

Pathology OSPE

Endocrine Block

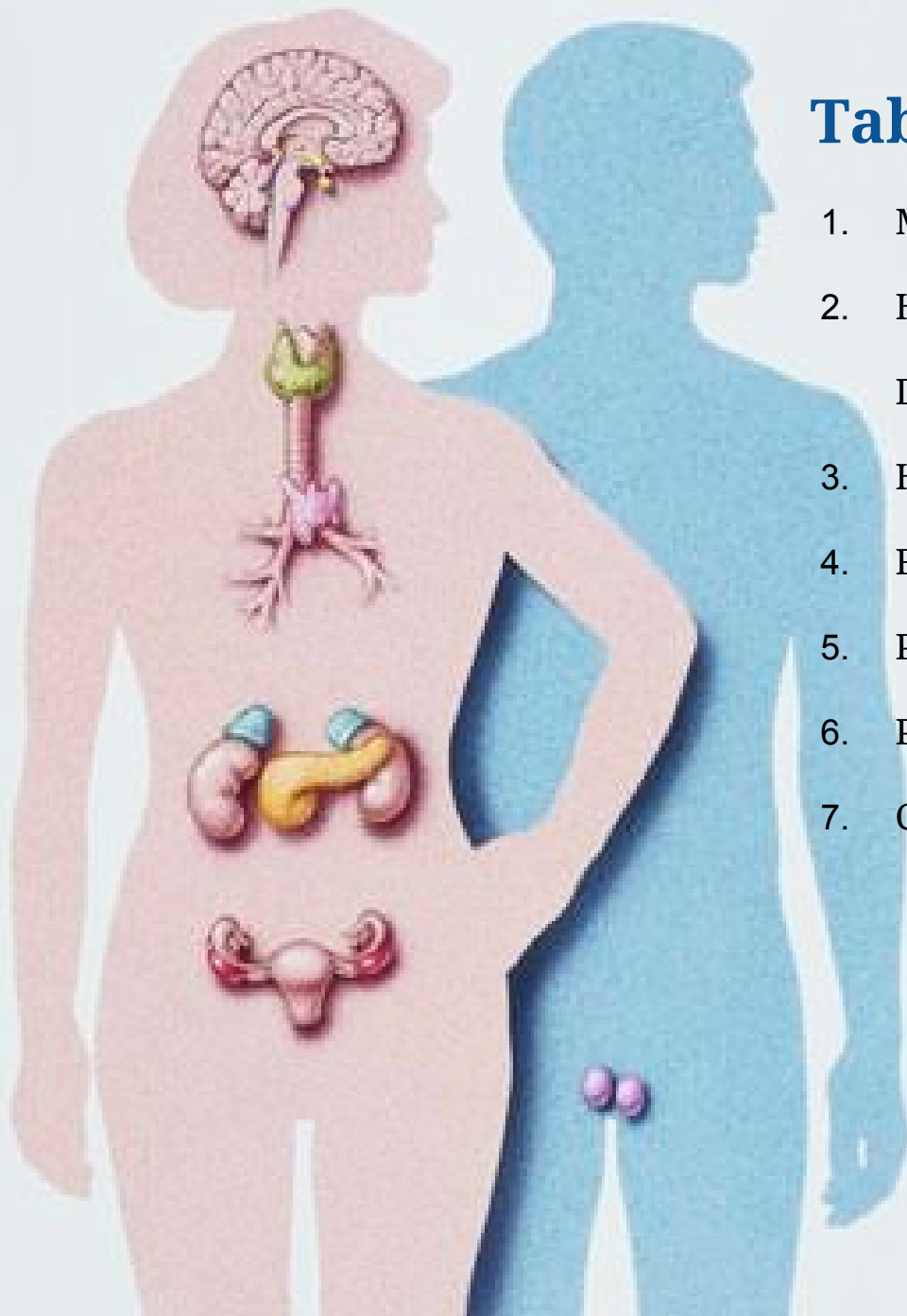


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Blue = Doctor's notes.
Red = Important.
Grey = Extra.

Multinodular Goiter

Definition: Markedly **enlarged and nodular** thyroid gland.

Causes:

1. Endemic goitre is caused by iodine deficiency in certain areas.
2. Hereditary enzymatic defects leading to dysshormonogenetic goitre.

