

## OFFICE-BASED MANAGEMENT OF THYROID DISEASE



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MEDICINE | Head & Neck Surgery



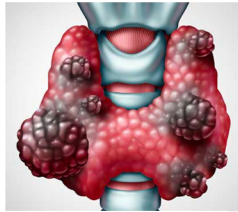
## Outline

- Epidemiology, history, exam
- Ultrasound and FNA
- Bethesda classification
- Pre-operative considerations
- Surgical decision making and office-based procedures



## How common are thyroid nodules?

- 50% of adults >50
- >90% are detected incidentally
- 10% or less are malignant



## Incidental detection

- 40% of neck ultrasounds
- 25% of CT scans
- 16% of MRIs
- 2% of PET CTs



## Take a good history

- Prior thyroid related concerns
- Previous biopsies
- Previous neck surgery
- Previous head/neck/chest radiation
- Family history of thyroid cancer
- Familial syndromic patterns or endocrine disorders (Cowden, Gardner/FAP, MEN II)



## Ask about relevant symptoms

- Dysphagia
- Dysphonia
- Dyspnea (at rest, positional, or nocturnal)
- Pain (more likely with thyroiditis and MTC)
- Hypo or hyperthyroid symptoms



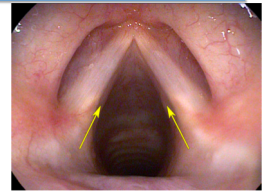
### Exam tips

- Stand behind the patient
- Position hands on either side of trachea just above sternal notch
- Ask the patient to swallow or drink water
- Palpate for lymph nodes



### Vocal Cord Function

- Voice complaints
- Dysphagia/aspiration
- Neck or chest surgery
- Neck or chest radiation
- Stroke
- Systemic/neurodegenerative disease



### Laryngeal Ultrasound



### ULTRASOUND & FNA



### Ultrasound

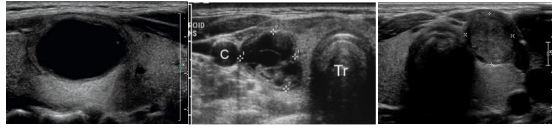
- Best imaging modality for thyroid nodules and cancer
- Must include the thyroid AND the cervical lymph nodes
- Determines whether biopsy is warranted



### When to biopsy

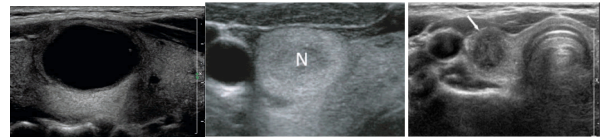


### Composition



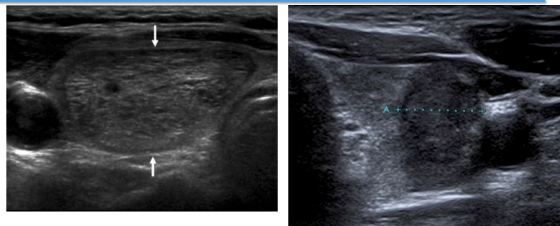
Cystic                      Mixed                      Solid  
 Less suspicious → More suspicious

### Echogenicity



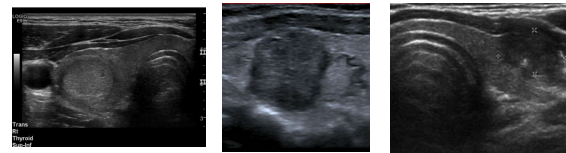
Anechoic                      Hyperechoic                      Hypoechoic  
 Less suspicious → More suspicious

### Shape



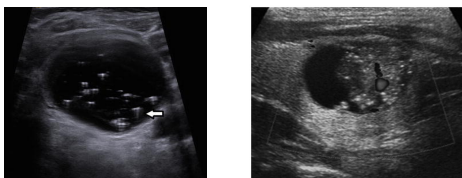
Wider than tall                      Taller than wide  
 Less suspicious → More suspicious

### Margins



Smooth                      Lobulated/irregular                      Extra-thyroidal extension  
 Less suspicious → More suspicious

### Echogenic foci



Comet tails                      Microcalcifications  
 Less suspicious → More suspicious

### Ultrasound characteristics of malignant nodules

- Solid
- Hypoechoic
- Taller than wide
- Irregular/lobulated margins
- Microcalcifications

