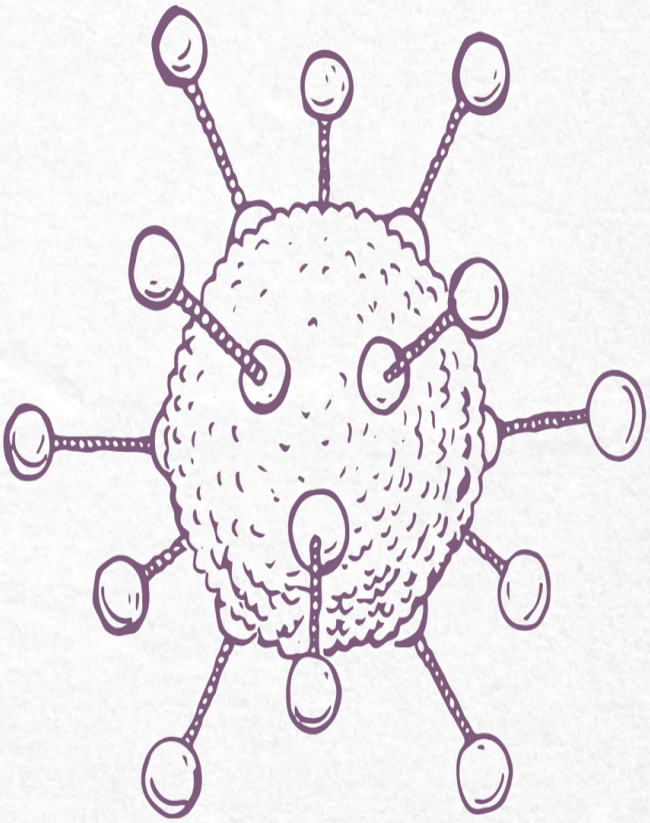
همة الأسنان لديكم

لا خوف عليكم

# PATHOLOGY

## ENDOCRINE 3



همّة الأسْنان

# The Adrenal gland

## I. Adrerenocortical Hyperfunction (Hyperadrenalism)

### 1. Hypercortisolism (Cushing Syndrome)

- In clinical practice, most cases are caused by the administration of exogenous glucocorticoids (Iatrogenic)
- The remaining cases are endogenous and **caused by** one of the following

**A. Primary hypothalamic-pituitary diseases associated with hypersecretion of ACTH (Cushing disease)**

- Accounts for 70% of cases of spontaneous, endogenous Cushing syndrome .
- Occurs most frequently during young adulthood (the 20s and 30s) and mainly affecting women

- In the vast majority of cases, the pituitary gland contains an ACTH-producing microadenoma
- The adrenal glands in Cushing disease show bilateral nodular cortical hyperplasia secondary to the elevated levels of ACTH ("ACTH-dependent" Cushing syndrome).
- The cortical hyperplasia, in turn, is responsible for the hypercortisolism

**B. Primary adrenal hyperplasia and neoplasms**

- Are responsible for about 10% to 20% of cases of endogenous Cushing syndrome and this form is called **ACTH-independent Cushing syndrome, or adrenal Cushing syndrome** and its biochemical hallmark is elevated levels of cortisol with low serum levels of ACTH

- In most cases, adrenal Cushing syndrome is caused by a unilateral adrenocortical neoplasm, which may be either benign (adenoma) or malignant (carcinoma).

**C. Secretion of ectopic ACTH by non-pituitary tumors**

- Accounts for about 10% of cases of Cushing syndrome mostly caused by small cell carcinoma of the lung,
- The adrenal glands undergo bilateral hyperplasia due to elevated ACTH, but the rapid downhill course of patients with these cancers cuts short the adrenal enlargement

## Changes in adrenal in cases of Cushing syndrome

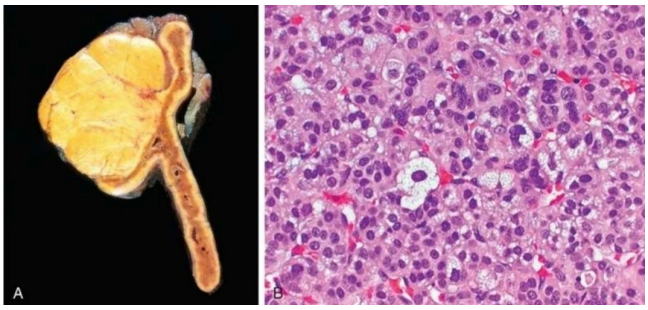
| change | Description |
|---|---|
| **1. Cortical atrophy**  | - If the syndrome results from exogenous glucocorticoids ,suppression of endogenous ACTH results in bilateral cortical atrophy, due to a lack of stimulation of the zona fasciculata and reticularis by ACTH<br>- The zona glomerulosa is of normal thickness because it functions independently of ACTH |
| **2. Diffuse and nodular hyperplasia:** | - Is found in 60% to 70% of Cases of **endogenous** Cushing syndrome.<br>- **Secondary hyperplasia** is found in patients with ACTH- dependent Cushing syndrome (due to Cushing disease or ectopic production of ACTH)<br>- In **primary cortical hyperplasia**, the cortex is replaced almost entirely by macro- or pigmented micronodules, and the pigment is believed to be lipofuscin |
| **3. Primary adrenocortical neoplasms** | - Are more common in women in their 30s to 50s.<br>a. Adrenocortical adenomas: Are yellow tumors surrounded by thin capsules, and most weigh less than 30 g |

