

Management of post-operative hypocalcemia for thyroidectomy patients at RCHSD

*** At risk population: Total thyroidectomy or completion thyroidectomy (s/p prior lobectomy)**

Pre-Operative labs – To be drawn when thyroidectomy is first considered

- Vitamin D-25 OH
- CMP (in order to check calcium and alkaline phosphatase along with electrolytes)
- TSH, and Free T4
- Anti TPO-Ab and Anti-Thyroglobulin antibodies

Pre-Operative supplementation with Vitamin D3: 50,000 IU 7 days prior to Surgery or

Pre-Operative supplementation with Vitamin D3 +/- Calcium

- VitD-25 OH = 20-29 ng/ml: Start with 1000 IU of Vitamin D3 daily if normal weight
2000 IU of Vitamin D3 daily if obese
- VitD-25 OH <20 ng/ml: Start with 2000 IU of Vitamin D3 daily if normal weight
5000 IU of Vitamin D3 daily if obese
- VitD-25 OH <10 ng/ml: Start with 5000 IU of Vitamin D3 daily if normal weight
10,000 IU of Vitamin D3 daily if obese
Add celiac panel with next blood draw
- Consider calcium supplementation with Vitamin D3 if Vitamin D < 20 ng/ml or patient at high risk for postop hypocalcemia
 - Thyroidectomy with central neck dissection
 - Cases with prior parathyroid re-implantation
 - Cases in which parathyroid glands were removed or were not visualized well
 - Grave's disease

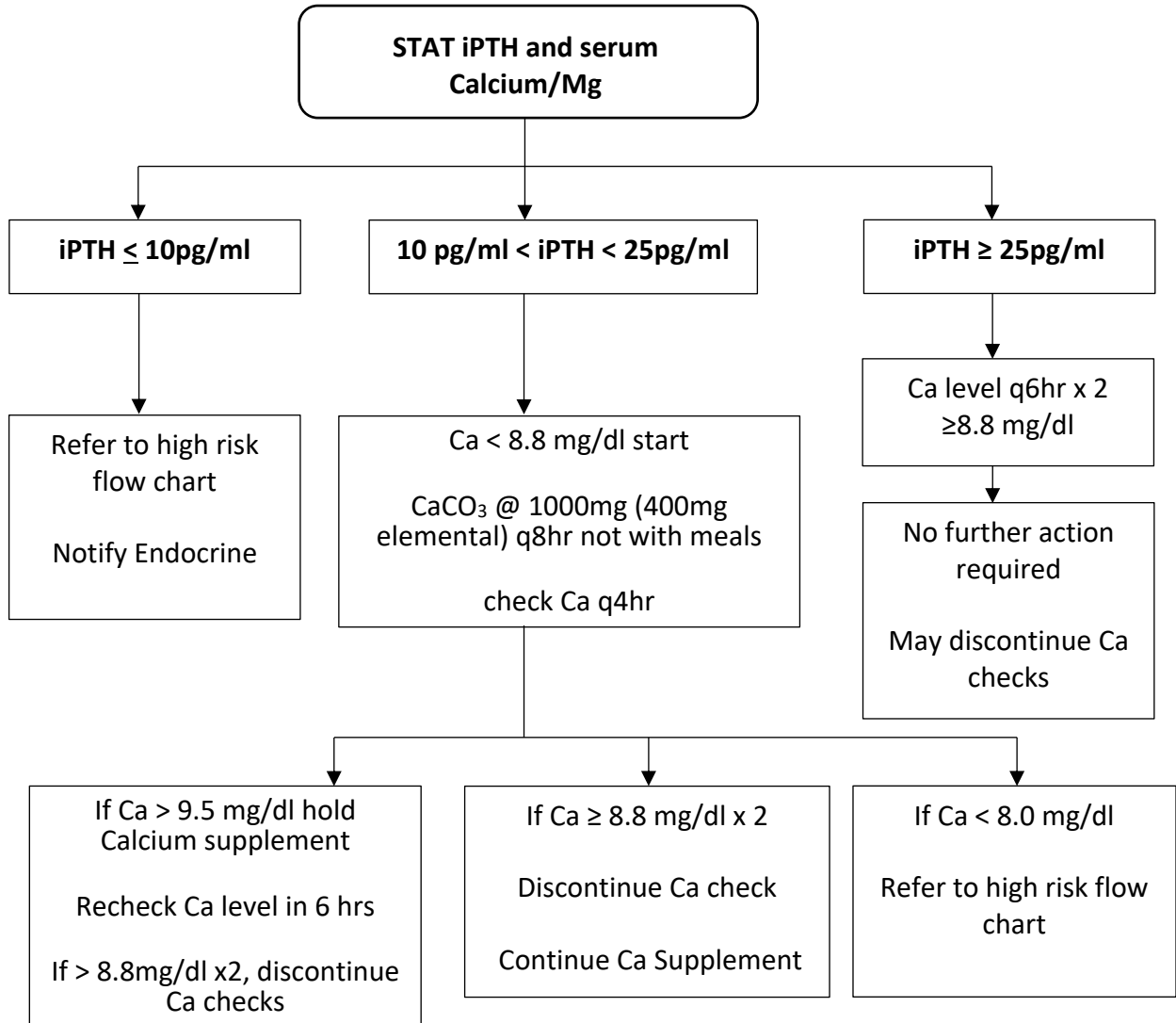
Post-Operative management – General measures

