



Pathology OSPE Review

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Cases :

(There will be 4 cases in the exam)

Thyroid Gland :

1. Multinodular Goiter
2. Thyrotoxicosis
3. Hashimoto's Thyroiditis
4. Follicular Adenoma
5. Papillary Carcinoma

Adrenal Gland :

6. Pheochromocytoma
7. Cushing Syndrome

1. Multinodular Goiter

The most common cause for an enlarged thyroid gland & the most common disease of the thyroid.

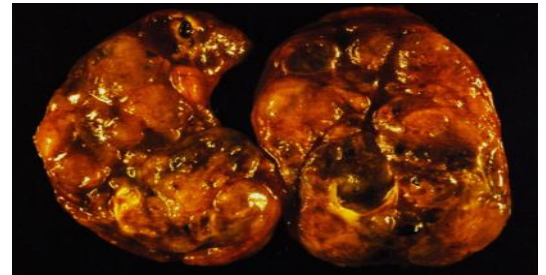
Clinical Signs :

Huge multiple neck nodules of thyroid gland. (anterior and lateral)

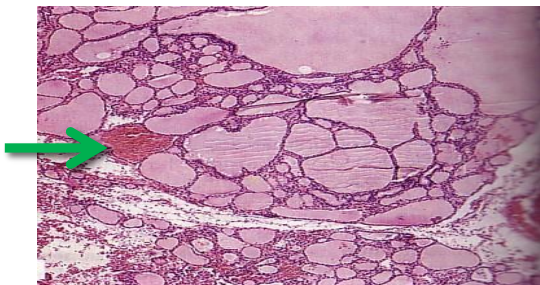


Gross Features :

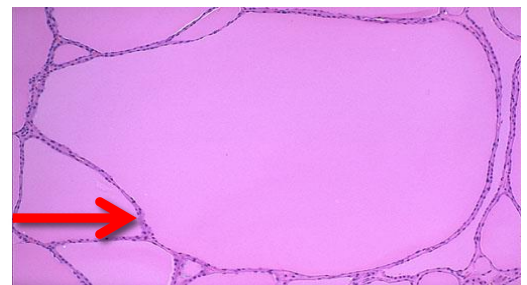
1. Diffuse **asymmetrical** enlargement of thyroid gland.
2. **Multiple nodules**.
3. Hemorrhage and area of cystic degeneration.



Histopathological Features :



1. Numerous **follicles** varying in size **filled with colloid** and lined with **Simple Columnar Epithelium**.
2. Recent haemorrhage. **(green arrow)**
3. Haemosiderin.
4. Calcification.
5. Cystic degeneration.



The follicles are irregularly enlarged, with **flattened epithelium**.

- **Many vegetables are goiterogens, fruits are NOT.**
- Lab results of Thyroid Function test will **be normal**. (i.e. **Normal T₄, T₃**)
- Mostly they're benign, and they contain **large amount of colloid** → other name : **Colloid Goiter**
- **Causes :**
 1. Iodine deficiency. **"Most common cause"**
 2. Excessive intake of **Goitrogens**. (e.g, cabbage, Brussels sprouts, cauliflower, turnips, cassava).
 3. Congenital.

Notes

2. Grave's disease (Thyrotoxicosis)

A diffusely enlarged thyroid gland associated with hyperthyroidism.

Clinical Signs :

- Hypermetabolism
- Tachycardia, palpitations
- Increased T3, T4
- Goiter
- **Exophthalmos** (Proptosis, Lid lag, Lid retraction, Peri-ocular fat deposition and Scleral rim above the iris)
- Tremor
- GIT hypermotility
- Thyroid "storm", life threatening

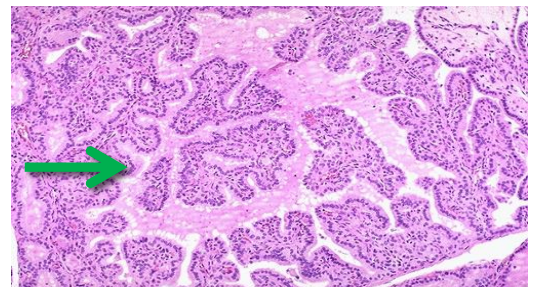
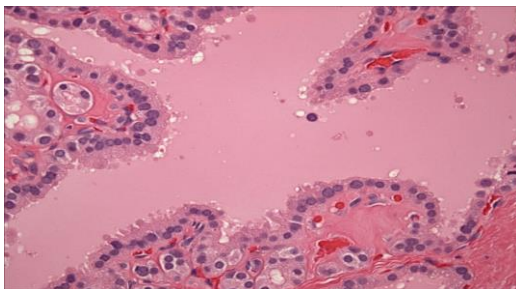


Gross Features :

