

# DISEASES OF PITUITARY GLAND

- Dr. Tariq Aladily
- [tnaladily@ju.edu.jo](mailto:tnaladily@ju.edu.jo)
- Department of Pathology
- The University of Jordan

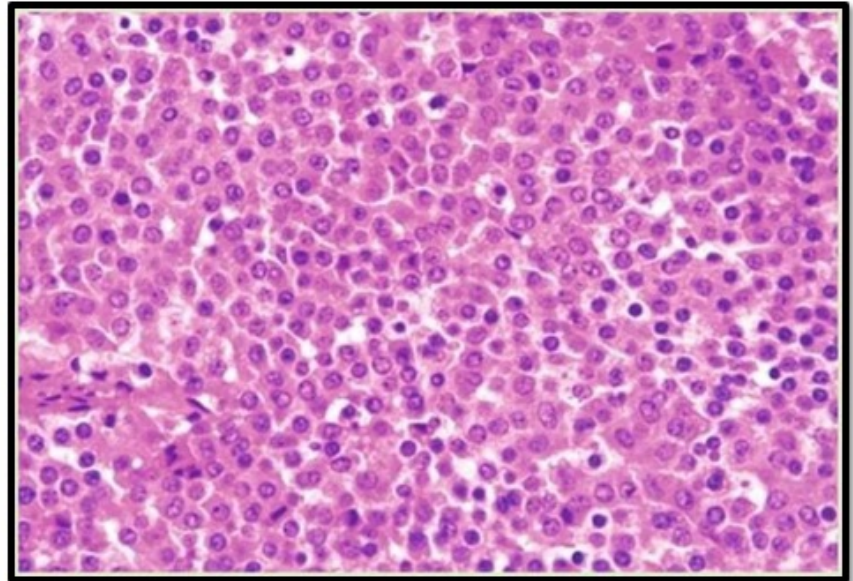
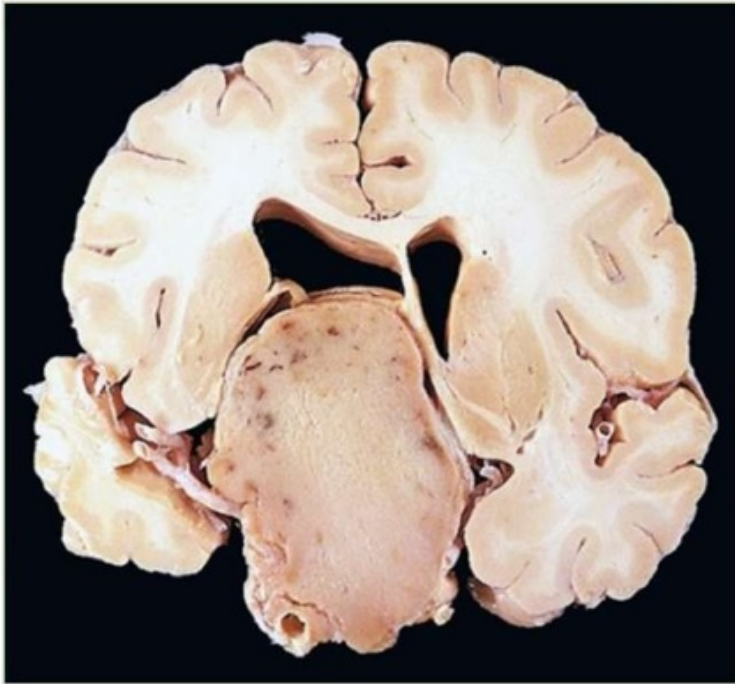


# ANTERIOR PITUITARY ADENOMA

- The most common pituitary tumor
- Can be functional or non-functional
- Called microadenoma if size  $\leq 1$  cm, very common, incidental finding, can be functioning
- Called macroadenoma if size  $> 1$  cm
- Large non-functional adenoma causes hypopituitarism
- May cause symptoms related to mass-effect (increased intracranial pressure, optic nerve compression, hydrocephalus)
- Histologic morphology does not correlate with functional status



# MORPHOLOGY



# LACTOTROPH ADENOMA (PROLACTINOMA)

- The most common functioning pituitary adenoma (30%)
- Dystrophic calcification is common (pituitary stones)
- Causes amenorrhea, galactorrhea, infertility and loss of libido
- Symptoms are less obvious in men and post-menopausal women (more chance to reach large size)
- High prolactin causes endothelial dysfunction and insulin resistance (cardiovascular diseases)
- Diagnosis: very high level of serum prolactin
- Mild increase in serum prolactin may accompany other types of pituitary adenoma or hypothalamic diseases due to interference with the normal inhibitory control of dopamine causing lactotroph hyperplasia
- Chronic renal failure: decreased clearance of prolactin
- Primary hypothyroidism: high TRH increases prolactin secretion
- Drugs blocking dopamine receptor (anti-depressants)



