

# THYROID PATHOLOGY

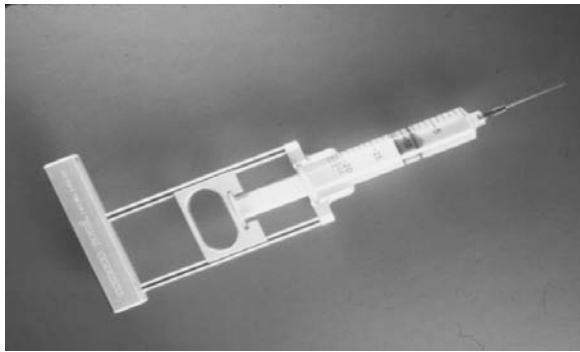
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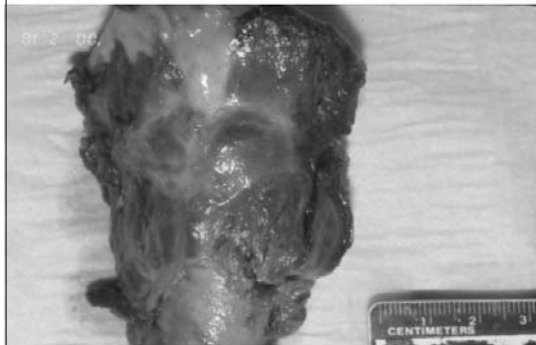
**CHORNOBYL  
PROJECT**

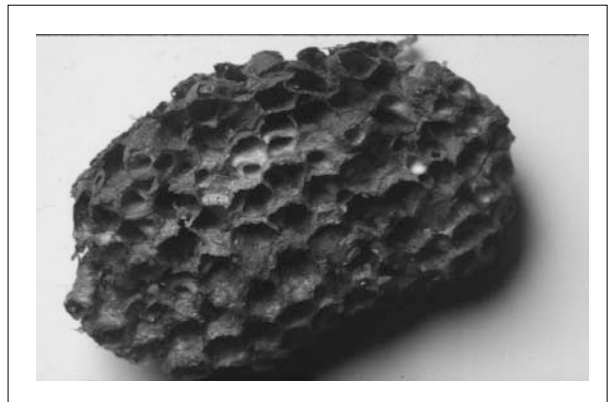
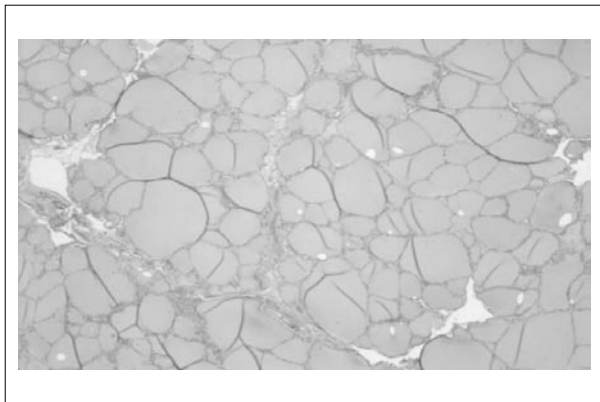
**COLUMBIA  
CLINICAL TEAM**



**CHORNOBYL**

**UKRANIAN-  
AMERICAN  
MOBILE  
ULTRASOUND**





**DEFINITIONS**

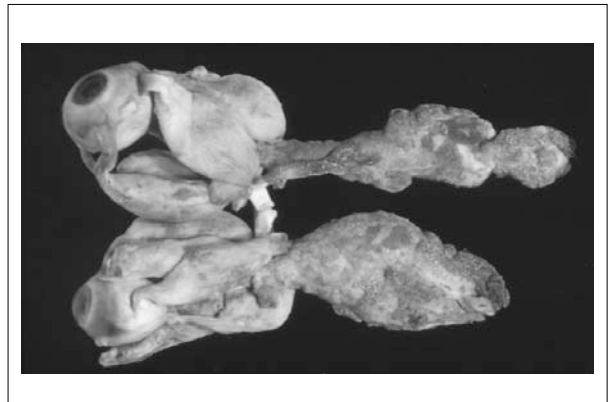
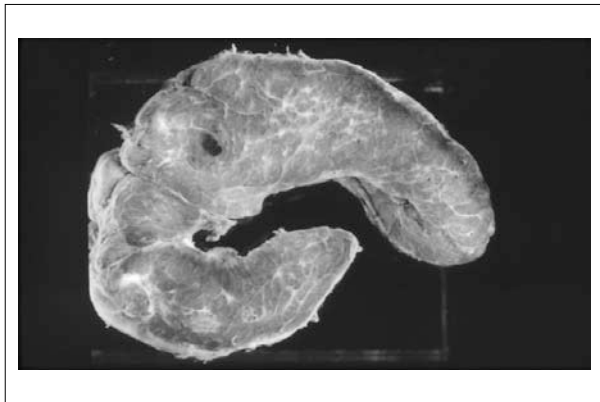
- **GOITER:** enlarged thyroid
- **EUTHYROID:** normal thyroid function
- **NONTOXIC:** thyroid not hyperfunctional
- **TOXIC:** hyperfunctional thyroid

