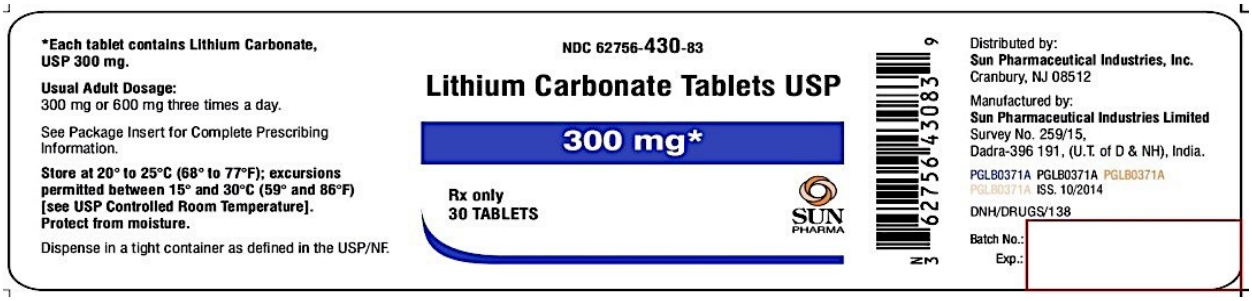
Lecture 6 • Mark Klimek • 87:50

Drug Toxicities, Hiatal hernia, Dumping syndrome

Drug Toxicities—Know these FIVE medications

1. Lithium (antimania drug)

- Used for Bipolar
  - Specifically, for the manic episodes but not for the depression
- Therapeutic level: 0.6 to 1.2
- Toxic level: >2.0
- Notice gray area: 1.3 to 2



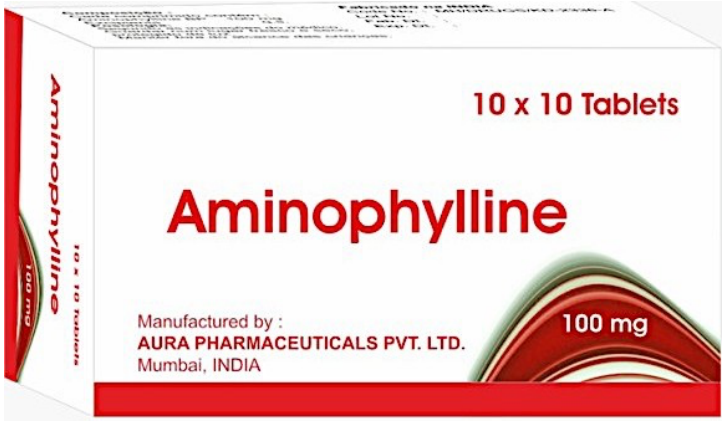
2. Lanoxin or Digoxin

- Used to treat A-Fib and CHF
- Therapeutic level: 1 to 2
- Toxic level: >2

3. Aminophylline—muscle spasm relaxer for the airway

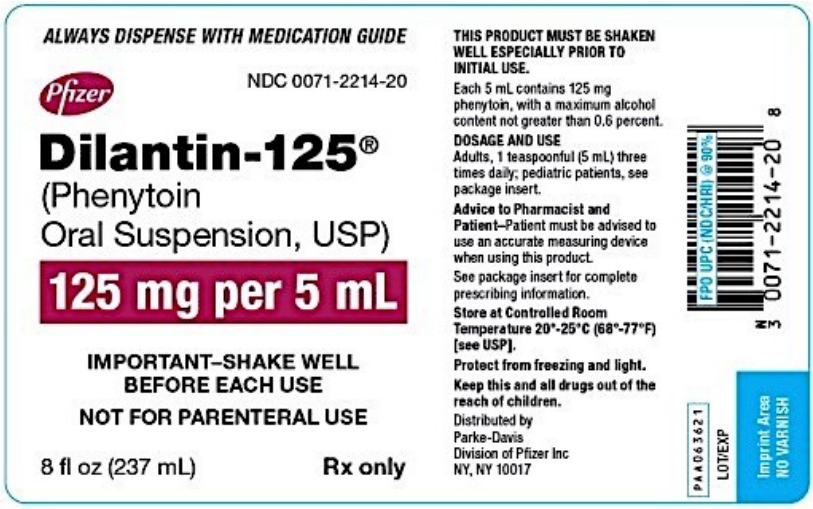
- Compound of the bronchodilator **theophylline**
- Therapeutic level: 10 to 20

