CHAPTER-15

Common Reproductive Disorders in Dairy Animals – anestrus, repeat breeder, abortion, dystocia, prolapsed etc.

Objectives

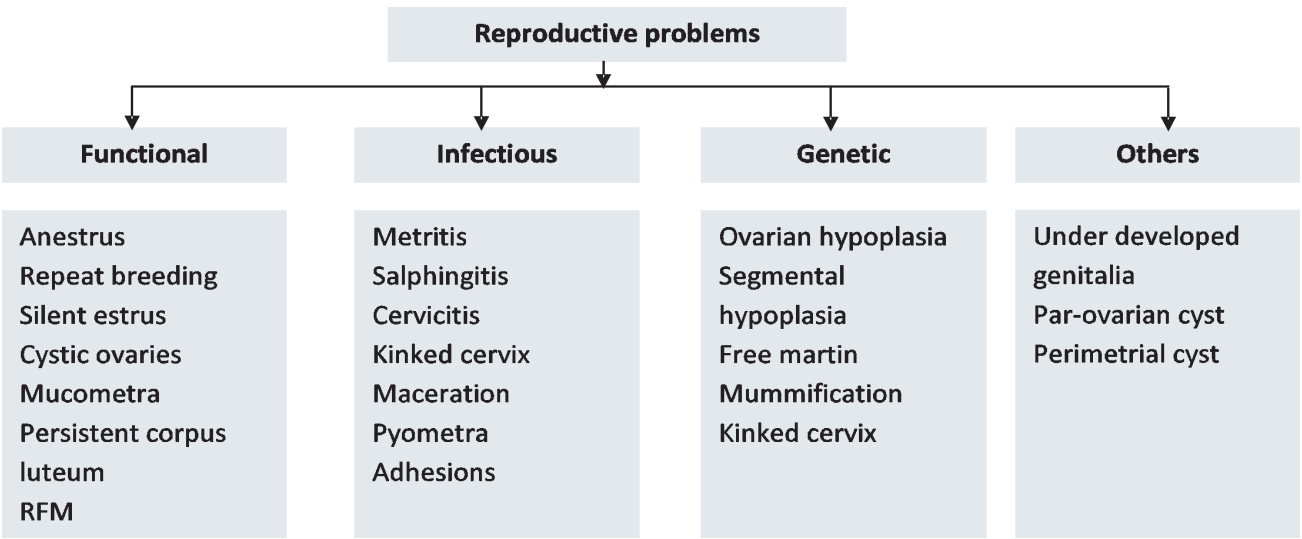
To learn about the most commonly occurring reproductive disorders in dairy animals

Introduction

Reproductive disorders and associated Infertility (transient loss of fertility) among cattle and buffaloes pose serious economic loss to farmers in terms of low returns and veterinary expenses. Due to impaired reproduction ability, the calving to conception (days open) period is prolonged leading to extended calving interval, which jeopardize the aim of obtaining a calf per cow per year. The causes of infertility in dairy animals are many and can be complex. They relate to follicle development and maturation, onset of estrus, successful coitus/insemination, ovulation, fertilization, implantation, the development and delivery of the normal fetus and its membranes, proper uterine involution and cleansing, resumption of ovarian cyclicity and estrus expression.

What are the common reproductive problems in dairy animals?

The reproductive problems can be divided into some major categories which include functional disorder, infectious disorders, genetic disorders and other miscellaneous disorders. The following figure depicts some major reproductive disorders.



Among the reproductive disorders, repeat breeding and anestrus are more common and results in huge loss to the farmers.

1. What is repeat breeding?

A repeat breeder cattle or buffalo is defined as one that has apparently normal genitalia without any abnormal discharge from genital tract and with normal estrous cycle and estrous period but fails to conceive after 3 consecutive inseminations/services with fertile semen/bull.