1. Diffuse **Symmetrical** enlargement of thyroid gland
2. Cut-surface is **homogenous**, soft and appear **meaty**.



Histopathological Features :



1. Thyroid follicles **lined by benign columnar and high cuboidal cells**
2. **Hyperplasia and hypertrophy of thyroid follicular cells.**
3. **prominent infoldings and scalloping features.**
4. Presence of intra-follicular peripheral vacuoles.

the **prominent infoldings** of the hyperplastic follicular epithelium

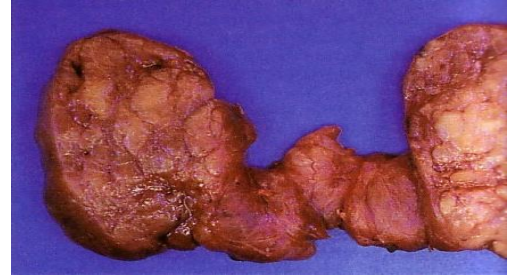
Note : It is an autoimmune disease. **Autoantibodies against TSH receptor**

3. Hashimoto's Thyroiditis

Gross Features :

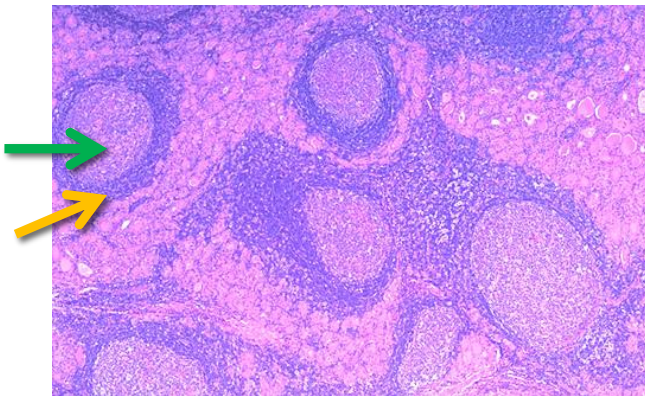


Symmetrically small thyroid gland demonstrates **atrophy* (later stage)**



- Initially, Rubbery and Flushy **diffuse symmetrical enlargement**.
- Pale, yellow-tan, firm & somewhat nodular cut surface

Histopathological Features :



Early stage:

1. **prominent lymphoid follicles** containing large **active germinal centers**
2. Plasma cells and lymphocytes



1. **pink Hürthle cells** at the center and right.
2. **The lymphoid follicle** is at the left

Notes :

- **Antithyroglobulin** and **antimicrosomal** (thyroid peroxidase) autoantibodies are detected in serum.
- Initially, the thyroid is enlarged with **transient hyperthyroidism**, followed by a **euthyroid state** and then **hypothyroidism with eventual atrophy*** years later.
- Type of thyroiditis :
1-Autoimmune (Hashimoto's) 2-lymphocytic 3-infectious 4-giant cell

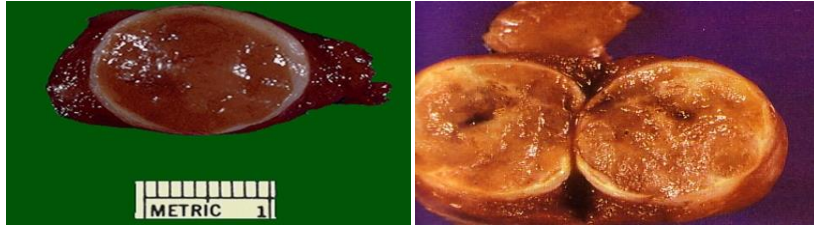
4. Follicular Adenoma (Benign tumor)

Clinical Signs :



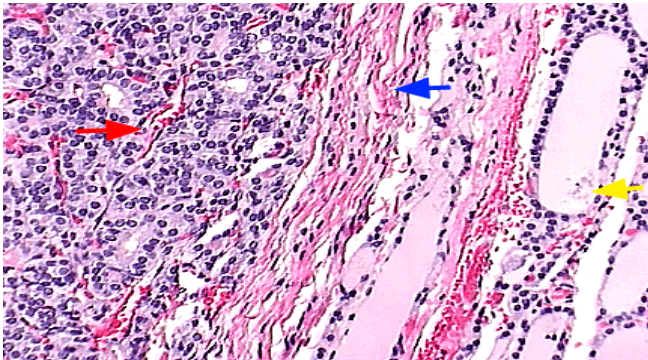
Central movable solitary thyroid nodule occupying the thyroid isthmus.
enlargement of the anterior neck (thyroid)

Gross Features :



1. A **well circumscribed** light **brown** and **circular** tumor nodule.
2. Surrounded by a **white thick capsule**.
3. The surrounding thyroid tissue is normal.
4. Brown hemorrhagic cut-surface.

