

Cases:

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

Pathology

Practical



432 Pathology Team

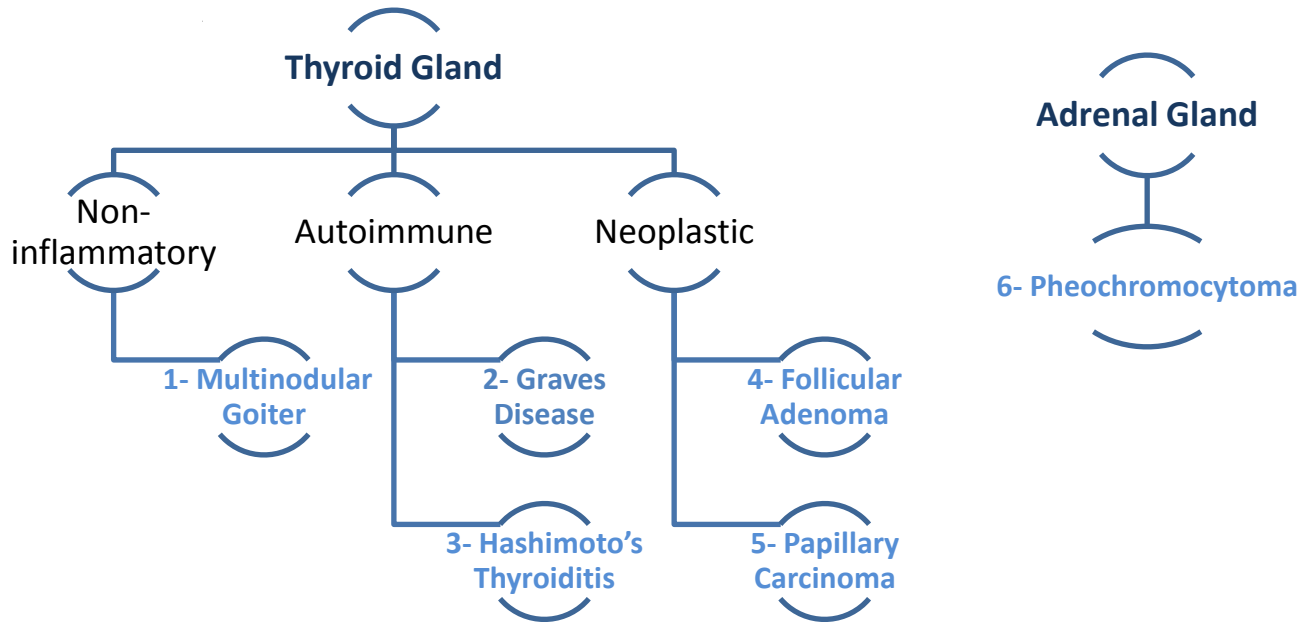
Done By: Noor Al-Zahrani & Roqaih Al-Dueb

Reviewed By: Abdulrahman Arj & Khulood AlRaddadi

Endocrine Block



Mind Map



(1) Multinodular goiter

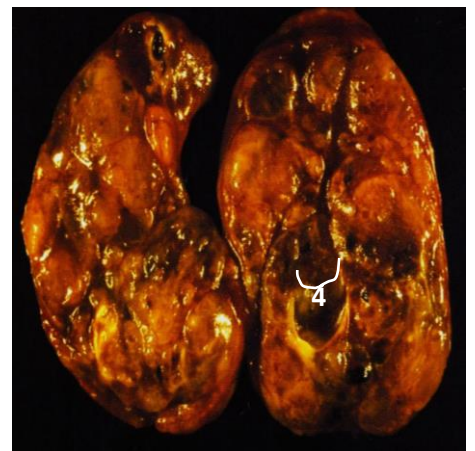
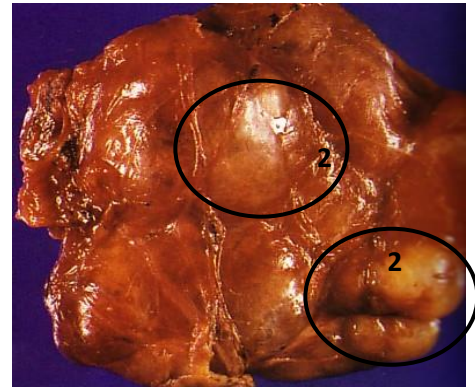
Goiter is the clinical term of thyroid enlargement, mostly caused by lack of iodine in water and food supply.