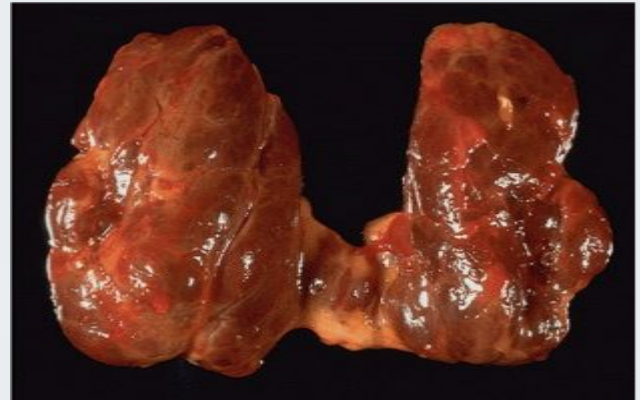
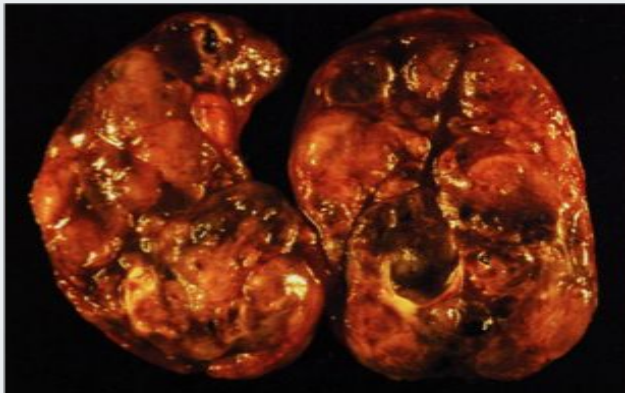
Complications: Airway obstruction, Dysphagia, Compression of large vessels in the neck.

- Endemic in the mountains "Himalayas"

Picture: Huge Multiple enlargement nodules in the anterior and lateral aspect of the neck.

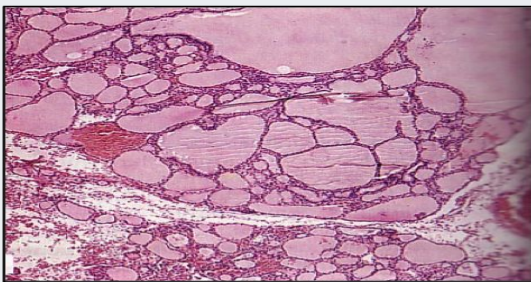


Gross

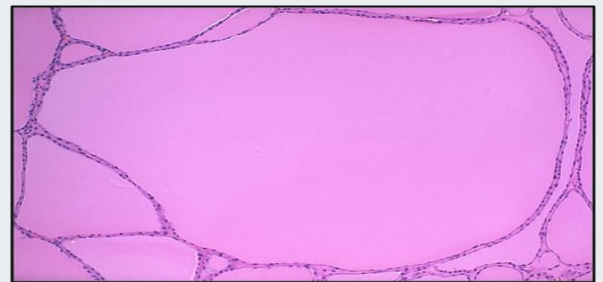


- a. Asymmetric enlargement of the gland
- b. Cut section shows cystic hemorrhage
- c. Heterogeneous cut section with multiple nodules
- d. This patient was euthyroid

Microscopic



1. Enlarged smooth colloid follicles.
2. Follicles are lined by flat epithelium & contains colloid
3. Recent haemorrhage
4. Haemosiderin
5. Calcification & cystic degeneration.



1. Enlarged smooth colloid follicles.
2. Follicles are lined by flat epithelium & contains colloid

Hyperthyroidism & Grave's Disease

Definition: Hypermetabolic state caused by elevated circulating levels of free T3 and T4. More common in female.

Clinical features:

- Hypermetabolism.
- **Primary:** high T3,T4 with LOW TSH as in GRAVES & toxic thyroid adenoma.
- **Secondary:** HIGH T3 ,T4 , and HIGH TSH [as pituitary adenoma (rare)]
- **Symptoms:** Goiter, Exophthalmos (proptosis), Increases in sympathetic activity: tachycardia, palpitations, tremors, GIT hypermotility ...etc

Cause: Autoantibodies (IgG Ab) that mimic the action of TSH on its receptors on the thyroid gland. (LATS)

Complications: Thyroid storm → life threatening condition requires a medical emergency.

