

# Oral contraceptive pills



# Learning objectives

- To know types, mechanism of action, and side effects of combined contraception.
- 2. to understand medical eligibility criteria of missed pills.
- To know types and side effects of progesterone only contraception.



It is a widely accepted, effective, & usually reversible method of contraception. It's introduced in 1956. 3 types:

1. combined oral contraceptive (COC).
2. Progesterone- only (minipills); contain either Norgestril or Norethisterone, taken each day.
3. Sequential oral contraceptives.



# 1. COC:-

Formulations:- It contains both estrogen(usually Ethinyl oestradiol or Menstranol) & a progesterone. Previously use high dose pills (100 ug of estrogen), but now decrease the dose of estrogen to 20-50 ug; most women use 30-35 ug estrogen (low- dose pills). The progesterone either 1<sup>st</sup> or 2<sup>nd</sup> or 3<sup>rd</sup> generation



- The pill is taken for 21 days followed by a 7-day break during which time withdrawal bleeding usually occurs. The pill should be taken at the same time each day, bed time is convenient. If the woman forgets to take the pill one night she can take it the next morning.
- Combined pills are available as monophasic (preparation in which every pill in the packet contains the same dose of steroids); & biphasic & triphasic pills ; in which the dose of both steroids changes once or twice during the cycle so that the regimen will mimics the normal cycle.



# Mode of action:-

- The principle mode of action of COC is the inhibition of ovulation. Estrogen inhibits FSH (suppressing the development of ovarian follicles, while progestogens inhibit the development of LH surge.
- Additional contraceptive effects include changes in the cervical mucus characteristics interfering with sperm transport, a possible alteration in the tubal motility, endometrial atrophy with impaired uterine receptivity.



# Advantages:-

1. Menstrual periods are usually lighter, shorter & more regular during the pill use, less painful & premenstrual symptoms less troublesome.
2. Decrease the incidence of iron deficiency anemia by decreasing menstrual blood loss.
3. Decrease incidence of benign breast lumps, functional ovarian cysts, endometriosis, acne & possibly PID.
4. COC use protects against ovarian & endometrial cancer (due to decrease in the number of ovulations & therefore rupture of ovarian capsule).



- There is also a 50 per cent reduction in ovarian and endometrial cancers which continues for 15 years after stopping the CHC.
- 5. There is a possible protective effect against rheumatoid arthritis, thyroid disease and duodenal ulceration.



# WHO medical eligibility criteria category 4 for combined hormonal contraception

- **CHC: UKMEC Category 4 – Unacceptable health risk and should not be used**
- Breastfeeding – <6 weeks postpartum
- Smoking – aged  $\geq 35$  years and smoking  $\geq 15$  cigarettes per day
- Cardiovascular disease – multiple risk factors for arterial cardiovascular disease
- Hypertension – blood pressure  $\geq 160$  mmHg systolic and/or  $\geq 95$  mmHg diastolic; or vascular disease
- VTE – current (on anticoagulants) or past history
- Major surgery with prolonged immobilisation
- Known thrombogenic mutations
- Current and history of ischaemic heart disease
- Stroke



- Valvular and congenital heart disease – complicated by pulmonary hypertension, atrial fibrillation, history of subacute bacterial endocarditis
- Migraine headaches – with aura at any age
- Breast disease – current breast cancer
- Diabetes – with nephropathy, retinopathy, neuropathy or other vascular disease
- Viral hepatitis – active or flare
- Cirrhosis – severe decompensated disease
- Liver tumours – benign hepatocellular adenoma and malignant hepatoma
- Systemic lupus erythematosus (SLE) – positive or unknown antiphospholipid antibodies



# Risks & side effects:-

A-Minor S/E :-

1. Disturbances of the menstrual cycle: either slight bleeding or frank break through bleeding especially with low dose pills. If frank through bleeding > 2 times the can be controlled by increasing the dose of estrogen or change to another preparation contains different proportion of estrogen to progesterone.

Amenorrhea when high –dose pills. Exclude pregnancy & sometimes can be treated by induction of ovulation.

2. Weight gain, fluid retention, headache, nausea, & vomiting, chloasma, mood changes, loss of libido, mastalgia, breast enlargement & greasy skin.