Gross Features:

- 1) **Asymmetric (irregular) enlargement** due to multiple nodules.
- 2) **Multinodular.**
- 3) Haemorrhage.
- 4) **Cystic degeneration.**

- Mostly they're **benign**, and they contain large amount of colloid → other name: **Colloid Goiter.**

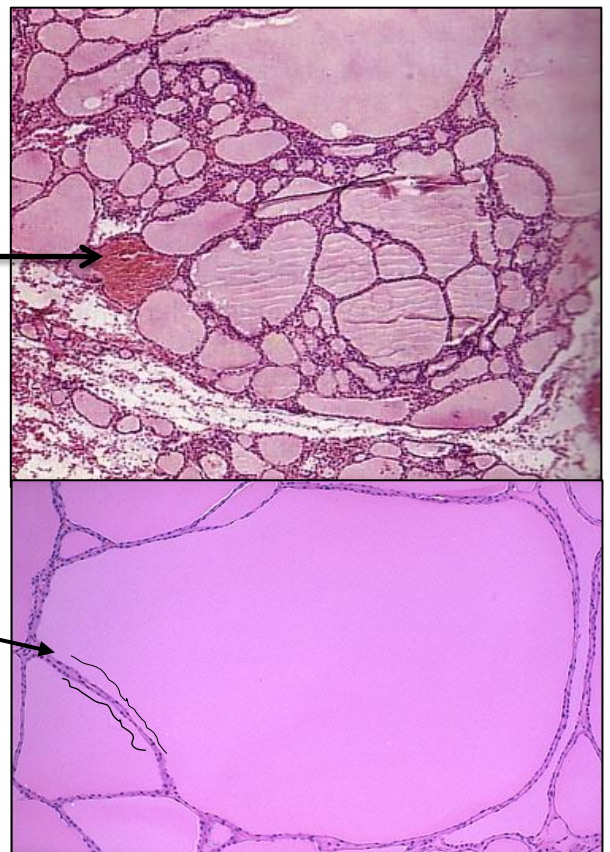
- Lab results of Thyroid Function test **will be normal** in Multinodular goiter.



Histopathological Features:

- **Numerous follicles varying in size filled with colloid.**
- * We can also see:
 - Recent **haemorrhage**
 - **Haemosiderin laden macrophages**
 - **Cystic degeneration**
 - Calcification (Not clear)

The follicles are irregularly enlarged, with **flattened lining cuboidal epithelium** and filled with **increased colloid** but it's inactive (not toxic).



(2) Thyrotoxicosis

HYPER-THYROIDISM, *Clinical features:*

- Hypermetabolism → weight loss.
- Tachycardia, palpitations.
- Low TSH and increased T3, T4.
- Goiter.
- Exophthalmos: "Protrusion of eye globes with retraction of eyelids caused **by increased retro-orbital connective tissue.**"
- Tremor.
- GI hypermotility.
- Thyroid "storm" (life threatening).



Graves' disease, Thyrotoxicosis:

Gross Features:

- **Symmetrical** enlargement of thyroid gland.
- Cut-surface is **homogenous, soft and appears meaty.**

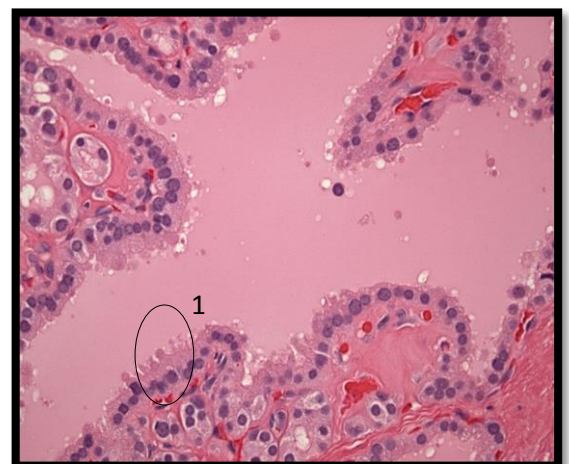
It is an autoimmune disease. The patient can have elevated T3 and T4 with depressed TSH



Histopathological Features:

- 1) Thyroid follicles **lined by columnar and high cuboidal cells** with evidence of **peripheral vacuoles (white patches at the periphery) and intrafollicular colloid material.** "Scalloped appearance".
- 2) Lymphocytic infiltration of the thyroid gland is sometimes seen in thyrotoxicosis.
- 3) **Hyperplasia and hypertrophy of follicular cells.**

Note the presence of peripheral smaller thyroid follicles devoid of colloid but lined by similar cells



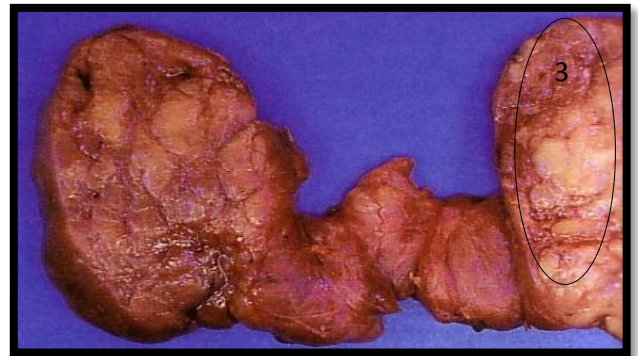
Scalloping feature: inward growth of the follicles.

(3) Hashimoto's thyroiditis

Gross Features:

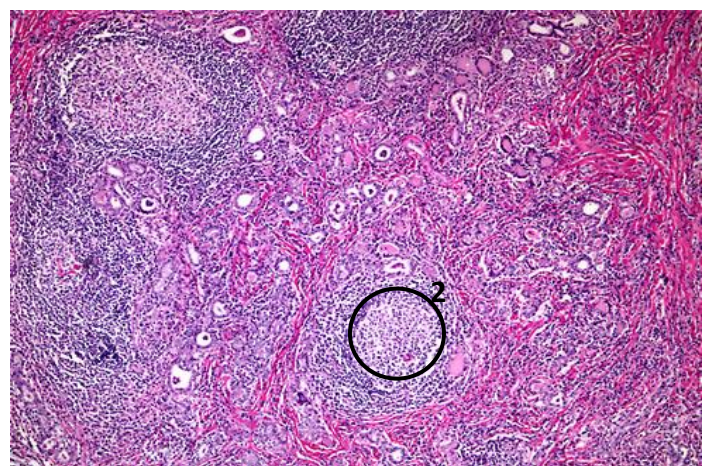
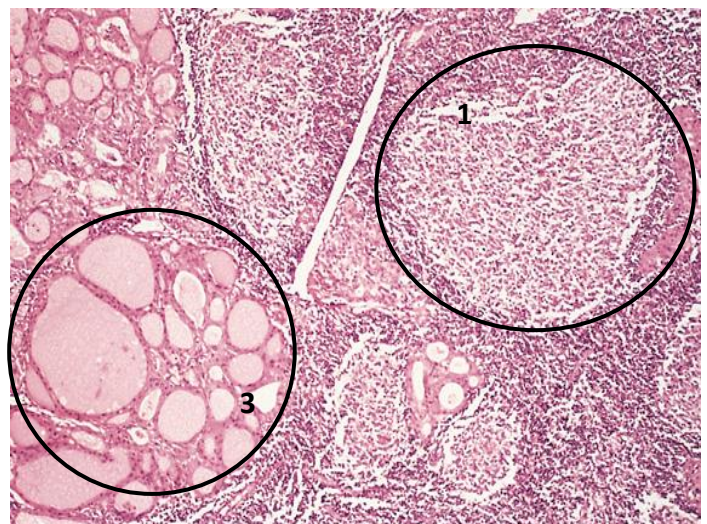
1. Diffuse enlargement.
2. Firm or rubbery.
3. Pale, yellow-tan, firm & somewhat nodular cut surface.

It is an autoimmune disease.



Histopathological Features:

- Massive (1) **lympho-plasmcytic** infiltration with lymphoid follicles & (2) germinal cells formation.
- (3) **Destruction of thyroid follicles.**
- Remaining follicles are small and many are lined by **Hürthle cells.**
- Increased interstitial connective tissue.



The diagnosis of Hashimoto thyroiditis requires not only lymphoid follicles in the thyroid, but **SECONDARY follicles** (i.e., germinal centers) & plasma cells should be present.