Treatment: thioamides, radioactive Iodine ...etc

Gross

1. Symmetrical enlargement of thyroid gland
2. homogeneous cut-surface
3. hyperplasia



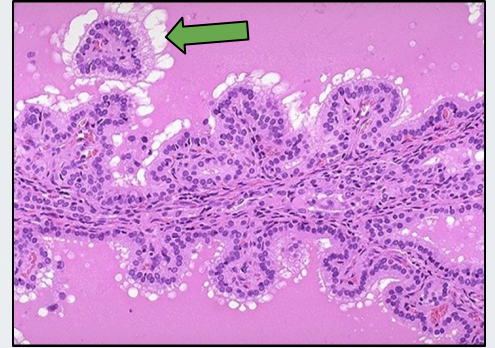
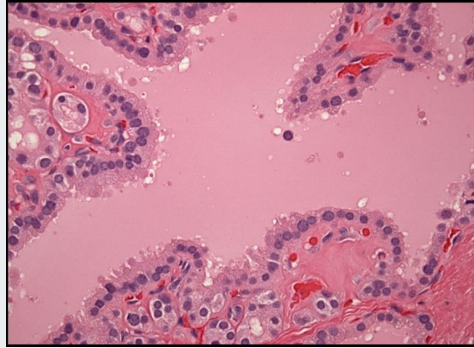
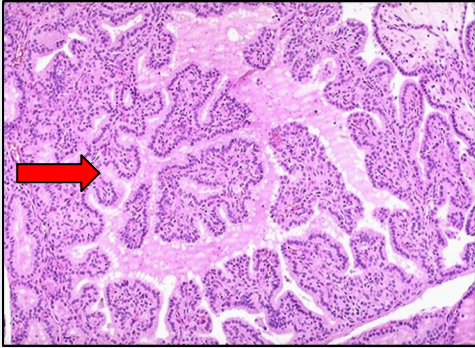
Exophthalmos: Proptosis, Lid lag , Lid retraction , Peri-ocular fat deposition and Scleral rim above the iris.

causes:

1. Lymphocytic infiltration
2. Connective and fat tissues accumulation
3. Edema



Microscopic



1. hyperplastic follicular epithelium
2. scallop colloid.
3. peripheral clear vacuoles within the colloid material (green arrow).
4. Infolding of hyperplastic follicular epithelium (red arrow).
5. Columnar & cuboidal cells.

This features indicate hyperfunctioning gland

Hashimoto's Thyroiditis

Definition: Is an autoimmune, **T cell mediated** inflammation leading to destruction of thyroid gland leading to gradual thyroid failure .

Incidence:

- Female predominance of (10:1) to (20:1), Age 45-65.
- The most common cause of hypothyroidism

Causes: Thyroid autoantibodies (anti-peroxidase thyroid antibodies, anti-thyroglobulin antibodies) → can be detected in serum.

Associated genes: Associated with HLA-DR5 and HLA-B5

Lab tests: The main two lab tests are “anti-peroxidase antibody, anti-thyroglobulin antibodies, TSH will be high and T4 is low

Complications: **B cell lymphoma, papillary carcinoma.**

Treatment: Replacement therapy with synthetic thyroid hormone preparations

Gross

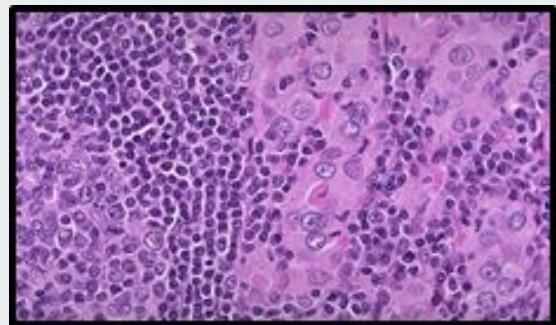
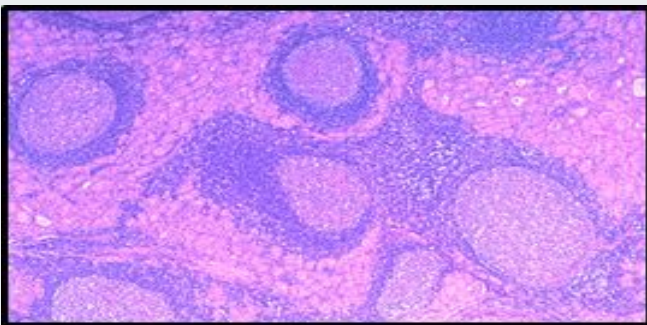


1. Diffuse enlargement.
2. Firm or rubbery.
3. Pale yellow and somewhat nodular cut surface.



This symmetrically small thyroid gland demonstrates atrophy.

