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Symptomatic Overt Hypothyroidism Post Induction

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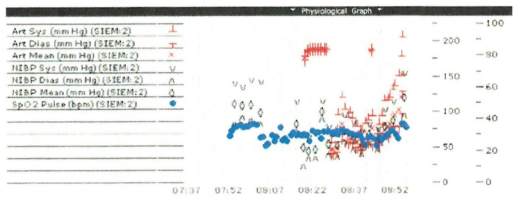
BACKGROUND

- 64 year old male ASA 3 with OSA, HTN, GERD, OA, chronic pain, hypothyroidism, depression, morbid obesity, CKD undergoing L4-L5 posterior lumbar interbody fusion.
- Surgical history: L5-S1 PLIF '02, Right TKA '13, Left TKA '13 w/o anesthesia complications.
- Stated adherence with the following medications: Celebrex 200mg BID, Elavil 70 mg qhs, Synthroid 75mcg qd, Nexium 40mg BID, Tramadol 50mg q6hrs, Percocet 5mg/325mg q8hrs
- NKDA, Social History: Lives at home with wife
- Exercise Tolerance – 4 METS, able to walk 2 miles a day several months ago w/o SOB or CP before being limited by back pain
- Pertinent Negative ROS – Denies CP, DOE, SOB, edema, recent weight gain/weight loss, fatigue, weakness during pre operative evaluation
- Vitals signs WNL , Airway/neck : Full Beard, MP II, TM 3 FB Ht: 72", Wt: 149kg
  Heart: RRR no m/r/g Lungs: CTA CBC, Chem 7, Coags all unremarkable
- **Anesthetic Plan**: General Endotracheal Anesthesia in the prone position
- PIV x 2, SASAM, BIS, induction w/ 100mg Lidocaine, 100mg Propofol, 50mg Ketamine, 150mcg Fentanyl and 140mg Succinylcholine
- Airway w/ Mac 4 and ETT 8.0 Maintenance with Remifentanil and Desflurane

INTRAOPERATIVE COURSE

- Patient underwent uneventful induction and intubation. Shortly after intubation, profound hypotension with MAP in 40's.
- Blood pressure unresponsive to IVF (1500cc Plasmalyte and 250cc 5% albumin)
- Unresponsive to vasopressors including: 10-20mcg boluses epi, total 100mcg and 1U boluses vasopressin, 5U total with multiple doses of phenylephrine 100mcg and ephedrine 5mg
- Radial arterial line inserted for hemodynamic monitoring
- Once induction medications had begun wearing off, per surgeon request, attempted 5 minute trial of desflurane ET 1.5% and remifentanil 0.05mcg/kg/min
- Unable to maintain MAPs >50 mmhg, so decision made to cancel case and wake up patient
- Pt taken to the PACU and was alert and following commands with SBPs were 130s-160s
- IM consult initiated to evaluate and work up patient



POSTOPERATIVE COURSE

- During IM consult evaluation, medical history same as pre-op evaluation except for history of medication nonadherence
- Contradiction between Pre-Admission Unit and Internal Medicine medication reconcilliation.
- Patient admitted to not taking his Synthroid 75mcg daily for the past month due to "Surgeon told me not to."
- ROS (+): depression, dry skin, constipation, weight gain, weakness (chronic pain), +edema (chronic)
- TSH 55.05 mcIU/mL, Thyroxine Free Pasma <0.1 ng/dL
- Upon confrontation with TFT values, patient reluctantly reports "missing a lot of doses" and "didn't know Synthroid was important"
- Endocrinology: Pt with overthypothyroidism and should resume outpatient Synthroid 75 mcg daily and follow-up in 4 weeks with PCM to uptitrate as he was severely underdosed.

	TSH result	FT4
Euthyroid	0.4-5.0 mU/L	0.6-1.8 ng/dL
Euthyroid Sick Syndrome	Normal	Low
Subclinical Hypothyroidism	High 5.0-10.0 mU/L	Low Normal- Normal
Overt Primary Hypothyroidism	Higher >20 mU/L	Low
Central Hypothyroidism (rare)	Low	Low

DISCUSSION

- Overt Hypothyroidism: TSH >20 mU/L, low T4, low T3 AND cardiovascular/peripheral tissue related symptoms
  - Elective procedures are contraindicated and should be deferred until the patient has been rendered euthyroid
- HEENT: Swollen oral cavity, edematous vocal cords or goiter enlargement predisposes to airway compromise and difficult intubation
- GI: Adynamic ileus, megacolon, decreased gastric emptying → increased risk of aspiration
- RESP: Decrease in maximal breathing capacity, diminished $DLCO_2$ decreased response both hypoxic and hypercapnic ventilatory drive
- HEME: Anemia (25%-50% of pts) and dysfunction of platelets and coagulations factors (esp factor VIII) requires close monitoring intraoperatively

DISCUSSION

- CV: The most important adverse effects of hypothyroidism *that may predict a bad surgical outcome* are those affecting cardiovascular function.
  - Hypothyroidism→ elevated cholesterol levels and abnormal coagulation parameters that elevates risk for cardiovascular events in the perioperative period
  - CV impairment contributes to increased sensitivity of anesthetic agents due to decreased cardiac contractility, cardiac output, blood volume, O2 consumption and increased SVR from chronic hypothermia
- Pt's with known ischemic heart disease or presenting for coronary revascularization.
  - Rapid thyroid replacement has the risk of increasing myocardial oxygen demand, and causing ischemia. However, delay in therapy may place the patient at risk of developing myxedema coma.
  - The current consensus is that if a patient needs urgent cardiac revascularization, they should undergo the procedure before replacement
  - Many endocrinologists recommend starting at least low dose T4
- ENDO:
  - BMR is only 55-60% of normal → inability to increase core temperature
  - Chronically decreased core temperatures produces chronic peripheral vasoconstriction → decrease in up to 1L of blood volume
  - Any peripheral vasodilation or further decrease in circulating volume may precipitate cardiovascular collapse
  - Pre-warming OR, Baer Hugger on prior to patient arrival (similar to pediatric patients)
  - Stress response is impaired in overt hypothyroidism, consider stress dose steroids 100mg hydrocortisone followed by 50mg q8hr
- RENAL & HEPATIC:
- decreased hepatic metabolism and decreased renal excretion of drugs confers increased sensitivity to anesthetic agents

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