

Popular Article

Clinical Management of Anestrus Condition in Buffalo and Cattle: A Mini Review

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Introduction

Anestrus, a functional abnormality of the reproductive cycle that affects both cattle and buffalo, is defined by the absence of overt indications of oestrus and has a significant negative impact on the livestock industry. More buffalo than cattle experience anestrus, and the problem is particularly bad in the summer. Anestrus is a complex issue, but its occurrence indicates poor nutrition, stress from the environment, uterine disease, and poor management techniques. It can be classified based on physiological and pathological conditions of the animals. For a better understanding of its origin, diagnostics, and treatments, additional study is required in order to develop effective management techniques.

Key Words: Anestrus, Cattle, Buffalo, Causes, Diagnosis, Treatment

Introduction

India has a large livestock resource, which helps to improve the socio-economic condition of the rural population. In 20th Livestock Census, 35.94%-Cattle, 27.80%-Goat, 20.45%-Buffaloes, 13.87%-Sheep, 1.69%-Pigs. As compare to previous census the percentage share of sheep and goat population has increased whereas the percentage share of cattle, buffalo and pig has marginally declined. Total Buffalo Population in the country is 109.85 million during 2019. Total Buffalo has increased by 1.1% over previous Livestock Census (2012). Female Buffalo Population increased by 8.61% whereas Male Buffalo is declined by 42.35% over previous census. About 20.5% of the total livestock is contributed by buffaloes.

The importance of buffaloes and its production potential, the buffalo has been termed as —The Black Gold (Acharya and Bhat, 1988). About 50 per cent of the rural poor in India are dependent on livestock for their livelihood (Thornton et al., 2002). Buffalo has traditionally been regarded as a poor breeder with delayed onset of puberty, long postpartum ovarian quiescence, poor signs of estrus and long inter-calving intervals (Brarand Nanda, 2004). Under Indian conditions, postpartum acyclicity is the most common single cause of infertility in rural buffaloes (Iyer, 1978).

Reproductive efficiency in the buffalo appears to be limited on account of three distinct inherent problems, delayed puberty, prolonged postpartum anestrus and summer anestrus. The incidence of anestrus (or lack of estrus expression varies from 9.09% to 69.4% in buffaloes [Khan HM, Mohanty TK, Raina VS, et al.2009]. A classification study on the type of anestrus revealed that around 50 to 60% of anestrus cases were subestrus, 30.5% to 40% were postpartum anestrus, 5.1% were summer anestrus and a high proportion of anestrus (26.6%) animals had genital infections [Chauhan FS, Singh M.1979].

Anestrus is not a disease but a state of sexual inactivity with absence of estrus expression due to a variety of conditions. Infertility in farmer's point of view is expressed by either the animal is not showing signs of estrus nor the animal is cyclic regularly but not getting conceived. Anestrus is characterized by a failure of estrus. Anestrus meaning "without cyclicity". Anestrus is observed more commonly either after parturition as postpartum or pre service.

Anestrus is functional disorder of the reproductive cycle which is characterized by absence of overt signs of estrus manifested either due to lack of expression of estrus or failure of its detection.

Importance in economy

Anestrus has great economic impact. Anestrus, leads to economic losses through increased inter-calving interval, poor net calf crops, production loss, treatment expenses and cost of replacing mature animal with first calving heifer. An estimated loss from anestrus around Rs.200 per day in purebred cow and and Rs 250.00 per day in crossbred cow.

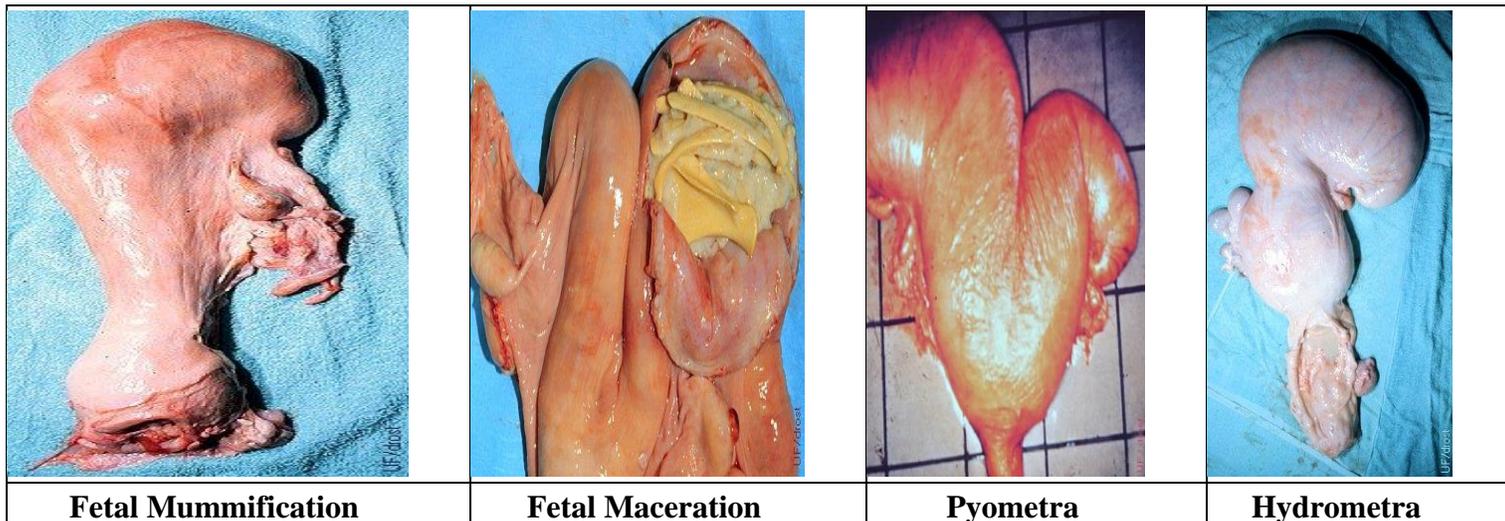
Classification

Broadly in clinical aspect, the anoestrus is categorized into two types

- 1. Class I or False anoestrus - with functional CL.**
- 2. Class II or True anoestrus - with no functional CL**

False Anoestrus

- Anestrus due to pregnancy.
- Anestrus associated with CL of pregnancy that terminated early and not recognized.
- Anestrus due to persistent CL – Conditions associated with uterine pathology such as pyometra, mummified fetus, fetal maceration, other disease states, mucometra and hydrometra.