- All patients should be on telemetry overnight after thyroidectomy
- ENT physician should page Endocrine on call at the completion of the surgery in order to relay information as to the extent of the resection and the status of the parathyroid glands.
- Intact PTH (iPTH) and serum calcium and magnesium level should be drawn in the PACU to be run STAT.
- Endocrine on call should be notified if PACU iPTH level is < 10 pg/ml in low-risk cases, and if <25 pg/ml in high-risk, or calcium level is <8 mg/dL

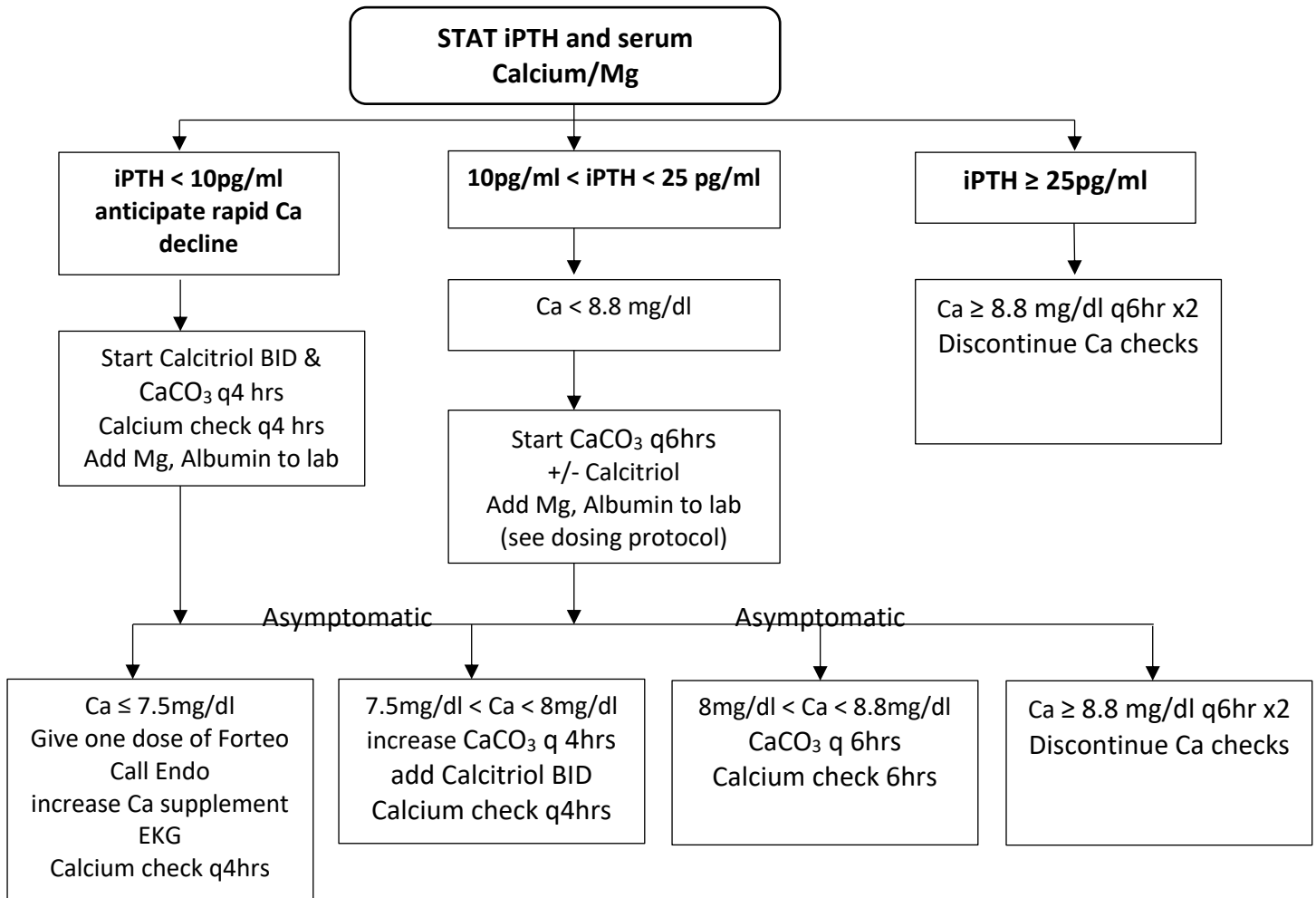
Risk Stratification for postop hypocalcemia

	Criteria
Low Risk patients	<ul style="list-style-type: none">• Completion thyroidectomy• Total thyroidectomy with non-malignant FNA preop• Total thyroidectomy without central neck dissection• Parathyroid glands visualized, left intact and well vascularized at the end of the procedure (noted in finding section of the operative report)
High Risk patients	<ul style="list-style-type: none">• Thyroidectomy with central neck dissection• Complicated or prolonged re-operative cases• Parathyroid re-implantation• Parathyroid glands were not identified and/or removed• Grave's disease• Chronic renal patients