# SOMATOTROPH ADENOMA

- Growth-hormone secreting adenoma
- Second most common functional PA, non-functional SA is rare
- Commonly reach large size
- Gigantism in children (long bones)
- Acromegaly in adults (skin, soft tissue, viscera)
- Also causes diabetes, hypertension, GI cancer, gonadal dysfunction
- May accompany lactotroph adenoma (mammosomatotroph)
- Microscopy: densely and sparsely granulated variants (the latter is more aggressive and non-responsive to somatostatin therapy)



# CORTICOTROPH ADENOMA

- Functional adenomas produces ACTH causing hypersecretion of adrenal cortisol causing Cushing Disease
- Commonly microadenoma, densely or sparsely granulated
- Crooke cell adenoma: another variant, showing ring-like cytokeratin protein inside the cells, clinically aggressive
- Proopiomelanocortin (POMC): precursor of ACTH, stains positive for PAS stain
- Cushing Syndrome: central obesity, hypertension, hyperglycemia
- Nelson syndrome: secondary to bilateral adrenalectomy, progressive enlargement of PA causing tumor effect, skin hyperpigmentation (POMC  $\square$  melanotropin)



# GONADOTROPH ADENOMA

- Usually produces small amounts LH and FSH hormones (silent)
- Most symptoms are related to mass-effect or hypopituitarism (impaired secretion of LH □ loss of libido, amenorrhea)
- Rarely secrete large amount of LH/FSH □ macroorchidism, hyperspermia, ovarian hyperstimulation



# THYROTROPH ADENOMA

- TSH-producing adenoma, uncommon (<1% of PA)
- Rare causes of hyperthyroidism

## PLURIHORMONAL ADENOMA

- Secrete multiple hormones, clinically aggressive

## NULL CELL ADENOMA

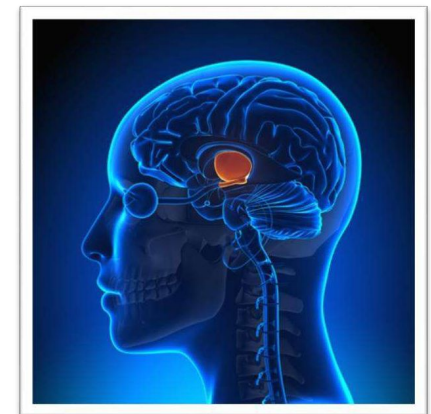
- \* Do not express any markers of hormones, not differentiated





# PITUITARY APOPLEXY

- Rare condition that complicates pituitary adenoma
- Sudden hemorrhage in pituitary gland causing acute enlargement and damage
- Symptoms of increased intracranial pressure (severe headache, nausea, vomiting, visual disturbance)
- Symptoms of hypopituitarism
- Loss of ACTH causes hypotension and hypoglycemia (fatal)
- Critical condition, neurosurgical intervention
- A similar but milder condition results from pituitary infarction secondary to ischemia (Sheehan syndrome), occurs in post partum hemorrhage



# PITUITARY CARCINOMA

- Rare, <1% of pituitary tumors
- Most are functional (prolactin or ACTH-secretion is most common)
- Differentiated from PA by metastasis

## **PITUITARY BLASTOMA**

- Malignant pituitary tumor, arises in children <2 years
- Morphologically undifferentiated cells (blastema)
- Cushing syndrome is common



# DISEASES OF POSTERIOR PITUITARY GLAND

## **Diabetes Insipidus (DI)**

- Deficiency in anti-diuretic hormone (ADH), called “central DI”
- Results in inability of kidneys to reabsorb fluids (polyurea, polydipsia, dehydration)
- Results from head trauma (including brain surgery), hypothalamic diseases (tumors, inflammation)
- Can be genetic: mutation in arginine vasopressin or its receptor
- Nephrogenic DI: kidney is unresponsive to ADH (similar symptoms)



# SYNDROME OF INAPPROPRIATE ADH SECRETION (SIADH)

- Results in over-reabsorption of water in kidneys (oligourea, hyponatremia, cerebral edema, brain dysfunction)
- Although total body fluid is increased, blood volume remains normal, no peripheral edema
- Usually caused by a paraneoplastic syndrome (small cell carcinoma of lung)
- Also caused by drugs, CNS inflammation or trauma



# CRANIOPHARYNGIOMA

- Suprasellar tumor, arises from the vestigial epithelium of Rathke pouch
- Slowly growing tumor
- Bimodal age distribution (children 5-15, old >65 years)
- Presentation: hypopituitarism (Dwarfism in children), DI, tumor effect (in adults)
- Adamantinomatous CPh: squamous cell with keratin, common in children, also shows dystrophic calcification, may produce cyst or becomes inflammatory producing “machine oil” material
- Papillary CPh: squamous cells show papillae formation, no keratin, no cyst, no calcification seen in adults

