increase BP

**4.What are the effects of Ach before and after administration called?**

Before- muscarinic effect

After- nicotinic effect

**5. Enlist 2 therapeutic uses of Atropine**

a) Organo phosphorus compound poisoning

b) Heart block

**PH 3.1**

**Write A Rational, Correct,and Legible Generic Prescription For A Given Condition & Communicate The Same To The Patient .**

|  |
| --- |
| 17.6 2021  Dr. xxyyzz MBBS.,MD (General Medicine)  Registration number : 255552  34, South Car Street,  Chidambaram.  Phone :1111122222  Patient’s Name : Mr. Red Age : 25 yrs Gender : Male  Hospital No : IP 4556.  Address : 40, Main Road,  Shanthi Nagar, Chidambaram  Diagnosis : Grand Mal Epilepsy  Rx  T.SODIUM VALPROATE 200 mg t.i.d for 30 days  Dispense 90 such tablet  One tablet to be taken orally 8th Hourly ( 6am, 2pm and 10pm) after food.  Avoid self driving, swimming.  Keep an ID card with details of condition & medication.  Follow up after a month.    Refills: Nil  Doctor’s Signature & Doctor’s stamp |

1. **Prescribe for a 30 years old man suffering from Grand mal epilepsy**
2. **Prescribe for a 45 years old man with mild hypertension**

Diagnosis : Mild Hypertension.

Rx

T. ENALAPRIL 5mg o.d for 20 days

Dispense 20 such tablets

One tablet to be taken orally once at 8pm after food for 20 days.

Salt restricted diet.

Regular exercises for 30 minutes each day.

Avoid smoking and alcohol.

Review after 20 days.

Refills : Nil

Doctor’s signature & stamp

1. **Prescribe for a pregnant woman with hypertension**

Diagnosis : Pregnancy induced hypertension

Rx

T.LABETALOL 100mg b.i.d for 20 days

Dispense 40 such tablets.

One tablet to be taken twice a day ( 8 am & 8 pm) after food for 20 days.

Salt restricted diet

Review after 20 days.

Refills : Nil

Doctor’s signature & stamp

1. **Prescribe for a 50 years old man with acute attack of angina pectoris**

Diagnosis : Acute attack of angina.

Rx

1. T. NITROGLYCERINE 0.5 mg SL

Dispense 10 such tablets

One tablet to be placed under tongue for acute relief of pain and should be discarded after pain relief. Can be used 5 to 10 minutes before activities that precipitate anginal pain.

2. T.METOPROLOL 25mg od for 15days

Dispense 15 such tablets

One tablet to be taken orally once after breakfast for 15 days.

3. T.ASPIRIN 150mg od for 15 days

Dispense 15 such tablets

One tablet to be taken orally after breakfast for 15 days .

Avoid smoking and alcohol.

Avoid strenuous activities, extreme cold & emotional stress

Take fat free diet

Review after 15 days.

Refill : Nil

Doctor’s signature and stamp

1. **Prescribe for a 35 years old female with mild intermittent/episodic bronchial asthma**

**( Symptoms 2 days /week Or 2 nights/month)**

Diagnosis : Mild episodic bronchial asthma.

Rx

SALBUTAMOL ( 100mcg/puff) 2 puffs by MDI

Dispense one canister of inhaler

Inhale 2 puffs by MDI at the onset of each episode.

Carry the MDI wherever you go. Report if symptoms occur more than twice per week.

Avoid smoking,

Avoid exposure to passive smoke, pollution, occupational chemicals ,allergic foods.

Review after two weeks.

Refills : Nil

Doctor’s signature and stamp

1. **Prescribe for a 40 years old male suffering from moderate persistant bronchial asthma**

**( Symptoms once each day / one night per week)**

Diagnosis: Moderate persistant asthma

Rx

1. SALMETEROL ( 25mcg/puff) + FLUTICASONE ( 125mcg/puff) 2 puffs b.i.d by MDI for 15 days

Dispense one canister of inhaler

Two puffs to be inhaled twice a day ( 7 am and 7 pm ) by MDI

2. T.DOXOPHYLLINE 400mg o.d for 15 days

Dispense 15 such tablets

One tablet to be taken orally once after breakfast for 15 days

3. T.MONTELEUKAST 10mg o.d for 15 days

Dispense 15 such tablets

One tablet to be taken orally once after dinner for 15 days .