**GRAVES' DISEASE**  
**DIFFUSE TOXIC GOITER**

MOST COMMON CAUSE OF  
**HYPERTHYROIDISM**

**GROSS:**

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

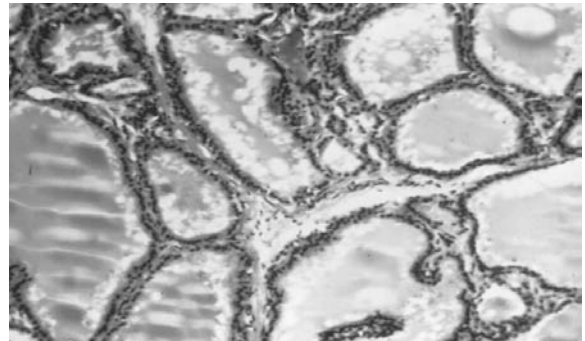


## GRAVES' DISEASE

### **MICROSCOPIC:**

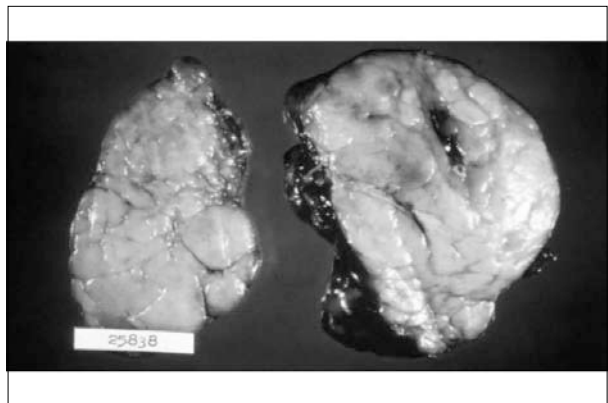
**Hyperplasia** of follicular lining cells

- **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

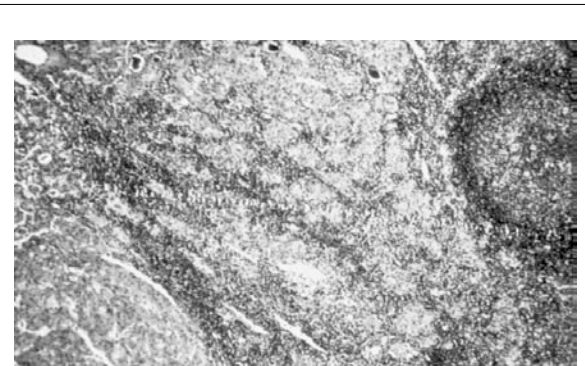


## HASHIMOTO'S THYROIDITIS

Lymphocytic thyroiditis with oxyphilia

### **MICROSCOPIC:**

- **Lymphocytes** & plasma cells
- **HURTHLE CELLS** = Oxyphilic cells
  - Abundant pink cytoplasm
  - pink = acidophilic = eosinophilic
  - Electron Microscopy
    - numerous **mitochondria**

