Objectives

- Thyroid Surgery
  - Office evaluation
  - Surgical techniques
  - Use of frozen section
  - Post-operative expectations

- Parathyroid Surgery
  - Patient selection/indications for surgery
  - Pre-operative localization studies
  - Surgical approach
Patient K.M.  
85 year-old female

- Hx severe CAD, CHF, s/p recent CABG/MVR
- Complicated post-op course, s/p tracheostomy
- PE, anticoagulated on Coumadin
- 7 cm left thyroid nodule seen on chest CT

Patient N.B.  
26 year-old female

- Right thyroid nodule on exam
- U/S noted a solitary 3.5 x 3.2 x 2.8 cm nodule
- Otherwise healthy
- Concerned about lifelong dependence on thyroid hormone
Patient with thyroid nodule

- TSH Ultrasound
  - TSH normal or elevated (hypothyroid)
  - TSH suppressed (hyperthyroid)

- Ultrasound-guided FNA
- Radioisotope scan

? Surgery

Thyroid - Office Evaluation

- Referring physician
- Review ultrasound and biopsy reports
- Perform office ultrasound
- Discuss recommended treatment options
- Describe surgical approach
- Review post-operative course

who performed the U/S
where was the bx read
molecular testing

importance of office-based U/S

extent of surgery

complications

need for post-operative calcium
voice changes
pain control
time off work/activity level
60 year-old male
Office Ultrasound

- Endocrinologist, noted left thyroid nodule
- Presented to his PCP - thyroid U/S and TFT’s
- Thyroid U/S performed – dominant left sided nodule
- Requested biopsy of the left sided nodule

FINDINGS:

ECHOGENICITY: Normal and uniform echogenicity.

RIGHT THYROID LOBE: 51 x 24 x 21 mm. 10 mm midpole nodule. 9 mm mid to lower pole nodule.

LEFT THYROID LOBE: 46 x 16 x 22 mm. 34 x 15 x 17 mm mid to lower pole nodule.

ISTHMUS: Not thickened.

LYMPHADENOPATHY: None identified.
Total versus Hemi for Indeterminate Nodules?

- Contralateral nodules
- Thyroid hormone replacement
- Patient age
- Patient risk factors
- Patient reliability
- Patient preference

Frozen Section for Indeterminate Nodules

To diagnose follicular thyroid cancer, need capsular/vascular invasion

Why not to do a frozen:
- 87% defer to permanents
- $500, 30 minutes of OR time
- Charge per informative FS – $12,470

Note utility of LN biopsy and frozen section

Chen, Annals of Surgery, 1995
Udelsman, Annals of Surgery, 2001
Complications - RLN

- 1-4% of thyroidectomy procedures
- Breathy voice/weak cough/aspiration
- 3 types of injuries
  - Stretch (nodule traction)
  - Stun (bovie, nerve dissection)
  - Transection/Sacrifice (inadvertent, cancer)
- Use of the nerve monitor
- Importance of larynx/voice specialist

![Image of surgical procedure]
Complications - Parathyroid

- Temporary hypocalcemia common
- Patients at risk for hypocalcemia/hypoparathyroidism
- Flexibility with supplements and dosing
- Importance of patient education
  - Timing of calcium intake
  - Keeping calcium on hand
  - Avoiding calcium with concerns about thyroxine absorption
  - “11 am hypocalcemic crisis”

Post-operative Course

- Overnight stay
  - Same day discharge criteria
- No bed rest required
- Limited driving/exercise/heavy lifting
- Most desk jobs back at work < 1 week
- Manual labor up to 2 weeks
- 6 week post-operative TSH
- Use of anti-inflammatory medications
Hyperparathyroidism

- Elevated calcium and PTH levels
- Low phosphorous level
- 24 hour urine calcium level (r/o FHH)
- Vitamin D levels

Patients with normal/borderline calcium and PTH levels

Normocalcemic/NormoPTH Hyperparathyroidism

- 62 yo female
- Ca 10.1 – 10.6, ionized 1.33
- PTH 31-43
- Most recent Ca 10.6 and PTH 43 (10/2014)
- Bone density femoral neck -2.7, spine -3.1
- U/S: Heterogeneous thyroid c/w Hashimoto’s. No obvious parathyroid adenoma. Small hypoechoic lesion right lower pole mildly suspicious for an enlarged parathyroid gland.
- Sestamibi scan negative

Does this patient have HPT? Is surgery likely to have a positive impact? What is the risk/benefit ratio for neck exploration?
Indications for Parathyroid Surgery
Updated Guidelines 2014

Are the new recommendations more supportive of surgical intervention in HPT?

