

HYPOCALCEMIA

(Last updated 7/24/2019; Reviewers: Rudy Tedja, DO)

IMMEDIATE CONSIDERATIONS

FINDINGS

- **Signs and symptoms**
 - Neuromuscular irritability
 - Perioral numbness
 - Paresthesias of the hands and feet
 - Muscle cramps
 - Focal/generalized seizures
 - Laryngospasm
 - + Trousseau's sign
 - + Chvostek's sign
 - Cardiovascular
 - Prolonged QT interval
 - Arrhythmias
 - Hypotension
 - Heart failure
 - Papilledema
 - Psychiatric
 - Anxiety
 - Depression
 - Emotional instability
 - Hallucinations
 - Psychosis

- **Lab findings**

- Influenced by albumin level because it is the main Ca-binding protein
- The measured calcium concentration needs to be corrected based on albumin level
 - Corrected total Ca (mg/dL) = measured total Ca (mg/dL) + [0.8 x (4 – albumin (gr/dL))]
- Corrected total Ca < 7.5 mg/dL
- **Ionized Calcium** < 4 mg/dL
- **Predisposing Conditions**
 - Head and neck surgery and/or radiation
 - Hypomagnesemia
 - Chronic kidney disease
 - Cytotoxic drugs
 - Alkalosis
 - Pancreatitis
 - Massive transfusion
 - Sepsis
 - Surgery

- **Differential Diagnosis**

- Seizure disorder
- Alcohol withdrawal

DIAGNOSTIC INTERVENTIONS

- **Labs**

- Total calcium level
- Ionized calcium level

- Serum albumin level
- Serum magnesium level
- Serum phosphorus level
- 25-OH and 1,25-OH vitamin D levels
- Serum PTH level
- Electrolyte panel and assess acid-base abnormalities
- **Monitoring**
 - ECG
 - Ionized calcium

THERAPEUTIC INTERVENTIONS

- **Initial therapy**
 - Medications
 - In severe hypocalcemia
 - 10-20 ml of 10% calcium gluconate IV (1-2 grams) or calcium chloride (if central IV access) over 10 minutes with ECG monitoring
 - Calcium chloride 1 gram IV push in cardiac arrest
 - In nonemergency situations, calcium gluconate is preferred
 - A central venous access is needed to infuse calcium chloride because it is more irritant to veins
 - Treat hypomagnesemia if present
 - Treat underlying cause
- **Consult**
 - Endocrinology
 - Nephrology

MANAGEMENT AFTER STABILIZATION

- **Follow up**

- Monitor serum total and ionized calcium level
- Monitor QT interval with serial ECGs
- Frequent neurology exam checks
- Monitor hemodynamics

- **Further treatment**

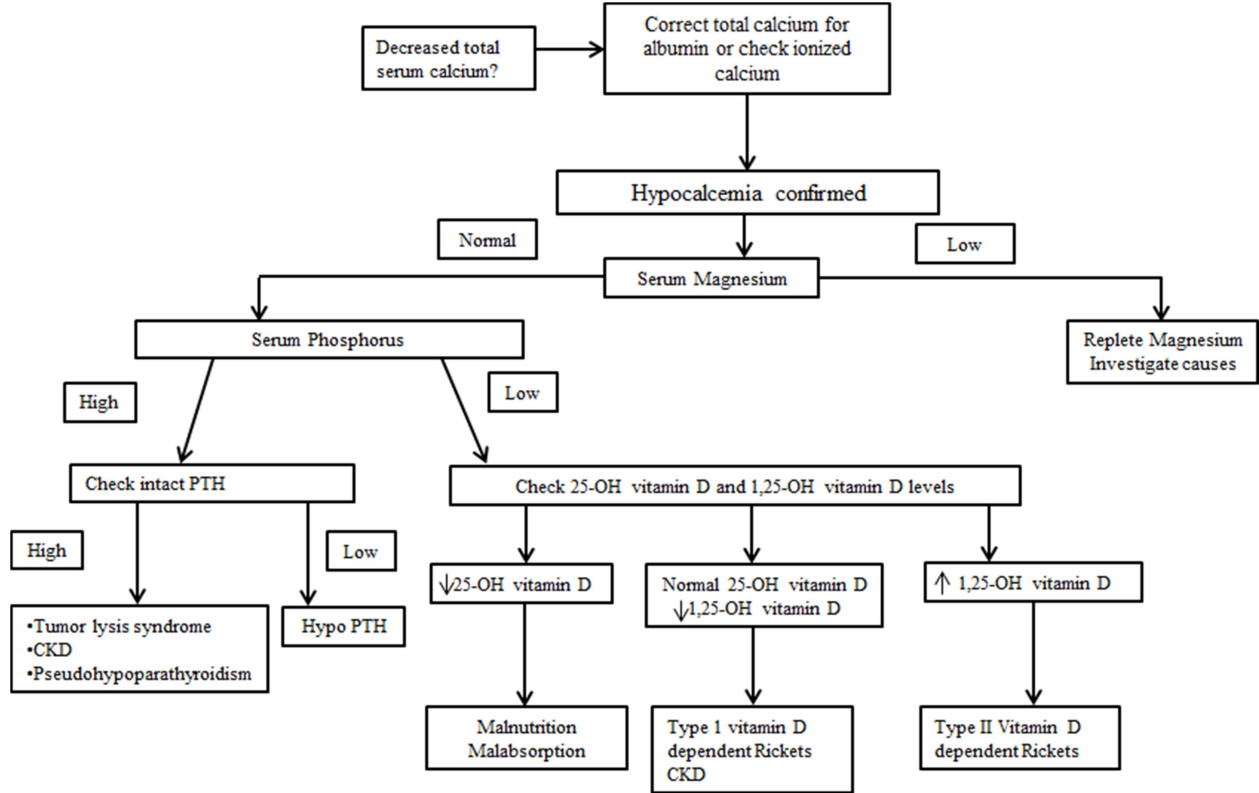
- Treat hypomagnesemia and investigate causes
- Replete with active form of Vitamin D
 - 1,25-dihydroxycholecalciferol in postoperative hypocalcemia or hypoparathyroidism
- Treat underlying alkalemia if present, as it exacerbates hypocalcemia
- Discontinue any medications that could decrease serum calcium level
- Oral calcium supplement is preferred in patients with mild hypocalcemia
 - Maintain serum calcium at lower level of normal to prevent hypercalciuria in those patients with hypoparathyroidism
 - May need to start salt restriction or thiazide if hypercalciuria develops

CAUTIONS

- **Complications**

- Watch for prolonged QT interval and arrhythmias
- Watch for focal or generalized seizures
- Calcium chloride extravasation can cause severe tissue injury/necrosis
- In hyperphosphatemia, watch for calcium x phosphorus product to prevent soft tissue calcification

ALGORITHM



REFERENCES & ACKNOWLEDGEMENT

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