I. Low-Risk patient flow chart

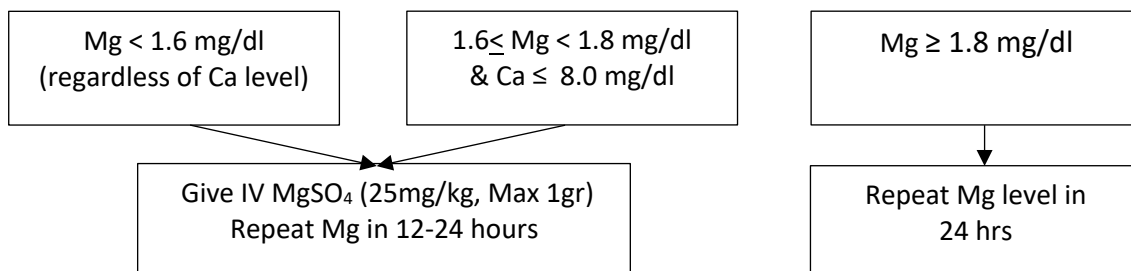


II. High-Risk patient flow chart



*** If symptomatic hypocalcemia or Ca ≤ 7mg/dl, see step III**

Mg replacement



III. Symptomatic Hypocalcemia or Calcium <7 mg/dl (In addition to the High-risk flowchart)

- Notify ENT and Endocrine on call and consider PICU admission
- Order SQ Forteo q12 hrs – first dose to be given STAT
- Obtain an EKG to evaluate QTc and cardiac rhythm
- Secure a central line or a good antecubital vein for administration of IV calcium
- Order IV calcium infusion given as Calcium (total) Gluconate 10% at 100-200 mg/kg over 5-10 minutes for tetany, stridor or wheezing
- Transfer patient to the PICU if Calcium <7mg/dl or QTc >470 msec, for closer cardiac monitoring
- Make sure Calcitriol based on High risk patient flowchart has been ordered

Doses for medications used in the protocol

Calcitriol PO: If < 30 kg 0.25 mcg BID
 If 30-50 kg 0.5 mcg BID
 If > 50 kg 1 mcg BID

If unable to take oral calcitriol use IV calcijex at the above dosages, but once daily

Calcium Carbonate (CaCO₃): If<30kg 500mg Q 4hrs or Q6 hrs (200mg elemental)
(Total calcium) If 30-50 kg 750 mg Q 4 hrs or Q6 hrs (300mg elemental)
 If > 50 kg 1000 mg Q 4 hrs or Q6 hrs (400mg elemental)

If unable to take PO use IV calcium (total) gluconate 100 mg/kg over 1 hr infusion q 6hrs

Forteo SQ: If < 30 kg 10 mcg
 If 30-50 kg 15 mcg
 If > 50 kg 20 mcg

Magnesium Sulfate IV (MgSO₄): 25 mg/kg (Max 1 gram) over 4 hrs

Goals for Discharge

- Off IV calcium for at least 12 hrs prior to discharge
- Last dose of Forteo at least 12 hrs prior to discharge, and no longer requiring Forteo
- Stable calcium levels >7.8 mg/dl (at least in 2 consecutive blood draws) over a 12 hr period
- If the patient is discharged home on supplements (calcitriol and/or PO calcium or magnesium)
repeat calcium and magnesium levels 2-3 days after discharge
- If the patient is high risk and is discharged home without calcium supplementation repeat calcium levels with thyroid function tests in 2 weeks
- Patients and caregivers must receive adequate education in recognizing signs and symptoms of hypocalcemia prior to discharge, and have the on call doctor's number