Avoid smoking,

Avoid exposure to passive smoke, pollution, occupational chemicals ,allergic foods.

Review after two weeks.

Refills : Nil

Doctor’s signature and stamp

.

1. **Prescribe for a 28 years old male IT professional with peptic ulcer a/c H.pylori infection .**

Diagnosis : Peptic ulcer with H.pylori infection

Rx

1. CAP. LANZOPRAZOLE 30mg b.i.d for 14 days

Dispense 28 such capsules

One capsule to be taken orally on an empty stomach before breakfast and dinner.

2. CAP. AMOXICILLIN 750mg b.i.d for 14 days

Dispense 28 such capsules

One tablet to be taken orally after breakfast and dinner.

3. T.TINIDAZOLE 500mg b.i.d for 14 days

Dispense 28 such tablets

One tablet to be taken orally after breakfast and dinner.

Avoid alcohol, coffee, fatty food, chocolate and hot spicy food.

Review after 2 weeks

Refllsl: Nil

Doctor’s signature and stamp

1. **Prescribe for a 21 years old female student with acute amoebic dysentery.**

Diagnosis : Acute amoebic dysentry

Rx

T.METRONIDAZOLE 400mg t.i.d for 7 days

Dispense 21 such tablets

One tablet to be taken 8th hourly after food .

T. PARAMOMYCIN 500mg t.i.d for 7 days

Dispense 21 such tablets

One tablet to be taken 8th hourly after food .

Wash hands before eating, after touching soil or using toilet

Drink clean, sterile drinking water

Avoid eating road side exposed eatables.

Reiew after one week

Refills: Nil

Doctor’s signature and stamp

1. **Prescribe for a 30 years old male suffering from typhoid fever**

Diagnosis : Enteric fever

Rx

T.CEFIXIME 200 mg b.i.d for 10 days

Dispense 20 such tablets

One tablet to be taken orally twice a day after food.

T.AZITHROMYCIN 500mg for 10 days

Dispense 11 such tablets

Two tablets to be taken after food on day 1. One tablet to be taken orally once a day after food for 9 days from day 2 .

Wash hands before eating, after touching soil or using toilet

Drink clean, sterile drinking water

Avoid eating road side exposed eatables.

Review after ten days

Refills: Nil

Doctor’s signature and stamp

1. **Prescribe for an adult with chloroquine sensitive malaria due to Pl.vivax**

Diagnosis : Chloroquin sensitive Pl.vivax malaria.

Rx

T. CHLOROQUIN PHOSPHATE 500mg

Dispense 5 such tablets

Two tablets to be taken orally after food immediately. One tablet to be taken orally 6 hours after the first dose. One tablet to be taken orally once after food on 2nd and 3rd day.

T.PRIMAQUINE 7.5 md b.i.d for 14 days

Dispense 28 such tablets

One tablet to be taken orally twice after food for 15 days.

Use mosquito repellents & mosquito net.

Review after 5 days.

Refills : Nil

Doctor’s signature and stamp

**11..Prescribe for an adult suffering from Chloroquin resistant Pl.falciparum malaria**

Diagnosis : Chloroquin resistant Pl.falciparum malaria

Rx

T.ARTESUNATE 100mg b.i.d for 3 days

Dispense 6 such tablets

One tablet to be taken orally twice a day (8am,8pm) after food for 3 days.

T. SULPHADOXIN 1500 mg + T.PYRIMETAMINE 75 mg o.d

Dispense 1 such tablet

One tablet to be taken orally once after food on day 3.

Use mosquito repellents & mosquito net.

Review after 3 days.

Refills : Nil

Doctor’s signature and stamp

**12. Prescribe for a 23 years old intern with needle injury after withdrawing blood from a HIV patient**.

Diagnosis: Post exposure prophylaxis after needle stick injury.

