DISEASES OF PITUITARY GLAND

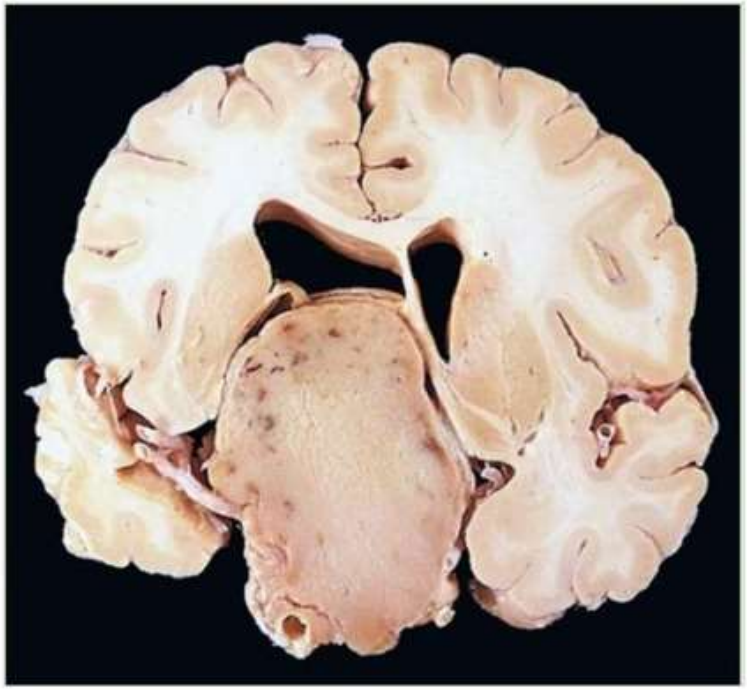
- Dr. Tariq Aladily
- tnaladily@ju.edu.jo
- Department of Pathology
- The University of Jordan

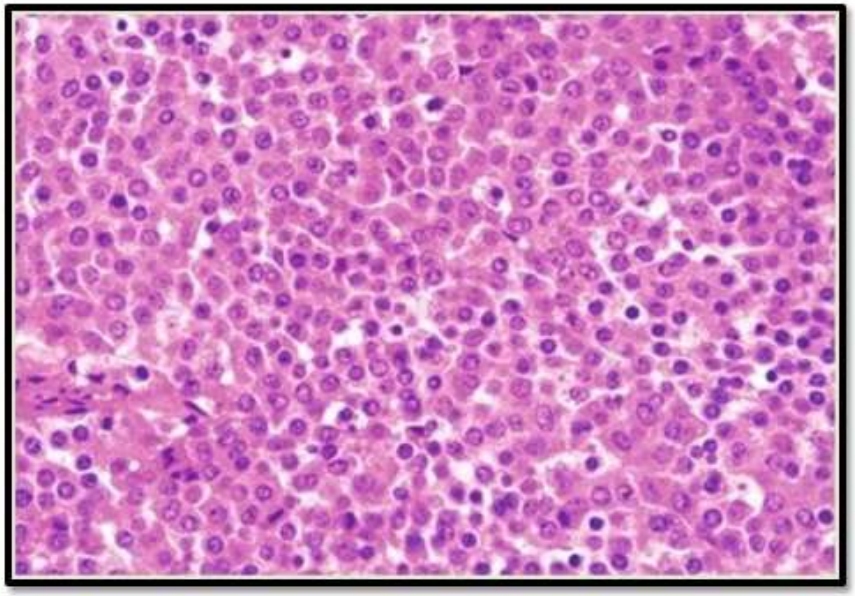
- Second semester 2021/2022

ANTERIOR PITUITARY ADENOMA

- The most common pituitary tumor
- Can be functional or non-functional
- Called microadenoma if size ≤1cm, very common, incidental finding, can be functioning
- Called macroadenoma if size >1cm
- 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 lactrotroph 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 → 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 AENOMA

* 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 post partum

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 vasoprossin or its receptor
- Nephrogenic DI: kidney is unresponsive to ADH (similar symptoms)

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

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