Microscopic



1. lymphoid follicles with germinal centers.
2. Pink **Hürthle cells** with abundant eosinophilic granular cytoplasm & abundant mitochondria.
3. Plasma cells & lymphocytic infiltration.

Follicular Adenoma

Definition: benign neoplasms derived from follicular epithelium. Cold nodules (uptake radioactive iodine).

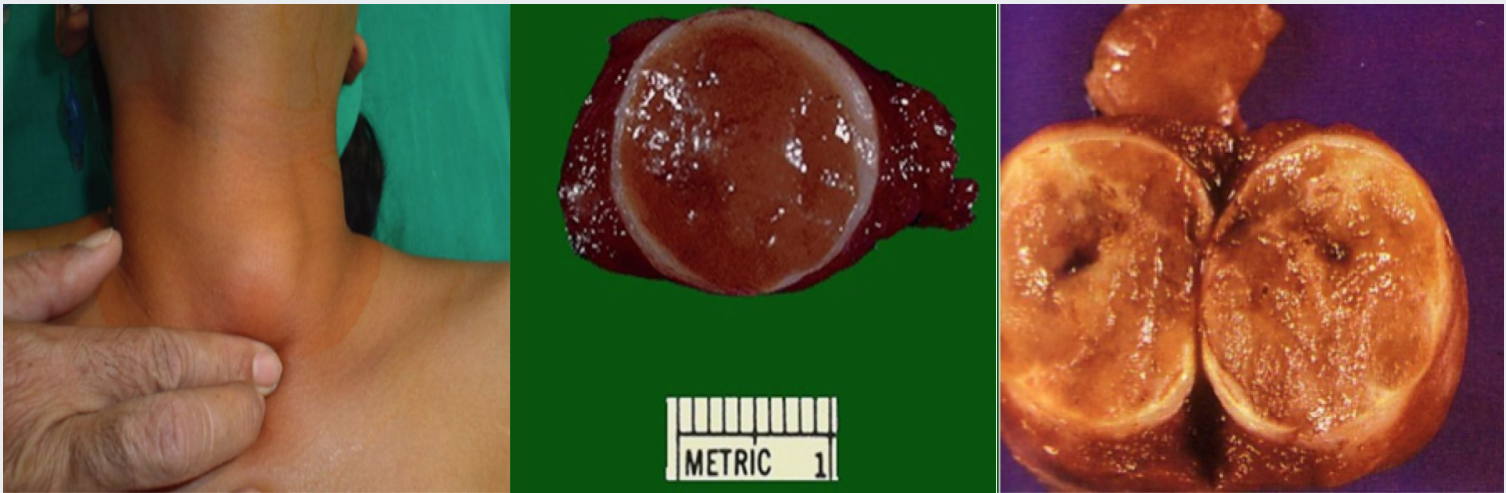
Clinical features: Painless nodule often discovered during physical examination.

Risk factors: Solitary nodules,

Complications: larger masses may cause difficulties in swallowing

Treatment: Excision → good prognosis (not metastasize)