Rx

1. T. TENOFOVIR 300mg o.d for 28 days

Dispense 28 such tablets

One tablet to be taken orally after breakfast for 28 days

2. T. EMTRICITABINE 200mg o.d for 28 days

Dispense 28 such tablets

One tablet to be taken orally after breakfast for 28 days

3. T. T.RALTEGRAVIR 400mg b.i.d for 28 days

Dispense 56 such tablets

One tablet to be taken twice a day orally after food for 28 days.

Immediately wash the injured site with soap and water.

Avoid recapping or bending contaminated needles.

Use puncture resistant sharps container for needle disposal.

Review after 4 weeks.

Refills: Nil

Doctor’s signature and stamp

**PH 3.2**

**Perform and interpret a critical appraisal (Audit) of a given prescription**

1. Given here is a prescription written for a 40 years old man suffering from loss of appetite, dyspepsia and pain in upper abdomen after taking meals for the past 5 days . After clinical examination and investigations he is diagnosed to be suffering from

Acid peptic disease . Critically audit/evaluate it and write the correct prescription.

Dr. XXX MBBS.,MD.,

Reg.No : 226543

Tab. Pantop 40mg od for 10 days

Tab. Multivit od for 10 days

Tab. Aceclofenac 100mg bid for 3 days.

1. Date of prescription is not given

2. Complete details of the doctor like address, phone number are not given

3. Details of the patient is not given

4. Diagnosis is not given

5. The superscription symbol Rx is missing.

6. In the inscription name of the drugs (Pantop,Multivit) are in brand name. They are

not written in capital letters. Aceclofenac being a NSAID is contra-indicated in this

patient as it will aggravate the disease. It is irrational to prescribe multivitamin to this

patient.

7. The subscription ie instruction to the pharmacist is not given

8. The transscription or instruction to the patient is missing.

9. Refill instruction is not given

10. Signature of the physician is not present.

**The corrected prescription**

|  |
| --- |
| 1.06.2022  Dr.XXX MBBS.,MD.,  Reg no : 226543  Malar Hospital  25,North Car street  Chidambaram  Phone : 7884430011    Patient’s name : Mr.Ravi Age : 40 years Sex : Male OP No : OP4433  Address : 43,Main road,  Shanthi nagar,  Ammapettai, Chidambaram.  Diagnosis : Acid Peptic Disease  Rx  T. PANTOPRAZOLE 40mg od for 7 days  Dispense 7 such tablets  One tablet to be taken orally in the morning on an empty stomach for 7 days.  Avoid alcohol, smoking and hot spicy food.  Avoid pain relievers like aceclofenac  Review after 7 days  Refills:Nil  Doctor’s signature and stamp |

2. Given here is a prescription for a 4 years old male child weighing 15kg suffering from diarrhoea for

the past 2 days . He passed 4 to 5 motions in one day. No H/O fever and vomiting. After thorough

examination the child was diagnosed to have diarrhoea.

Critically evaluate (Audit) it and write the correct prescription.

1.06.2022

Dr.XXX MBBS.,MD.,

Reg no : 226543

Malar Hospital

25,North Car street

Chidambaram

Phone : 7884430011

Patient’s name : Baby.Rohit

T. Crocin 250mg bid for 2 days

Syr.Metrogyl (2oomg/5ml) 7.5ml bid for 5 days.

1. Details of the child is not complete

2. Diagnosis is not written

3. The superscription symbol Rx is not present

4. In the inscription the names of the drugs are in brand name and they are not written in capital

letters . This child does not have fever, hence prescribing pareacetamol (crocin) is irrational. The

child suffers from diarrhea only, hence prescribing anti-amoebic drug metronidazole is irrational.

WHO ORS and Zinc are missing in the prescription.

