THYROID PATHOLOGY

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DEFINITIONS

- **GOITER**: enlarged thyroid
- **EUTHYROID**: normal thyroid function
- **NONTOXIC**: thyroid not hyperfunctional
- **TOXIC**: hyperfunctional thyroid

GRAVES’ DISEASE
DIFFUSE TOXIC GOITER

**MOST COMMON CAUSE OF**

**HYPERTHYROIDISM**

**GROSS:**

- DIFFUSELY ENLARGED
- UP TO 3-4X NORMAL (normal 10-35gm)
- SURGERY RARE
GRAVES’ DISEASE

MICROSCOPIC:

Hyperplasia of follicular lining cells

– **New follicles formed;** tall, columnar cells
– **Scalloping** of colloid
– **Lymphoid cell infiltrates**
  • ?source of abnormal autoantibodies
HASHIMOTO’S THYROIDITIS

• May be found
  – incidentally
  – visible neck mass
  – compressing trachea or esophagus

• GROSS:
  • Usually enlarged up to 2-3X
  • Usually symmetrical, diffuse & firm
    – if nodular, suspect neoplasm
  • Light tan or gray
  • L-thyroxine therapy may shrink gland
HASHIMOTO’S THYROIDITIS

Lymphocytic thyroiditis with oxyphilia

MICROSCOPIC:
• LYMPHOCYTES & plasma cells
• HURTHLE CELLS = Oxyphilic cells
  – Abundant pink cytoplasm
  – pink = acidophilic = eosinophilic
  – Electron Microscopy
    • numerous mitochondria
NONTOXIC NODULAR GOITER
“NTNG”

• Common:
  – 4-7% adults in US have palpable nodular goiter
  – usually asymptomatic but may cause compression
  – most are MULTINODULAR
  – may have only one palpable nodule
    • clinical concern to rule out neoplasms
    • do ultrasound to detect other nodules
    • do needle aspirate or core bx to diagnose NTNG

NONTOXIC NODULAR GOITER
“NTNG”

• **GROSS:**
  >1 round, well demarcated, tan
glistening nodules of variable
sizes within normal red-brown
tyroid tissue.
NONTOXIC NODULAR GOITER “NTNG”

- **MICROSCOPIC:**
  - Follicles
    - VARYING SIZES, usually large
    - filled with COLLOID
    - lined by cuboidal cells
  - Zones of FIBROSIS & HEMORRHAGE
THYROID NEOPLASMS

• BENIGN: ADENOMA

• GROSS:
  – Nodule
    • well encapsulated
    • solid
    • deep-tan
THYROID NEOPLASMS

• How to distinguish Follicular ADENOMA from CARCINOMA?
  – Search for invasion of capsule or blood vessels
  – Examine entire nodule, especially capsule
THYROID CARCINOMA

1. PAPILLARY: 70-80%
2. FOLLICULAR: 10-20%
3. MEDULLARY: 5%
4. ANAPLASTIC: 1-3%
PAPILLARY CARCINOMA

• 70-80% of thyroid carcinomas
• **GROSS**: most often solitary
  **BUT**…
• **MICRO**: most often **multifocal**
  – if opposite lobe is serially sectioned, another focus will be found in 50-75% of cases

PAPILLARY CARCINOMA

**GROSS:**

• GRANULAR or FIRM WHITE LESION
• IRREGULAR BORDERS
PAPILLARY CA

MICRO:
- PAPILLARY FRONDS
- CUBOIDAL LINING CELLS
- MOST LESIONS ALSO HAVE FOLLICULAR AREAS
- SAME BIOLOGIC BEHAVIOR REGARDLESS OF % PAP VS. FOLL
PAPILLARY CA

NUCLEAR FEATURES:
• GROUND GLASS
• OPTICALLY CLEAR
• ORPHAN ANNIE-EYE

PSAMMOMA BODIES=
– SMALL CONCENTRIC CONCRETIONS
PAPILLARY CA

RELIABLY DIAGNOSED BY:
1. FINE NEEDLE ASPIRATION (FNA)
2. CORE NEEDLE BIOPSY
3. FROZEN SECTION DIAGNOSIS
PAPILLARY CA

METASTATIC SPREAD:
- LYMPHATIC TO PARATHYROIDAL LNs
- MULTICENTRIC FOCI IN THYROID
  - ? MULTIPLE PRIMARIES
  - ? MET FOCI VIA LYMPHATIC SPREAD
- CLINICAL OR SUBCLINICAL

