Reproductive Failure in Female

- **Anestrus:** is a broad term that indicates the lack of estrus expression at an expected time.

Classification:

(A) On the basis of corpus luteum (CL)

(I) Presence of functional corpus luteum (functional anestrus or apparent anestrus).

• Anestrus due to pregnancy.

• Anestrus due to pyometra.

• Anestrus due to mummified fetus.

• Anestrus due to macerated fetus.

• Silent heat or weak heat.

(II) Absence of functional corpus luteum (true anestrus)

The ovaries are quiescent, inactive and do not have any functional CL, This condition is referred to as true anestrus. This may be due to:

• Malnutrition.

• Lactational stress (The act of suckling stimulates the prolactin secretion which increase the period of anestrus. It has been shown that suckling decreases LH secretion. This prevents the first postpartum ovulation and return of cyc1icity. Plasma cortisol level increases in suckled cow which depresses LH secretion and sensitivity of pituitary gland to GnRH).

• Seasonal stress.

• Chronic wasting disease.

• Senility.

(B) On the basis of stage of the animal:

1. Prepubertal anestrus

• Delayed puberty - due to under nutrition.

• Abnormal reproductive tract - Freemartins, hermaphrodites, segmental aplasia of paramesonephric duct and ovarian hypoplasia.

• Debilitating disease such as chronic pneumonia etc.

2. Postpartum anestrus:

• Physiological anestrus for 2-3 weeks after parturition.

• Lactational stress.

• Nutritional effects such as negative energy balance and deficiency of micro nutrients.

• Uterine diseases such as RFM, metritis, pyometra etc.

• Chronic debilitating diseases such as leg injuries, displaced abomasum.

3. Post service anestrus:

• Pregnancy.

• Pyometra.

• Luteal cyst.

• Silent estrus.

Ovarian cysts

Definition: "Ovarian cysts are defined as follicle like ovarian structures that are 2.5 cm. in diameter or larger and persist for 10 days or more generally in the absence of corpus luteum."

OR

"Ovaries are said to be cystic when they contain one or more fluid filled structures larger than a mature follicle (>2.5 cm. in diameter), which persist for more than 10 days and result in aberrant reproductive function."

Synonyms

Various synonyms are used for this disease which include 'cystic ovarian disease', 'cystic ovarian degeneration', 'cystic Graafian follicles', 'Ovarian cysts', 'luteal ovarian cysts' and 'cystic cows.'

Etiology:

• Deficiency of LH secretion during the pre-ovulatory stage.

• There is also some evidence that ovarian cysts may be due to defect within the ovary. The ability of follicles to respond to the preovulatory LH surge is dependent upon the timely formation of LH receptors on its surface during follicular maturation. If less number of receptors are present on the follicle, it will result in ovulatory failure as well as cystic ovary.

Predisposing factors:

• Hereditary predisposition: Higher incidence in dairy breeds as compared to beef breeds.

• Age: Incidence is higher in that lactation in which milk yield is in peak. Therefore, ovarian cyst is **uncommon in first lactation.**

• Nutrition: Feeding of high protein diets causes higher incidence of the disease.

• Season: Incidence is more in **winter** than other seasons.

• Stress: Ketosis, dystocia, twin births, RFM, milk fever etc. cause stress. Due to stress, ACTH is released which causes LH suppression.

• Postpartum uterine infections: Endotoxin produced by micro-organisms in the uterus may trigger the $PGF_{2\alpha}$ release, which in turn stimulates the secretion of cortisol. The elevated cortisol level suppresses the preovulatory release of LH and leads to the development of cyst.

Classification: Ovarian cysts have been classified into two parts.

• Anovulatory cyst or pathogenic ovarian cyst ego Follicular cysts and luteal cyst.

• Ovulatory cyst or nonpathogenic ovarian cyst ego cystic corpora lutea.

- **Follicular cysts**: are anovulatory follicles that persist on the ovary for 10 days or more, have a diameter greater than 2.5 cm. and are usually characterized by nymphomania.

- **Luteal cyst** is anovulatory follicle over 2.5 cm. in diameter that is partially luteinized and persists for a prolonged period and is usually characterized by anestrus.