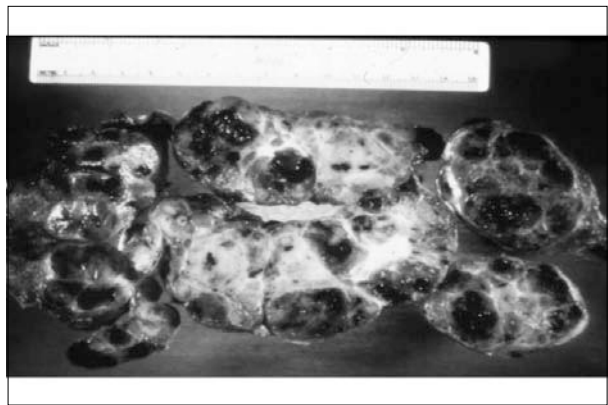


## NONTOXIC NODULAR GOITER “NTNG”

- 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 neoplasm
    - do ultrasound to detect other nodules
    - do needle aspirate or core bx to diagnose NTNG

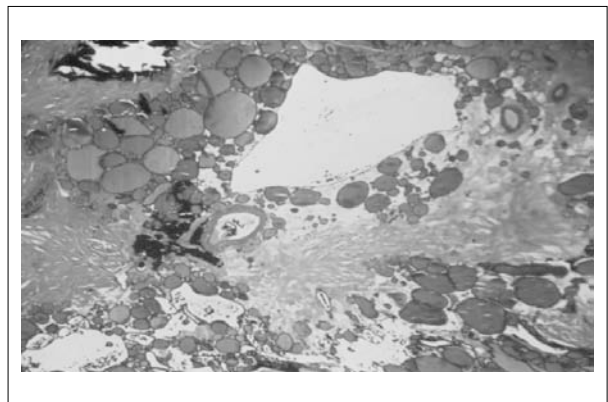
## NONTOXIC NODULAR GOITER “NTNG”

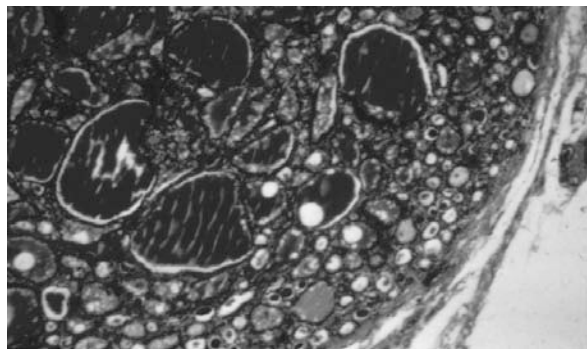
- **GROSS:**
  - ≥1 round, well demarcated, tan glistening nodules of variable sizes within normal red-brown thyroid tissue.



## NONTOXIC NODULAR GOITER “NTNG”

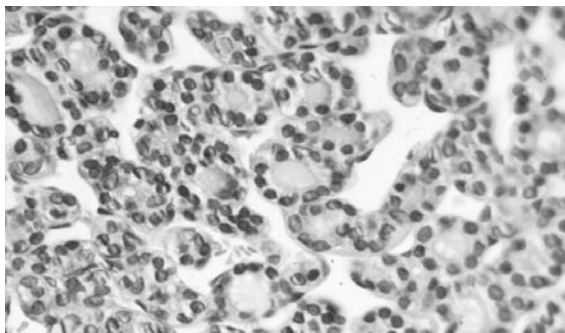
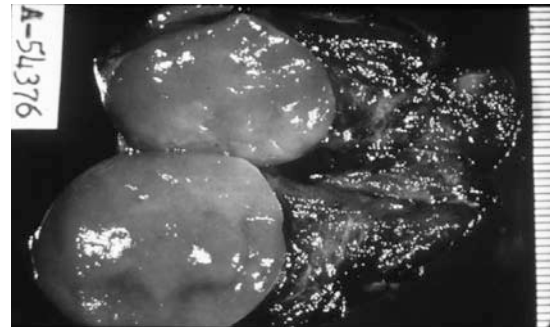
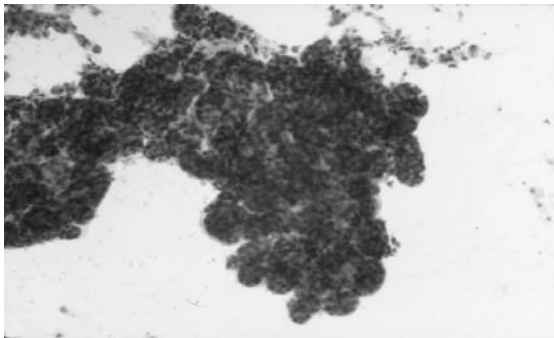
- **MICROSCOPIC:**
  - Follicles
    - VARYING SIZES, usually large
    - filled with COLLOID
    - lined by cuboidal cells
  - Zones of FIBROSIS & HEMORRHAGE