# B-Serious S/E :

- 1.CVS: on venous side; increase risk of venous thrombosis & pulmonary embolism. In dose-dependent pattern related to the amount of estrogen in the pill. Estrogen increase platelet count & platelet adhesiveness & decrease ant thrombin in blood.
  - This risk is the most during the first year of CHC use.
- On arterial side: including hypertension, CVA,& coronary heart disease. Increase risk was only seen on smoker woman on the pill.



2. Carbohydrate metabolism: high dose pills will decrease carbohydrate tolerance.

3. Malignancy: small increase in breast cancer & that the risk persisted for 10 years after stopping the pills especially if she take the pills before the birth of the first child.

Also small increase in the risk of carcinoma of cervix.

Liver cancer; benign hepatic adenoma is rare complication.



# Interaction with drugs:

- Effectiveness of the combined oral contraceptive pill (COCP) (and all other methods) is not affected by administration of most broad-spectrum antibiotics.
- Barbiturates, sulphonamide, rifampicin, phenytoin & most anticonvulsants will increase activity of liver enzymes that metabolize the steroids.
- Effect on pregnancy: no increase in the incidence of congenital abnormality in woman who has taken the pills after pregnancy has started.
- Follow up: B.P checked at 6, 12 months, then annually, Pap smear annually .examine breast each year.



# Missed-pill guidelines for COC

- If **ONE pill** has been missed (more than 24 hours and up to 48 hours late) .
- **Continuing contraceptive cover**
- • The missed pill should be taken as soon as it is remembered • The remaining pills should be continued at the usual time.
- **Minimizing the risk of pregnancy**
- Emergency contraception (EC) **is not** usually required.



If **TWO OR MORE** pills have been missed (more than 48 hours late

- **Continuing contraceptive cover** •
- The most recent missed pill should be taken as soon as possible •
- The remaining pills should be continued at the usual time •
- **Condoms** should be used or sex avoided until **seven** consecutive active pills have been taken.



- **Minimising the risk of pregnancy**
- If pills are missed in the **first week** (Pills 1 - 7) .
- **EC** should be considered if unprotected sex occurred in the pill-free interval or in the first week of pill-taking
- If pills are missed in the **second week** (Pills 8 - 14)
- **No indication for EC** if the pills in the preceding 7 days have been taken consistently and correctly (assuming the pills thereafter are taken correctly and additional contraceptive precautions are used).
- .



- If pills are missed in the **third week** (Pills 15 - 21)
- **OMIT THE PILL-FREE INTERVAL** by finishing the pills in the current pack (or discarding any placebo tablets) and starting a new pack the next day.



# Evra patch

- With this patch 20  $\mu\text{g}$  of ethinyl estradiol and 150  $\mu\text{g}$  of norelgestromin are released every 24 hours.
- It is the first transdermal contraceptive applied once weekly for 3 weeks followed by a patch-free week (3 weeks on, 1 week off).
- The Pearl index is 1.24 per 100 WY



# NuvaRing

- releases 120 µg of etonogestrel (ENG) and 15 µg of ethinyl estradiol daily. It is 54 mm in diameter and 4 mm thick.
- It is placed vaginally once every 3 weeks and following a 1-week ring-free interval a new ring is inserted.
- Efficacy and cycle control are comparable to the COCs. Side-effect profile is also similar to that of COCs.
- However, women have reported more vaginal symptoms of vaginitis, leukorrhoea, foreign body sensation, coital problems and expulsion.



# Progesterone- only contraception:

Available as oral pills, implants, long acting injectables, & recently hormone – releasing IUCD.

Mechanism of action:

Given in high doses e.g. injectables, progestogens inhibit ovulation. In low doses; ovulation may be inhibited often inconsistently. By all routes progestogens affect cervical mucus reducing sperm penetrability & transport & all have an effect on the endometrium which probably compromises implantation.



S/E:

All low dose progesterone – only methods are associated with high incidence of irregular bleeding because ovulation inhibited inconsistently .Also progestogens may alter the vasculature of the endometrium increase the chance of bleeding.

Efficacy:

- POP has a higher failure rate than COC.
- Failure rates for traditional POPs vary from 0.3 to 8.0 per 100 WY. The decrease efficacy is due in part that many women continue to ovulate & in part because the POP has a shorter half- life in the circulation.