Clinical manifestations of hypocalcemia – Mild to Moderate Hypocalcemia

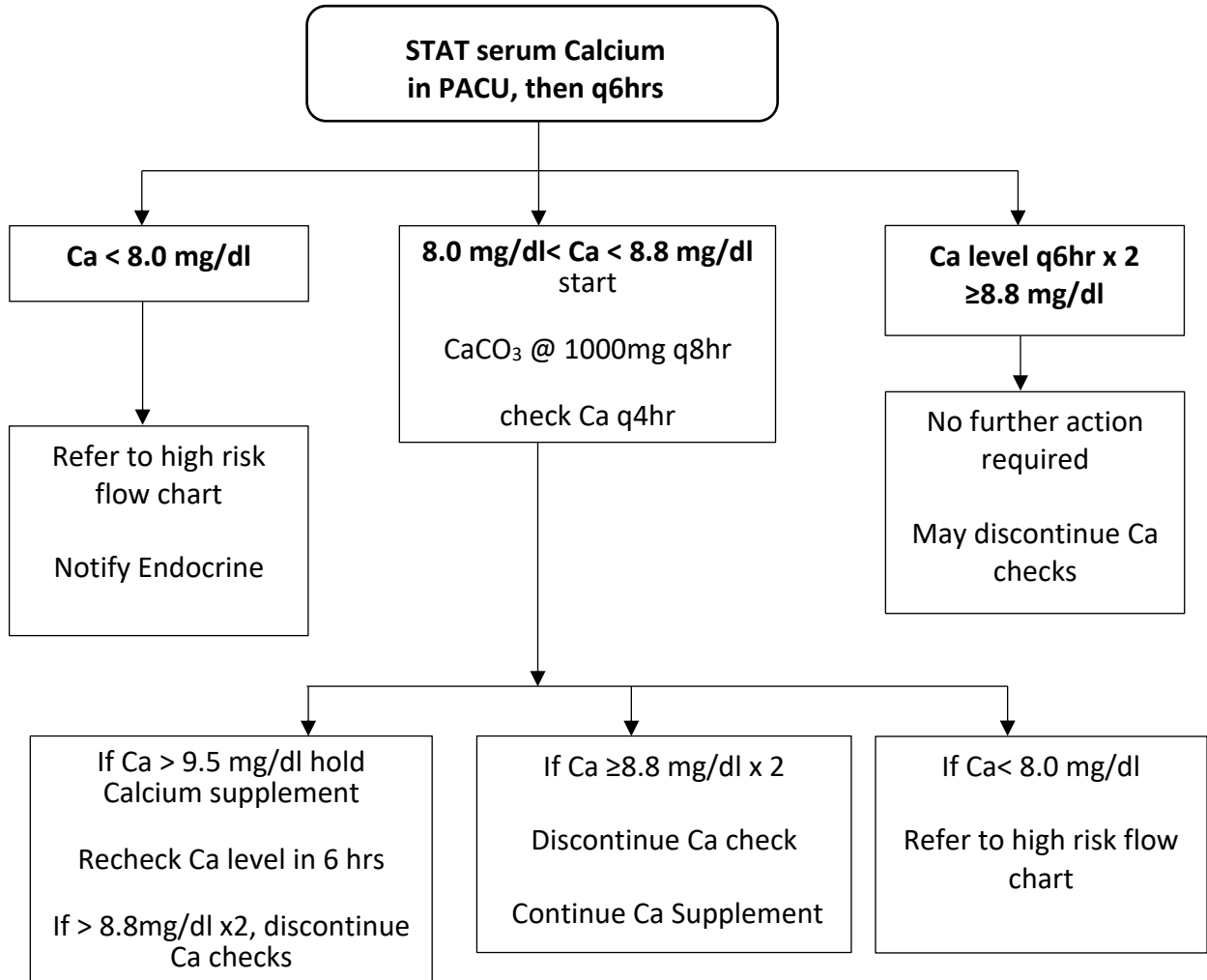
- Paresthesia or numbness of the fingertips and perioral area
- Spontaneous muscle cramps
- Muscle stiffness and myalgia
- Chvostek's sign: Twitching of the ipsilateral facial musculature (perioral, nasal, and eye muscles) by tapping over cranial nerve VII anterior to the TMJ.
It is neither sensitive nor specific for hypocalcemia: it is absent in 30% of patients with hypocalcemia and is present in roughly 10-15% of normocalcemic patients
- Trousseau's sign of latent tetany: Carpopedal spasm induced by inflation of the blood pressure cuff around the arm.
More sensitive and specific than Chvostek's sign: present in 94% of hypocalcemic patients and only observed in 1% of normocalcemic patients.
- Prolongation of QTc in the EKG
- Asthma not controlled with routine bronchodilators, or wheezing in patients without previous history of asthma