5. Subscription is missing

6. Instruction to the patient is not written

7. Refill instruction is not given

8. Signature of the physician is missing.

**The corrected prscription**

|  |
| --- |
| 1.06.2022  Dr.XXX MBBS.,MD.,  Reg no : 226543  Malar Hospital  25,North Car street  Chidambaram  Phone : 7884430011  Patient’s name : Baby.Rohit Age :4 years Sex; Male Weght:15 kg OP NO : OP 4321678  Diagnosis : Acute Diarrhoea  Rx  WHO ORS 20.5 g /L  Dispense 4 such pockets  Dissolve the content of 1 pocket in 1 litre of boiled and cooled water. Take 1 cup(250ml) by mouth after each loose motion. Prepared ORS must be consumed within 24 hours.  Syr. ZINC GLUCONATE (20mg/ml) 5ml od for 5 days  Dispense 1 bottle of Zinc gluconate ( 100ml)  5ml to be taken orally once a day after food for 5 days  Review after 24 hours.  Refills: Nil  Doctor’s signature and stamp |

3. Given here is a prescription written for a 24 years old woman suffering from throbbing

headache on one side lasting for 8hours and vomiting, associated with sensitivity to light

and sound. She had similar episode 2 months back. After thorough examination she was

diagnosed to have Migraine.

Critically evaluate it and write the correct prescription

Dr.xxx

Phone : 7154389009

Patient’s name: Mrs.Kamala Age:24 years Sex:Female Weight:65kg

OP NO: OP 887766

T.Sumatriptan 100mg tid

T.Propranolol 40mg o.d

T.Ergotamine 2mg IV

1.The date of prescription is not given

2. Details of the doctor is not complete

3. Diagnosis is not written

4. The superscription symbol Rx is not present

5. In the Inscription the name of the drugs are not in capital letters. Dose of sumatriptan is high. Duration of drug therapy is not given. The patient should either receive Sumatriptan or Ergotamine. Sumatriptan and Ergotamine should not be given together. Sumatriptan is equally effective and better tolerated. This patient needs anti emetic as there is vomiting. Patient also needs additional NSAID combination. Propranolol is not needed. It is given as prophylactic therapy when attacks are more frequent than 2 to 3 per month.

6. Subscription is missing

7. Instruction to the patient is not written

8. Refill instruction is not given

9. Signature of the physician is missing.

**The corrected prescription**

|  |
| --- |
| 2.06.2022  Dr.xxx MBBS.,MD.,  Reg no: 776611  Get well hospital,  30,South car street,  Chidambaram  Phone : 7154389009  Patient’s name: Mrs.Kamala Age:24 years Sex:Female Weight:65kg  OP NO: OP 887766  Diagnosis : Acute Migraine  Rx  SUMATRIPTAN (20mg/0.1ml) one spray by nasal spray.  Dispense one bottle(1ml) of nasal spray  Spray once into one nostril. Can be repeated one more time after 2 hours if pain is not completely relieved.  Inj.METOCLOPRAMIDE 10mg IM once  Dispense one such ampoule (10mg/2ml)  Inject 2ml of Metoclopramide intramuscularly immediately  T.ACECLOFENAC (100mg) + PARACETAMOL (5OOmg) tid for 2 days  Dispense 6 such tablets .  One tablet to be taken orally three times a day after food for 2 days.  Regular sleep schedules  Regular exercises  Avoid alcohol, chocolates, aged cheese, yeast.  Review after 2 days  Refills: Nil  Doctor’s signature and stamp |

4. A 40 years old male ,a known case of Gout on T.Allopurinol approached his family physician with symptoms of Acute Tonsillitis. The physician wrote the following prescription. Critically audit it and write the correct prescription.

T. Allopurinol 100mg bid

Cap.Ampicillin 500mg tid

1. Date of prescription is not given

2. Details of the prescriber and patient are not given

3. Diagnosis is not written

4. The superscription symbol Rx  is not given

5. In the inscription the names of the drugs are not in capital letters. Duration of drugs therapy is not given. A higher incidence of skin rashes has been reported when ampicillin is given to patients on allopurinol. Hence ampicillin can be replaced with amoxicillin which is equally effective but does not produce skin rashes.