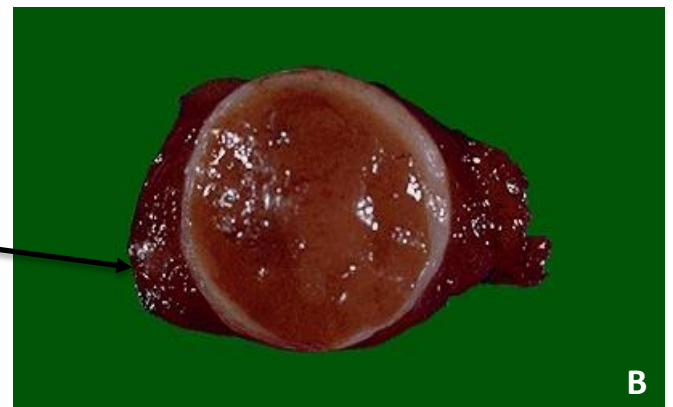
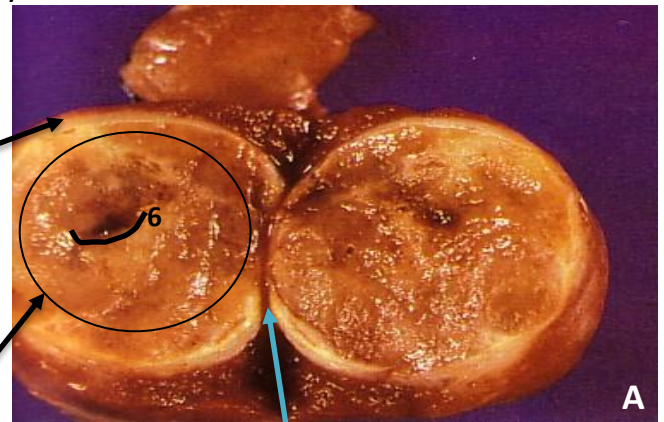
If the thyroid gland looks like a lymph node, the diagnosis is Hashimoto thyroiditis, Hashimoto = autoimmune

(4) Follicular Adenoma

EXTREMELY well encapsulated **benign** tumor. **Excision is curative**. This adenoma is a well-differentiated neoplasm because it closely resembles normal tissue.

Gross Features:

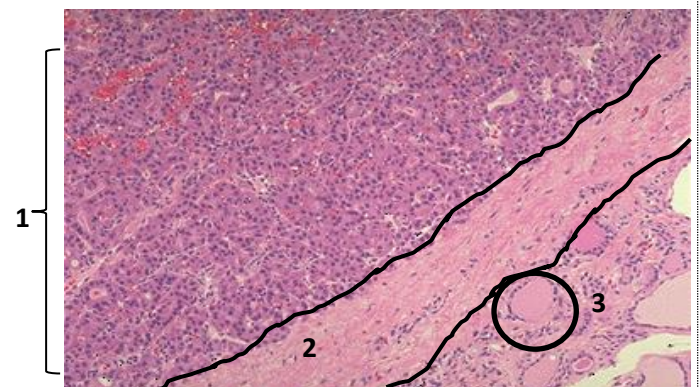
1. Solitary.
2. Variably sized.
3. **Encapsulated** (thick and whitish).
4. **Well-circumscribed**.
5. With homogenous gray-white to red-brown cut-surface.
6. +/- degenerative changes.
7. Same features, with unremarkable surrounding thyroid tissue.



Histopathological Features:

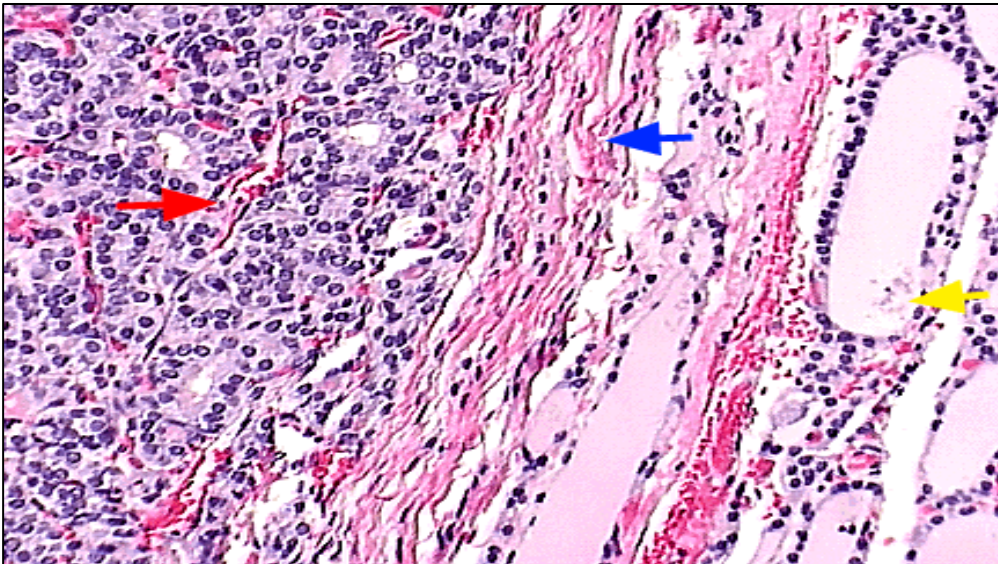
1. **Proliferating small thyroid follicles** containing colloid and **showing benign features (minimal atypia)**.
2. It is surrounded by a **fibrous capsule**.
3. **Compressed normal thyroid tissue**.

