

## Luteal Cyst in Buffaloes

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### Introduction

A luteal cyst is a type of ovarian cyst that arises from the corpus luteum and persists beyond the usual lifespan of the CL. A luteal cyst is a common ovarian disorder in the buffaloes which is characterized by the formation of a fluid-filled sac that resembles the corpus luteum (CL) but persists for longer than normal and fails to regress after ovulation. The corpus luteum is responsible for secreting the progesterone which is essential for maintenance of pregnancy. In the case of a luteal cyst, the cystic structure produces progesterone which in turn disrupt the normal hormonal regulation of the estrous cycle leads to irregular estrus cycles, anovulation, or failure to conceive. Luteal cysts are one of the most significant reproductive problems in the buffaloes leads to infertility and suboptimal reproductive performance particularly in the tropical regions where environmental and managemental stresses are more prevalent. Luteal cysts lead to prolonged estrus, anestrus and infertility in buffaloes which in turn have a significant economic effect on the dairy and meat production in tropical regions where the reproductive issues are further exacerbate challenges such as heat stress, poor nutrition and diseases.

### Causes

Several factors contribute to the formation of luteal cysts in the buffaloes particularly in the tropical climates.

### Hormonal imbalances

- Excessive LH (Luteinizing Hormone): In some cases, the failure of the normal hormonal feedback mechanism leads to excessive production of LH which in turn stimulates the formation of a luteal cyst instead of triggering ovulation.

- Inadequate Prostaglandin F<sub>2α</sub> (PGF<sub>2α</sub>): Prostaglandin is responsible for the luteal regression and inadequate secretion of PGF<sub>2α</sub> prevents the regression of the corpus luteum leads to cyst formation.

### Environmental factors

- Heat stress: In tropical regions, heat stress affects the hypothalamus-pituitary-ovarian axis, disrupting the release of gonadotropins (LH and FSH) leads to abnormal ovarian function such as the formation of luteal cysts.
- Poor management and handling: Stress due to overcrowding, poor nutrition or poor housing conditions lead to hormonal disruptions that favour the development of luteal cysts.

### Infections and diseases

- Postpartum infections: Uterine infections such as endometritis disturbs the normal hormonal function and predispose the buffalo to ovarian cysts such as luteal cysts.
- Metabolic disorders: Nutritional deficiencies particularly in energy, minerals and vitamins affect the hormonal balance leads to the formation of luteal cysts.

### Genetic factors

- Breed susceptibility: Certain buffalo breeds have a higher genetic predisposition to developing the luteal cysts due to inherited hormonal imbalances or reproductive inefficiency.

### Incidence

The incidence of luteal cysts in buffaloes is influenced by various factors such as the buffalo's age, reproductive history and environmental conditions.

- Tropical regions: In tropical regions, the incidence of luteal cysts is generally higher



due to heat stress, poor nutrition and inadequate management practices. Heat stress is a particularly important factor in the tropical climates where it impairs the ovarian function and increases the likelihood of cyst formation.

- Postpartum buffaloes: Luteal cysts are more commonly observed in the postpartum buffaloes particularly in animals that exhibit a delayed return to estrus after calving.
- High-productivity buffaloes: High-yielding buffaloes especially those under intensive dairy management are more prone to developing luteal cysts due to the metabolic stress associated with lactation.

### Pathophysiology

The formation of a luteal cyst involves a disruption in the normal process of ovulation and luteal regression.

- Failure of ovulation: The process of ovulation where the mature follicle ruptures and releases an egg is impaired. This failure causes the follicle to develop into a cystic structure resembling a corpus luteum.
- Persistent corpus luteum: Unlike a normal CL, which regresses after a short period if the animal is not pregnant a luteal cyst remains active and continues to secrete progesterone. This prevents the buffalo from coming into estrus as the body is under the hormonal influence of high progesterone levels.
- Hormonal imbalance: Elevated progesterone from the luteal cyst inhibits the secretion of gonadotropins (LH and FSH) which are necessary for the development and release of a new follicle. As a result, a prolonged anestrus or irregular estrus behaviour can occur.

### Clinical symptoms

The clinical symptoms of luteal cysts vary; but the most common signs include

- Anestrus: The buffalo does not exhibit any signs of estrus or heat. The presence of elevated progesterone inhibits the typical estrous cycle.