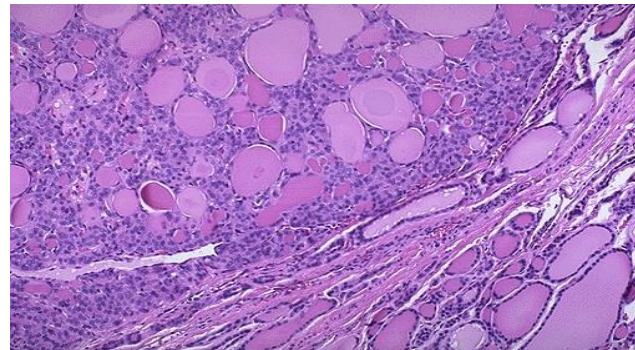
Histopathological Features :



Red arrow:
located within the adenoma. Hyperplastic crowded thyroid **follicular cells**, little colloid is seen.

Blue arrow:
points to the thick fibrous **capsule** of the adenoma, a few strands of connective tissue (**no capsular or vascular invasion**)

Yellow arrow:
points to colloid within a large **normal follicle**.

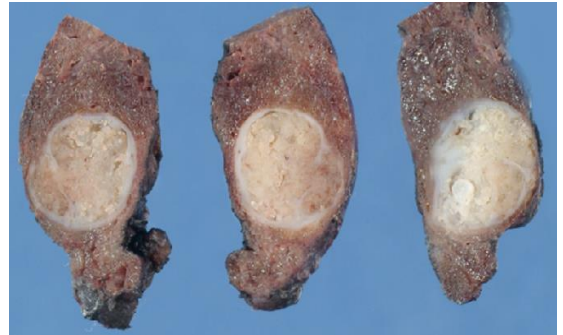


- Normal thyroid follicles appear at the lower right.
- The follicular adenoma is at the center to upper left. **This adenoma is a well-differentiated neoplasm because it closely resemble normal tissue.**
- The follicles of the adenoma contain colloid, but there is greater variability in size than normal.

Notes :

- **Benign** tumor and **Excision** is curative. Management : **thyroidectomy**
- **Vascular or/and Capsular invasion**. May indicate malignancy.

5. Papillary Thyroid Carcinoma



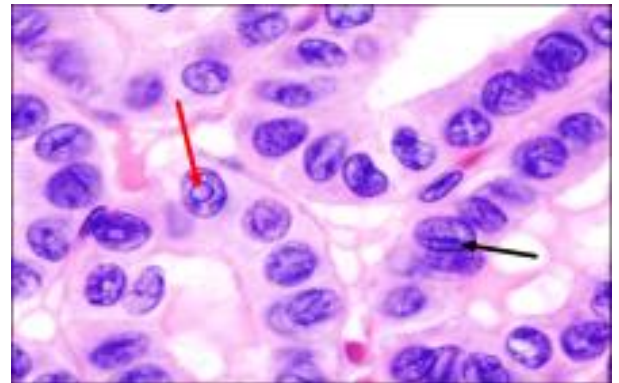
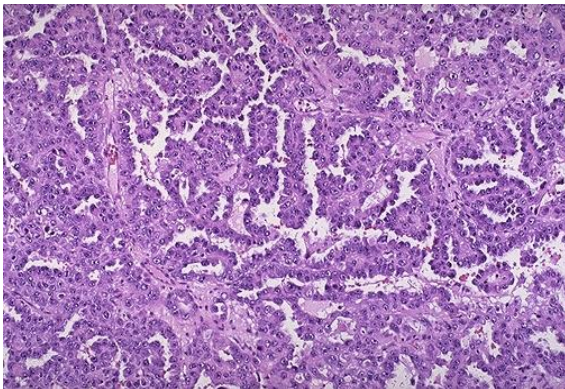
Clinical Signs :

Huge thyroid swelling due to papillary thyroid carcinoma

Gross Features :

Well circumscribed nodule showing a whitish cut surface with vague scattered **papillary areas**.

Histopathological Features :



1. Papillary structures (fronds).
2. **Orphan Annie nuclei**. (clear nuclei)
3. Psammoma bodies

1. **Intranuclear inclusion (red arrow)**.
2. **Coffee-bean like nuclei** with prominent nuclear groove (**black arrow**).

Notes :

- Papillary carcinoma is the most common subtype of thyroid carcinoma.
- **Psammoma bodies** : Concentrically calcified structures.
- **Orphan annie nuclei** : Overlapping clear nuclei.
- **Nuclear features: Nuclear grooving - Orphan Annie nuclei - Intranuclear inclusion**
- **Good prognosis if it is removed. While anaplastic has bad prognosis**
- Serum **calcitonin** is normal in papillary thyroid carcinoma but is increased in cases of medullary carcinoma.