# Indications of POP:

1. In women in whom estrogen is absolutely or relatively contraindicated as women with CVS risk factors, migraine, D.M or mild hypertension.
2. Lactating women since estrogen impairs milk production.



- **POP: UKMEC Category 3 – Risks generally outweigh benefits**
- Current and history of ischaemic heart disease and stroke – continuation of the method
- Past history of breast cancer and no evidence of recurrence for 5 years
- HIV – on antiretroviral therapy (drug interactions)
- Cirrhosis – severe (decompensated)
- Liver tumours – hepatocellular adenoma and malignant hepatoma
- SLE – positive or unknown antiphospholipid antibodies



- **POP: UKMEC Category 4 – Unacceptable health risk and should not be used**
- Breast disease – current breast cancer



# S/E:

1. Irregular vaginal bleeding.
2. High incidence of functional ovarian cysts due to effect on ovarian activity.
3. Headache, nausea, bloating, breast tenderness & mood changes, oily skin & acne.
4. Long -term risks: very small increase in the risk of carcinoma breast after prolonged use of POP (Depo-Provera confers a high degree of protection against endometrial ca.).



# Missed-pill guidelines for POPs

- **TRADITIONAL POPS** (Micronor\*, Noriday\*, Norgeston\*, Femulen)
- **>3 hours late** (>27 hours since the last pill was taken)
- Take a pill as soon as remembered.
- If more than one pill has been missed just take one pill. Take the next pill at the usual time. This may mean taking two pills in one day. This is not harmful. An additional method of contraception (condoms or abstinence) is advised for the **next 2 days** (48 hours after the POP has been taken).



# DESOGESTREL-ONLY (Cerazette\*)

- >12 hours late
- (>38 hours since the last pill was taken)
- Take a pill as soon as remembered. If more than one pill has been missed just take one pill. Take the next pill at the usual time. This may mean taking two pills in one day. This is not harmful. An additional method of contraception (condoms or abstinence) is advised for the **next 2 days** (48 hours after the POP has been taken).



# Inject able progestogens:

- 2 types: 1. Depo-Provera (medroxy-proesterone acetate given in a dose of 150 mg every 12 weeks.
2. Norethisterone –enanthate 200 mg given every 8 weeks.

**Subcutaneous DMPA (Sayana Press)** 104 mg given subcutaneously every 13 weeks. It can be injected into the upper anterior thigh or anterior abdomen .



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# S/E:

1. Irregular vaginal bleeding (treated by administration of estrogen simply by adding the combined pills).
2. Amenorrhea.
3. Delayed fertility; it may take 1 year for normal fertility to return following cessation of depo provera.
- 4. Decrease bone marrow density (BMD); Amenorrhea → hypooestrog. → ↓BMD.
- **5. Weight gain**
- The average weight gain among women using DMPA is between 2 and 6 kg.



# PROGESTOGEN-ONLY IMPLANT

- Nexplanon
- is the only POI available in the UK. It has replaced Implanon.
- It is a single rod which contains 68 mg of etonorgestrel ENG in a membrane of ethylene vinyl acetate. It is licensed for 3 years.
- Nexplanon is radio-opaque
- . Nexplanon<sup>®</sup> is a flexible rod (40 mm × 2 mm) and is inserted
- subdermally 8 cm above the medial epicondyle, usually of the non-dominant arm.
- **Insertion**
- is conducted under local anaesthesia using a specially designed insertion device.



# Mode of action

- The main mode of action is inhibition of ovulation .
- Thickening of the cervical mucus prevents sperm penetration into the upper reproductive tract.
- It also brings about changes in the endometrium making the environment unfavourable for implantation .



# Side effects

- irregular bleeding and oligomenorrhoea/ amenorrhoea.
- **Weight gain** .
- Mood changes and loss of libido can occur.
- Acne can improve, occur or worsen whilst using the implant.
- **Complications with removal**
- include deeply sited, non-palpable, broken or migrated implants. As Nexplanon contains barium sulphate it is radio-opaque. Hence it can be identified on X-rays. Ultrasound and MRI can also be used to locate the implants.









# Emergency contraception

Is any drug or device used after intercourse to prevent pregnancy, to prevent implantation of a fertilized egg.

1. Yuzpe regimen. 2 tablets of high-dose estrogen (100ug) & 500ug levonorgestrel repeated after 12 hours. S/E nausea & vomiting. The dose should be given within 72 hours of coitus.