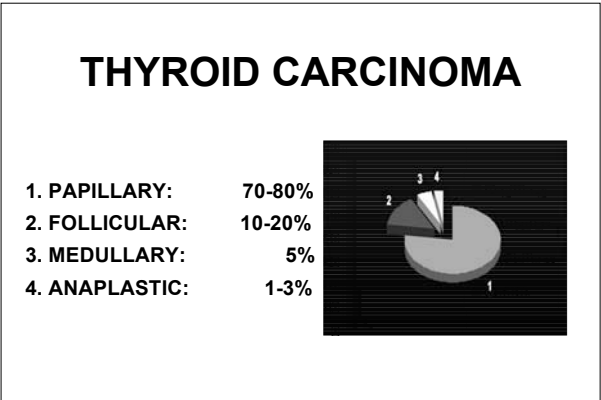
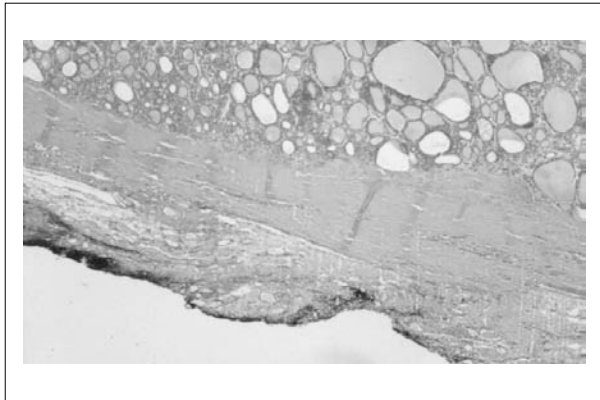
## THYROID NEOPLASMS

- **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



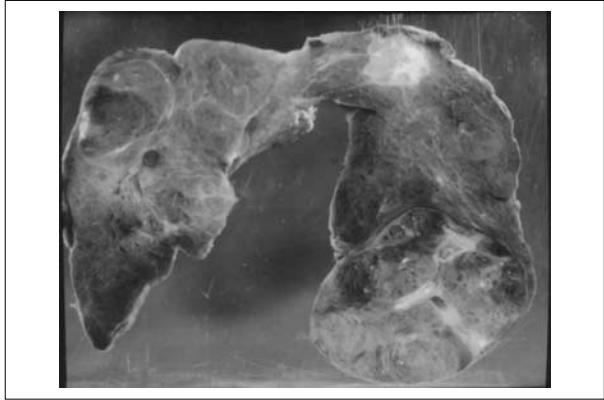
### PAPILLARY CARCINOMA

- 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:

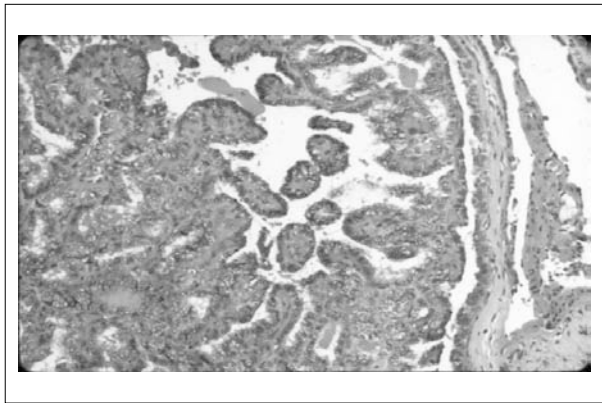
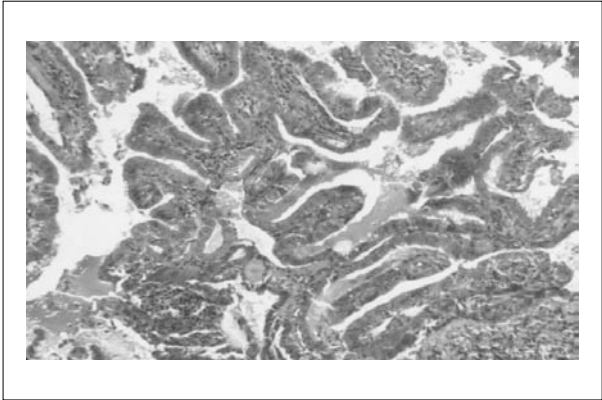
- **GRANULAR** or **FIRM WHITE LESION**
- **IRREGULAR BORDERS**



