

Pharmacology-3rd Class-2014

Steroids Sex (Gonadal) Hormones Agonist & Antagonists

Lec.9

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Objectives:

- At the end of this lecture, students should be able to :

- 1- Identify **hormonal contraceptives**
- 2- Explain Combined oral contraceptive pills (COCPs) (preparations, clinical uses, adverse effects and contraindications)
- 3- Identify **pharmacokinetic of steroid sex hormones**
- 4- List **male sex hormones** (preparations, clinical uses, adverse effects)
- 5- State the **antagonist of male sex hormones**

- At a level accepted to the quality assurance standards for the College of Medicine/ University of Mosul.

Hormonal Contraceptives:

Methods by drugs or hormone include:

1. Combined oral contraceptive pills (COCPs).
2. Progesterone only pills (POPs) oral.
3. Progesterone injection.
4. Progesterone release intrauterine contraceptive device (IUCD).

Combined oral contraceptive pills (COCPs) consists of combination of:

1. Estrogen usually ethinylestradiol (dose either 30 or 50 μ g).
2. Progesterone mostly norethisterone.

Action of COCPs

1. Mainly inhibition of ovulation (estrogen)
2. Alteration of endometrium and cervical mucus (more viscous) so implantation not occur (Progesterone).

Adverse effects of COC pills

1. General breast fullness, depression, nausea, vomiting, headache, edema.
2. Cardiovascular → ↑ risk of thromboembolism, MI, CVA, thrombophlebitis and hypertension.
3. Metabolic → abnormal glucose tolerance test.
4. Serum lipid disorders → ↑ Total cholesterol and LDL.
5. Cancer
 - a. Increase incidence of breast cancer and cervical cancer.
 - b. Decrease incidence of ovarian and endometrial cancer.
- 6- Cholestatic jaundice and cholecystitis (may occur)

Contraindication of COC pills:

A- Absolute

- 1- Thromboembolic disorders.
- 2- Impaired liver function.
- 3- Known or suspected breast cancer.
- 4- Known or suspected pregnancy.
- 5- Smoker over 35 years old.
- 6- Undiagnosed abnormal vaginal bleeding.

B- Relative:

Migraine, headache, hypertension, DM, epilepsy, GB disease, depression, sickle cell anemia.

Benefits additional to contraception:

- 1- Regulation of menstrual cycle and decrease blood loss.
- 2- Decrease risk of functional ovarian cysts and cancer of endometrium and cancer of ovary.
- 3- Decrease risk of uterine fibroid.
- 4- Decrease dysmenorrhea and premenstrual tension.
- 5- Protective against thyroid disease, RA, and osteoporosis.
- 6- Improve Acne.

Male Sex Hormones:

I- Androgenic (Testosterone) Natural androgen secreted by the testis.

It is converted by hydroxylation to the active dihydrotestosterone (D.H.T.)

- Necessary for:

1. Spermatogenesis.
2. development of male 2^o sex characteristics growth at puberty.

Preparations:

- 1- Testosterone: given by implant or injection, skin patches also available.
 - 2- Mesterolone: given orally.
- It is hypothalamic feedback inhibition of pituitary gonadotrophin is less.
 - It cause less liver injury..

Clinical uses of Androgens:

- 1- Replacement therapy in:
 - a. 1° or 2° testicular failure.
 - b. Hypopituitarism in male (given with cortisol and thyroxin).
- 2- Male contraception (under trial).
- 3- premenopausal breast cancer.
- 4- In hepatic cirrhosis.

Side effect of Androgen (testosterone):

- 1- Increase libido, leading to undesirable sexual activity.
- 2- Virilization in female and menstrual disorders.
- 3- Liver injury (Cholestatic).
- 4- Mild Na and water retention.
- 5- Lipid disorders.
- 6- Hypercalcaemia in malignant disease of bone.

II- Anabolic steroids:

- Androgen effective protein anabolic agents e.g. (IM)
Nandrolone and Stanozolol (oral).

Clinical uses:

- 1- Delayed puberty in boys (>16 years).
- 2- Increase lean body mass in:
 - a. athletics.
 - b. Compensation protein loss in renal failure, trauma.
- 3- Hypoplastic anemia.
- 4- Osteoporosis in androgen deficiency man.
- 5- Relieve itching of jaundice (unknown mechanism)

Antiandrogen "Androgen antagonist":

- 1- Cyproterone acetate (Androcure)
- 2- Flutamide and bicalutamide

1- Cyproterone

Derivative of progesterone.

Actions:

1. Competition with testosterone for receptors in target peripheral organs → decrease the number of sperms.
2. Competition with testosterone in CNS so decrease sexual drive and cause impotence.
3. Some agonist progesterone activity on hypothalamic receptors inhibit gonadotrophin testosterone reaction.

Clinical uses:

- 1- Decrease male hyper sexuality.
- 2- Treatment of severe female hirsutism and acne.
- 3- Prostatic cancer.

2- Flutamide:

Used with gonadorelins in treatment of prostatic cancer.

3- Finasteride:

- Inhibit conversion of testosterone to DHT, has localized antiandrogen activity in tissue where DHT is the principle androgen
- Treatment of benign prostatic hypertrophy (BPH).