Disorders of Parathyroid Glands

- Hyperparathyroidism
- Hypoparathyroidism

How will you know if your patient has a parathyroid disorder?

What nursing assessments are involved?

Fluid & Electrolytes
Mobility
Perfusion
Stress & Coping
# Changes in Calcium Regulation

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<th>Alteration</th>
<th>Description/Definition</th>
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<td>Changes in calcium regulation</td>
<td>Alterations in hormones that regulate calcium levels (PTH, calcitonin) cause blood and bone calcium to be too high or too low.</td>
<td>Increased calcium levels can lead to renal calculi.</td>
<td>Hyperparathyroidism treatment includes surgical and pharmacologic intervention, including calcimimetics, hormone replacement therapy, and biphosphonates.</td>
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<td>• Hyperparathyroidism</td>
<td>Decreased calcium levels can lead to osteoporosis and severe muscle cramping.</td>
<td>Hypoparathyroidism treatment includes oral calcium carbonate tablets, vitamin D, and diet rich in calcium and low in phosphorus.</td>
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<td>• Hypoparathyroidism</td>
<td>Because calcium is important for neuronal signaling, muscle contraction, and many chemical reactions, abnormal calcium levels can cause manifestations in almost every body system.</td>
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Gland: Parathyroid; Hormone: PTH

ETIOLOGY & PATHOPHYSIOLOGY:

• Primary hyperparathyroidism – increased secretion of PTH (adenoma, long-term lithium therapy)

• Secondary hyperparathyroidism – compensatory response to conditions that induce or cause hypocalcemia (Vit D deficiency, malabsorption, CKD, hyperphosphatemia)

• Tertiary hyperparathyroidism – hyperplasia of the parathyroid glands and a loss of negative feedback (kidney transplant after long period of dialysis for CKD)

• PTH regulates serum calcium and phosphate levels by stimulating bone resorption of calcium, renal tubular reabsorption of calcium, and activation of vitamin D

• Hyperparathyroidism – increased secretion of parathyroid hormone
Hyperparathyroidism

• Excess levels of PTH lead to hypercalcemia and hypophosphatemia
• Decreased bone density
• Urinary calcium and phosphate can lead to calculi
Hyperparathyroidism

CLINICAL MANIFESTATIONS:
Can be asymptomatic or overt and associated with hypercalcemia

Cardiovascular: HTN, angina, dysrhythmias, increased digitalis effect

Neurologic: lethargy, weakness, fatigue, psychosis, depression, depressed reflexes, personality changes, irritability, memory impairment, delirium, confusion, coma, headache, poor coordination, gait abnormalities, psychomotor retardation, paresthesias

DIAGNOSTIC STUDIES:
- PTH, BMP (calcium, phosphorus, chloride, creatinine), Amylase, Alkaline phosphatase, Uric acid, Urine calcium
- Bone density test
- US, CT, MRI

Elevated PTH
Serum Ca+ >10mg/dL
Serum Phos <3mg/dL
Hyperparathyroidism

CLINICAL MANIFESTATIONS:

**Renal/urinary:** - hypercalciuria, kidney stones, UTI, polyuria

**Visual:** - impaired vision, corneal calcification

**Gastrointestinal:** - vague abdominal pain, anorexia, n/v, constipation, pancreatitis, PUD, cholelithiasis, weight loss

**Integumentary:** - skin necrosis, moist skin

**Musculoskeletal:** - weakness, fatigue, skeletal pain, backache, pain on weight bearing, osteoporosis, pathologic fractures of long bones, compression fracture of spine, decreased muscle tone, muscle atrophy
Interprofessional Care – Surgical Therapy

CRITERIA:

• Most effective for primary and secondary
• Elevated serum Ca+ levels
• Hypercalciuria
• Markedly reduced bone mineral density
• Over symptoms (e.g. neuromuscular effects, nephrolithiasis)
• Under age 50

• Partial or complete removal of parathyroid glands
• Parathyroidectomy leads to rapid reduction of high calcium levels

• Post-op care see surgical therapy for hyperthyroidism
Interprofessional Care – Nonsurgical Therapy

CRITERIA: Asymptomatic or mild symptoms
• Keep regular examinations
• Monitoring of relevant serum and urine labs
• Annual x-rays & bone scans
• Diet
  – High fluids & moderate Ca+ intake
  – Refer to dietician prn
• Exercise & avoid immobility

CRITERIA: Severe Hypercalcemia
• IV sodium chloride
• Loop diuretics (furosemide)
• IV Biphosphonates
• Phosphates
• Calcimimetic agents (cinacalcet) - ↓ PTH secretion
  – 2° hyperparathyroidism
  – CKD
  – Parathyroid cancer
Gland: Parathyroid; Hormone: PTH

- Hypoparathyroidism – inadequate circulating PTH
- Hypocalcemia due to lack of PTH

ETIOLOGY & PATHOPHYSIOLOGY:

- Iatrogenic – accidental removal of parathyroid gland or damage to vascular supply of glands during neck surgery (e.g. thyroidectomy)
- Idiopathic – absence, fatty replacement, or atrophy of glands
- Severe hypomagnesemia (e.g. malnutrition, chronic alcoholism, renal failure) lead to suppression of PTH
- Tumors
- Heavy metal poisoning
Nursing and Interprofessional Management

TREATMENT GOALS:
- Treat acute complications of hypocalcemia, such as tetany and prevent long-term complications
- **ASSESSMENT:** S&S hypocalcemia, serum lab values

ACUTE INTERVENTIONS:
- IV calcium w/ ECG monitor and cardiac assessment
- Assess for extravasation during IV infusion
- Rebreathing to lower pH for calcium availability

TEACHING NEED:
- Oral Ca+ supplements
  - (1.5 to 3 g/day in divided doses), Magnesium, and Vit D (or calcitrol)
- High calcium diet
- Follow-up care & monitor Ca+ levels