



# ANTERIOR PITUITARY INSUFFICIENCY

(MEDICINE)

**Black = Slides**

**Red = Important**

**Green = Female's doctor notes**

**Silver = Not important**

**Done by / Wael Al Saleh**

### ❖ Pituitary Development:

- It is recognizable by 4- 5<sup>th</sup> week of gestation and Full maturation by 20<sup>th</sup> wk.
  - It is originating From **Rathke's pouch**.
  - Intermediate lobe also originating From Rathke's pouch
  - Remnant of Rathke's pouch found in oral cavity and called pharyngeal pituitary
- 

### ❖ Anterior Pituitary Anatomy:

- It Lies at the base of the skull as sella turcica
- Roof is formed by diaphragma sellae "which is a reflection of dura matter preventing CSF from entering the sella turcica"
- Floor is formed by the roof of sphenoid sinus
- Lateral wall by **cavernous sinus** containing III, IV, VI, V **cranial nerves and internal carotid artery**
- Optic chiasm lies above the gland and anterior to the stalk
- Posterior pituitary originating from neural cells from hypothalamus.
- Pituitary stalk joins the pituitary gland with hypothalamus
- All the hormonal and neural signals pass through the Pituitary stalk
- Blood supply : superior, middle, inferior hypophysial arteries and Venous drainage: to superior and inferior petrosal sinuses.
- **The most common way to diagnose pituitary disorders by MRI.**
- **Optic chiasm, Pituitary stalk, internal carotid artery and pituitary gland is what seen on the MRI.**
- **The master gland of endocrine system is hypothalamus**

❖ Anterior pituitary hormones:

|              | Corticotroph               | Gonadotroph                     | Thyrotroph | Lactotroph               | Somatotroph                   |
|--------------|----------------------------|---------------------------------|------------|--------------------------|-------------------------------|
| Hormone      | ACTH                       | FSH, LH                         | TSH        | Prolactin                | GH                            |
| Stimulators  | CRH and low cortisol level | GnRH and Low sex hormones level | TRH        | Estrogen, TRH            | GHRH                          |
| Inhibitors   | Glucocorticoids            | Sex steroids, inhibin           | T3, T4,    | Dopamine                 | Somatostatin,                 |
| Target Gland | Adrenals                   | Ovary, Testes                   | Thyroid    | Breast and other tissues | Liver, bone and other tissues |

❖ Etiology(Causes) of Pituitary-Hypothalamic Lesions:

A) Non-Functioning Pituitary Adenomas

B) Endocrine active (**Hyperfunctioning**) pituitary adenomas:

- Prolactinoma "**the most common type**"

C) Primary malignant pituitary tumors

D) Metastases in the pituitary from: (breast, lung, stomach, kidney)

E) Pituitary cysts

F) Empty sella syndrome " sella turcica have no pituitary tissue! It's just filled with CSF"

G) Pituitary abscess "due to an infection"

H) Lymphocytic hypophysitis "Inflammatory condition which are the lymphocytes attack the pituitary gland and causing the inflammation"

I) Carotid aneurysm

- ❖ Adenomas sometimes cause vision loss due to compression on the optic chiasm
- ❖ If the patient has lesion on the pituitary stalk he will develop Diabetes insipidus because of the ADH deficiency
- ❖ Pituitary adenoma is the most common cause of pituitary disorders and it has Genetic-related.
- ❖ Pituitary incidentaloma is small tumor and has no effect usually found in autopsy.
- ❖ Pituitary adenomas divided into two types:
  - 1) Functional adenoma ( hormonal-secreting)
  - 2) Non-Functional adenoma "Having mass effect"

---

❖ First type : Non-Functional adenoma (NFPA) :

- There is absence of signs and symptoms of hormonal hypersecretion
- more in male
- Presentation of NFPA:
  - 1) incidentaloma by imaging
  - 2) Symptoms of mass effects "which means mechanical compression on adjacent structures causing the following symptoms: a) cranial nerve palsy. B)Visual problems c)stretching meninges causing headache d) CSF rhinorrhea "
  - 3) Hypopituitarism: means all the pituitary hormones decreased
  - 4) Gonadal hypersecretion and sometimes vomiting
- Treatment of NFPA:
  - 1) Surgery
  - 2) Adjunctive therapy:
    - Radiation therapy
    - Dopamine agonist
    - Somatostatin analogue