Repeat breeding (RB) in cattle or buffalo is one of the most frustrating reproductive problems at field conditions. Incidence RB in cattle and buffaloes ranges from 5.5 to 33 and 6 to 30 per cent respectively. Etiology of RB is mainly divided into: (1) Failure of fertilization, which may be due to defective gametes transport, abnormalities in ovulation and egg pickup or defective gametes and (2) Embryonic morality due to chromosomal abnormalities, dietary deficiencies, high environmental temperature, hormonal imbalance or adverse uterine environment (inflammation and infection). It has been reported that 20-30% of RB cases were due to embryonic morality and approximately 25% of bovine embryos were lost during the first three weeks of life. Failure of fertilization and embryonic mortality cannot apparently be differentiated if the embryo dies before 13 days of gestation because the inter-estrus interval usually remains unaltered. But if the embryo dies after this period, the inter-estrus interval is prolonged. Several reasons have been attributed to resulting in repeat breeding condition.

Managemental and therapeutic approach for repeat breeding

Once the animal is considered as repeat breeder, the cause should be identified. Since RB is a syndrome and may be due to multi-factorial etiology, no single technique or method can be used to diagnose the cause. Examination of the suspected animal at various intervals may be useful to rule out certain conditions and to identify the underlying cause.

1. **Ovulation abnormalities:** Ovulation should take place at proper time so that capacitated/ spermatozoa and ova could meet at ampulla of the oviduct, where fertilization takes place. Normally ovulation takes place at 10-12 hr after the end of oestrus in cattle and buffaloes. Abnormalities in ovulation include delayed ovulation and anovulation. If ovulation occurs beyond the specified time period, it is called as delayed ovulation. If ovulation does not occur (anovulation), the follicle may persist, luteinized and lysed by $PGF_2\alpha$ and the animal may come into oestrus normally or it may turn into cystic. The differential diagnosis between delayed and anovulation can be made by examination per rectum of ovaries of suspected animal on the day of oestrus, day 2 and day 10-12 of the oestrus cycle. If the follicle is present on all three exanimations, the case is diagnosed as anovulation, while if the follicle

is present on first and second examination and a corpus luteum (CL) at the same place on 3rd examination, the case is delayed ovulation. Once diagnosed, delayed/ anovulation can be treated by administration of LH or hCG on the day of estrus.

2. **Subclinical infection:** In subclinical infection of the reproductive tract, there may not be any visible abnormalities in discharge except from occasional whitish flakes and the animal experiences normal cycle length. Because of these subclinical infections, uterine environment is altered, which may interfere with embryo survival. Confirmatory diagnosis is made by uterine cytology or biopsy. However, due to technical constratints, it is not usually practiced at field level. White side test can be used to some extent to identify subclinical infection. In this test to 1 ml of genital discharge, 1 ml of 5% NaOH is added and heated up to boiling. Appearance of yellow colour indicates infection. Uterine infection can be treated with wide range of antibiotics, antiseptics, hormones and other alternative therapies. Post insemination antibiotic therapy may be useful in these cases.

3. **Defective gamete transport:** It may be due to abnormalities in tubular genital tract or hormonal imbalance. Transport of gamete in tubular genital tract is controlled by oestrogen: progesterone ratio. If this ratio is altered, gamete transport is impaired. Other abnormalities like oviductal occlusion (partial/complete) also interfere with gamete transport. This can be easily diagnosed at field level by infusing 1% phenol red or 0.1 % phenosulphonpthalene (PSP) into uterus. Phenolsulphonphthaleine (PSP) is a dye that is not readily absorbed at the uterine lumen. When this dye is placed in the uterine lumen and is the tubes are patent, it passes along them into peritoneal cavity. From this site it is readily absorbed into the circulation and excreted by the kidneys into urine. If an alkali is added to the urine containing this dye the color of the urine changes to red or pink. If the oviducts are occluded, the dye does not go to peritoneum and thus do not appear in the urine. Thus an unchanged urine colour after addition of alkali indicates tubal occlusion and a change of colour to red or pink indicates that the tubes are patent.