* (No capsular\vascular invasion).

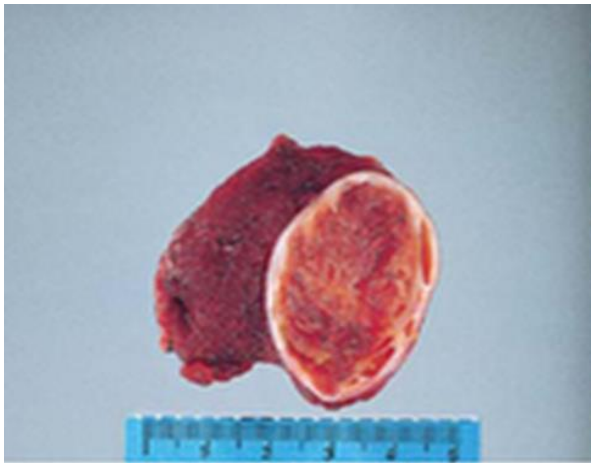


NOTES:

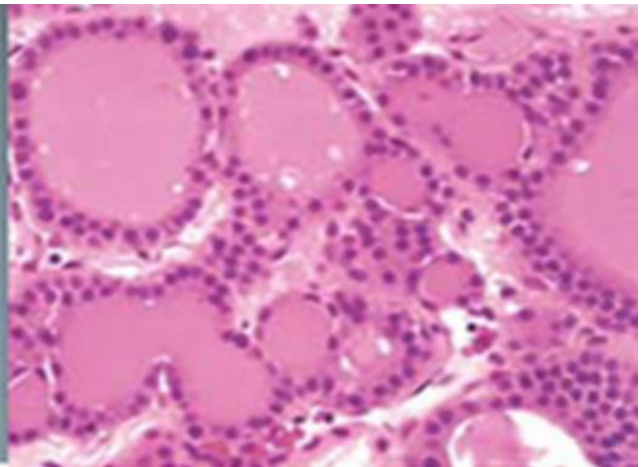
- It is sometimes difficult to tell a well-differentiated follicular **carcinoma** from a follicular **adenoma**. Thus, patients with follicular neoplasm are treated with **subtotal thyroidectomy** to be on the safe side.
- The follicles of the adenoma contain colloid, but there is greater variability in size than normal (it closely resembles normal tissue) → **Excision is curative**.



- The **red arrow** is located within the adenoma. Although composed of follicular cells, little colloid is seen.
- The **blue arrow** points to the capsule of the adenoma, a few strands of connective tissue.
- The **yellow arrow** points to colloid within a large normal follicle.



Follicular adenoma of the thyroid. A solitary, well-circumscribed nodule



well-differentiated follicles resembling normal thyroid parenchyma

(5) Papillary thyroid carcinoma

This neoplasm can be multifocal, because of the propensity to invade lymphatics within thyroid, and lymph node metastases are common.