Gross

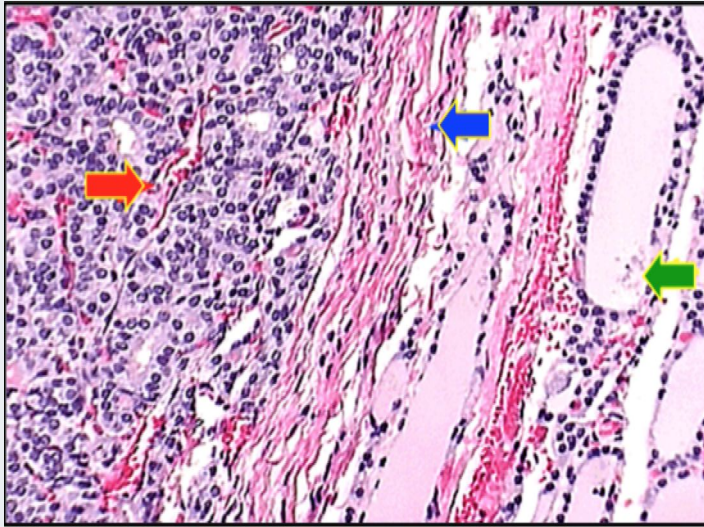


solitary thyroid nodule at the anterior neck

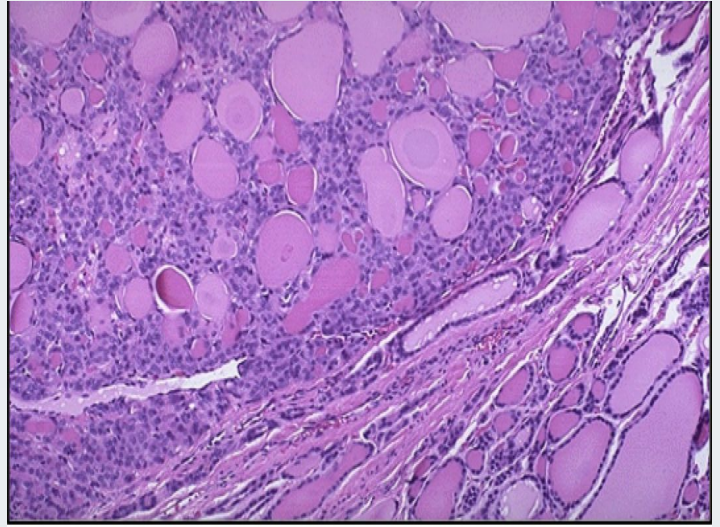
- 1. well circumscribed encapsulated tumor**
- 2. brown cut surface with area of hemorrhage**

Microscopic

Follicular Adenoma-LPF



Follicular Adenoma-HPF



- **Red arrow** Adenomatous hyperplastic crowded follicles (little colloid)
- **Blue arrow** → Intact capsule
- **Green arrow** → colloid within a large normal follicle. (outside the tumor)

- **Lower right:** normal thyroid follicle.
- **Center to upper left:** adenomatous hyperplastic crowded follicles.

Q1. How can you differentiate between follicular adenoma & follicular carcinoma? (Regarding this case)

In adenoma there is no capsular and vascular invasion.

Q2. Features that indicate malignant transformation in cortical adenoma (Regarding Cushing syndrome case) :

- Large weight of the lesion (more than 300 g).
- Cellular anaplasia
- No Capsule or invasion of the capsule.

Papillary Thyroid Carcinoma

Definition: Malignant tumor of thyroid gland.

Incidence: **Most common type of carcinoma**, Mostly in female between 25-50 (**younger female**).

Clinical features: Asymptomatic Solitary or multifocal cold nodules.

Causes: Hashimoto's thyroiditis can predispose to it.

Risk factors: ionizing Radiation

Associated genes: RET , NTRK1 and BRAF

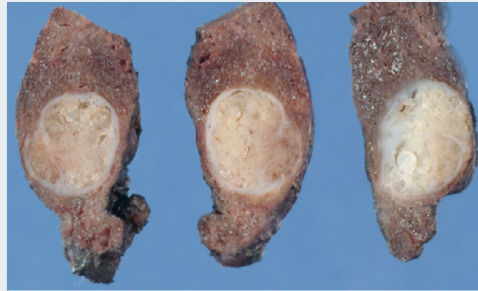
Complications: Metastasize to the cervical lymph node

Prognosis: good in early stages, but bad in tall cell variant. **Treatment:** Surgery or radioactive iodine.