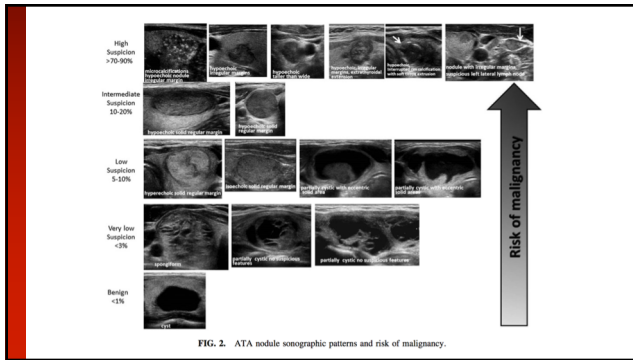
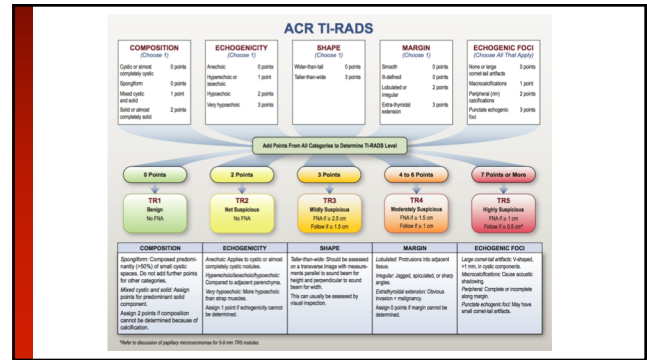


FIG. 2. ATA nodule sonographic patterns and risk of malignancy.



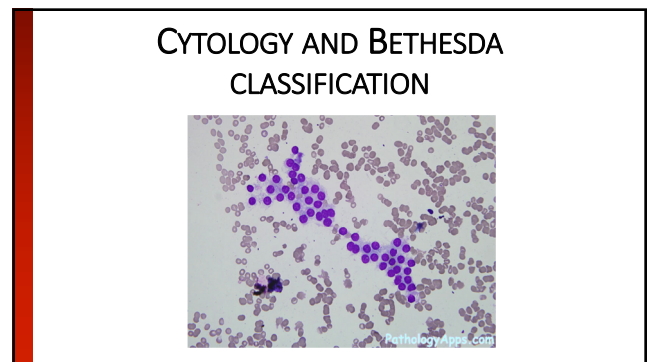
Should I perform or order an FNA?

High suspicion  
FNA if  $\geq 1$ cm

Moderate/intermediate suspicion  
FNA if  $\geq 1$ cm (ATA) or 1.5cm (ACR)

Mild/low suspicion  
FNA if  $\geq 1.5$ cm (ATA) or 2.5cm (ACR)

Not suspicious  
No FNA required (can consider for nodules >2cm according to ATA)



Bethesda Classification of Thyroid Cytology

**Diagnostic category**

- I. Nondiagnostic
- II. Benign
- III. AUS/FLUS
- IV. Suspicious for follicular neoplasm
- V. Suspicious for malignancy
- VI. Malignant

AUS: Atypia of undetermined significance;  
FLUS: Follicular lesion of undetermined significance

Bethesda I: Non-diagnostic

- Repeat the FNA
  - Ultrasound guidance if not done the first time
- If still non-diagnostic:
  - Observe if sonographically low risk
  - If sonographically high risk, consider excision (diagnostic lobectomy)

### Bethesda II: Benign

- 0-3% risk of malignancy
- Can be followed with periodic US surveillance vs. surgery if symptomatic



### Bethesda III/IV: Indeterminate nodules (aka the grey area)

- Atypia of undetermined significance (**AUS**) or Follicular lesion of undetermined significance (**FLUS**)
  - 6-18% risk of malignancy
- Follicular neoplasm (**FN**) or suspicious for follicular neoplasm (**SFN**)
  - 10-40% risk of malignancy
  - medullary thyroid carcinoma is in the ddx!
- \*Can consider molecular testing

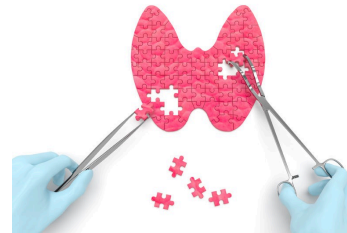


### Bethesda V/VI: Suspicious for/Malignant

- Bethesda V (suspicious): 40-65% risk of malignancy
  - Should be treated as malignant
- Bethesda VI (malignant): 97-99% malignant