4. **Luteal insufficiency:** Progesterone, secreted by CL, is essential for embryo survival. If the CL is not compeletely formed, or if it is not functioning adequately, it leads to failure of pregnancy. Luteal insufficiency has been suspected to cause infertility for many years, and although proof is difficult, repeat breeders are frequently treated on this assumption. It is impossible to diagnose this condition by rectal palpation. Some assessment about luteal function can be done by measuring progesterone level in blood of milk. If other causes are ruled out, a RB animal can be suspected for this condition and can be treated with GnRH or hCG at 2-3 days after insemination to improve the CL formation, at mid cycle to stimulate accessory CL information or at around day 17 to prevent the CL regression.

Fixed time insemination

To avoid human errors in identifying estrus in sub-estrus buffaloes and cattle, $PGF_2\alpha$ can be used to bring the animal into estrus and insemination can be done at fixed time. $PGF_2\alpha$ can be administered at 5-16 days of estrous cycle or to those animals, which have mature CL as assessed by rectal examination. In this case, single injection is usually sufficient to bring the animal into oestrus. Double injection of $PGF_2\alpha$ at 11 days interval can also be employed and it avoids the rectal palpation of CL. It should be taken care that no pregnant animal is administered with $PGF_2\alpha$. It was observed by many workers that fixed time insemination at 72 and 96 hr after $PGF_2\alpha$ administration yielded higher conception rates. Hence, this method can be employed in repeat breeders.

2. What is anestrus?

If the animal fails to exhibit estrus for longer period, excepting during pregnancy, called as anestrus, affects the economy by prolonging the calving interval. This condition is generally observed after parturition (post partum anestrus) especially under field conditions. A variety of factors are known to be associated with anestrus, few important factors are discussed below.

Nutritional

Several cases of prepubertal anestrus reported are due to under nutrition and dietary deficiencies. However, infertility due to deficiency of single nutrient is seldom observed and is usually of multiple deficiencies. Only few nutrients have direct effect on reproduction.

Under feeding: In heifers, under feeding delays the onset of puberty and sexual maturity where as in adults, it is characterized by irregular estrous periods and anestrus. Underfeeding or starvation for prolonged period causes failure of proper follicular development, leading to follicular atresia along with loss of sexual desire. Under feeding may also lead to production of weak young ones.

Protein and vitamin deficiency: Deficiency of protein which delays onset of estrus is not much encountered except due to severe under feeding or inaniation where vitamin A and phosphorus deficiencies are other complicating factors. Except for vitamin A, other vitamins deficiency seldom affects reproduction. Vitamin A deficiency adversely affects reproduction in most species, as it is necessary for maintenance of epithelial tissues. Vitamin A deficiency is characterized by keratinization of epithelium, degeneration of placenta, fetal death, abortion and retention of foetal membranes. Deficiency of vitamin B complex is rare because of the ability of its ruminal synthesis by cattle and buffaloes and may occasionally produce some inhibitory effects on reproduction.

Mineral deficiency: The deficiencies causing anestrus in cattle and buffaloes are mostly

limited to phosphorus and trace elements. The phosphorus requirement for reproduction is about 10 – 12 g daily except during lactation when an additional amount is required. Phosphorus deficiency usually occurs when an animal is fed with a feed, which is low in protein and green grass. The usual symptoms of phosphorus deficiency are delayed onset of puberty in heifers and failure of exhibit estrus in cows. Calcium deficiency does not have much impact on animal's cyclicity. Copper, cobalt, manganese and iron deficiencies are not uncommon and their deficiencies may affect normal reproduction.

Hormonal

Most of the hormonal disturbances causing infertility are secondary to basic nutritional, hereditary and other stress factors. It should always be remembered that indiscriminate use of hormones itself may lead to infertility. Treatment of anestrus depends upon the etiology.