- 2. Levonorgestrel 1.5 mg once up to 3 days. Replace yuzpe regimen.
- it works mainly by inhibiting ovulation. It prevents follicular rupture.
- It can be used more than once in a cycle.
- 3. IUCD is highly effective postcoital contraception with failure rate < 1%. It is used up to 5 days after coitus or 5 days after ovulation
- should be the first-line choice, particularly if the woman intends to continue the IUD as long-term contraception.
- When used for EC, its effect on the endometrium is thought to prevent implantation if fertilization has occurred



- 4. ellaone-ulipristal acetate
- 30mg single dose tablet
- If vomiting occurs within 3 hours, another tablet should be taken. Ulipristal is not recommended to be used more than once per cycle as the safety of efficacy of repeated exposure has not been assessed
- .
- Is progesterone receptor modulator .
- Its primary mode of action is thought to be inhibition or delay of ovulation. It can prevent ovulation after the LH surge has started.
- Effective up to 120 hours after coitus.
- Levo norgestrel effective 69%
- Ulipristal 85%.
- Oral EC is much less effective than the Cu-IUD for EC and is estimated to prevent only two-thirds of pregnancies.
- • Effective ongoing contraception should be started after EC.



# Sterilization:

- Sterilisation is a permanent and usually an irreversible method of contraception .

## 1-Female sterilization

- It involves blocking both fallopian tubes by laprotomy, mini-laprotomy, & more commonly by laparoscope or via hysteroscopy.

Bilateral salpingectomy or hysterectomy may be preferable when there is coexistent gynecological pathology.



# Methods of tubal occlusion:

- 1.Ligation (using absorbable or non- absorbable sutures)
- The Pomeroy technique is the most widely used ligation technique .
- 2.Electrocautery.
- 3.Rings.
- 4.Clips.
- 5.Laser (co2 laser).
- 6.Chemical agents instilled into fallopian tubes e.g. quinacrine.
- The failure rate for female sterilisation is 1 in 200.



# Hysteroscopic sterilisation

- Micro-inserts made from nickel–titanium and stainless steel are inserted hysteroscopically through the cornual ends of both tubes.
- This can be performed under local anaesthesia and/or intravenous sedation. These generate fibrosis around the devices and the tubes are occluded by 3 months after the procedure.
- Additional contraception needs to be used until a hysterosalpingogram is performed at 3 months to confirm full occlusion of the tubes.
- It is an irreversible procedure and the failure rates quoted are the same as for the other methods of tubal occlusion.



# Complications:

## A-Immediate complications

1. Complication of G.A.
2. Vascular damage or damage to bowel or other internal organs especially with electrocautery.
3. Gas embolism.
4. Thrombo-embolism.
- 5. Wound infection.



## B- Long -term complications

- 1. Menstrual disorders. There is no evidence to suggest that there is an increased incidence of bleeding problems and consequently an increased hysterectomy rate after tubal occlusion.
- 2. Abdominal pain & dysparunia (more common after cautery).
- 3. Psychological problems & psycho-sexual problems.
- 4. Bowel obstruction from adhesions (very rare).



# Vasectomy (male sterilization)

Division or occlusion of the vas deferens prevents the passage of sperm using clips or diathermy or injection of sclerosing agents as silicone.

- Efficacy: failure rate is 1 in 2000.
- The procedure can be carried out under a local anaesthetic and is safer than female sterilisation. Following the procedure, men should be advised to use effective contraception until two consecutive semen samples 4 weeks apart confirm azoospermia. (The first sample should be taken at least 8 weeks after surgery.)