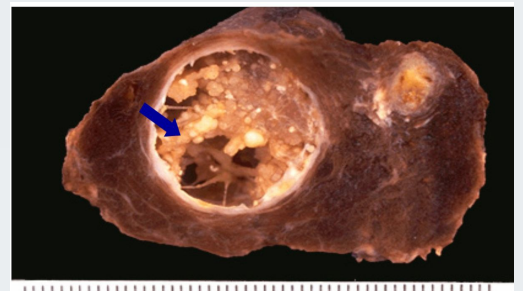
Gross



Huge mass at the anterior neck

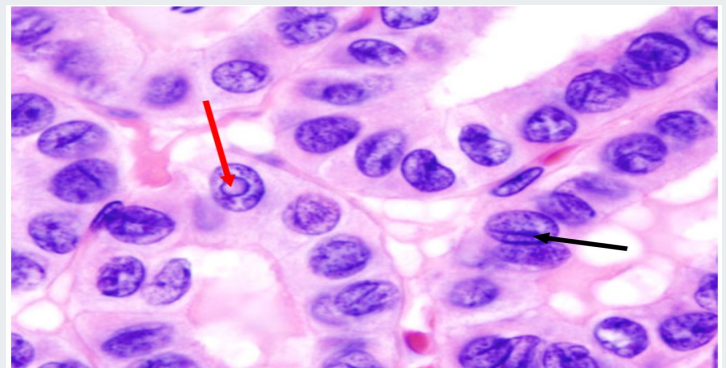
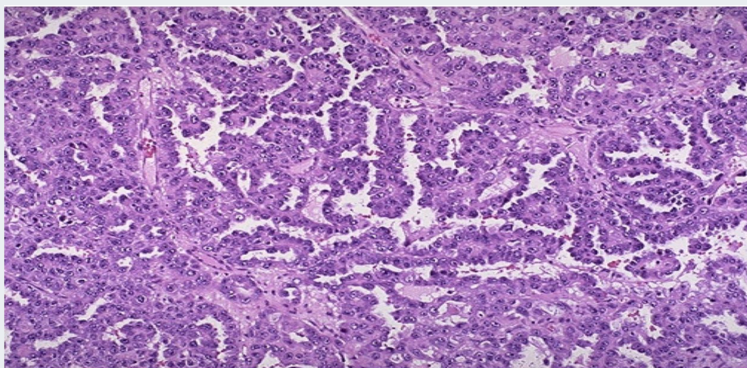


- Well circumscribed pale and firm nodules.
- Whitish scattred papillary areas.



- Well circumscribed nodules
- Multifocal
- Cystic mass contains papillary excrescences (blue arrow).

Microscopic



- Papillary configuration “elongated epithelial lining with fibrovascular core”.
- Orphan annie nuclei.
- Coffee bean nuclei. (Grooved) (Black arrow)
- Intranuclear inclusion. (red arrow)
- Calcified psammoma bodies.

Pheochromocytoma 10% tumor

Definition: Catecholamines producing tumor of chromaffin cells of adrenal medulla.

Rule of 10%: Familial-Malignant-Extramedullary.

Clinical features: Palpitation, tachycardia, tremor, anxiety, **headache**, pallor, nausea, **sweating**, episodic **HTN and hypertensive crisis**.

Associated with: familial syndromes such as: - MEN 2 A and B syndrome. - Von-Hippel-Lindau disease. - Von Recklinghausen's disease.

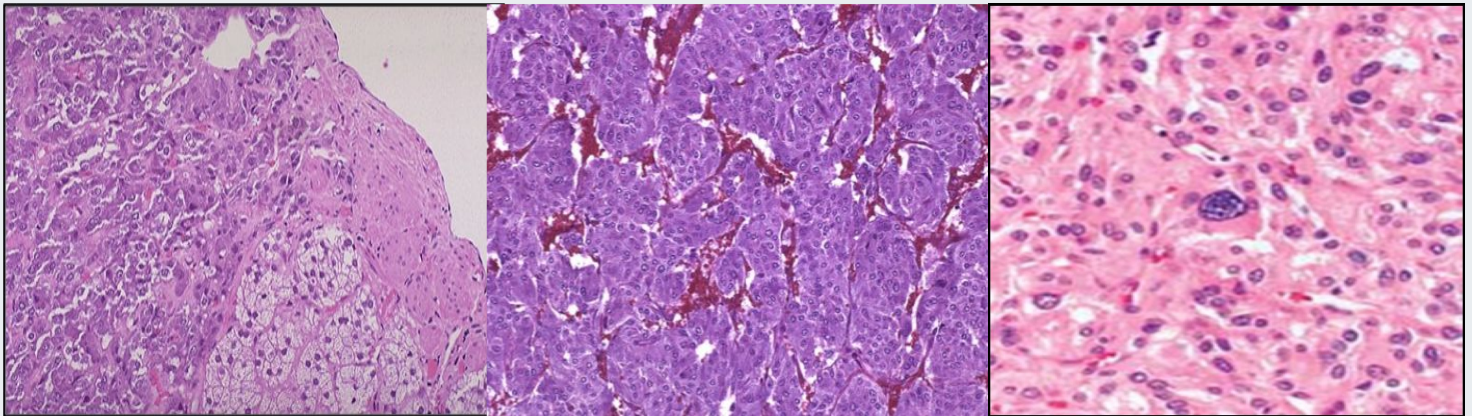
Treatment: Surgical excision.