PAPILLARY CA

SPREAD:
- RARELY DIE OF PAPILLARY CA
- IF DIE, USUALLY
  - PULMONARY OR CEREBRAL METS
  - INVASION OF JUGULAR, CAROTID OR AIRWAY
  - ANAPLASTIC DIFFERENTIATION
FOLLICULAR CA

• 10-20% OF THYROID CARCINOMAS
• USUALLY
  – SOLITARY
  – COLD
  – LOW RAI UPTAKE

FOLLICULAR CA

GROSS:
• SOLITARY
• MAY HAVE CAPSULE
  – INVASION DISTINGUISHES CA FROM ADENOMA
• MAY INVADE
  – ADJACENT THYROID
  – OUTSIDE THYROID & CAUSE ADHESIONS TO ADJACENT STRUCTURES
FOLLICULAR CA

MICRO:
  • SOLITARY IN ONE LOBE
  • METASTATIC SPREAD:
    – INVADES AND METS VIA VEINS
    – COMMON SITES OF METS:
      • LUNGS AND BONES
FOLLICULAR CA

Treatment:

• Total thyroidectomy (1 or 2 stages)

• If metastatic to lung or bone, treat with hi dose $^{131}\text{I}$ to ablate

• 10 year survival: 50-70%
THYROID NEOPLASMS

• How to distinguish Follicular ADENOMA from CARCINOMA?
  – Search for invasion of capsule or blood vessels
  – Examine entire nodule, especially capsule

FOLLICULAR CA

• VERY DIFFICULT TO DIAGNOSE BY FROZEN SECTION
  – Bland tumor cells
  – Subtle invasion

• EASY TO DIAGNOSE ANY CA WITH GROSS INVASION &/OR ANAPLASIA AND MITOSES
MEDULLARY CA

• 5% OF THYROID CARCINOMAS
• ARISE from PARAFOLLICULAR CELLS ("C" CELLS)
  – ARISE FROM NEURAL CREST
• FAMILIAL 25% (MEN)
• ASSOCIATED WITH RET PROTO-ONCOGENE
MEDULLARY CA

• “C” CELLS PRODUCE MAINLY CALCITONIN
  – & OTHER PP HORMONES ie SERATONIN, ACTH
• PRE-OP SERUM CALCITONIN FOR DIAGNOSIS
• POST-OP SERUM CALCITONIN TO DETECT RESIDUAL OR RECURRENT TUMOR
• TOTAL THYROIDECTOMY
• LN DISSECTION IF ENLARGED OR SUSPICIOUS NODES

MEDULLARY CA

GROSS:

• YELLOW-TAN
• ILL-DEFINED BORDERS
• INFILTRATES ADJACENT TISSUES
MEDULLARY CA

MICROSCOPIC:
• SOLID NESTS
• ROUND TO SPINDLY CELLS
• AMYLOID-LIKE STROMA
  – CONGO RED, POLARIZED:
    APPLE GREEN BIREFRINGENCE
MEDULLARY CA

SPREAD:
• LYMPHATIC
• VENOUS
• METS TO LUNG AND BONES
• MULTIFOCAL

ANAPLASTIC CA

• 1-3% OF THYROID CARCINOMAS
• VERY POOR PROGNOSIS
  (<5% SURVIVE 5 YEARS)
• LESS FREQUENT than 40 years ago
ANAPLASTIC CA

CLINICAL:
- Patients >50 years old
- Old nodule begins to grow rapidly
  - ? arose in pre-existing nodule
- ? Lower incidence due to more resected nodules

ANAPLASTIC CA

CLINICAL:
- Rapid growth
- Invasion of adjacent structures
- Tracheostomy frequently necessary
- Usually unresectable
- Chemo / Radiation **not** useful in most
ANAPLASTIC CA

MICRO:
• HIGHLY UNDIFFERENTIATED!!!!
  – small cells
  – giant cells
  – spindle cells
• May need immunostains to distinguish from lymphoma & sarcoma
MALIGNANT LYMPHOMA OF THYROID

• USUALLY ARISES IN HASHIMOTO’S THYROIDITIS

• RARELY PRIMARY IN THYROID
THYROGLOSSAL DUCT CYST

- PERSISTENT THYROID ALONG EMBRYONAL MIGRATION PATH IN MIDLINE NECK, ANTERIOR TO LARYNX & HYOID BONE
- RESECTED WHEN RESIDUAL TRACT / CYST PERSISTS OR RECURS
- MICRO:
  - LINED BY CILIATED RESPIRATORY EPITHELIUM, SQUAMOUS, OR BOTH