6. Subscription is missing

7. Instruction to the patient is not written.

8. Refill instruction is not given

9. Signature of the physician is missing.

**The corrected Prescription**

|  |
| --- |
| 2.06.2022  Dr.xxx MBBS.,MD.,  Reg no : 776611  Get well hospital,  30,South car street,  Chidambaram  Phone : 7154389009  Patient’s name: Mr.YYY Age:40 years Sex:Male Weight:71kg  OP NO: OP 7654321  Diagnosis : Acute Tonsillitis  Rx  Cap. AMOXICILLIN 500mg tid for 5 days  Dispense 15 such capsules  One capsule to be taken orally three times a day after food for 5 days  T. ALLOPURINOL 100mg bid for 5 days  Dispense 10 such tablets  One tablet to be taken orally twice a day after food for 5 days  Gargle with warm salt water  Review after 5 days  Refills: Nil  Doctor’s signature and stamp |

5. A 54 years old male, known Type-II Diabetic was well controlled with T.Glimepiride and

T.Metformin. Recently he developed Stage-I hypertension and the physician prescribed the

followimg anti-hypertensive drug. Perform a prescription audit and suggest changes for rational

therapeutics.

2.06.2022

Dr.xxx MBBS.,MD.,

Reg no : 654321

Get well hospital,

30,South car street,

Chidambaram.

Phone : 7154389009

Diagnosis : Hypertension with Type II diabetes mellitus

Rx

T.Glimepiride img od for 15 days

T.Metformin 5oomg bid for 15 days

T.Propranolol 40mg bid for 15 days

1.Details of the patient is not given

2.In the inscription the names of the drugs are not written in capital letters. Non selective beta blockers block the symptoms of hypoglycemia and worsen the hypoglycemic episodes,hence avoided in diabetics. Suggested alternative is either ACE—I or ARB which are renoprotective in type II diabetes mellitus.

3. Subscription is missing

4. Instruction to the patient is not written.

5. Refill instruction is not given

6. Signature of the physician is missing

**The corrected prescription**

|  |
| --- |
| 2.06.2022  Dr.xxx MBBS.,MD.,  Reg no: 665511  Get well hospital,  30,South car street,  Chidambaram.  Phone : 7154389009  Patient’s name : Mr.Ravi Age : 54 years Sex : Male OP No : OP4433  Address :2nd south cross street,  Vaheesan nagar,  Chidambaram.  Diagnosis: Hypertension with Type II diabetes mellitus  Rx  T.GLIMEPIRIDE img od for 15 days  Dispense 15 such tablets  One tablet to be taken orally before breakfast for 15 days  T.METFORMIN 5oomg bid for 15 days  Dispense 30 such tablets  One tablet to be taken orally twice ( after breakfast and dinner) a day for 15 days  T. LOSARTAN 25 mg od for 15 days  Dispense 15 such tablets  One tablet to be taken orally once after dinner for 15 days  Review after 15 days  Salt free and DASH diet  Regular exercises for 30minutes each day  Avoid smoking and alcohol  Refills: Nil  Doctor’s signature and stamp |

5.Written here is a prescription for a 27 years old primi woman in her first trimester suffering from mild iron deficiency anaemia . Comment, correct and rewrite the prescription.

Mrs .Kamala Age:27years Sex: Female Weight:65kg OP NO: OP665123

Address: 24, North cross street ,

Gandhi nagar,

Chidambaram

Inj. Microfer 1 amp i.m daily for 7 days

Fersolate 400mg t.i.d for 30 days

Folic acid 100mg t.i.d for 30 day

**COMMENTS**

1. Date of prescription is not given

2. Details of the prescriber is not written

3. Diagnosis is not written

4. The superscription symbol Rx  is not given

5. In the inscription The names of the drugs ( Microfer,Fersolate) are given in brand name.

The drugs’ names are not written in capital letters. Patient is suffering from mild anaemia, so

parenteral iron therapy is not needed. Dosage of ferrous sulphate ( Fersolate) and folic acid

are wrong .Formulaitons of ferrous sulphate and folic acid are not given.

