



TSH, Thyroid stimulating hormone
 ACTH, Adrenocorticotropin hormone
 FSH, Follicle-stimulating hormone
 LH, Luteinizing hormone
 MSH, Melanophore-stimulating hormone
 GH, Growth Hormone
 PRL, Prolactin

The rate of growth

- The growth period in boys extends from birth till the age of about 20 years (18 years in girls).
- The rate of growth is high immediately after birth (5 cm in the first month).
- This rate drops sharply in the first two years down to about 8 mm/month then the drop continues at a slower rate.
- At the onset of puberty (12 - 14 yrs in boys, 11 - 12 yrs in girls), there is a pubertal spurt of growth but this is followed by rapid decline, then arrest of growth due to union of epiphyses.

- The size of the viscera also increases.
- The increase in the size of the heart without parallel increase in its blood supply leads to high tendency of myocardial ischemia and a special type of cardiomyopathy “acromegalic cardiomyopathy”.
- Glucose tolerance is reduced and frank diabetes is common.
- Pressure on the optic chiasma by the pituitary tumor could lead to bitemporal hemianopia.

Dwarfism

- Dwarfism is a state of short stature with normal proportions which results from lack of growth hormone activity during the growth period .
- According to the mechanism which causes the lack of GH activity, there are four types of dwarfism:
 - a. **Pituitary dwarfism**
Caused by deficiency in hypothalamic GRH or in pituitary GH. Can be treated by synthetic GRH or GH.
 - b. **Laron dwarfism:** Caused by lack of response of the tissues to the secreted GH due to absence of GH receptors on the cells can be treated by IGF-I

- Treatment of all types of dwarfism should always start before puberty (i.e. before union of epiphysis).
- Except for their small size, and some acceleration of the aging process, dwarfs have normal functioning of different organs. At the age of puberty, there is a little spurt of growth due to the direct action of androgens, but this is followed shortly by arrest of growth because of the union of epiphyses.
- There is normal maturation of the sexual organs and functions. Mental development and brain functions are normal. The metabolic rate is normal.

Effects of hyper secretion of prolactin

- Hyper prolactinemia results from “prolactinomas”, prolactin-secreting tumors of the mammotropes of the anterior pituitary.
- Prolactinomas are the most common type of pituitary tumors.
- It is found in over 10 % of the population, but clinical manifestations appear in a small minority.

Treatment

- Dopamine or dopamine agonists, e.g. bromocriptine are successful in suppressing prolactin secretion and reducing the size of the tumor.
- The manifestations disappear with successful treatment..

The pituitary gonadotropins

- Gonadotropins are hormones which act on the gonads (testes or ovaries).
- Two gonadotropins are secreted by the anterior pituitary, i.e. the follicle-stimulating hormone (FSH) and the luteinizing hormone (LH).
- Both hormones are secreted in response to stimulation by the hypothalamic gonadotropin-releasing hormone (GnRH)

Lutinizing hormone (lh)

- **Actions**

- In the male: It stimulates the interstitial cells of Leydig in the testis to secrete testosterone.
- In the female: It reduces ovulation by rupture of the graafian follicle, formation of the corpus, formation of the corpus luteum, and secretion of estrogen and progesterone by the corpus luteum.

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Manifestations

- **A) Hypofunction of other glands:**
- **i) Hypoadrenocorticism:** There is atrophy of the **zonae fasciculata** and **reticularis** of the adrenal cortex, with resultant drop in plasma glucocorticoids and adrenal androgens.
- The patient can not tolerate stressful conditions.
- In females, there is decrease in libido, and lack of axillary, and pubic hair.

- Zona glomerulosa, and its aldosterone secretion are maintained.
- The stress-induced increase in aldosterone does not occur any more, but the increase induced by salt depletion persists.
- Salt depletion does not occur, except in long-standing cases.

- **ii) Hypothyroidism** → decrease in general metabolism → less metabolic waste products:
- **E) Pallor of skin:**
 - This due to lack of ACTH and other hormones with melanocyte stimulating hormone (MSH) activity.
- **F) Bodyweight:**
 - There is no loss of weight. Only some decrease in protein mass may be found, but patients with pituitary insufficiency tend to be well nourished.
 - The cachexia and emaciation which was reported before in cases of hypopituitarism was due to “anorexia nervosa” which may be present in some cases.