### PAPILLARY CA

MICRO:

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



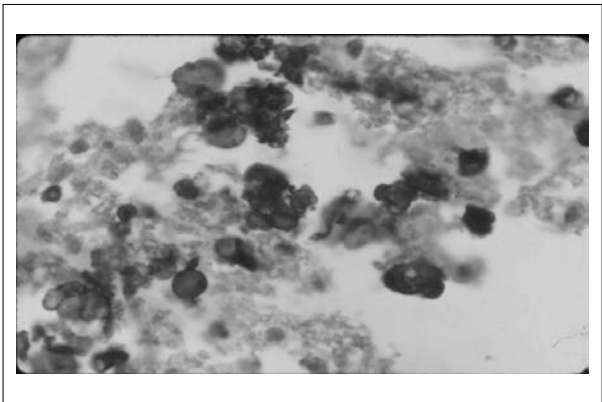
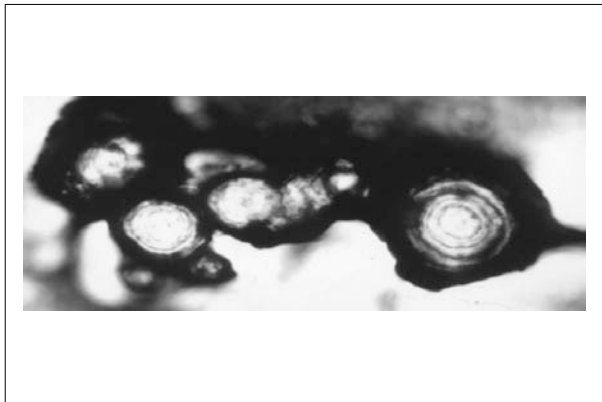
**PAPILLARY CA**

**NUCLEAR FEATURES:**

- GROUND GLASS
- OPTICALLY CLEAR
- ORPHAN ANNIE-EYE

**PSAMMOMA BODIES=**

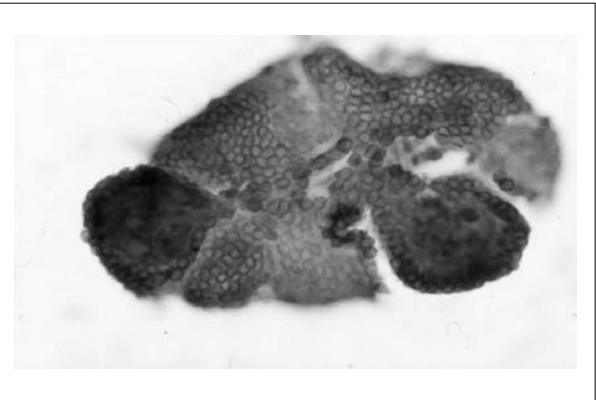
- SMALL CONCENTRIC CONCRETIONS



## 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

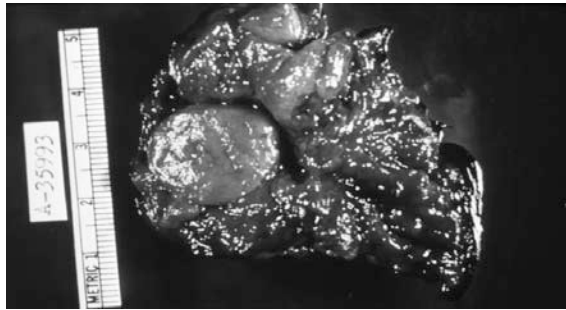
- 10-20% OF THYROID CARCINOMAS
- USUALLY
  - SOLITARY
  - COLD
  - LOW RAI UPTAKE

## FOLLICULAR CA

### GROSS:

- SOLITARY
- MAY HAVE CAPSULE
  - INVASION DISTINGUISHES CA FROM ADENOMA
- MAY INVADE
  - ADJACENT THYROID
  - OUTSIDE THYROID & CAUSE ADHESIONS TO ADJACENT STRUCTURES