3. What is retention of fetal membranes?

Retention of fetal membranes (RFM) is defined as inability of a cow to shed the fetal membranes even after 12h of parturition. This is an economically important condition because it affects the general health of the cow and her subsequent reproduction and lactation performance. RFM predisposes cows to different peri-partum diseases that includes but not limited to, mastitis, metritis and ketosis, and directly decrease the milk yield and disease resistance. The reproductive consequences of RFM are due to postpartum metritis and include an increase in the service period, days open, calving to conception interval and calving interval. Proper management of cows and buffaloes during pre and peri-partum period is at most important to reduce the RFM and associated complications

Preventive management of RFM

A vast repository of preventive and therapeutic regimes has been reported for RFM with variable efficacy. Prevention of RFM is the key in maintaining post-partum reproductive efficiency. The nutritional management of mature cows for proper body condition and minimal cases of milk fever are the major two points to be taken care to keep the incidence of RFM minimal. Proper growth rates resulting in heifers calving at desirable body weight and selection of calving ease sires are the most important management considerations for prevention of retained placenta in heifers. The strategy should focus on maintaining a healthy, contented and active cow prior to, during and after parturition. A balanced, limited ration during the 6-8 week dry period; sufficient daily exercise; sufficiently large, clean and comfortable calving areas and proper sanitary procedures during the calving period minimize the chances of retention and infections of the reproductive tract.

- In selenium deficient or borderline areas, the administration of a dietary level of selenium (0.1 ppm) tended to minimize the incidence of retained placentas. Vitamin E

and Selenium supplementation during the dry period reduces the risk of RFM. Results indicated that treatment with either type of synthetic Vitamin E (a-tocopherol acetate and a-tocopheryl acetate) was associated with a lower risk of RFM compared with treatment with natural Vitamin E (α-tocopherol). A single intra muscular injection of 1100 IU of DL α-tocopherol acetate and 30 mg of sodium selenite during dry period (preferably on 21 days prior to calving) has been shown to reduce the incidence of RFM.

- Vitamin A and D deficient cows have high retention rates. Intramuscular injections of Vitamins A & D may be given 4 to 8 weeks prior to calving if a deficiency is suspected.
- The calcium:phosphorus ratio for the dry cow is extremely important in the prevention of milk fever, and in turn, retained placentas. Maintenance of calcium:phosphorus ratio between 1.5:1.0 and 2.5:1.0 is absolutely necessary. Above 2.5:1.0, the incidence of milk fever and retained placenta increase. Supplementary phosphorus may have to be fed to dry cows to maintain the proper ratio as recommended by the Veterinarian.
- Administration of either Oxytocin (20-30 IU) or Prostaglandin $F_2\alpha$ (natural 25 mg; synthetic 200 µg) immediately after calving has been shown to reduce the incidence of RFM.

Therapeutic management of RFM

The basic goal in any treatment of RFM is to return the cow's reproductive tract to a normal state as quickly as possible. There are generally two methods of managing retained placenta when no systemic involvements are present manual removal and natural separation.

- Manual removal has long been a common practice but should not be used because of possible injury to the delicate lining of the uterus. In India, it is a common practice to remove the placenta manually even without allowing sufficient time to the cow to expel the membrane normally. This invariably results on uterine infection and associated complications.
- If the membranes are not released due to poor uterine contractions, the afterbirth may detached without damage by applying slight tension externally to the fetal membranes.
- In unavoidable situations, the membrane parts that are easily detachable can be removed gently and some type of antibiotic or antiseptic solution may be placed in the uterus as prescribed by a veterinarian.
- Based on recent research on RFM, the most common recommendation is to allow the membranes to separate naturally with or without the use of medication. Hormones such as prostaglandin $F_2\alpha$, and oxytocin may be used to hasten the process.

- A series of intrauterine infusions is usually more effective than a single treatment. The length and number of treatments considered should be determined on an individual basis as recommended by a veterinarian. In the experience of the authors, infusion into the post-partum uterus leads to complications like salphingio-ovarian adhesion. RFM and associated post-partum complications can well managed by systemic treatment with long acting antibiotics like Ceftiofur.
- Partial retention may go unnoticed until complications such as metritis or pyometra develop. When noticed, affected cows may have increased temperature; be off feed; be depressed; have lowered milk production and have a foul smelling vaginal discharge. These animals should be examined and can be systemically with antibiotics and locally with intrauterine medication (if unavoidable) by a veterinarian.

