Dr. Methaq A.M.Hussein

MRCP(LONDON),, SCE OF ENDOCRINE , D.M(LONDON)

FIBIMS, Assist Professor

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**Hypothalamus**  
The [**hypothalamus**](http://www.innerbody.com/image_endo01/endo03.html) is a part of the [**brain**](http://www.innerbody.com/image/nerv02.html) located superior and anterior to the brain stem and inferior to the [**thalamus**](http://www.innerbody.com/image_nerv01/nerv142.html).. The hypothalamus contains special cells called neurosecretory cells—neurons that secrete hormones:

* Thyrotropin-releasing hormone (TRH)
* Growth hormone-releasing hormone (GHRH),,, Growth hormone-inhibiting hormone (GHIH)….somatostatin
* Gonadotropin-releasing hormone (GnRH)
* Corticotropin-releasing hormone (CRH)
* [**Dopamine**](http://en.wikipedia.org/wiki/Dopamine) **(Prolactin-inhibiting hormone**
* Oxytocin
* Antidiuretic hormone (ADH)

The last two hormones—oxytocin and antidiuretic hormone—are produced by the hypothalamus and transported to the posterior pituitary, where they are stored and later released.

**Pituitary Gland**  
The [**pituitary gland**](http://www.innerbody.com/image/endo01.html), also known as the hypophysis, is a small pea-sized lump of tissue connected to the inferior portion of the hypothalamus of the brain. Many [**blood vessels**](http://www.innerbody.com/image/card05.html)surround the pituitary gland to carry the hormones it releases throughout the body. Situated in a small depression in the [**sphenoid bone**](http://www.innerbody.com/image_skel01/skel44_new_skull.html) called the sella turcica, the pituitary gland is actually made of 2 completely separate structures: the posterior and anterior pituitary glands.

1. *Posterior Pituitary*: The posterior pituitary gland is actually not glandular tissue at all, but nervous tissue instead. The posterior pituitary is a small extension of the hypothalamus through which the axons of some of the neurosecretory cells of the hypothalamus extend. These neurosecretory cells create 2 hormones in the hypothalamus that are stored and released by the posterior pituitary:
   * Oxytocin triggers uterine contractions during childbirth and the release of milk during breastfeeding.
   * Antidiuretic hormone (ADH) prevents water loss in the body by increasing the re-uptake of water in the kidneys and reducing blood flow to sweat glands.
2. *Anterior Pituitary*: The anterior pituitary gland is the true glandular part of the pituitary gland. The function of the anterior pituitary gland is controlled by the releasing and inhibiting hormones of the hypothalamus. The anterior pituitary produces 6 important hormones:   
     
   * Thyroid stimulating hormone (TSH), as its name suggests, is a tropic hormone responsible for the stimulation of the thyroid gland.
   * Adrenocorticotropic hormone (ACTH) stimulates the adrenal cortex, the outer part of the adrenal gland, to produce its hormones.
   * Follicle stimulating hormone (FSH) stimulates the follicle cells of the gonads to produce gametes—ova in females and sperm in males.
   * Luteinizing hormone (LH) stimulates the gonads to produce the sex hormones—estrogens in females and testosterone in males.
   * Human growth hormone (HGH) affects many target cells throughout the body by stimulating their growth, repair, and reproduction.
   * Prolactin (PRL) has many effects on the body, chief of which is that it stimulates the [**mammary glands**](http://www.innerbody.com/image_repo03/repo02-new.html) of the breast to produce milk.
   * Type of staining of cells…..acidophile….basophile….nonstaining or chromophobes

*Pituitary Disorders*

Hypopituitarism

*Hypopituitarism is the inability of the pituitary gland to provide sufficient hormones, due to an inability of the pituitary gland to produce hormones or due to an insufficient supply of hypothalamic-releasing hormones.*

*Symptoms depend on the degree of hormone depletion and the rapidity of onset. Hypopituitarism is usually a mixture of several hormonal deficiencies but rarely involves all the pituitary hormone*

*Causes Pituitary tumours: for example, adenomas.*

*Non-pituitary tumours: craniopharyngiomas, meningiomas, gliomas, chordomas, ependymomas, metastases.*

*Infiltrative processes: sarcoidosis, histiocytosis X, haemochromatosis.*

*Infections: cerebral abscess, meningitis, encephalitis, tuberculosis, syphilis.*

*Ischaemia and infarction: subarachnoid haemorrhage, ischaemic stroke, Sheehan's syndrome (postpartum haemorrhage with anterior pituitary infarction), pituitary apoplexy (caused by an acute infarction of a pituitary adenoma).[]*

