

Introduction

A follicular cyst is a condition where the normal follicle in the ovary fails to ovulate and continues to grow leads to a fluid-filled sac. This is a type of ovarian cyst that disrupts the estrous cycle. A follicular cyst disrupts the normal hormonal balance and prevent the buffalo from coming into estrus or lead to prolonged estrus which in turn affect the fertility. Unlike normal follicles that grow and rupture during the estrus to release an egg for fertilization; a follicular cyst does not rupture. Instead, it grows larger and produces abnormal levels of estrogen which leads to an absence of estrus or prolonged estrus. Follicular cysts are one of the common ovarian disorders observed in the buffaloes particularly in tropical regions. Managing the follicular cysts is essential for maintaining the reproductive health and optimizing the productivity on a buffalo farm. In tropical regions, heat stress, inadequate nutrition and infections are more prevalent leads to the follicular cysts. This condition is associated with the reduced reproductive performance in the buffalo herds leads to extended calving intervals and lower overall herd productivity.

Causes

Several factors contribute to the development of follicular cysts in the buffaloes such as hormonal imbalances, environmental stress and health conditions.

Hormonal imbalances

- Disrupted LH surge: The luteinizing hormone (LH) surge is responsible for triggering the ovulation; insufficient or delayed secretion prevents the follicle from rupturing leads to cyst formation.
- Excessive estrogen: High levels of estrogen without ovulation leads to formation of cyst. The absence of

ovulation leads to the cyst becoming the dominant structure in the ovary.

- Insufficient progesterone: Low levels of progesterone in the luteal phase prevent the normal progression of the estrous cycle leads to the formation of cysts.

Environmental factors

- Heat stress: High temperatures in the tropical regions induce the stress in buffaloes which in turn negatively affects the hypothalamus-pituitary-ovarian axis leads to hormonal disruptions that promote the cyst formation.
- Poor management practices: Stress from overcrowding, poor handling or sudden environmental changes contributes to hormonal imbalances and increase the likelihood of follicular cyst formation.

Infections and diseases

- Endometrial infections: Chronic infections such as endometritis disrupt the hormonal environment in the reproductive tract leads to changes in the ovary which in turn induce to cyst formation.
- Systemic illness: Illnesses affecting the buffalo's general health such as respiratory or gastrointestinal diseases lead to the hormonal imbalances that in turn affect the ovarian function.

Nutritional deficiencies

- Poor nutrition: Deficiencies in key nutrients such as energy, protein and minerals (copper, zinc and selenium) affect the reproductive health and increase the risk of follicular cysts.

Genetic factors

- Some buffalo breeds have a higher predisposition to developing follicular cysts especially if there is a genetic tendency for hormonal irregularities.



Incidence

The incidence of follicular cysts varies depending on the several factors such as management practices, environmental conditions and genetic predispositions. In the tropical regions, heat stress, nutritional deficiencies and reproductive management challenges are more common and the incidence of follicular cysts is higher.

- Increased in tropical regions: Heat stress is a significant contributing factor in the tropical climates which in turn increase the likelihood of hormonal imbalances leads to cyst formation.
- Postpartum period: Buffaloes that have recently calved are more susceptible to the ovarian cysts particularly if they experience metabolic stress, poor nutrition or infections during the postpartum period.
- High-producing buffaloes: High-producing buffaloes especially those in intensive dairy systems are more likely to develop follicular cysts due to the metabolic and hormonal changes associated with lactation.

Pathophysiology

The pathophysiology of follicular cyst formation involves a disruption in the normal hormonal regulation of the estrous cycle. Under normal conditions, a dominant follicle grows on the ovary and during estrus, it ruptures to release an egg for fertilization (ovulation). In the case of follicular cysts

- Failure to ovulate: The follicle does not undergo normal ovulation due to an insufficient or delayed LH surge leads to cyst formation.
- Hormonal disruption: The cyst that forms continues to produce estrogen which in turn cause abnormal estrus behaviour such as prolonged or irregular estrus cycles.
- Continued follicular growth: The cyst continues to grow and become very large, prevent the normal development of other follicles and disrupt the overall ovarian function.

Follicular cysts lead to infertility if not managed properly because they prevent the buffalo from becoming pregnant.

