THYROID PATHOLOGY

AACE/ACE Principles of Endocrine Neck Sonography Course™
Primary objective of thyroid ultrasound: assess for malignant disease
Nodular Disease
- Benign
- Malignant

Goiter
- Iodine deficient
- Thyroiditis
- Organification defects
- Lymphoma

Miscellaneous
- Malformations
- Vascular
Goiter

- Iodine Deficiency
- Thyroiditis
  - Hashimotos
  - Graves
  - Subacute
  - Postpartum and Painless
- Organification defects
- Lymphoma
Iodine Deficiency

- Worldwide leading cause of goiter
- Volume of thyroid can estimate iodine status of region
- “Rare” in developed world
  - Increasing deficiency seen with popularity of designer salts
- Goiter is nonspecific, but most often multinodular.
Autoimmune Thyroiditis

- Hashimoto’s Thyroiditis
- Graves Disease
  - Both autoimmune disease – Opposite ends of the spectrum.
  - Ultrasonographic appearance is very similar
  - Hypoechoic and heterogeneous
    - Numerous variations
Hashimoto’s Thyroiditis

- Hypoechoic and heterogeneous
- Developing fibrosis
- Multiple prominent nodes in central and lateral neck is the norm.
- Matted clustered nodes.
  - Often with abnormal shape and loss of hilar line.
- Paratracheal nodes.
- Increased frequency of Papillary Cancer in Hashimoto’s.
Patterns seen in Autoimmune Thyroiditis

- Mildly Hypoechoic and Heterogeneous
- Micronodular
- Swiss Cheese
- Macropseudonodular
- Profoundly hypoechoic
- Hyperechoic
- Speckled
Mildly Hypoechoic and Heterogeneous
Profoundly hypoechoic
Profoundly hypoechoic
Fibrotic
Macropseudonodular

D 1: 22.5 mm
D 2: 21.6 mm
Macropseudonodular
Pseudonodule?
Nodular vs Pseudonodular
Nodule clearly defined in both planes
Hypoechoic with developing fibrosis
Variation of Pathology
Lymph Nodes in Hashimoto’s Thyroiditis

- Multiple prominent nodes in the central and lateral neck is the norm
- Matted clustered nodes may be seen
  - Often with loss of hilar line
- Paratracheal lymph nodes
Paratracheal Nodes
Hashimoto’s Thyroiditis
Hashimoto’s Thyroiditis – Lymph Nodes

D 1: 6.6 mm
D 2: 14.9 mm
D 3: 4.5 mm

D 1: 24.7 mm
D 2: 4.7 mm
Vascularity in Autoimmune Thyroiditis

- **Graves Disease - Thyroid Inferno**
  - Hypervascular high velocity flow
- **Subacute, painless, postpartum**
  - Full spectrum from avascular to hypervascular
  - In thyrotoxic patient the absence of flow suggests thyroiditis, but high intensity flow can be seen in either Graves or thyroiditis
Graves Disease – Thyroid Inferno
Isoechoic isthmus nodule, TSH 0.01 mIU/L
Toxic Multinodular Goiter

278 UCl I-123
24 HR RAIU=40.4%

MARKER

ANT
RAO
LACO
Graves'
Graves’ Disease
Graves’ Disease
TSH <0.01 mIU/L, Free T4 6.6 ng/dL

Hashimoto’s Thyroiditis
TSH 73.21 mIU/L, Free T4 0.3 ng/dL
Subacute Thyroiditis

- Extremely tender gland
- Varying degree of goiter
  - Preexisting and inflammatory
- Systemic Symptoms
- Transient thyrotoxic phase
- Subsequent hypothyroid phase
  - 95% recovery
- May be focal
- Painless, postpartum variants

Subacute Thyroiditis

At presentation

Six month follow-up
Case Presentation

- 66 year old man with hypothyroidism treated with levothyroxine for 11 years. Six months ago seen by you and was doing well. TSH 1.45 mIU/ L, Free T4 1.4 ng/ dL.
- Presents now with painless swelling of the right lower neck.
- You palpate a large right thyroid nodule extending across the isthmus not appreciated 6 months ago.
Lymphoma

- Arises in thyroid already affected by Hashimoto's thyroiditis
- Ultrasonographic appearance deeply hypoechoic.
  - Appearance not significantly different than in Hashimoto's
  - Rapid growth of goiter should raise suspicion
- Diagnosis by cytology and flow cytometry
Lymphoma

UT Southwestern

L12-5/THYROID 1

CF
FR 18Hz
RS

2D
78%
C 76
P Low
Res

R Thyroid W 3.5 cm
R Thyroid H 5.6 cm

Trans Right Thyroid Mid

AGC M4

7.0-
Thyroid Lymphoma

Image courtesy of Woody Sistrunk, MD, FACE
Causes of goiter include iodine deficiency, organification defects, and autoimmune thyroiditis.

Autoimmune thyroiditis is very common and has a myriad of appearances.

- Hypoechoic and heterogeneous is most common.

Progressive growth of goiter or (pseudo)nodules should raise suspicion of neoplastic process.
Malformations
- Hemiagenesis
- Thyroglossal Duct Cyst

Vascular
- Varicosities
- Hemangioma

Anatomical Variants
Hashimoto’s with Hemiagenesis
Thyroid Hemiagenesis with Graves’ Disease

- Right Lobe
- Trachea
- Isthmus
Multinodular Goiter ???
Multinodular Goiter ???
Thyroglossal Duct Cyst
Undescended Thymus Gland

Inferior pole of thy
Mass in Neck

Transverse

Lateral aberrant thyroid

Longitudinal
Mass in Neck

Biopsy - Normal thyroid / Nodular goiter
Mass in Neck

Rim of normal thyroid tissue

TRACHEA

Metastatic Squamous Cell Carcinoma
Squamous Cell Carcinoma

3D Volume
Dia 1: 8.2 mm
Dia 2: 9.1 mm
Dia 3: 12.8 mm
V: 0.50 cm³

Transverse  Longitudinal
Renal Cell Carcinoma Metastasis
Renal Cell Carcinoma Metastasis
The patient had a nodule bulging out of the neck. Did not correlate with this posterior nodule.
Sebaceous cyst
Unknown mass . . .

Transverse

Longitudinal