6. Subscription is missing

7. Instruction to the patient is not written.

8. Refill instruction is not given

9. Signature of the physician is missing

The corrected prescription

|  |
| --- |
| 3.06.2022  Dr. Indira MBBS.,MS (O.G),,  Indira Hospital  34,East car street,  Chidambaram.  Mrs .Kamala Age:27years Sex: Female Weight:65kg OP NO: OP665123  Address: 24, North cross street ,  Gandhi nagar,  Chidambaram  Diagnosis: Pregnancy associated with anaemia  Rx  T.FERROUS SULPHATE 200mg t.i.d for 30 days  Dispense 90 such tablets  One tablet to be taken three times a day orally after food.  T.Folic acid 5mg od for 30 days  Dispense 30 such tablets  One tablet to be taken once orally after breakfast for 30 days  Take iron rich foods such as red meat, dark green leafy vegetables  Take dates, nuts  Review after 30 days  Refills: Nil  Doctor’s signature and stamp |

**PH 3.5**

**To prepare and explain a list of p—drugs for a given patient/condition**

**1.Select a P-drug for a 58years old male suffering from Stage-II hypertension ( BP 160/100)**

Step 1:

**Diagnosis-**- Stage—II Hypertension.

Step 2 :

**Therapeutic objectives**—Reduce the systolic and diastolic pressure. As the patient is < 60 years the treatment goal is to lower BP ≤ 140/90 mm of hg.

Step 3a:

**Make an inventory of effective groups of drugs**

1.ACE—inhibitors

2.ARBs

3.CCBs—Dihydropyridines

4.Diuretics—Thiazides

Step 3b:

**Make an inventory of effective groups of drugs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Drugs** | **PVR** | **HR** | **COP** | **Plasma volume** |
| ACE—I | ↓↓ | --- | --- | --- |
| ARBs | ↓↓ | --- | --- | --- |
| CCBs—DHP | ↓↓ | ↑ | ↑ | --- |
| Thiazide Diuretics | ↓ | -- | --- | ↓ |

Step 4:

**Choose an effective group according to criteria**

* ACE –inhibitors& ARBs are less effective in elderly because of lower Renin status.ACE—I cause Cough .Both ACE—I and ARBs cause Dysgeusia, Hyperkalemia, Neutropenia With ↑ Risk Of Infection**.**
* Thiazide diuretics have an adverse metabolic profile and electrolyte disturbances even at low doses in elderly.
* Dihydropyridine CCBs are effective in elderly patients with low renin status. They have no deleterious effects on metabolic profile and electrolyte balance.
* All the above groups of drugs are available as low cost generics.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Drugs** | **Efficacy** | **Safety** | **Suitability** | **Cost** |
| ACE—Inhibitors | + | ++ | ++ | + |
| ARBs | + | ++ | ++ | + |
| CCBs( DHP) | ++ | ++ | +++ | + |
| Thiazide diuretics | + | + | ++ | + |

**Based on the above analysis , the group most effective is CCBs.**

Step 5:

**Choose a P-drug**

* Short acting DHP like Nifedipine cause tachycardia through baro-receptor reflex mediated sympathetic discharge and can precipitate myocardial ischaemia in elderly.
* Tachycardia is minimal with long acting DHPs like Amlodipine and Cilnidipine.
* Lower incidence of pedal edema with cilnidipine compared to Amlodipine.
* Cost of CCBs varies from Rs 3 to Rs 5 per tablet.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CCBs** | **Efficacy** | **Safety** | **Suitability** | **Cost** |
| Nifedipine | ++ | + | + | + |
| Amlodipine | ++ | ++ | ++ | + |
| Cilnidipine | ++ | +++ | ++ | + |

From the above analysis our P-drug for elderly male with Stage-II hypertension is

Generic name : CILNIDIPINE

Dosage form : Tablet

Route : oral

Schedule : 5mg once daily preferably at night after food

Duration of treatment : Until the next visit.

**2. Select a P—drug for 30 years old male alcoholic with Acute bleeding peptic ulcer.**

Step 1:

**Diagnosis**--- Acute bleeding peptic ulcer

Step 2 :

**Therapeutic objectives**

Relief of pain

Ulcer healing

Prevention of bleeding.

