PITUITARY
NORMAL HISTOLOGY OF THE PITUITARY GLAND
PITUITARY/SELLA TURCICA

• NEOPLASTIC:
  – PITUITARY ADENOMA
    • TYPICAL
    • ATYPICAL/AGGRESSIVE
    • WITH OR WITHOUT INFARCTION (APOPLEXY)
  – CRANIOPHARYNGIOMA
  – RATHKE’S CLEFT CYST

• NON-NEOPLASTIC
  – HYPOPHYSITIS
PITUITARY ADENOMA
CELL TYPES

- PROLACTIN (PRL) – 33%
- GROWTH HORMONE (GH) – 10%
  - Sparsely granulated*
  - Densely granulated
- GH + PRL – uncommon
  - Mixed cell types
  - Mammosomatotroph
  - Acidophil stem cell* (rare)
- GYCOProTEIN-PRODUCING
  - FSH/LH – 10-15%
  - TSH* - 1%
- ACTH – 10%
  - Crooke cell adenoma*
- PLEURIHORMONAL
  - Silent adenoma, subtype III*
- NULL CELL – 20%

* Denotes tendency toward aggressive behavior
ATYPICAL PITUITARY ADENOMA

- MORPHOLOGIC CRITERIA
  - “MORE THAN AN OCCASIONAL MITOTIC FIGURE”
  - MIB-1 (Ki-67) GREATER THAN 3%
  - “SIGNIFICANT” p53 IMMUNOSTAINING

- SPECIAL TYPES WITH AGGRESSIVE (ATYPICAL) BEHAVIOR
  - SPARSELY GRANULATED GH TUMOR
    » WITH/WITHOUT PRL
    » KERATIN POSITIVE FIBROUS BODIES
  - ACIDOPHIL STEM CELL (GH + PRL)
  - CROOKE CELL (ACTH)
  - TSH
  - SILENT ADENOMA, SUBTYPE III
Cytokeratin (cam 5.2)
Prolactin (PRL)
Growth Hormone (GH) – sparsely granulated somatotroph (atypical) adenoma
ATYPICAL MAMMOSOMATOTROPH ADENOMA
ATYPICAL MAMMOSOMATOTROPH ADENOMA
ATYPICAL PROLACTINOMA
PROLACTINOMA

MIB-1 (19%)  P53 (22%)  

ATYPICAL PROLACTINOMA

PHH-3  PROLACTIN
SPECIAL STAINS STUDIES ON PITUITARY TUMORS

• **STANDARD STAINS**
  – p53, mib-1 (Ki-67), reticulin
  – PRL
  – GH
  – ACTH
  – FSH
  – LH
  – TSH
  – ALPHA SUBUNIT

• **SPECIAL REQUESTS**
  – SOMATOSTATIN RECEPTOR 2a
    • GH-PRODUCING ADENOMAS
    • PREDICTS FAVORABLE RESPONSE TO SOMATOSTATIN ANALOGS (OCTEOTRIDE)
PITUITARY APOPLEXY
PITUITARY CARCINOMA

• VERY RARE
• NO DISTINGUISHING HISTOLOGIC FEATURES
• WHO *Tumors of the Endocrine Organs* (2004):
CRANIOPHARYNGIOMA

• ADAMANTINOMATOUS TYPE
  – MOST COMMON
  – YOUNGER AGE GROUP

• PAPILLARY TYPE
  – UNCOMMON
  – OLDER AGE GROUP
CRANIOPHARYNGIOMA

ADAMANTINOMATOUS

PAPILLARY
RATHKE’S CLEFT CYST
LYMPHOCYTIC HYPOPHYSITIS
T (CD3)
B (cd20)
MACROPHAGE (CD163)
THYROID
COMMON LESIONS OF THE THYROID GLAND

• NEOPLASTIC
  – BENIGN
    • FOLLICULAR ADENOMA
  – MALIGNANT
    • PAPILLARY CARCINOMA
      – FOLLICULAR VARIANT
      – PAPILLARY VARIANT
    • FOLLICULAR CARCINOMA
      – USUAL TYPE
      – ONCOCYTIC TYPE (FORMERLY HURTHLE CELL CA)
    • ANAPLASTIC THYROID CARCINOMA
    • MEDULLARY CARCINOMA
COMMON LESIONS OF THE THYROID GLAND

• NON-NEOPLASTIC CONDITIONS
  – ADENOMATOUS NODULE(S)
  – LYMPHOCYTIC THYROIDITIS
    • HASHIMOTO THYROIDITIS
  – DEQUERVAIN’S (GRANULOMATOUS) THYROIDITIS
FNA DIAGNOSTIC CLASSES

• NEGATIVE/BENIGN
• INCONCLUSIVE
• ATYPICAL
• SUSPICIOUS
• MALIGNANT
COMMON FNA DIAGNOSES

• ADENOMATOUS (HYPERPLASTIC/COLLOID) NODULE
  – Benign
• FOLLICULAR LESION
  – Inconclusive (adenomatous nodule vs. follicular neoplasm)
  – Atypical (microfollicles suggestive of follicular neoplasm)
• PAPILLARY LESION (CARCINOMA)
  – Atypical
  – Suspicious
  – Malignant
• HURTHLE CELL LESION
  – Inconclusive (focal change vs. neoplasm)
• LYMPHOCYTIC THYROIDITIS
  – Benign
FOLLICULAR LESIONS (FNA)