- Toxic level: >20
- Non-therapeutic level: <10 … if it is not therapeutic, increase dose of medication, and assess for compliance



4. Dilantin (phenytoin)

- Seizure medication
- Therapeutic level: 10-20
- Toxic level: >20

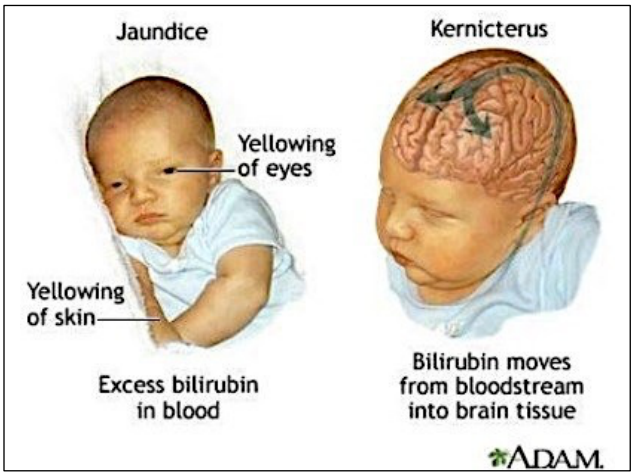


5. Bilirubin

- Breakdown product of Red Blood Cells
- Normal level in adults: **0.2 to 1.2**
- Always tested in the Newborns on the NCLEX
- In **Newborns** bilirubin is much higher than in adults
  - Elevated level: 10 to 20
  - Toxicity: >20
- When do physicians want to hospitalize these newborns?
  - When bilirubin level is about 14 to 15

Patterns

- 1s and 10s
- 2s and 20s
  - 2s: **L**ow # (**L**ithium and **L**anoxin)
  - 20s: High # (Aminophylline, Dilantin and Bilirubin)



Jaundice—Yellow skin from excess bilirubin in the blood

- It appears as yellow skin and sclera

Kernicterus—Excess bilirubin in the brain

- Occurs when level in the blood gets >20
- In the brain, it may cause aseptic (sterile) meningitis or encephalopathy (don't need to know)
- It can be DEADLY

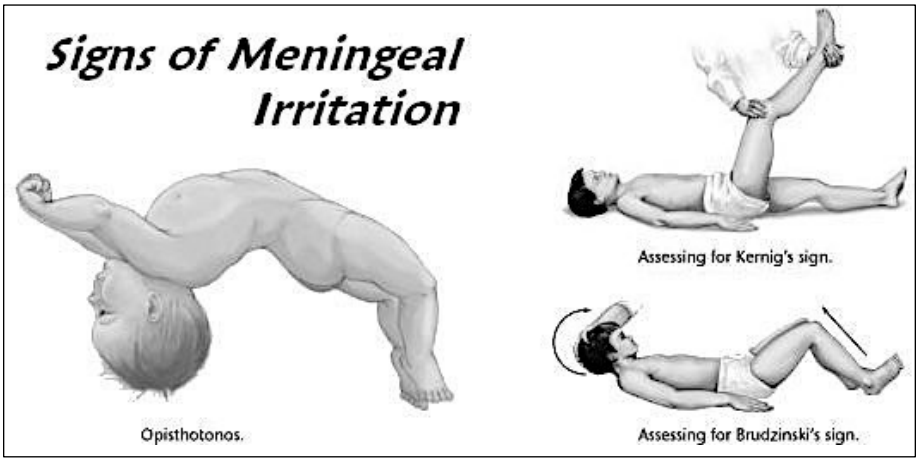
Opisthotonos

- **Position** the newborn assume due to irritation of the meninges from kernicterus
- Presentation: hyperextended posture … (Is a medical emergency)

Question

In what position do you place an opisthotonic newborn?