Gross

1. Tumor arising from the medulla which is grey hemorrhagic in the cut surface.
2. Remnant of the normal adrenal gland

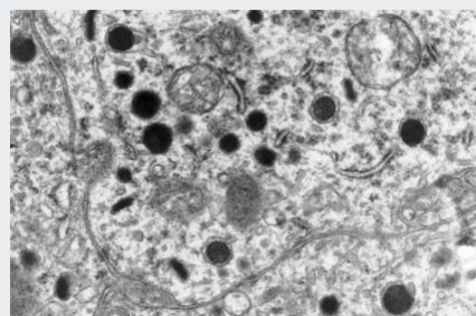


Microscopic



- 1-Enlargement polymorphism abundant eosinophilic cytoplasm.
- 2-Trabecular and circular proliferation of tumor cells“zile ballen pattern”
- 3-Spindle cells with abundant granular eosinophilic cytoplasm.

Neurosecretory granules in EM



Cushing Syndrome

Definition: a metabolic disorder caused by High levels of **cortisol hormone in serum.**

Clinical features: Weight gain- Rounded face- Hirsutism - weakness - thin skin
Causes:

1. ACTH **dependent** as such cushing disease and small cell carcinoma
2. ACTH **independent.** such as adrenal tumors and Glucocorticoids therapy

Complications: Glucose intolerance , Osteoporosis, HTN, peptic ulcer , depression

Treatment: Treat the underlying aetiology.

you can differentiate between adenoma and carcinoma by Louis characteristics

“weight, size, capsular and vascular invasion...”

Gross "Cortical Adenoma "



Classical Moon face appearance.

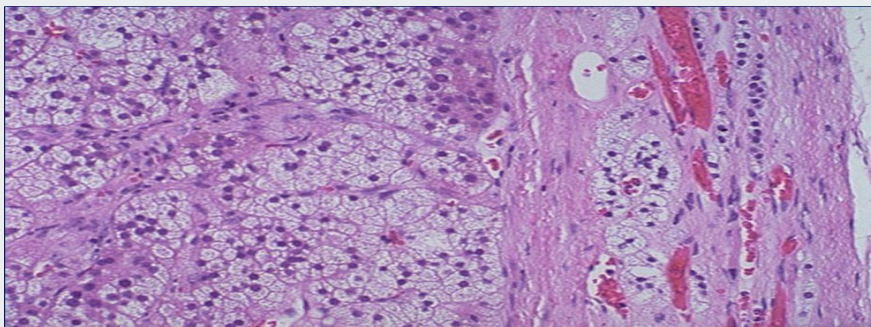


- Abdominal striae.
- Central obesity

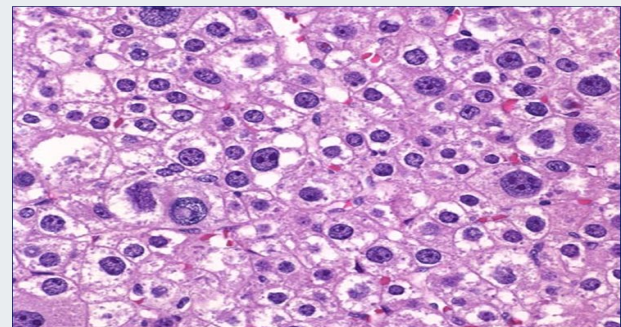


- Tumor arising from the cortex.
- Well encapsulated lesion.
- Surrounded by atrophic adrenal gland.
- Gold yellow cut surface and hemorrhage.

Microscopic "Cortical Adenoma "



- Left normal adrenal zona fasciculata.
- Intact capsule of this benign neoplasm is at the right.
- Hyperplastic cortical adenoma cells that resemble that normal one.



- Cellular pleomorphism
- Hyperchromatism
- Prominent nucleoli.

so this case of cushing's is caused by adrenal adenoma

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**THE HARDER
YOU WORK FOR
SOMETHING,
THE GREATER
YOU'LL FEEL WHEN
YOU FINALLY
ACHIEVE IT.**
KUSHANDWIZDOM