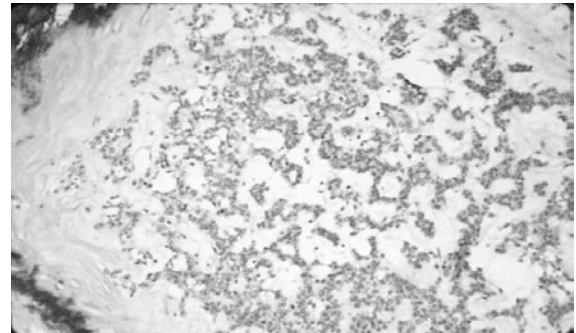
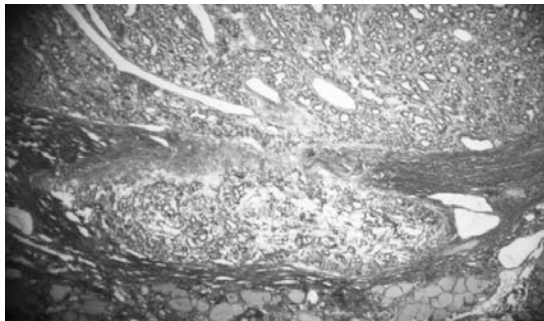




## FOLLICULAR CA

### MICRO:

- SOLITARY IN ONE LOBE
- METASTATIC SPREAD:
  - INVADES AND METS VIA VEINS
  - COMMON SITES OF METS:
    - LUNGS AND BONES



**CHORNOBYL PROJECT**  
 **$I^{131}$  Radioisotope scan of 24 year old man with thyroid cancer and lung metastases**



## FOLLICULAR CA

### Treatment:

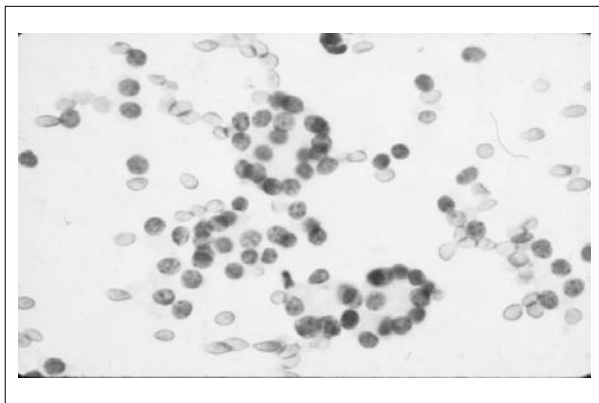
- Total thyroidectomy (1 or 2 stages)
- If metastatic to lung or bone, treat with hi dose  $I^{131}$  to ablate
- 10 year survival: 50-70%

## 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:

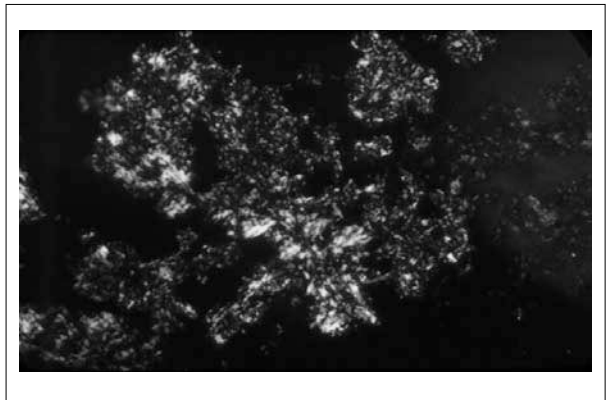
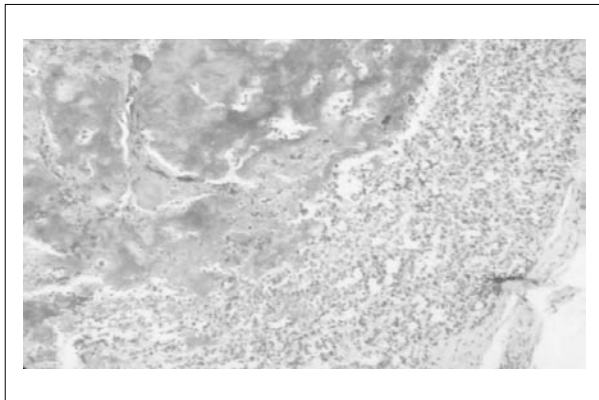
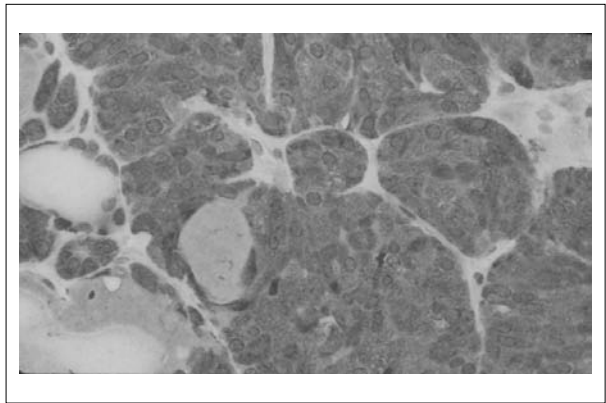
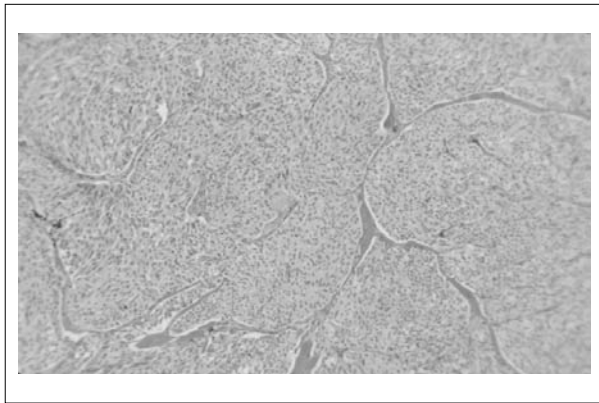
- YELLOW-TAN
- ILL-DEFINED BORDERS
- INFILTRATES ADJACENT TISSUES