❖ Second type: Functional pituitary adenoma :

**A) Prolactinoma** ↑PRL secretion :

- **Most common functional pituitary tumor**
- Sings and symptoms associated with tumor mass:  
Vision loss , cranial palsy, headaches and seizure "due to compression on temporal lobe"
- Sings and symptoms associated with hyperprolactinemia:  
A) In women: amenorrhea, oligomenorrhea, infertility, galactorrhea and osteoporosis.  
B) In men: Gynecomastia, infertility, impotence, erectile dysfunction and osteoporosis.
- **Treatment: medically by Dopamine agonist (the only type which treated without surgery)**

---

**B) Growth hormone insufficiency:**

- ↑GH : in children : **Gigantism.**                      **In adults: Acromegaly**
- ↓ GH: in children : **Dwarfism.**  
   **In adults: Metabolic syndrome, hyperlipidemia, CVS disease**
  
- **Hyperfunctioning mass** →→ Acromegaly in adults
- **Pituitary tumor as mass effect** →→ Growth hormone deficiency
- **Diagnosis of GH-deficiency :**
  - 1) GH
  - 2) IGF-I level (Best method)
  - 3) insulin tolerance testing
  - 4) X-ray of hands shows delayed bone age
  
- **Management of GH-deficiency :**  
GH replacement

## ❖ Acromegaly:

### Signs and symptoms:

1. Lower jaw protrusion
2. prominent supraorbital bridges
3. large nose and lips
4. huge hands and feet
5. osteoarthritis
6. Carpal tunnel syndrome
7. HTN
8. Colon Polyp
9. Organomegaly
10. Skin tags
11. obstructive sleep apnea

### Diagnosis:

- 1) IGF-I level (Best method) and it will be High.
  - 2) GH level not used because it has pulsatile secretion.
- **Cardiac disease is a major cause of morbidity and mortality of Acromegaly patients**

### Treatment:

- 1) Somatostatin analogue
  - 2) Surgery
-

### **C) Adrenal hormones insufficiency :**

↑ ACTH from pituitary gland means there is ↑ cortisol → Cushing's syndrome

↓ ACTH from pituitary gland means there is ↓ cortisol → 2ry adrenal insufficiency

#### **1) secondary adrenal insufficiency (↓Cortisol) :**

- In early morning, cortisol level reaches its highest level : 500 and above.

#### **Signs and symptoms of 2<sup>nd</sup> adrenal insufficiency (Hypoadrenalism):**

1. Nausea and Vomiting
2. Abdominal pain
3. Diarrhoea
4. Muscle ache
5. Dizziness and weakness
6. Tiredness
7. **Weight loss**
8. Hypotension

**Diagnosis:** done by Measure the level of cortisol in early morning. In this case, it will be low.

#### **2) Cushing's syndrome ↑ cortisol :**

##### **Signs and symptoms:**

1. Wight gain
  2. **Moon face**
  3. HTN and CVS problems
  4. Osteoporosis
  5. D.M
  6. Acne
  7. Hirsutism
  8. **Pendulous abdomen with red striae**
  9. **Fat pads (buffalo hump)**
  10. Skin brusis
  11. Thin skin with poor wound healing
  12. Immune suppression
  13. Hyperglycemia
  14. Respiratory problems
- ❖ **Management:** Surgery

### C) Thyroid hormones insufficiency:

#### 1) Hypothyroidism

- Diagnosis :

- 1. ↓ TSH

- 2. ↓ Free T3 & T4

- Treatment :    1) Thyroxine replacement                      2) Surgery

---

#### 2) Hyperthyroidism:

- Diagnosis :

- 1. ↑TSH

- 2. ↑Free T3 & T4

- Treatment:    1) Surgery                                      2) Somatostatin Analogue

#### ❖ Gonadotroph adenoma :

1. There will be high FSH, Estradiol and low LH
2. It will cause polycystic ovaries

**GOOD LUCK**