- **Cystic corpora lutea**: are nonpathogenic ovarian cysts which arise following ovulation and are defined as corpora lutea that contain a fluid filled central cavity of variable size. Cystic corpora lutea are capable of normal progesterone synthesis and do not alter the length of the estrous cycle.

Differences between follicular cyst and luteal cyst:

Follicular cysts	Luteal cyst
Multiple on one or both ovaries.	Usually single in one ovary.
Thin walled as they do not get luteinized.	Thick walled due to partial luteinization.
Tense and distended, give fluctuating fluid-filled feeling.	Soft but luteinized tissue, gives little hard feeling.
More than 2.5 cm. in diameter	About 2.5 cm. or slightly more.
Persist for 10 days or more.	Persist for a month or longer.
Easy to rupture.	Difficult to rupture.
Fluid inside the cyst is pale yellow or straw-colored.	Fluid is usually amber or dark yellow or brown in color.
Characterized by nymphomaniac symptoms	Characterized by anestrus.

Clinical signs of follicular cysts:

Nymphomania i.e. displaying excessive and prolonge1 signs of estrus, and a short interval between two successive estruses.

• Excess swelling of vulva.

• Frequent and copious vaginal discharge than normal.

• Nervous, restless and bellowing frequently than normal.

• Attempt to ride other cows and will stand to be mounted by other cows.

• Sexually aggressive as a bull, so the affected cow is often spoken "buller".

• Relaxation of sacro-sciatic ligament.

• Sometimes *vaginal prolapse* when the cow sits down.

• The mucus is tougher and more opaque than the mucus of estrus.

• External os of the cervix is usually large, dilated and relaxed.

• Uterus is large, edematous and flaccid.

• In long standing cases of nymphomania, the relaxation of pelvic ligaments cause tipping of the pelvis and elevation of tail-head. This elevated tail head is called **sterility hump**.

• Hydrometra or mucometra is also found in long standing cases of follicular cysts.

• In few cases, cystic dilatation of the endometrial glands is so marked that the endometrium developed as swiss-cheese appearance on histological section.

Clinical signs of luteal cyst:

• Cessation of cyclic activity i.e. anestrus.

• Some of the long-standing cases of luteal cysts develop a masculine body and attempt to mount the other cows but unlike the nymphomaniacal cow, they will not stand when being mounted by other cows. This condition is called **virilism**.

Treatment of follicular cysts:

1. Manual rupture: Manual rupture of cystic structures by palpation per rectum. Ovarian hemorrhages and adhesions may follow manual rupture, which could further cause infertility. Therefore, manual rupture should be discouraged.

2. **Gonadotropin-releasing hormone (GnRH):** After treatment with GnRH analogue (Buserelin), most of the cows that respond come in estrus 18 to 23 days after treatment. Receptal (Buserelin) - 5 ml *I/M.*

3. Administration of hCG:

Chorulon (hCG) - 3000-5000 IU- I/V Cows that respond to the treatment develop a normal estrous cycle within 20 to 30 days after treatment. A second or third treatment may be required in few cases. Cases of ovarian cyst are not usually retreated until at least 3 to 4 weeks have elapsed and unless signs of nymphomania persist.

4. Sequential GnRH and $PGF_{2\alpha}$ treatment: Ovarian cysts that luteinize in response to GnRH administration undergo regression similar to that of normal corpora lutea. The luteolytic activity of $PGF_{2\alpha}$ reduces interval from the treatment with GnRH to the first estrus (18 to 23 days). $PGF_{2\alpha}$ should be given on 9th days, after GnRH treatment.

5. Administration of progesterone: 50 to 100 mg progesterone (Duraprogen) I/M for 14 days or a single dose of 750 to 1000 mg repository progesterone is used for the treatment of follicular cyst.

Treatment of luteal cyst:

• $PGF_{2\alpha}$ analogue - Lutalyse 5 ml – I/M

Prevention:

1. Selective breeding: The use of only such bulls whose daughters have shown low incidence of ovarian cyst.

2. GnRH treatment on days 12 to 14 post-partum reduces the incidence of ovarian cysts.