- **Other carcinomas: Follicular, Medullary, Anaplastic**

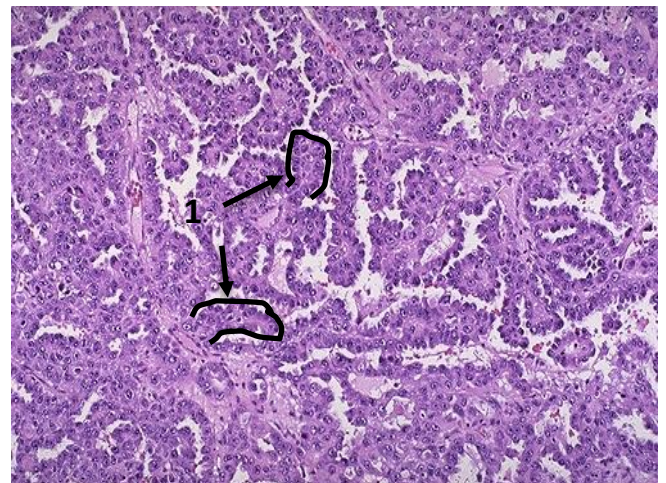
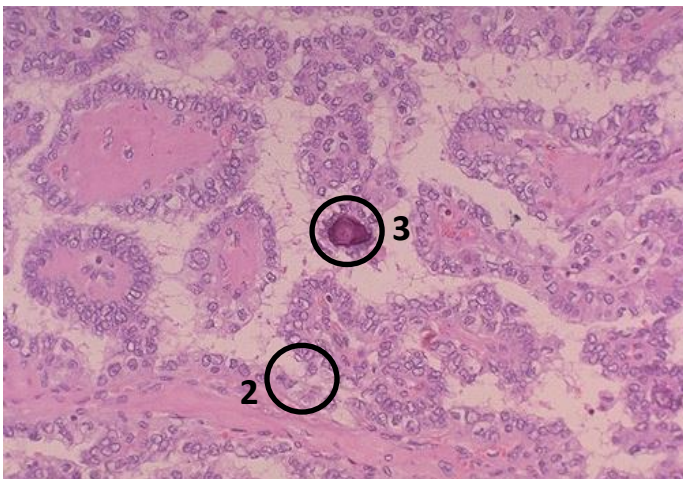
Gross Features:

1. A relatively well circumscribed.
 2. Pale and firm nodule.
 3. A whitish cut surface with vague scattered papillary areas. (papillae can be seen on gross but not in this picture).
- Patient will present with thyroid nodule then the clinician should ask for fine needle aspiration.



Histopathological Features:

1. Papillary structure "fronds" (1).
2. Overlapping clear nuclei (Orphan Annie nuclei) lining papillary areas (2).
3. Calcified Psammoma bodies (3).



****Very Important**

Nuclear features of Papillary Carcinoma:

- 1- Nuclear grooving.
- 2- Orphan Annie Nuclei.
- 3- Intra-nuclear inclusions.

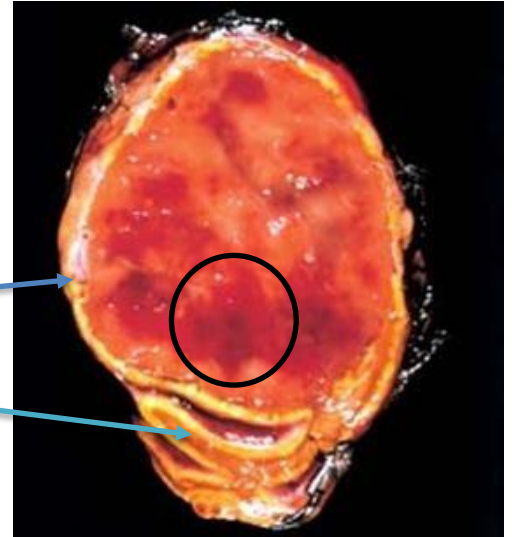
- Orphan Annie cells are seen in papillary carcinoma in which considerably cytoplasm has invaginated into the nucleus.
- **Serum calcitonin is normal in papillary thyroid carcinoma but is increased in cases of medullary carcinoma.**
- Good prognosis if it is removed and more common in young female.
- While anaplastic has bad prognosis and it's more common in elderly.