## Complications

### A-Immediate

1. Scrotal hematoma, wound infection.
2. Up to 2 % men fail to have azospermia in which case vasectomy repeated.



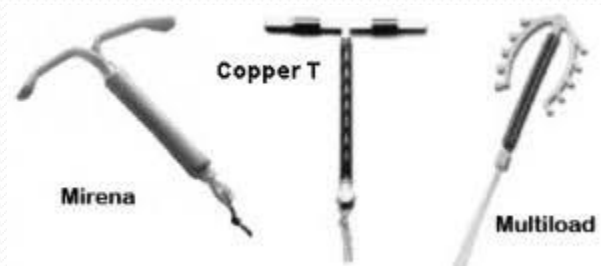
## B- Late complications

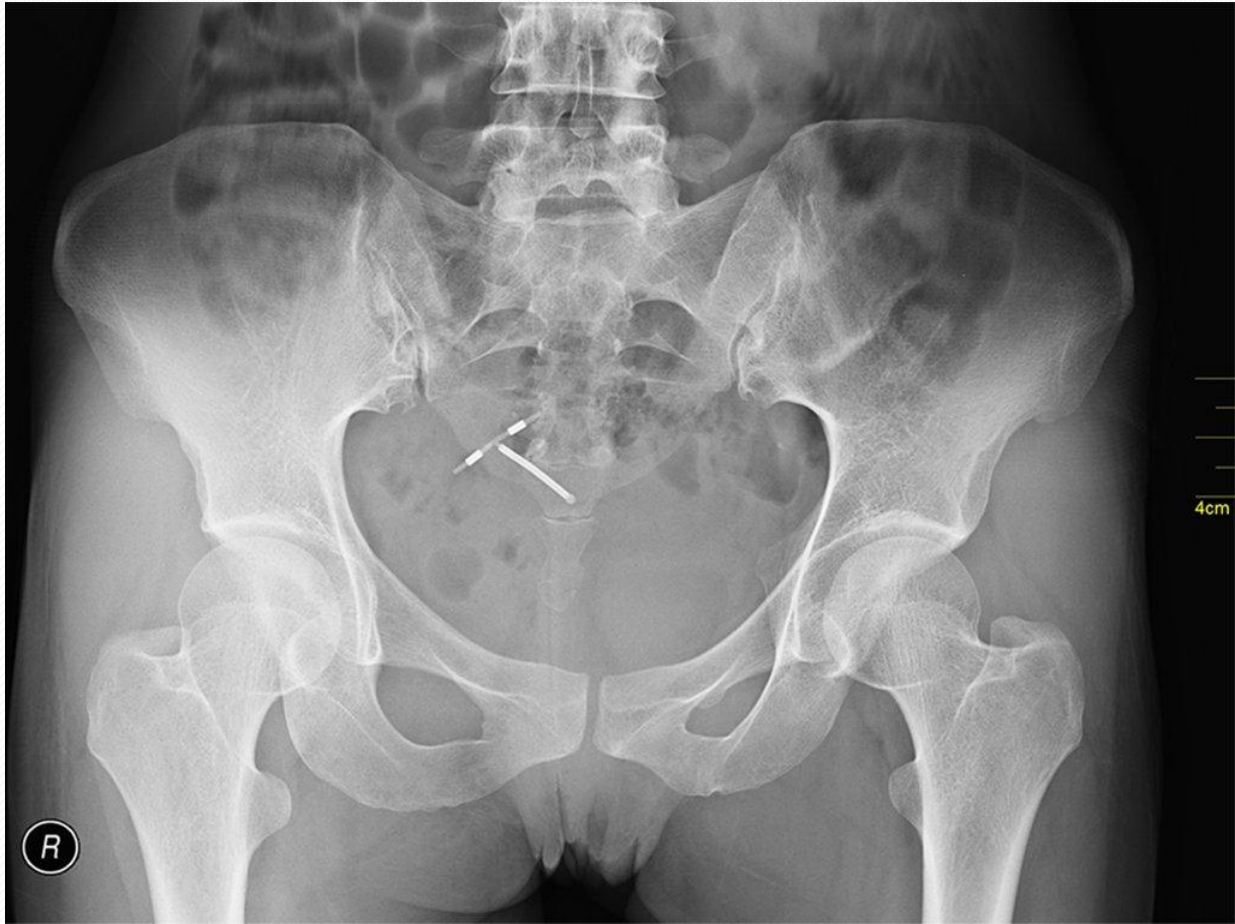
1. Antisperm antibody; it is harmless unless restoration of fertility is desired.
2. Small inflammatory granuloma.
- **3. *Cancer***
  - There is no increase in testicular or prostatic cancers following the vasectomy operation [B].
- **4. *Heart disease***
  - There is no increased incidence of heart disease associated with vasectomy.

















**Barrier method:**  
The diaphragm fits  
over the cervical  
opening, preventing  
sperm from entering  
the uterus

 ADAM