- Put newborn on the side



Pathological vs. Physiological Jaundice

- If the newborn comes out yellow, something is wrong = Pathologic jaundice
- If the newborn turn yellow 2 to 3 days postpartum, that's ok = Physiologic jaundice

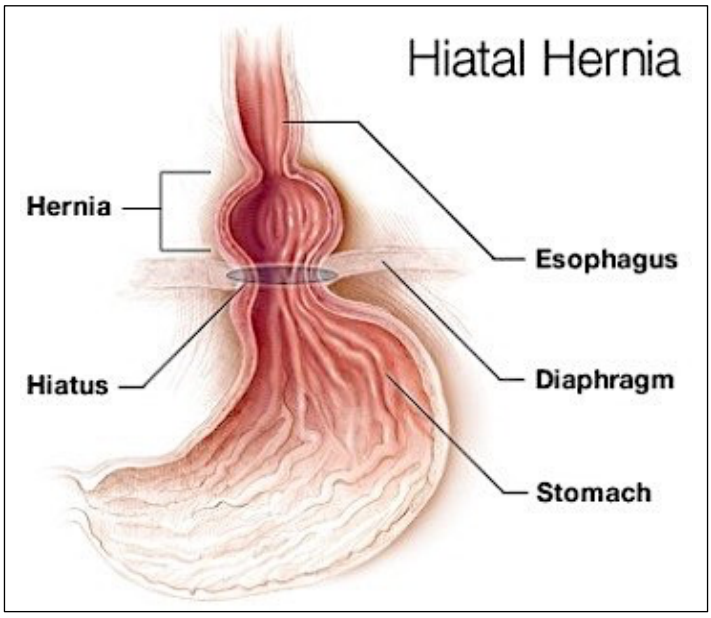
Dumping Syndrome vs. Hiatal Hernia

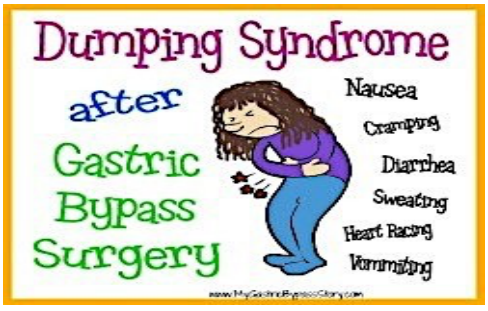
- Both gastric emptying problems and are opposites

Hiatal Hernia

- Regurgitation of gastric acid upward or backward into esophagus

- "Like a cow with 2 stomachs," gastric contents go in wrong direction at the correct rate
- S/Sx of hiatal hernia is similar to GERD (Heartburn and indigestion)
- S/Sx of hiatal hernia = S/Sx of GERD when lying down after a meal
  - In other words, **Heartburn, Indigestion on lying down after eating**
- **Treatment**
  - Can do 3 things, as shown below
    1. Elevate HOB (head of bed) during and 1 hour after meals
    2. Increase the amount of fluids with meals
    3. Increase the amount of Carb content
    - These cause the stomach to empty quickly so its content doesn't back up
    - **High**-atal Hernia … Everything **high**





Dumping Syndrome

- Gastric contents are dumped too quickly into duodenum
  - Right direction but at wrong rate
- S/Sx of dumping syndrome
  - **Drunk:** Staggering gate, impaired judgment, labile—all blood gone to gut
  - Also get **Shock:** cold/clammy, tachycardia, pale
  - Now add **Acute abdominal distress:** n/v, diarrhea, cramping, guarding, borborygmi, bloating, distention
- Dumping syndrome = Drunk, Shock, Acute Abdominal Distress

Note

- Drunk is what it is
- Shock is what it is
- Drunk + Shock = Hypoglycemia
- Drunk + Shock + Acute abdominal distress = Dumping syndrome

Treatment of Dumping Syndrome

- Can do 3 things, as shown below
  1. Lower HOB (head of bed) during meals and turn pt on the side
  2. Decrease the amount of fluids 1 or 2 hours before or after meals
  3. Decrease the amount of Carb content
  - These 3 things prevent the stomach to empty quickly or dump its content into the duodenum
- Dumping syndrome … Everything **low**

What is protein is added in the diet?

- Protein does the opposite of carbohydrate
- Protein bulks gastric content, takes longer to digest, and moves slower through the gut
- Therefore, give
  - Low protein in hiatal hernia
  - High protein for dumping syndrome

Electrolytes

- **Memorize these 3 sentences**
  1. Kalemias do the same as the prefix (hypo-, hyper-), except for HR and urine output which go opposite
  2. Calcemias do the opposite as the prefix
  3. Magnesemias do the opposite as the prefix
- Natremias
  - HypoNatremia = Volume overload … HyperNatremia = Dehydration

Kalemia(s)

- Go in the **same** direction as the prefix, except for **HR** and **urine output** (UO), which go in the **opposite** direction
- Hypo—Symptoms go **low** with hypo, except HR and UO
- Hyper—Symptoms go **high** with hyper, except HR and UO