Clinical manifestations of hypocalcemia – Severe Hypocalcemia

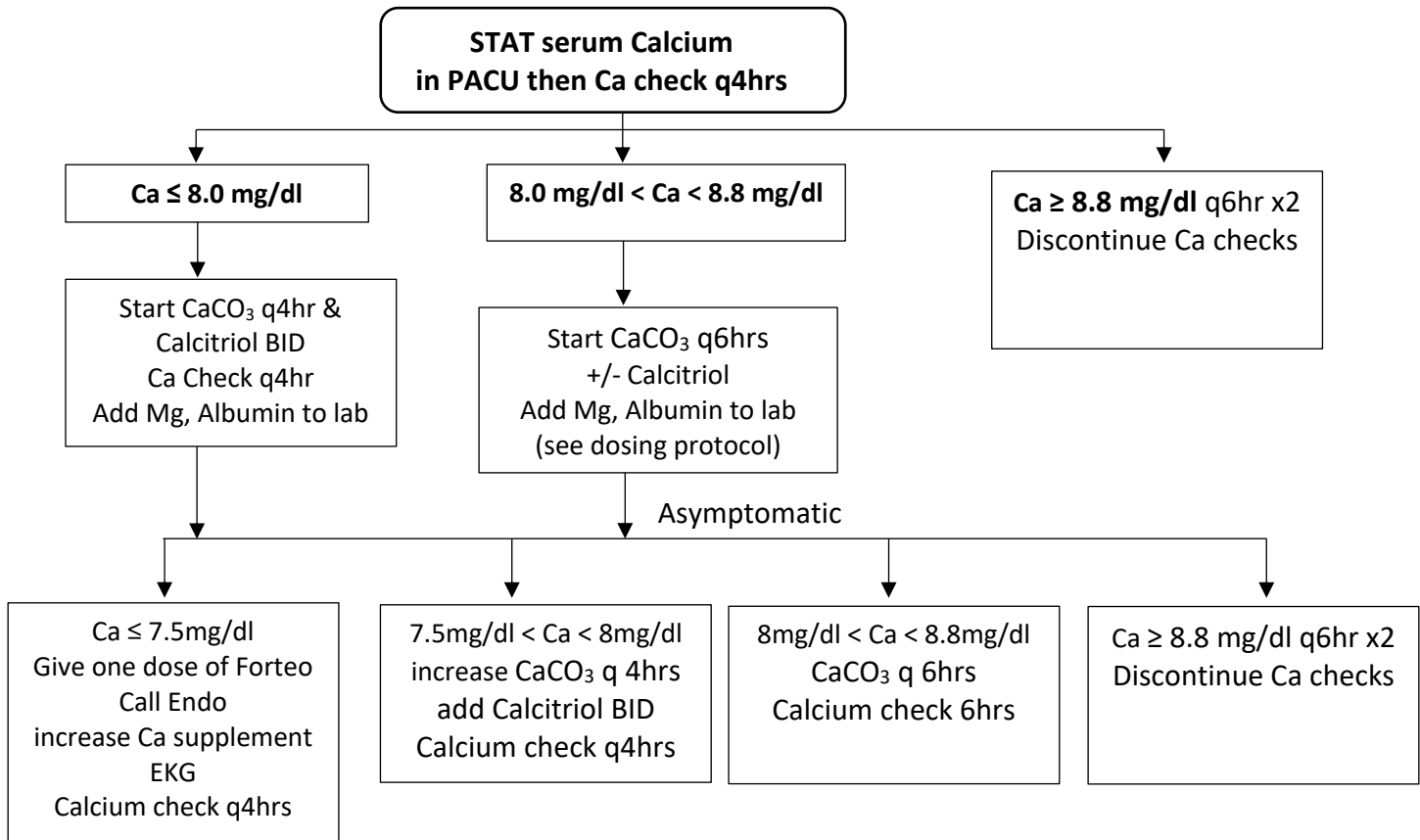
- Stridor and/or dyspnea induced by prolonged contraction of the respiratory and laryngeal muscles
- Anxiety or agitation
- Mental status changes
- Seizures
- Prolongation of QTc in the EKG
- Arrhythmia on EKG

Modified flowchart for when iPTH is not available in house

I. Low-Risk patient flow chart



II. High-Risk patient flow chart



*** If symptomatic hypocalcemia or Ca ≤ 7mg/dl, see step III**

Mg replacement