Are neurocognitive symptoms addressed and considered an indication for surgery in HPT?

Parathyroid Imaging
Available Tests

First line studies
- Sestamibi scan
- Neck U/S
- 4D-CT scan

Other localization tests
- MRI
- PET scan

Invasive, second line studies (reserved for specific cases)
- Venous catheterization
- Arteriogram
- U/S guided FNA
Left upper parathyroid
4D CT scan

- CT scan of the neck and upper mediastinum
- Multiphasic
  - 1. Precontrast axial images
  - 2. During infusion
  - 3. 30 second delay
- 3-D multi-projection images
- Anatomic lesions and perfusion characteristics are evaluated
Pre-operative Localization

Neck U/S  
(MGH radiology, outside, endocrine, surgeon)  
Sestamibi scan  
(MGH v. outside)  
\[ \text{surgeon not happy 😊} \]  
4D-CT scan  
\[ \text{😊} \]
Pre-operative Localization

Available studies reviewed and office U/S performed

- Convincing lesion on combination U/S-MIBI
  OR
- Office U/S alone

  Surgery

No convincing lesion

  4D-CT scan

  Re-evaluate indication for surgery

Case # 1
H.Q. 74 yo female

- Calcium – 13, PTH - 114
- U/S – large MNG, no parathyroid adenoma
- Sestamibi scan – negative
- 4D-CT scan
  - Likely parathyroid adenoma in the superior mediastinum below the clavicle
  - 10 x 6 x 5 mm
Parathyroidectomy
Focused Approach

Pre-operative localization

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<th>OR...</th>
<th>Bilateral 4 gland exploration</th>
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<td>Focused exploration</td>
<td>Larger incision</td>
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<td>Longer operative times</td>
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<td>Overnight stay</td>
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Intraoperative PTH measurement

Termination of procedure if abnormal gland found and adequate decrease in PTH level

Surgical Approach

- Assemble all relevant pre-operative information
  - Patient age
  - Ca and PTH values
  - Pre-operative imaging
- Approach surgery with an open perspective
- Utilize intra-operative tools
  - Intra-operative PTH
  - Frozen section
**Patient case**

- 74F diagnosed with pHPT in 2011
  - Fatigue, abdominal pain, muscle weakness
  - PTH 170, Ca 10.5, Vit D 29
  - Sestamibi scan -> ? R inferior parathyroid adenoma
- 5/12 Neck exploration at OSH

**Patient case**

- 74F diagnosed with pHPT in 2011
  - Fatigue, abdominal pain, muscle weakness
  - PTH 170, Ca 10.5, Vit D 29
  - Sestamibi scan -> ? R inferior parathyroid adenoma
- 5/12 Neck exploration -> Normal R inferior gland, superior not identified, L glands normal. No parathyroid glands removed
- 7/15 labs: PTH 145, Ca 11.2, Vit D 26.2
  - Repeat sestamibi -> adenoma in R Lower pole
- 10/15 Referred to MGH
What to consider

- Cure rates for initial parathyroidectomy:
  - High volume center: >95%
  - Low volume center: 85-90%
- Most common causes of failure:
  - Missed Adenoma
  - Hyperplasia/MEN 1
  - Hyperplasia/Non-familial
  - Carcinoma
Take Home Points

• Every patient with HPT should be considered for surgery
• Shift in localization studies
• Intra-operative PTH is useful!
• Individualized approach to each surgery

Your first shot is your best shot……..