Some S/Sx of Hyperkalemia

- Brain: seizures, agitation, irritability, loud down
- Heart: tented T waves, ST elevated, tachypnea
- Bowel: diarrhea, borborygmi
- Muscle: spasticity, increase tone, hyperreflexia (3+, 4+)
- Heart rate: down (bradycardia)
- UO: down (oligouria)

Some S/Sx of Hypokalemia

- Lethargy, bradypnea, paralytic ileus, constipation, muscle flaccidity, hyporeflexia (0, 1+)
- Tachycardia (HR is up)
- Polyuria (UO is up)

Question
Your patient has hyperkalemia, select all that apply

a. Adynamic ileus
b. Obtunded
c. 1+ reflex
d. Clonus (irritable)
e. U wave
f. Depressed ST
g. Polyuria
h. Bradycardia

Answer

- Kalemia goes in the same direction, except HR and urine output … therefore,
- Clonus are bradycardia are right

Calcemia(s)

- Go in the **opposite** direction as the prefix
- Hypo—Symptoms go **high** with hypo
- Hyper—Symptoms go **low** with hyper

Calcemias do the opposite of the prefix—it is a sedative

- So Hypercalcemia is bradycardia, bradypnea, flaccid, hypoactive reflexes, lethargy, constipation, etc.
- So Hypocalcemia is agitation, irritability, 3+ or 4+ reflexes, spasm, seizure, tachycardia, Chvostek sign (tap the **cheek**), Trousseau (inflate BP cuff), etc.

Choosing answers for potassium and calcium

- For potassium pick answers related to heart problems
- For calcium pick answers related to muscle problems

Magnesemia(s)

- Magnesium goes in the opposite direction of the prefix—it is also a sedative

It is possible that S/Sx are from several electrolytes imbalances. In that case,

- Choose CALCIUM if nerve or skeletal involvement
- Pick POTASSIUM for any other symptom
  - Generally anything effecting blood pressure

Your patient has diarrhea … Which one of the following electrolyte imbalances causes diarrhea?
Hyperkalemia, hypokalemia, hypocalcemia, or hypomagnesemia

- Tetany? Hypocalcemia

Test tip

- Common mistake
- Tetany = Hyperkalemia—prefix example. Pay attention

Natremia(s)—Sodium

- Hyp**E**rnatrema = D**E**hydration
  - Hot, flushed, dry skin, thready pulse, rapid HR … **Give fluid**
  - Associate **"E"** in hypernatremia with D**E**hydration
- Hyp**O**natremia = **O**verload
  - Crackles, distended neck veins … **Fluid restriction, Lasix**
  - Associate **"O"** in hyponatremia with **O**verload
  - Nursing Dx: Fluid Volume Excess

Question

In addition to a high potassium, what other electrolyte abnormality can be seen in DKA?

- Hypernatremia = Dehydration
- DKA should make you think of DEhydration, which is also associates with hypErnatremia

Question

In addition to High Potassium what other electrolyte imbalance is possible in DKA?

- Answer: Hypernatremia

Review—Think dehydration or Fluid overload

- SIADH: Hyponatremia
- DI: Hypernatremia
- HHNK: Hypernatremia

How to spot early signs of electrolyte imbalance?

- The **earliest sign** of any **electrolyte disturbance** is
  - Numbness and tingling = **Paresthesia**
  - Circumoral paresthesia = Numbness and tingling around the lips
- **The universal sign of all electrolyte imbalances is**
  - Muscle weakness = **Paresis**

Treatment

- Potassium is the only one Boards will test
- **Never Push Potassium IV**
- Potassium <40 mEq/L of IV fluid
  - If >40 mEq/L, clarify dosage with physician

How do you lower potassium?

- Of all electrolyte imbalance, high potassium is the most problematic
- High potassium can stop the heart
- The fastest way to lower potassium level is to
  - Give **D5W and regular insulin** to decrease potassium
  - This will drive the potassium into the cell and out of the blood
  - **Temporary solution** but quick
- **Kayexalate** is long-term solution
  - Through *enema or ingestion*, Kayexalate exchanges potassium for sodium

    - Potassium is eliminated through feces and pt becomes hypernatremic
    - Hypernatremia is managed with IV fluid administration
    - The downside is it takes hours to work
- To solve this problem
    - Give D5W, Regular insulin, and Kayexalate and the same time D5W and Regular insulin work instantly Kayexalate works in a few hours—**K Exits Late**