Step 3a:

**Make an inventory of effective group of drugs**

1.Proton pump inhibitors

2.H2 blockers

Step 3b:

**Make an inventory of effective group of drugs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Drugs** | **Acid suppression** | **Ulcer healing** | **Relief of symptoms** |
| PPI | +++ | +++ | +++ |
| H2 blockers | ++ | ++ | ++ |

Step 4:

**Choose an effective group according to criteria**

* PPIs are powerful and prolonged inhibitors of acid secretion compared to H2 blockers .Hence they relieve the symptoms and promote healing more rapidly than H2 blockers. Maximal acid suppression by PPI cause high gastric PH which enhances clot formation and prevent bleeding.
* Shore term treatment with PPI & H2 blockers are well tolerated and have excellent safety record.
* As this condition is an emergency, the drugs are given by IV route. The cost of PPI range from

Rs 45 to Rs 100/Inj. The cost of H2 blockers range from Rs 5 to Rs 25/Inj.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Drugs** | **Efficacy** | **Safety** | **Suitability** | **Cost** |
| PPIs | +++ | ++ | ++ | ++ |
| H2 blockers | ++ | ++ | ++ | + |

Based on the above analysis , the group most effective is PPI

Step 5:

**Choose a P-drug**

* Only drugs Like Omeprazole, Esomeprazole,Rabeprazole and Pantoprazole are available for IV use among PPI.
* Omeprazole, Esomeprazole, Rabeprazole have affinity for CYP450 and hence risk of drug interactions is more.
* Pantoprazole has less affinity for CYP 450 hence less risk of drug interactions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Drugs** | **Efficacy** | **Safety** | **Suitability** | **Cost** |
| Inj.Omeprazole | +++ | + | ++ | Rs 50—55/inj |
| Inj.Esomeorazole | +++ | + | ++ | Rs 80—100/inj |
| Inj.Pantoprazole | +++ | ++ | ++ | Rs 45—55/inj |
| Inj.Rabeprazole | +++ | + | ++ | Rs 60-100/inj |

From the above analysis our P-drug for this patient with bleeding peptic ulcer is

Generic name : PANTOPRAZOLE

Dosage form : INJECTION

Route : IV (40mg/inj)

Schedule :80mg bolus injection followed by 8mg/hour infusion for 3 days

Duration of treatment : 3 days.

Select the P-drug for 25 years old male suffering fro acute amoebic dysentery

Step 1:

**Diagnosis** --- Acute amoebic dysentery

Step 2:

**Therapeutic objectives**

Kill the active trophozoites

Relieve the signs and symptoms

Step 3:

**Make an inventory of effective group of drugs**

Intestinal tissue amoebicide

(Nitroimidazoles)

Metronidazole

Tinidazole

Secnidazole

Ornidazole

Satranidazole

Step 4:

**Choose an effective group according to criteria**

* All the above group of drugs are equally efficacious. Metronidazole has shorter duration of action of 8 hrs . Hence should be given three times a day. Other drugs have prolonged half life, hence given as single dose or twice a day.
* Side effects of Metronidazole are headache, nausea, metallic taste, dry mouth and neurotoxicity. The incidence of side effects is lower with other drugs.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Drugs** | **Efficacy** | **Safety** | **Suitability** | **Cost** |
| Metronidazole | ++ | ++ | ++ | Rs1.50 to 2.0/ tab (400mg) |
| Tinidazole | ++ | + | ++ | Rs 5.0 to 9.0/tab (500mg) |
| Secnidazole | ++ | ++ | ++ | Rs 4.50 to 17/tab (500mg) |
| Ornidazole | ++ | ++ | ++ | Rs 7.50 to 12/tab (500mg) |
| Satranidazole | ++ | + | ++ | Rs 10 to 11/tab (300mg) |

From the above analysis our P-drug for this patient with Acute amoebic dysentery is

Generic name : METRONIDAZOLE

Dosage form : TABLET

Route : ORAL

Schedule : 400mg tds orally after food for 5 days

Duration of treatment : 35days.