- **COMMON FNA DIAGNOSIS**
- **ENCUMBRANCES**
  - **NEOPLASMS:**
    - FOLLICULAR ADENOMA
    - FOLLICULAR CARCINOMA
  - **NON-NEOPLASTIC CONDITIONS:**
    - ADENOMATOUS NODULE(S):
      - ADENOMATOUS HYPERPLASIA
      - COLLOID NODULE
      - NODULAR ADENOMATOUS HYPERPLASIA
FNA

- FNA DIAGNOSIS MODIFIERS:
  - DIAGNOSTIC OF
  - CONSISTENT WITH
  - SUGGESTIVE OF
  - CANNOT RULE OUT
HURTHLE CELL LESIONS (FNA)

- HURTHLE CELL NEOPLASM
  - FOLLICULAR ADENOMA, ONCOCYTIC TYPE
  - FOLLICULAR CARCINOMA, ONCOCYTIC TYPE

- HURTHLE CELL CHANGE
  - ADENOMATOUS NODULES
  - HASHIMOTO THYROIDITIS
NORMAL HISTOLOGY OF THE THYROID
ADENOMATOUS NODULE
FOLLICULAR NEOPLASMS

• ADENOMA VS. CARCINOMA
  – DISTINCTION CAN ONLY BE MADE ON HISTOLOGIC EVALUATION OF ENTIRE CAPSULE
  – AND/OR THE HISTOLOGIC DEMONSTRATION OF VASCULAR INVASION
  – CANNOT BE MADE ON FNA
FOLLICULAR ADENOMA
FOLLICULAR CARCINOMA
FOLLICULAR NEOPLASMS

• ADENOMA VS. CARCINOMA
  – DISTINCTION CAN ONLY BE MADE ON HISTOLOGIC EVALUATION OF ENTIRE CAPSULE
  – AND/OR THE HISTOLOGIC DEMONSTRATION OF VASCULAR INVASION
  – CANNOT BE MADE ON FNA
HURTLE CELL (ONCOCYTIC) LESIONS

- ADENOMAS
- CARCINOMA
- LOCALIZED CHANGE IN ADENOMATOUS NODULES AND OTHER TUMORS
- PROMINENT IN HASHIMOTO THYROIDITIS

NOW TERMED:
- **FOLLICULAR** ADENOMA/CARCINOMA, ONCOCYTIC (OR HURTHLE CELL) TYPE
PAPILLARY CARCINOMA
SPECIAL STAINS/STUDIES

• PAPILLARY CARCINOMA
  – IMMUNOSTAINS (LIMITED VALUE)
    • HBME-1
    • KERATIN 19
    • GALECTIN-3
  – MOLECULAR STUDIES
    • BRAF V600E MUTATION
      – IF EXTRATHROIDAL EXTENSION
      – EXTRANODAL EXTENSION (of metastasis)
EXTRATHYROIDAL EXTENSION
EXTRA NODAL EXTENSION
PAPILLARY MICROCARCINOMA

- DEFINED AS LESS THAN 1 CM
- OFTEN SEEN AS INCIDENTAL FINDING
  - IN HASHIMOTO THYROIDITIS
  - IN ADENOMATOUS HYPERPLASIA
LYMPHOCYTIC THYROIDITIS

- LYMPHOCYTIC THYROIDITIS
- HASHIMOTO THYROIDITIS
PITUITARY SUMMARY

• MOST LESIONS ARE ADENOMAS
  – ADENOMA
  – ATYPICAL ADENOMA
  – CERTAIN TYPES WITH AGGRESSIVE BEHAVIOR
  – CARCINOMAS ARE VERY RARE

• HORMONES STAINS DONE ROUTINELY

• SOMATOSTATIN RECEPTOR STAINS CAN BE DONE ON REQUEST (GH ADENOMAS)
THYROID SUMMARY

• FNA FREQUENTLY HELPFUL
  – PAPILLARY CA
  – FOLLICULAR LESIONS
    • ADENOMATOUS (COLLOID) NODULES
    • FOLLICULAR NEOPLASMS
  – THYROIDITIS
  – HURTHLE CELL LESIONS

• Follicular neoplasms require histologic evaluation to distinguish adenoma from carcinoma
THYROID SUMMARY
COMMON DIAGNOSES

• ADENOMATOUS NODULES (nodular adenomatous hyperplasia)
• PAPILLARY CARCINOMA*
• PAPILLARY MICROCARCINOMA
• FOLLICULAR ADENOMA
• FOLLICULAR CARCINOMA
• LYMPHOCYTIC THYROIDITIS

* SPECIAL STUDIES: BRAF FOR PAPILLARY CARCINOMA IF EXTRATHYROIDAL/EXTRANODAL EXTENSION