## 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

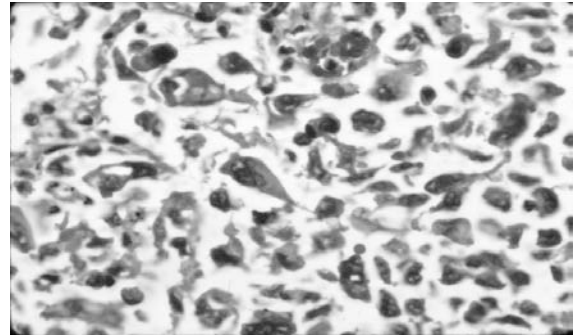
### CLINICAL:

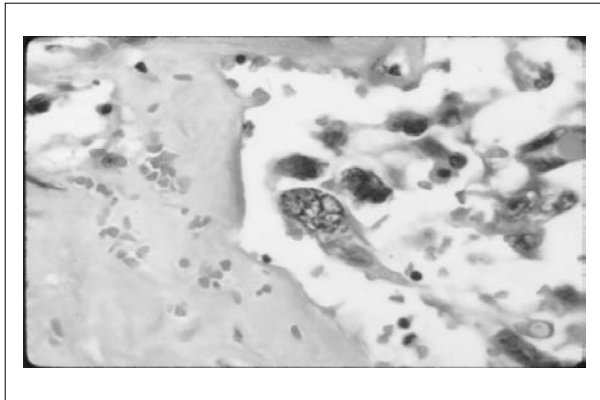
- Rapid growth
- Invasion of adjacent structures
- Tracheostomy frequently necessary
- Usually unresectable
- Chemo / Radiation not useful in most

## ANAPLASTIC CA

### MICRO:

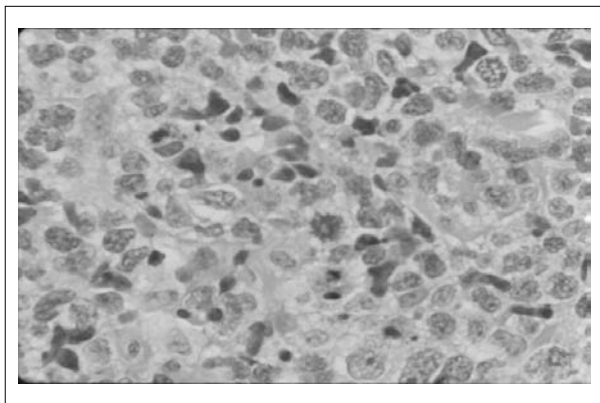
- HIGHLY UNDIFFERENTIATED!!!!
  - small cells
  - giant cells
  - spindle cells
- May need immunostains to distinguish from lymphoma & sarcoma





## 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