4. What is abortion?

Abortion in dairy cattle is commonly defined as a loss of the fetus, which has grown to a recognizable size, between the age of 42 days and approximately 260 days. A low rate of abortions is usually observed on farms and 3 to 5 abortions per 100 pregnancies per year is often considered "normal." However, the loss of any pregnancy can represent a significant loss of income to the producer and appropriate action should therefore be taken to prevent abortions and to investigate the cause of abortions that may occur.

Causes of abortion

Non-infectious causes

- Genetic
- Environmental: temperature
- Nutritional: phytotoxins including mycotoxins
- Iatrogenic: administration of abortifacient drugs

Infectious causes

- General infections with high fever
- Specific infections such as brucellosis, BVD etc.

Prevention of abortions

- Proper hygienic and biosecurity measures in the cow's environment and feed storage
- Isolation of aborting cows and immediate removal of aborted materials
- Systematic evaluation of the feed for mycotoxins and other phytotoxins
- Adequate immunization against infectious diseases causing abortion
- Maintenance of adequate breeding and treatment records to avoid insemination of

pregnant cows and administration of intra uterine drugs that may cause abortion to pregnant cows.

5. What is dystocia?

Dystocia, more commonly known as difficult calving, is a problem most dairy producers encounter. Consequences range from the need for increased producer attention to the loss of the cow and calf. Dystocia is a leading cause of calf death at or shortly after birth and leads to uterine infections, more retained placentas, and longer calving intervals.

The causes of dystocia spring from many management choices ranging from breeding genetics and nutrition to management of the cow or heifer during delivery.

- Breeding - genetics can play a role in dystocia through birth weight and heifer development.
- Over conditioned dam - too much fat around the pelvis can lead to a small birth canal.
- Malformation of the calf or the dam.
- Shortened or lengthened gestation.
- Heifers often have dystocia because the birth canal (mainly the vagina and vulva) does not stretch enough for the calf to be delivered.
- Fetal-maternal incompatibility (the fetus is too large or the cow's pelvis is too small) - most frequent cause of dystocia in beef cows/heifers.
- Malposition - more frequent in dairy animals.
- Other diseases - i.e. Milk Fever where there is a decrease in calcium which will decrease muscle tone causing the cow to become too weak to push out the calf, or uterine torsion where the cervix is twisted.

How to avoid dystocia?

- Feed heifers to calve with adequate size at 24 months and cows so that they are in good flesh to calve once a year but not over conditioned.
- Provide a clean, dry, well ventilated and accessible maternity area.
- Observe the calving.
- Give the cow adequate time to prepare herself for delivery.
- Observe strict sanitation procedures when examining a cow.
- Know your limitations and call for veterinary assistance when trouble occurs and before the cow becomes exhausted.
- Provide good neonatal calf care.

6. What is prolapse?

A prolapse is defined as the falling down or slipping of a body part from its usual position.

The complete uterine prolapse is most common at calving. This is when the uterus is completely expelled out behind the cow, and can hang down to the hocks when standing. This condition can be life threatening for the cow, and the uterus must be cleaned and reinserted as quickly as possible. The cow can go into shock quickly and die from blood loss.

A cervical prolapse is usually seen in older cows and occurs when the tissue around the birth canal becomes relaxed during the later stages of pregnancy. The increased pressure in the abdominal cavity will push the vagina or rectum out. If there is tissue trapped outside the birth canal, it can swell and become infected. The bladder can also be trapped in the expelled tissue, preventing the animal from urinating.

How to prevent prolapse?

- It is important not to allow cows to become overly fat during the last trimester of pregnancy.
- Prolapses can also be an inherited trait. If there is a high incidence in the herd, check the bloodliness of the cows and bulls in the herd.
- If large calves are a possible cause of the prolapse, use low birth weight bulls in the breeding program, and provide a ration to keep the cow herd in good condition and not over conditioned.
- When pulling a calf, do not use excessive traction.

Activity

1. Go to field and discuss with the farmers about the most common reproductive disorders with their animals
2. Got to nearby veterinary hospital and observe how the cases of reproductive disorders are being handled

Review Questions

1. Define repeat breeding.
2. What are the possible causes for anestrus in dairy animals?
3. How dystocia can be minimized?

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