MEDICAL UNIVERSITY – PLEVEN
FACULTY OF MEDICINE - DISTANCE LEARNING CENTRE
DIVISION OF ENDOCRINOLOGY AND METABOLIC DISEASES

Lecture №1

Pituitary- hypothalamus system disorders

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Hypothalamus system

- The hypothalamus is the control center for several endocrine and neurological functions.
- Damage to the hypothalamus may cause dysfunctions in:
- **body temperature regulation**
- **growth regulation**
- **weight regulation**
- **sodium and water balance**
- **milk production**
- **emotions**
- **sleep cycles**

Anterior pituitary-(adenohypopheses)

The anterior pituitary synthesizes and secretes the following important endocrine hormones from:

- **Somatotrophins – GH,**
- **Thyrotrophins: -TSH**
- **Corticotrophins: ACTH**
- **Lactotrophins: PRL**
- **Gonadotrophins: LH, FSH**
- **Melanotrophins: MCH**

Diseases of the Pituitary gland
Adenomas

- Macroadenoma ≥ 10 mm in diameter
- Microadenoma ≤10 mm in diameter

Clinical manifestations

1. Endocrine features:

Hyperfunction, or hormonal over secretion

Hypofuncton, or hormonal deficiency

2. **Ophthalmo-neurologic symptoms*:***

Tumor mass compression; head ache, nausea, intracranial hypertension, ophthalmic haemianopsy

Acromegaly

- **Acromegaly** is a **rare** condition with an approximate incidence of **3-4 new** cases per million of population per year.

- The condition was named by **Pierre Marie** in **1886** using the Greek words **akron- extremities** and **megas- large** to describe the typical clinical appearance of the condition.

Acromegaly

Etiology:

- The disease occurs as a result of **excessive secretion of growth hormone**.
- In more than **99**% of cases this is due to a benign pituitary growth hormone **secreting adenoma**.
- Pituitary **carcinomas are exceedingly rare**.
- Extremely infrequently acromegaly occurs as a result of **ectopic secretion of growth hormone** releasing hormone (**GHRH**) from a **peripheral neuroendocrine tumour**, or from excessive **hypothalamic GHRH secretion**.

Clinical features of Acromegaly

General Symptoms and Signs

- **1. Compressive Symptoms**

GH secreting pituitary adenomas are frequently (more than 70%) large tumors (macroadenoma ≥ 10 mm in diameter) which may present with local mass effects such as

- **headache** (often severe and out of proportion to the size of the pituitary tumour),
- **hydrocephalus**
- **visual field defects**
- **ophthalmoplegia, or other cranial nerve palsies**.

Classical clinical manifestations

- Change in appearance
- Increase in soft tissues
- Enlargement of the hands and foots
- Ring size increases
- Increase in the size of the tongue
- Elongation of the jaw results in prognathism which contributes to dental malocclusion
- Weakness and lethargy
- Oligo- or amenorrhea, infertility
- Erectile dysfunction and/or decreased libido

Complications of acromegaly

Endocrine and Metabolic

1. Diabetes mellitus
2. Impaired glucose tolerance (insulin resistance)
3. Hyperlipidaemia (triglycerides)
4. Hypogonadism – decreased libido and fertility
5. Polycystic overy syndrome (secondary to decreased SHBG)
6. Multiple endocrine neoplasia type 1

Medical therapy

- Dopamine agonists in the treatment of Acromegaly
- Short-acting dopamine agonist: Bromocriptine (Parlodel).
- Side effects of nausea, headache, dizziness, postural hypotension.
- Long-acting dopamine agonist: cabergoline (Dostinex) - 1 mg per day.

Medical therapy

- **Somatostatin's analog treatment of acromegaly**
- **Octreotide** (**Sandostatin**) a synthetic **somatostatin analog**, represented a major advance in the treatment of acromegaly
- The usual doses are between **100-200 mg three times** daily

Hypopituitarism

Etiology of the hypopituitarism

- Invasive processes
- Infarction
- Infiltrative processes
- Injury
- Immunologic disease
- Iatrogenic reasons
- Infectious, Idiopathic, and Isolated

Clinical Features

- The onset of pituitary insufficiency is usually gradual, and the classic course of progressive hypopituitarism is an initial loss of
- GH
- FSH and LH
- TSH
- ACTH, and finally PRL

Laboratory findings

- **anemia** (related to thyroid and androgen deficiency and chronic disease), **hypoglycemia**
- **hyponatremia** (related to hypothyroidism and hypoadrenalism
- **Hyperkalemia**, which is common in primary adrenal failure, is not present

Treatment

- **ACTH deficiency must include glucocorticoid support** .

- **Hydrocortisone** (15–25 mg/d orally) or prednisone (5–7.5 mg/d orally) in two or three divided doses provides adequate glucocorticoid replacement for most patients.

- **ACTH deficiency does not usually require mineralocorticoid therapy.**

Treatment of hypothyreoidismus

- **TSH deficiency**

  Levothyroxine sodium, 0.1–0.15 mg/d orally

  Response to therapy is monitored clinically and with measurement of serum **free thyroxine levels**, which should be maintained in the mid to upper range of normal.

Treatment of hypogonadism

- Gonadotropins:

replace sex steroids and restore fertility.

Treatment of Growth Hormone deficiency

- **Human GH** (hGH) produced by recombinant DNA technology is available for use in children with hypopituitarism and for adults with GH deficiency
- In adults, GH is usually administered subcutaneously, once per day in a dosage of **2–5 g/kg**
- Side effects (edema, paresthesias, arrhythmias, glucose intolerance, diabetes) should be assessed