6. Pheochromocytoma

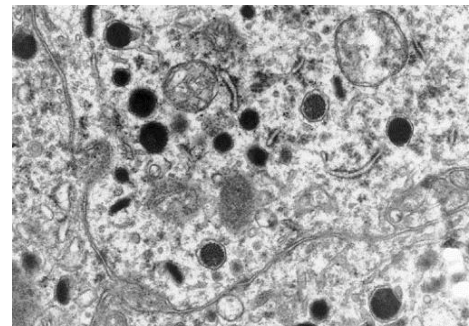
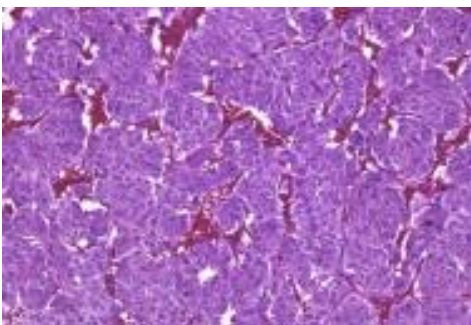
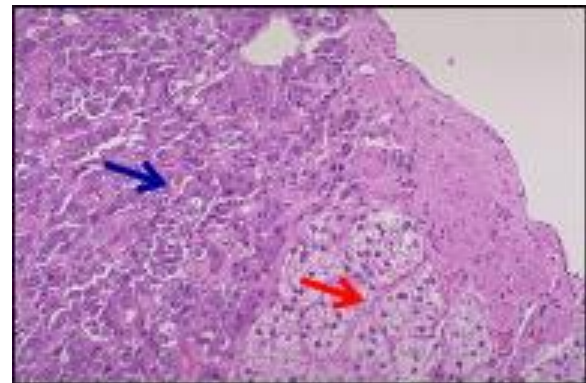
Gross Features :

- A single partly pale and partly hemorrhagic adrenal medullary mass.
- Grey-tan color of the tumor.
- A small remnant of remaining adrenal at the lower right (arrow)



Histopathological Features :

- Some residual adrenal cortical tissue.
- Darker cells of the pheochromocytoma, a trabecular sheets of tumor cells with blood vessels.



Tumor cells are (pleomorphic large-small with granular cytoplasm with salt and pepper chromatin)

By EM, cells contain neurosecretory granules. (contain catecholamines).

Notes:

- Usually, the patient presents with **hypertensive crisis**.
- Laboratory test that help to confirm the diagnosis of pheochromocytoma: Increased urinary excretion of:
 1. Catecholamines
 2. Metanephrines
 3. VMA (Vanillyl mandelic acid).

7. Cushing Syndrome

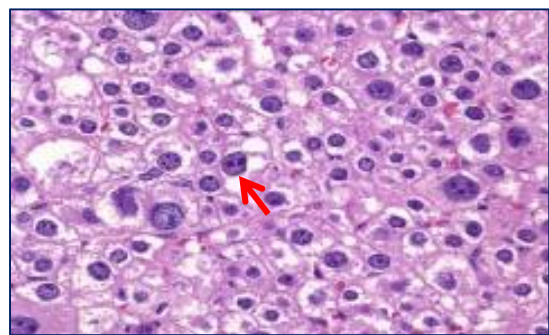
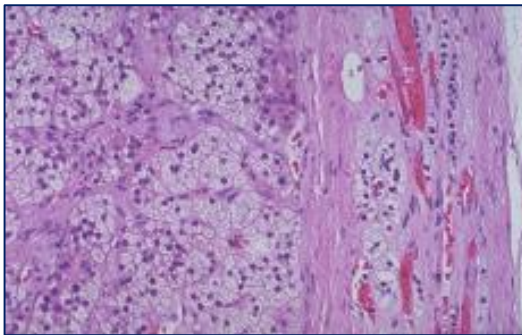
If Histopathology picture only,
diagnoses: cortical adenoma

Gross Features :

- A **Well-circumscribed** neoplasm with diffuse enlarged cortical area enlarged
- Some remaining **atrophic adrenal** gland in the periphery.



Histopathological Features :



- **Hyperplasia of adrenal cortex with benign capsule**
- Minimal cellular **pleomorphism** within adenomas.
- **Enlarged hyperchromatic nuclei** with one or more prominent nucleoli (**arrow**).
- **Well-differentiated** cells resembling the normal **cortical fasciculata zone**.

Notes:

- Clinical Features of Cushing Syndrome :
Moon face, truncal obesity and purple striae. (due to high cortisol)
- Causes of Cushing Syndrome:
 - ACTH-DEPENDENT
 1. Cushing disease (pituitary adenoma).
 2. Ectopic corticotrophin syndrome
 - ACTH-INDEPENDENT
 1. **Adrenal adenoma (the cause in this case)**
 2. Adrenal carcinoma
 3. Macro nodular hyperplasia
 4. Primary pigmented nodular adrenal disease