**PH 3.4**

**Recognise and report an ADR**

**Students reporting form**

**Case report –1**

A 55 years old male alcoholic was admitted on 25.2.2022 for liver cirrhosis with ascitis. He was administered Inj.Furosemide 40mg tid to reduce ascitic fluid. He responded with brisk diuresis, but on the third day he became disoriented, confused, and extremely weak with slurred speech. He had a fainting episode on getting up from the bed. He was investigated on 25.5.2022 for the following parameters .

Serum K + = 2meq/L Blood PH = 7.8 Blood ammonia = 40µml/L

**What is the AE in the above case?. Record it in the ADR reporting form.**

**Group of the drug considered: Furosemide**

AE – Hepatic encephalopathy due to hypokalemic alkalosis

Analysis : Expected, Possible

**Comments:**

Brisk diuresis in this patient resulted in hypokalemic alkalosis which precipitated hepatic encephalopathy. NH3 produced by gut bacteria is not detoxified by cirrhotic liver,hence blood NH3 tends to raise. NH3 is also partly ionized to NH4+ in blood and excreted in urine. During alkalosis NH3 ionises to lesser extent raising the blood NH3 furthur. Raised level of NH3 enters brain to cause encephalopathy.

**Treatment:**

* Diuretic should be with held till the fluid electrolyte and acid-base balance is restored.
* IV Kcl along with normal saline hasten recovery from hypokalemia and alkalosis
* Oral Lactulose reduces blood NH3 by producing acid degradation products in the gut which covert NH3 into poorly absorbed NH4 ions.
* Suppressing NH3 producing gut bacteria by oral Rifaximine/oral Neomycin .

**Case report—2**

An elderly male aged 70 years had been suffering from difficulty in passing urine, poor stream and frequent urge to urinate for the past 2 years due to BPH. Recently he had been experiencing episodes of vertigo for which he was prescribed T.Promethazine 25 mg bd for 3 days. On the 3rd day he came back to the hospital since he had not passed urine for the past 24 hrs and had severe pain in the lower abdomen.

O/E: There was bulge in the pubic region due to full bladder. On catheterization he passed 1.5 L urine and the pain was relieved. The physician asked the patient to stop taking Promethazine.

**What is the AE in this case scenario ?. Record it in the ADR reporting form**

AE: Acute urinary retention.

Analysis : Expected, Probable

**Comments:**

Promethazine is a H1—anti- histaminic, anti-vertigo with high anti- muscarinic action . Anti-muscarinic drugs cause urinary retention in old males with prostatic hypertrophy. Hence he should be prescribed Cinnarizine an anti-histaminic, anti-vertigo drug with low anti –muscarinic activity.

**Case report –3**

**A 3 years** old girl was brought to the hospital emergency by the parents with the following signs and symptoms for the past half an hour.

Rigid neck , eyes staring in one direction, clinched teeth, head tilted to one side and there were intermittent purposless movement of the upper limb. The child was not speaking.

The parents informed that she had vomited twice in the morning and hence took the child to a quack who had given her an inj. After giving injection vomiting stopped but the child developed above symptoms after an hour. The physician gave another injection to the child and the above symptoms subsided within 15 minutes. He advised the parents not to approach quacks for medical treatment.

**What is the AE in the above case scenario?. What could be the anti-emetic given by the quack?**

AE : Acute muscular dystonia

Analysis : Expected, Probable

**Comments:**

The quack had given Inj.Metoclopramide. Acute dystonia, an extrapyramidal motor reaction is caused by blocked of D2 receptors in CNS. Children and elderly are more sensitive to this side effect. Drug induced extrapyramidal motor reactions can be reversed by centrally acting anticholinergic drugs.

IM injection of Promethazine which has anticholinergic, anti-histaminergic, sedative and ani-emetic can reverse the acute dystonia rapidly within 15 to 30 min.

Domperidone crosses blood-brain barrier poorly and hence extrapyramidal side effects are rare. Domperidone is the preferred anti-emetic in children.