## Clinical Course

Cushing syndrome develops **gradually** but a major **exception** to this insidious onset is with Cushing syndrome <u>associated with small cell carcinomas</u>

## Manifestations

a. Hypertension and weight gain are early manifestations.
b. With time, truncal obesity, "moon facies," accumulation of fat in the posterior neck and back ("buffalo hump")
c. Selective atrophy of fast-twitch (type II) myofibers, with decreased muscle mass and proximal limb weakness.
d. Glucocorticoids induce gluconeogenesis with
e. resultant hyperglycemia, glucosuria, and polydipsia,The catabolic effects on proteins cause loss of collagen and resorption of bone and bone resorption results in the osteoporosis, susceptibility to fractures.
f. The skin is thin, fragile, and easily bruised; cutaneousstriae are particularly common in the abdominal area
g. Patients are at increased risk for a variety of infections.
h. Hirsutism and menstrual abnormalities
i. Mental disturbances ,mood swings, depression, psychosis




Extraadrenal Cushing syndrome caused by pituitary or ectopic ACTH secretion usually is associated with . increased skin pigmentation secondary to melanocyte stimulating activity in the ACTH precursor molecule

---

## 2. Hyperaldosteronism 

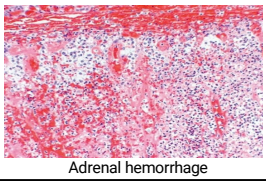
| Type | description | Causes |
|---|---|---|
| **secondary hyperaldosteronism** | Aldosterone release occurs in response to activation of renin-angiotensin system and characterized by increased levels of plasma renin | encountered in conditions associated with:<br>a. Decreased renal perfusion<br>b. Arterial hypovolemia and edema like in heart failure<br>c. Pregnancy (caused by estrogen-induced increases in plasma renin substrate) |
| **primary hyperaldosteronism** | Indicates primary , autonomous overproduction of aldosterone with secondary suppression of reninangiotensin system and decreased plasma reninactivity | a. <u>Bilateral idiopathic hyperaldosteronism</u>,<br>- Characterized by bilateral nodular hyperplasia of adrenals<br>- Is the most common underlying cause of primary hyperaldosteronism, accounting for about 60% of cases<br>b. <u>Adrenocortical neoplasm</u>,<br>- either an adenoma (the most common cause) or, rarely, an adrenocortical carcinoma.<br>- In approximately 35% of cases, the cause is a solitary aldosterone-secreting Aldosterone producing adrenocortical adenoma referred to as **<u>Conn syndrome</u>** |

## Clinical Features

- The clinical hallmark is **hypertension**
- Hyperaldosteronism may be the most common cause of secondary hypertension
- Hypokalemia results from renal potassium wasting and, can cause neuromuscular manifestations, including weakness, paresthesias,, and occasionally frank tetany
- Adenomas are amenable to surgical excision.
- Surgical intervention is not very beneficial in bilateral hyperplasia, and best managed medically with analdosterone antagonist such as spironolactone
- The treatment of secondary hyperaldosteronism rests on correcting the underlying cause of the reninangiotensin system hyperstimulation.

---

## II. ADRENAL INSUFFICIENCY

| The pattern | causes | Notes |
|---|---|---|
| Acute Adrenocortical Insufficiency | a. Crisis in patients with chronic adrenocortical insufficiency precipitated by stress<br>b. In patients maintained on exogenous corticosteroids<br>- rapid withdrawal of steroids or failure to increase steroid doses in response to an acute stress, because of the inability of the atrophic adrenals to produce glucocorticoid<br>c. Massive adrenal hemorrhage may destroy enough of the adrenal cortex to cause acute adrenocortical insufficiency | - This condition may occur :<br>1. In patients maintained on anticoagulant therapy<br>2. Patients suffering from sepsis : a condition known as the Waterhouse-Friderichsen syndrome<br>- This catastrophic syndrome is associated with Neisseria meningitidis septicemia but can also be caused by Pseudomonas spp., , and Haemophilus influenzae<br>  <br>Adrenal hemorrhage |
| Primary Chronic Adrenocortical Insufficiency (Addison Disease) | More than 90% of all cases are caused by<br>a. **Autoimmune adrenalitis** : Accounts for 60% to 70% of cases and is the most common cause of primary adrenal insufficiency in developed countries.<br>b. **Infections** : mainly tuberculosis.<br>c. **Metastatic neoplasms** involving the adrenal mainly carcinomas of the lung. | 2 Disseminated infections caused by **Histoplasma capsulatum** and **Coccidioides immitis** also may result in chronic adrenocortical insufficiency.<br>- Although adrenal function is preserved in most such instances,<br>- 3.the metastatic growths sometimes destroy sufficient adrenal cortex to produce a degree of adrenal insufficiency.<br>- Carcinomas of the lung and breast are the source of a primary tumour |