### PRE-OPERATIVE CONSIDERATIONS



### Pre-op Testing: Thyroid Function and Autoimmunity

- TSH, T3, T4
- Graves'/Hashimoto's thyroiditis
  - Thyroperoxidase Antibody (TPO Ab)
  - Thyroid Stimulating Immunoglobulin (TSI)
- Thyroglobulin (Tg) and Thyroglobulin antibody (TgAb)
  - Impacts surveillance
- Consider Ca, PTH, and Vit D



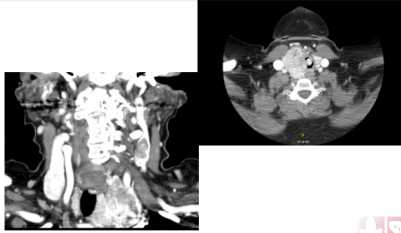
### Locoregional metastatic disease

- Importance of complete ultrasound to include central and lateral nodal compartments
  - "Lymph node mapping"
- FNA of suspicious cervical nodes
  - Send with Tg washout



## Invasive/extensive disease

- Aerodigestive tract
- Major vessels
- Bony invasion
- Substernal/mediastinal
- Retropharyngeal



- All indications for cross sectional imaging!



## A quick note about contrast-enhanced imaging

- CT with IV contrast is most useful for differentiating between tumor and normal structures
  - Iodine is cleared ~8 weeks and does not typically delay RAI
  - Can test via urinary iodine levels
- MRI can be considered as an alternative
  - Gadolinium does not interfere with RAI



## SURGICAL DECISION MAKING AND OFFICE BASED PROCEDURES



“Adequate surgery is the most important treatment variable influencing prognosis.”

-2015 ATA Thyroid Nodule/DTC Guidelines



## Who is the ideal candidate for a lobectomy?

- Tumor <4cm AND and no evidence of:
  - Extra-thyroidal extension
  - Neck lymph node metastases
  - Distant metastases
- Normal contralateral lobe
- No underlying thyroiditis

\*Primary benefit is potential avoidance of hormone replacement (~85%) and decreased risk of nerve/parathyroid complications



## Considerations for total thyroidectomy

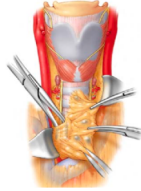
- T3 or T4 primary
- CN1
- Contralateral nodules
- Auto-immune thyroid disease
- History of H&N radiation
- Familial thyroid cancer
- Histologic variants (tall cell, columnar, diffuse sclerosing, hobnail)
- Extra-thyroidal extension
- Mutational status\*
- Patient preference

\*Primary benefit is to facilitate RAI and surveillance



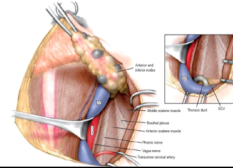
### Central neck dissection (level VI)

- Prophylactic dissection for early stage tumors without clinically positive nodes **not** recommended
- Indicated for clinically involved nodes
- Considered for patients with T3/4 tumors and N1b (lateral) disease



### Lateral neck dissection

- Indicated for biopsy-proven metastatic disease
- Should be compartmentally based (IIa-Vb)

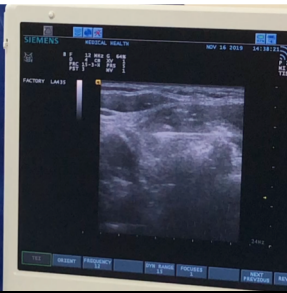


### Radiofrequency ablation (RFA)

- Minimally invasive alternative for benign nodules
  - Volume reduction 60-90% after 12 months
  - Indicated for compressive or cosmetic concerns
  - Preserves normal thyroid (less likely to require hormone supplementation)
  - Scarless
- Preliminary data for small malignancies also promising



### Radiofrequency ablation (RFA)



### PEI (Percutaneous Ethanol Injection)

- Thyroid cysts
- Thyroglossal duct cysts
- (isolated lymph node metastases)
- (palliation of nonresectable disease)



## Active Surveillance

- Papillary microcarcinomas ( $\leq 1\text{cm}$ ) with no aggressive features or evidence of metastases
- Patients with significant co-morbidities or limited life expectancy
- Beware of tumor location
- ~10% of nodules grow  $\geq 50\%$  in 10 years
- 1-2% develop cervical nodal mets
- Reliable follow up and thorough neck ultrasound critical



## Take home thoughts

- Get comfortable with thyroid nodules
- Ultrasound, ultrasound, ultrasound
- Cross-sectional imaging for invasive disease
- Choosing the right approach requires individualization
- The first chance is the best chance

