



جامعة الأزهر - غزة
AL-AZHAR UNIVERSITY-GAZA



Male reproductive system





Abnormal puberty

- Precocious puberty: appearance of physical and hormonal signs of pubertal development at an earlier age than is considered normal
- Boys, onset of puberty before age 9 years is considered precocious.
- Precocious in girls younger than 8 years





Classification

- Central precocious puberty (gonadotropin-dependent precocious puberty, true precocious puberty)
- Peripheral precocious puberty gonadotropin-independent precocious puberty, peripheral pseudopuberty, peripheral precocity)
- Isosexual: premature development of secondary sexual characteristics appropriate for gender (can be complete or incomplete, as described above)
- Heterosexual: masculinization of girls or feminization of boys
 - ✓ Boys: McCune-Albright syndrome, estrogen-secreting leydig cell tumor
 - ✓ Girls: congenital adrenal hyperplasia





Central precocious puberty

- Definition: precocious puberty with elevated GnRH levels
- With gametogenesis
- Etiology
 - ✓ Idiopathic or constitutional (most cases)
 - ✓ CNS lesions
 - ✓ Pituitary gonadotropin-secreting tumors (rare)
 - ✓ Pineal body tumor
 - ✓ Systemic conditions: tuberous sclerosis, neurofibromatosis
 - ✓ Obesity-related precocious sexual development due to increased leptin in obesity





Peripheral precocious puberty

- Definition: precocious puberty without elevated GnRH levels
- No gametogenesis
- Etiology
 - ✓ ↑ Androgen production, e.g.:
 - Ovarian cyst (most common cause)
 - Congenital adrenal hyperplasia
 - Virilizing ovarian and adrenocortical tumors
 - Leydig-cell tumor
 - ✓ ↑ Estrogen production, e.g.:
 - HCG-secreting germ cell tumors (e.g., granulosa cell tumor)
 - Rarely: adrenal gland tumors that produce estrogen
 - McCune-Albright syndrome
 - ✓ ↑ β -HCG production: e.g., hepatoblastoma
 - ✓ Primary hypothyroidism
 - ✓ Obesity-related precocious sexual development due to compensatory hyperinsulinemia (caused by increased insulin resistance in obesity)





- True or central precocious puberty due to the premature activation of hypothalamic-pituitary-gonadal axis - isosexual precocious sexual development.
- Pseudoprecocious puberty: due to a secreting tumor inducing only the development of secondary sexual characteristics.
- Partial or incomplete precocious puberty: premature adrenarche, premature thelarche.





Micropenis

- Micropenis: not per se a disorder of delayed sex maturation. Size of penis is small compared to standards for age, has normal size with absence of sexual ambiguity.
- 3 main causes:
 - ✓ hypopituitarism (GH and gonadotrophins deficiencies)
 - ✓ primary testicular defects (hypergonadotrophic hypogonadism),
 - ✓ partial insensitivity to androgens





Delayed puberty

- Definition: absent or incomplete development of secondary sex characteristics by the age of 14 in boys or 13 in girls
- Etiology
 - Constitutional growth delay (most common cause of delayed puberty)
 - Definition: a temporary delay in growth and onset of puberty that is not caused by any pathological process
 - Etiology: may be inherited as an autosomal dominant, recessive, or X-linked trait
 - Malnutrition and other chronic diseases (such as inflammatory bowel disease, hypothyroidism, or psychosocial deprivation)
- Hypogonadism
 - ✓ Hypergonadotrophic hypogonadism. Turner's syndrome, Klinefelter's syndrome
 - ✓ Hypogonadotrophic hypogonadism. Panhypopituitarism





Pubertal gynaecomastia

- Breast development during male puberty is called pubertal gynaecomastia. Etiology is unknown.
- Occurs in 30-65% of boys during puberty and it is observed between the age of 14–14.5 years.
- pathologies
 - ✓ Klinefelter's syndrome and non endocrine tumors (breast cancer, neurofibroma, hemangioma, lipoma – in these cases gynaecomastia is usually unilateral).
 - ✓ Inbalance between secretion of estrogens and testosterone.
- Gynaecomastia - Due to abnormal sensitivity of the mammary gland to estrogens or exaggerated in situ conversion of testosterone to





Male hypogonadism

- Definition Failure of testes to produce adequate amounts of testosterone, spermatozoa, or both.
- Klinefelter's syndrome (XXY) is the most common congenital cause and is thought to occur with an incidence of 2:1,000 live births.
- Acquired hypogonadism is even more common, affecting 1:200 ♂.
- Presentation
 - ✓ Failure to progress through puberty.
 - ✓ Sexual dysfunction.
 - ✓ Infertility.
 - ✓ Non-specific symptoms, e.g. lethargy, reduced libido, mood change gain.





Secondary hypogonadism

Definition Hypogonadism as a result of hypothalamic or pituitary dysfunction.

Diagnosis

Low 9 a.m. serum testosterone.

Low normal or low LH and FSH, normal inhibin B and anti-Müllerian hormone.





Causes of secondary hypogonadism

- Idiopathic:
 - ✓ Kallmann's syndrome.
 - ✓ Other genetic causes, e.g. mutations of GnRHR or GPR54 genes.
 - ✓ Idiopathic hypogonadotrophic hypogonadism (IHH).
 - ✓ Fertile eunuch syndrome.
 - ✓ Congenital adrenal hypoplasia (DAX-1 gene mutation).
- Functional:
 - ✓ Exercise.
 - ✓ Weight changes.
 - ✓ Anabolic steroids.
 - ✓ Stress—physical/psychological.
 - ✓ Systemic illness.
- Medication and recreational drugs.
- Structural:
 - Tumours, e.g. pituitary adenoma, craniopharyngioma, germinoma.
 - Infiltrative disorders, e.g. sarcoidosis, haemochromatosis.
 - Head trauma. Radiotherapy.
 - Surgery to the pituitary gland or hypothalamus.
- Miscellaneous: Haemochromatosis. Prader–Willi syndrome. Laurence–Moon–Biedl syndrome.





Testicular function tests

1. Urinary gonadotropins

- ✓ Primary hypogonadism ++ testis
- ✓ Secondary hypogonadism -- Hypothalamic or pituitary

2. Urinary 17 ketosteroids:

Sterile male

-- = impaired Leydig cells

normal = impaired gametogenic function

3. Testosterone, FSH, LH in blood

	Testosterone	FSH&LH
✓ Primary	--	++
✓ Secondary	--	--





Testicular function tests

4. Semen analysis

1. Volume: 2-4 ml/ejaculation
2. Number 80-100 million/ml
below 50 million = subfertile
below 20 million = infertile
0 = azoospermia
3. Specific gravity 1028 ++ → ++ viscosity → -- motility
4. Motility: 60% actively motile
3mm/min = ??? 6 hours
5. Fructose 150-650 mg%
(Seminal vesicles)
6. PH (Prostate) 7.3-7.5
7. Sperm quality > 25% abnormal shapes
8. Color White opalescent





Testicular function tests

5. Testicular biopsy → Seminiferous tubules

✓ Sperm: obstruction

✓ No sperm: no gametogenic function