- Prolonged estrus: Some buffaloes show signs of estrus for a prolonged period without the occurrence of ovulation.
- Irregular estrous cycle: The buffalo exhibits the signs of estrus at irregular intervals or have silent heats where no overt signs are apparent.
- Failure to conceive: The most significant symptom of a luteal cyst is infertility. A buffalo with a luteal cyst fails to conceive despite the repeated insemination.
- Ovarian enlargement: On veterinary examination (ultrasonography or rectal palpation), an enlarged ovary containing a cystic structure resembling the corpus luteum can be detected.

### Diagnosis

The diagnosis of luteal cysts is made through a combination of clinical observation, reproductive history and diagnostic tests.

#### Clinical examination

- The absence of estrus or the presence of prolonged estrus is a key indicator of luteal cysts.
- Reproductive history such as failure to conceive and extended calving intervals provide the clues.

#### Ultrasonography

- Ultrasound: This is the most reliable diagnostic tool for detecting the luteal cysts. A cystic structure in the ovary resembling the corpus luteum typically over 2.5 cm in diameter is characteristic of a luteal cyst.
- Ovarian monitoring: Ultrasonography allows for monitoring the size and characteristics of the cyst and help to assess the ovarian response to treatment.

#### Hormonal assays

- Progesterone levels: Elevated progesterone levels in the blood or milk are indicative of luteal cysts. Testing for progesterone helps to confirm the presence of a persistent luteal structure in the ovary.
- GnRH and LH levels: Blood tests to measure the gonadotropins indicate a failure in the normal hormonal signaling that should trigger ovulation.



## Treatment

The goal of treatment for luteal cysts is to restore normal ovarian function and reproductive cycling.

### Hormonal therapy

- Prostaglandin F<sub>2α</sub> (PGF<sub>2α</sub>): Prostaglandin is the most commonly used treatment for the luteal cysts. It causes the regression of the cyst by stimulating the luteolytic pathway, which leads to the breakdown of progesterone and the resolution of the cyst.
- GnRH (Gonadotropin-releasing Hormone): GnRH is used to stimulate the release of LH which in turn help to induce the ovulation and resolve the cyst. GnRH is used in combination with PGF<sub>2α</sub> for better results.
- Estrogen injection: In some cases, estrogen is used to initiate the estrus and encourage the normal growth of a follicle that lead to ovulation.

### Manual rupture

- In some situations, a veterinarian attempts to manually rupture the cyst to trigger normal ovulation. This is done under the controlled conditions.

### Supportive care

- Improving the buffalo's nutritional status, reducing stress and providing a proper management environment support the ovarian function and improve the response to treatment.

### Control and prevention

Preventing the luteal cysts in buffaloes involves proper management, stress reduction and addressing nutritional deficiencies.

### Stress management

- Heat stress control: Provide adequate cooling mechanisms, ventilation and shaded areas to reduce the impact of high temperatures which is crucial in the tropical climates.
- Minimize overcrowding: Ensure that buffaloes have enough space to avoid the stress from overcrowding which in turn leads to hormonal imbalances.

### Nutritional management

- Provide a balanced diet with adequate energy, protein and minerals particularly trace elements such as zinc, copper and

selenium which are vital for the reproductive health.

- Ensure that buffaloes receive sufficient intake of vitamins particularly vitamin A to support the normal ovarian function.

### Regular monitoring

- Regular estrus detection and monitoring for the signs of abnormal cycling helps to identify the luteal cysts early. Ultrasonography should be used periodically to monitor the ovarian health and detect cysts before they affect fertility.

### Veterinary care

- Routine veterinary check-ups to monitor the reproductive health of buffaloes especially after calving helps to identify and treat the luteal cysts early.
- Prompt treatment of infections such as endometritis is important to prevent the ovarian dysfunction and cyst formation.

### Conclusion

Luteal cysts are significant reproductive problems in the buffaloes especially in the tropical regions where the heat stress and poor management practices exacerbate the hormonal imbalances. Effective treatment involves hormonal therapy with prostaglandin and GnRH being the most common treatments. Prevention revolves around the managing environmental stressors, optimizing nutrition and providing the regular reproductive monitoring. With proper management, the incidence of luteal cysts can be minimized leading to improved reproductive performance and overall productivity in the buffalo herds.