*Empty sella syndrome: radiological diagnosis of absence of normal pituitary within the sella turcica. Usually benign and asymptomatic but may develop headaches and hypopituitarism.*

*Iatrogenic: irradiation,[ neurosurgery, withholding previous chronic glucocorticoid replacement.*

*Head injury (may have occurred up to several years before).[]*

*Congenital: Kallmann's syndrome (congenital hypogonadotropic hypogonadism with midline defects such as anosmia).[]*

*Autoimmune: lymphocytic hypophysitis.[]*

*Genetic causes - eg, PIT1, PROP1 gene mutations, septo-optic dysplasia.*

*Presentation*

Presentation varies from asymptomatic to acute pituitary failure with acute collapse and coma, depending on the aetiology, rapidity of onset, and predominant hormones involved.

Initially, a patient with any hormone deficiency may be asymptomatic.

May present with endocrine dysfunction:

Adrenocorticotrophic hormone (ACTH) deficiency 1.:

Chronic: fatigue, pallor, anorexia, weight loss.

Acute: weakness, dizziness, nausea, vomiting, circulatory collapse, fever, shock.

Children: delayed puberty, failure to thrive.

Hypoglycaemia, hypotension, anaemia, lymphocytosis, eosinophilia, hyponatraemia.

Thyroid-stimulating hormone (TSH) deficiency: 2.

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Tiredness, cold intolerance, constipation, hair loss, dry skin, hoarseness, cognitive slowing.

Weight gain, bradycardia, hypotension.

Children: delayed development, growth restriction and intellectual impairment.

Gonadotrophin deficiency :3.

Women: oligomenorrhoea, loss of libido, dyspareunia, infertility, osteoporosis.

Men: loss of libido, impaired sexual function, mood impairment, loss of facial, scrotal, and body hair; decreased muscle mass, osteoporosis, anaemia.

Children: delayed puberty.

Growth hormone deficiency: 4.

Decreased muscle mass and strength, visceral obesity, fatigue, decreased quality of life, impairment of attention and memory.

Dyslipidaemia, premature atherosclerosis.

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5. Antidiuretic hormone deficiency:

Polyuria, polydipsia.

Decreased urine osmolality, hypernatraemia.

May also present with features attributable to the underlying cause:

Space-occupying lesion: headaches or visual field deficits.

Large lesions involving the hypothalamus: polydipsia and inappropriate secretion of antidiuretic hormone

*May be hypopituitarism with mass effect but with hyperprolactaemia……??????*

*Hypopituitary coma*

*Usually occurs in a patient known to have hypopituitarism and often develops gradually but may occur suddenly due to pituitary apoplexy.]*

*May be triggered by infection, trauma, surgery, hypothermia or pituitary haemorrhage.*

*Clinical features of apoplexy include hormone deficiencies, meningism, visual field defects, ophthalmoplegia, reduced consciousness, hypotension, hypothermia and hypoglycaemia.*

*Treatment is required urgently in the form of intravenous hydrocortisone. Thyroid replacement (T3) should only be started once hydrocortisone therapy has been given. Pituitary apoplexy requires urgent surgery.*

Investigations

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Blood glucose, renal function and electrolytes (disturbances of renal function, glucose and electrolytes are common).

Hormonal assays:1.

TFTs, prolactin, gonadotrophins, testosterone, cortisol.

Measurement of gonadotrophins, TSH, growth hormone, glucose and cortisol following 2. stimulation with gonadotrophin-releasing hormone (GnRH), thyrotropin-releasing hormone (TRH) and insulin-induced hypoglycaemia.

3.Cranial MRI scan should be performed to exclude tumours and other lesions of the sellar and parasellar region after hypopituitarism has been confirmed.

*Management[]*

*Acute resuscitation, including intravenous fluids, may be required).*

*If hypopituitarism has been caused by a tumour, pituitary function may be restored after successful surgical or medical removal of the lesion.*

*Medical care consists of hormone replacement as appropriate and treatment of the underlying cause.*

*Glucocorticoids are required if the ACTH-adrenal axis is impaired, especially in acute presentations. Increased doses of glucocorticoids are required following any form of emotional or physical stress (eg, during an infection) to prevent acute decompensation.*

*Secondary hypothyroidism: thyroid hormone replacement.*

*Gonadotrophin deficiency: testosterone replacement; oestrogens, with or without progesterone, for women (combined oral contraceptive pill for premenopausal u*

*Growth hormone replacement.*

*Management of Diabetes Insipidus.*

*Surgical:*

*In pituitary apoplexy, prompt surgical decompression may be life-saving.*

*Removal of macroadenomas that do not respond to medical therap*

*Note:the loss of hormons not similer to replacement of these hormons???y*