(6)Pheochromocytoma

- Medullary tumor.
- The clinical features and the investigations will determine whether it's benign or malignant.
- **Origin: neuroendocrine cells (chromaffin cells).**

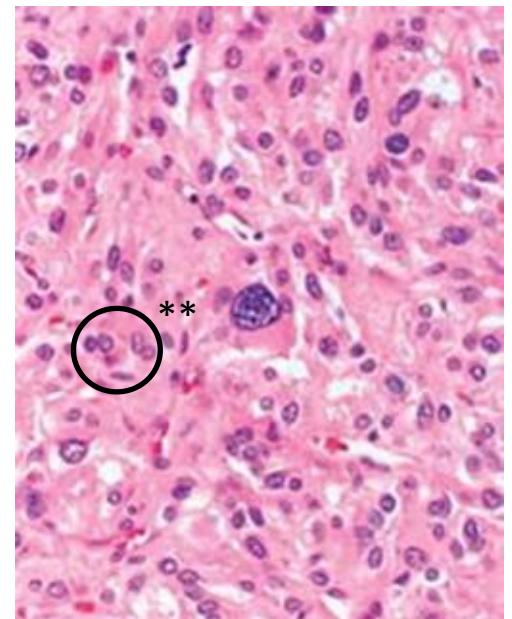
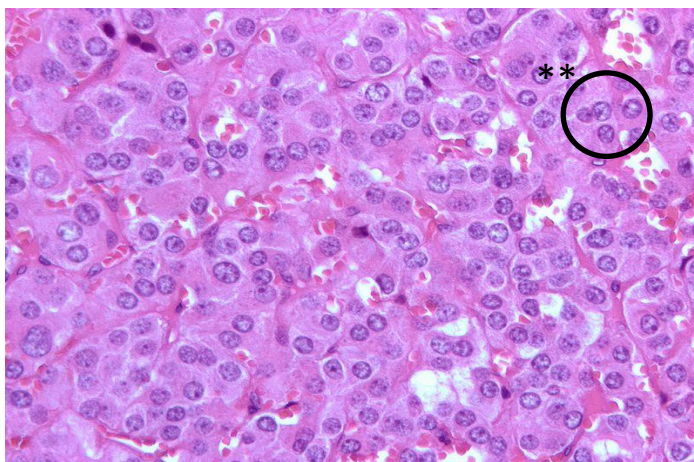
Gross Features:

1. Well circumscribed **medullary adrenal mass**.
2. Tumor has a **hemorrhagic** cut surface (circle).
3. **Compressed adrenal cortex**.
4. **Residual adrenal gland**.



Histopathological Features:

1. **Nests of cells (Zellballen) pattern**.
2. Pleomorphic cells with abundant eosinophilic cytoplasm and **"salt and pepper" chromatin** ** in some cells (this feature is seen in all neuroendocrine tumors).
3. The cells are **polygonal to spindle shaped**.



- Patient presents usually with **hypertension**, and common in young male.
- Laboratory test that help to confirm the diagnosis of pheochromocytoma:
Increased **urinary** excretion of:
 1. Catecholamines
 2. Metanephrines
 3. VMA (Vanillyl mandelic acid).

Summary

	Cases	Gross	Microscope
1	Multinodular goiter	1- Asymmetric enlargement. 2- Multinodular & Haemorrhage. 3- Cystic degeneration.	1- Numerous enlarged follicles. 2- Calcification & Haemorrhage. 3- Haemosiderin macrophages.
2	Thyrotoxicosis	1- Symmetrical enlargement. 2- Homogenous. 3- Soft and meaty.	1- Columnar and high cuboidal cells. 2- Peripheral vacuoles "Scalloping". 3- Lymphocytic infiltration.
3	Hashimoto's thyroiditis	1- Symmetrical diffuse enlargement. 2- Yellowish-nodular cut surface.	1- Lympho-plasmcytic infiltration. 2- Hurthle cells. 3- Destruction of thyroid follicles.
4	Follicular Adenoma	1- Encapsulated. 2- Well-circumscribed. 3- Homogenous cut-surface.	1- Proliferating small thyroid follicles. 2- Well-defined fibrous capsule. 3- Compressed normal tissue.
5	Papillary thyroid carcinoma (PTC)	1- Well circumscribed nodule. 2- Vague scattered papillary areas.	1- Papillary projections. 2- Orphan Annie cells. 3- Psammoma bodies.
6	Pheochromocytoma	1- Well circumscribed. 2- Haemorrhage. 3- Compressed cortex.	1- Nests of cells (Zellballen). 2- Salt and pepper chromatin. 3- Pleomorphic cells.

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Good Luck ^_^

اللهم إني استودعك ما قرأت و ما حفظت و ما تعلمت فرده عليّ عند حاجتي إليه انك على كل شيء قدير

If there is any mistake or feedback please contact us: 432PathologyTeam@gmail.com