Clinical symptoms

The clinical symptoms of follicular cysts vary depending on the size of the cyst and the hormonal imbalance involved.

- Absence of estrus (anestrus): One of the most common signs is the absence of estrus or heat as the buffalo does not exhibit the normal behavioural signs associated with estrus.
- Prolonged estrus: Some buffaloes exhibit the prolonged or continuous estrus showing the signs of heat behaviour for an extended period without ovulation.
- Nymphomania: Excessive and persistent mating behaviour or attempts to mount may be observed due to the high levels of estrogen produced by the cyst.
- Ovarian enlargement: On veterinary examination (ultrasound), the ovary appears as enlarged due to the presence of the cyst.

In some cases, buffaloes show no external signs but still fail to conceive due to the absence of ovulation.

Diagnosis

Accurate diagnosis of follicular cysts requires a combination of clinical observation and diagnostic tools.

Clinical examination

- Estrus detection: The absence of typical estrus behaviour or prolonged estrus without conception raise the suspicion of a follicular cyst.
- Palpation: Palpation of the ovaries via rectal examination reveals an enlarged, cystic structure on the ovary.

Ultrasonography

- Ovarian ultrasound: This is the most accurate method for diagnosing the follicular cysts. An ultrasound reveals the presence of a fluid-filled cyst on the ovary typically measuring more than 2.5 cm in diameter.
- Monitoring of follicular development: Ultrasound is also used to monitor the maturation of follicles and identify any abnormalities in their development.

Hormonal test

- Estrogen and progesterone levels: Blood tests are used to measure the levels of

estrogen and progesterone. High estrogen levels with low progesterone are indicative of a follicular cyst.

- LH and FSH levels: Testing for the luteinizing hormone (LH) and follicle-stimulating hormone (FSH) helps to confirm a failure of ovulation which is associated with cyst formation.

Treatment

The treatment of follicular cysts generally aims to restore the normal ovarian function and hormonal balance.

Hormonal therapy

- GnRH (Gonadotropin-releasing Hormone): Administration of GnRH stimulates the release of LH which in turn helps to induce the ovulation and rupture the cyst.
- Estrogen injection: Estrogen sometimes is used to stimulate the estrus and encourage the development of a normal follicle.
- Progestogens: Progestogens helps to regulate the estrous cycle and initiate the luteal phase, which in turn helps to resolve the cyst.

Manual rupture of the cyst

- In some cases, veterinarians attempt to manually rupture the cyst to encourage normal ovulation. This should only be performed by experienced practitioners.

Ovary ablation or Ovariectomy

- In severe cases where other treatments fail, the surgical removal of the cyst or the affected ovary is considered.

Supportive care

- Improving the buffalo's nutrition and reducing the environmental stress helps to support the recovery process and prevent future cyst formation.

Control and prevention

Prevention of follicular cysts formation involves the good management practices, nutritional support and minimizing the stress factors.

Stress reduction

- Heat stress management: Provide adequate cooling, ventilation and shade to minimize the effects of heat stress which is a major contributing factor in the tropical regions.

- Minimize overcrowding: Avoid overcrowding in the barn to reduce the stress and improve overall animal welfare.

Nutritional management

- Provide balanced feed rich in essential nutrients (proteins, minerals and vitamins) to support the reproductive health.
- Ensure adequate intake of trace minerals such as zinc, copper and selenium which are essential for the ovarian function.

Regular reproductive monitoring

- Implement regular estrus detection and reproductive monitoring to identify the potential issues early and provide the timely interventions.
- Use ultrasonography to monitor the follicular development and detect the cysts at an early stage.

Health Management

- Prevent infections and other reproductive diseases by implementing a regular vaccination schedule and maintaining the good farm hygiene.

Conclusion

The follicular cysts in buffaloes significantly affect the reproductive performance and farm productivity particularly in the tropical regions where environmental factors such as heat stress exacerbate the problem. Early diagnosis and appropriate treatment with hormonal therapies or manual intervention helps to resolve the follicular cysts and restore the normal fertility. Preventive measures such as stress reduction, proper nutrition and reproductive management, play a crucial role in minimizing the occurrence of follicular cysts and improving the overall reproductive efficiency in the buffalo herds.

