What Endocrine surgeons need to know about Endocrinology!

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Hyperthyroidism:

- Pre-operative preparation
  - Emergent
    - Corticosteroids
    - Potassium Iodide (KI)
    - Iopanoic acid [Contrast agent- not available in the USA]
  - Non-Emergent
    - Anti-thyroid therapy to 'cool off' the thyrotoxic state
      - MMI or PTU
    - Beta-blocker therapy
      - Atenolol or Propranolol or Metoprolol
    - Potassium Iodide (KI) to reduce vascularity of the gland.
      - 150 to 300 mg of inorganic iodine per day [1 to 2 drops of saturated iodine t.d. or 7-8 drops Lugol’s iodine t.d.]
      - "Iodine escape"
Hypothyroidism

- Risk of surgery in Hypothyroid patients
  - Clinically/biochemically euthyroid on replacement- no additional risk
    - Post-operatively will not require replacement unless NPO for >5 days.
    - If NPO for more than 5 days use IV levothyroxine q 24hrs at 50-80% of daily oral dose.
  - Clinically/biochemically hypothyroid or myxedema
    - Emergent surgery- surgery takes precedence followed by PO or IV levothyroxine replacement.
    - Non-Emergent surgery- ideally replace levothyroxine, normalize thyroid function before surgery.

- What is the peri-operative risk of hypothyroidism
  - Hypothyroid patients have a higher incidence of peri- & post-operative ileus, hyponatremia, hypotension, hypercapnia
  - More sensitive to opiate medication and altered mental status, decreased fever response to sepsis

Hypothyroidism - treatment

- Pre-morbid adequate replacement [normal TSH]
  - If NPO for 3-4 days – No replacement is required. Resume home dose when appropriate
  - If NPO for > 5 days – start on IV levothyroxine at 50-80% of daily PO dose

- Pre-morbid Hypothyroid or newly diagnosed Hypothyroidism/Myxedema
  - Start with 50 mcg of IV levothyroxine q 24hrs
  - In high risk patients [Elderly or known CAD]- use 25mcg IV levothyroxine q 24hrs
Thyroid Cancer

- Pre-operative
  - Lateral Neck imaging for lymph node

- Post-operative adjuvant therapy
  - Radio-iodine ablation
    - Withdrawal of T4 for 4-8 weeks v. T3 for 4 weeks post-op, withdraw for 10 days v. rhTSH stimulated

Risk of MTC development in MEN-2 depends on the mutated RET codon

Timing of Thyroidectomy

<table>
<thead>
<tr>
<th>Risk</th>
<th>RET codon mutation</th>
<th>Recommended age to begin annual screening for MTC</th>
<th>Recommended timing of prophylactic thyroidectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>918, 634, 653</td>
<td>Not applicable</td>
<td>In the first months to year of life</td>
</tr>
<tr>
<td>High</td>
<td>653, 609, 611, 618, 620, 630, 686, 689, 769, 780, 804, 891, 912</td>
<td>Three years</td>
<td>At or before age five years</td>
</tr>
<tr>
<td>Moderate</td>
<td>804</td>
<td>Five years</td>
<td>Childhood or young adulthood</td>
</tr>
</tbody>
</table>

Risk of MTC development in MEN2 depends on mutated RET codon.

MEN2: multiple endocrine neoplasia type 2; MTC: medullary thyroid cancer.

* Annual physical examination, neck ultrasound, and measurement of serum calcitonin.

† Patients with MEN2 and a diagnosis of MTC (regardless of age) must have pheochromocytoma excluded prior to thyroidectomy.

Hyperparathyroidism

- Pre-operative
  - Localization of lesion - adenoma v. hyperplasia
    - ‘Locate’ the surgeon

- Operative
  - Intra-operative PTH monitoring - 50% reduction in PTH level
  - Intra-operative Indo-cyanine green fluorescence

- Post-operative
  - “Hungry bone syndrome”
    - Treat with PO Calcium carbonate and Calcitriol
    - IV Calcium carbonate infusion 50mg/hr [Use CaCO3 solution concentration 50mg/mL]
    - Correct Magnesium deficiency
    - Correction of Phosphate deficiency can be hazardous unless patient has concomitant CHF or muscle paralysis

Management of adults with hypocalcaemia after thyroid surgery

<table>
<thead>
<tr>
<th>Postoperative day</th>
<th>Serum tests</th>
<th>Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right of surgery</td>
<td>Calcium level</td>
<td>Calcium replacement</td>
</tr>
<tr>
<td>Day 1</td>
<td>Calcium and phosphate level</td>
<td>Calcium replacement</td>
</tr>
<tr>
<td>Days 2 to 4</td>
<td>Calcium and phosphate level</td>
<td>Calcium replacement</td>
</tr>
</tbody>
</table>

To convert serum calcium to mmol/L, divide by 4. To convert serum phosphate to mmol/L, divide by 3.1.
**Hypo-parathyroidism [chronic]**

- Calcium Carbonate [1-2 gms elemental calcium] TID or Calcium Citrate TID (in Elderly, on PPI or Achlorohydria) along with

- Calcitriol 0.25mcg PO TID [to be given along with Ca]

- Monitor serum and 24hr urine calcium [Avoid hypercalcuria >250mg]

- When 24hr Ur Calcium is >250 mg use thiazides to reduce Ur Ca
  - HCTZ 12.5 - 50 mg/day +/- dietary Sodium restriction

- Maintain Serum Calcium level in the lower end of the normal range.

**Hypo-parathyroidism [chronic]**

- rhPTH 1-84 (Natpara)
  - To be used in conjunction with Calcium and Calcitriol
  - Starting dose 50mcg SQ daily. Reduce Calcitriol dose by 50% on starting Natpara. Maintain Calcium dose as is, until Ur calcium excretion is >300mg