Understanding Hypocalcemia

What is Calcium?

**NORMAL RANGE**
- 9 to 10.5 mg/dL

**MAIN FUNCTIONS**
- Helps Magnesium
  - Calcium will help with magnesium's main functions when magnesium is low
- Helps Keep the Following Team Players Strong
  - Bone Mineralization
    - keeps bones hard
  - Beats: Aids Neuromuscular Processes
    - Nerve impulses and muscle contraction
  - Blood: Coagulation
    - Blood clots
    - Prevents bleeding

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What is Hypocalcemia?

LOW CALCIUM RANGE

- Less than 9 mg/dL

CAUSES

- Conditions that decrease the ionized fraction of calcium
  - Hyperphosphatemia
  - Low PTH levels

- Conditions that increase renal excretion of calcium
  - Hyperproteinemia
  - Acidosis
  - Increased urine volume

- Medications that cause Low Calcium
  - Certain antibiotics
  - Loop diuretics
  - Lithium
  - Corticosteroids
  - Anticonvulsants
  - Citrate

- Conditions that increase parathyroid hormone
  - Immobility
  - Removal or destruction of the parathyroid glands

- End Stage Kidney Disease
  - Increased Calcium Excretion
  - Kidney Disease, polyureic phase
  - Massive Diarrhea
  - Steatorrhea

- Wound Drainage, especially GI

- Calcium is normally also bound in the GI lumen

- Inadequate intake of Vitamin D or Low Magnesium Levels
  - Required for absorption of calcium in the gut

- Alkalosis
  - Medications such as calcium chelators or binders

- Increased Calcium Excretion
  - Kidney Disease, polyureic phase

- Lactose Intolerance

- Malabsorption syndromes such as celiac sprue or Crohn's disease

- Alcohol Abuse

- Liver Disease

- Hyperparathyroidism

- Increased Calcium Intake
  - Dietary intake of calcium

- Hypercalcemia

- Increased Intake of Vitamin D or Magnesium

- End Stage Kidney Disease

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Hypocalcemia Patient Presentation

Cardiovascular System
- Inefficient contractility with muscles
- Decreased heart rate
- Hypotension
- Diminished peripheral pulses
- Big risk for bleeding and dysrhythmias (Ventricular Tach)

Respiratory System
- Not directly affected because respiration rate is equal to increase respiratory movement because of muscle tetany or seizures

Neuromuscular System
- Irregular skeletal muscle: Twitches, cramps, weak, seizures
- Paroxysmal muscle spasms in the calf or foot during periods of inactivity
- Paroxysms followed by numbness that may affect the lips, nose, and ears

Gastrointestinal System
- Increased gastric motility; hyperactive bowel sounds
- Cramping and diarrhea

Renal System
- Urinary output will vary depending on the cause

Laboratory Findings
- Serum calcium levels less than 9 mg/dL
- Electrocardiogram changes
- Prolonged ST interval
- Prolonged QT interval

Hypocalcemia Interventions

Replace Calcium (IV or PO)
- When administering calcium IV, warm the injection solution to body temperature (helps with discomfort) before administration and administer slowly
- Monitor for electrocardiogram changes, infiltration, and hypercalcemia
- Provide Vitamin D if giving calcium PO

Medications Increase Calcium Absorption
- Aluminum hydroxide (Tums) reduces phosphorous levels causing the counter effect of increasing calcium levels
- Vitamin D aids in the absorption of calcium from the intestinal tract
- Quiet Environment to reduce environmental mental stimuli
- Initiate Seizure Precautions
- Fracture Precautions
- Risk for Bleeding

Education on calcium rich foods
- Dairy: Cheese, Milk, Yogurt
- Collard greens and broccoli
- Tofu and Sardines