(Source: <http://lms.tanuv.ac.in/mod/resource/view.php?id=23574>)

ANESTRUS DUE TO PERSISTENT CORPUS LUTEUM (PCL):

The follicular growth proceeds through all the developmental stages



undergo ovulation



CL formation



enter into anestrus due to failure of luteal regression.

absence of estrogenic dominant follicle at the time of luteal regression

Note: Persistent CL does not occur in the presence of a normal non pregnant uterus. Many veterinarians tend to call wrongly a cyclic CL as persistent CL.

Sub estrus/Silent Estrus/Quite Ovulation:

Characterized by failure of overt symptoms of estrus



Follicular development and ovulation occur without the manifestation of overt signs of estrus.



common during the post pubertal period in heifers and early in high yielding dairy cows.

Progesterone secreted from regressing CL of previous cycle potentiates the action of estrogen and seems to favours the manifestation of estrus in next cycle.

Sub estrus/Silent Estrus/Quite Ovulation:

Etiology:

- Physiological basis is not known - may be due to a lack of estrogen and a potentiating action of progesterone.
- Unobserved estrum may be due to managerial deficiencies and short period of estrus

Managemental error:

- Farmer/herdsman unnoticed the estrus sign exhibited by the animal.
- It's a manmade error even though from animal side everything is normal.

Diagnosis for False Anestrus

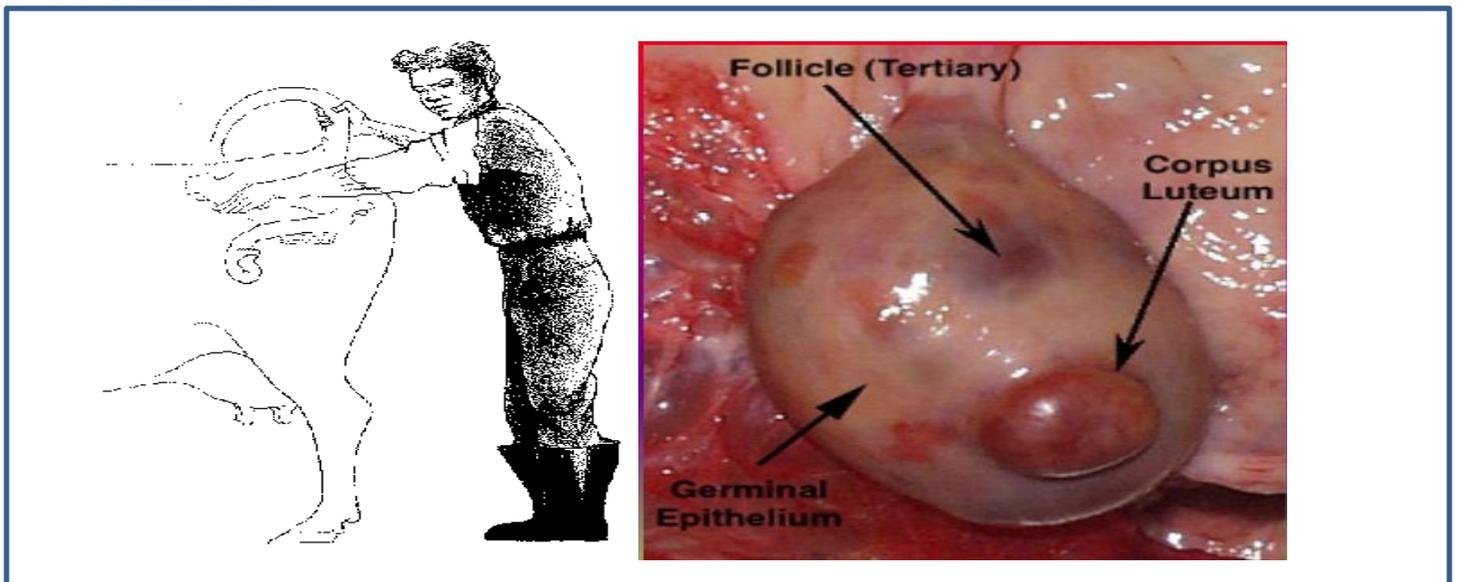
History

Based on the information viz., failure of displaying the overt signs of estrus by the animals after attaining puberty or 60–90 days postpartum.

Clinical signs

symptoms of estrus shown with cyclicity which subsequently ceased and revert in to anestrus

Rectal examination:



1. Reveals a mature CL in one of the ovaries and a flaccid uterus.
2. A tonic uterus with regressing CL and follicle or developing CL indicating estrus, proestrus or metestrus.
3. Examination of postpartum anestrus cows at 60-90 day.

Ultrasonography

Treatment

- Education of farmer/herdsman.
- Unobserved estrus.
- Improving the managerial practice.
- Increased regular observation thrice a day for estrus.
- Provision of adequate lighting to improve estrus detection.

- Use of estrus detection aids.
- Use of teaser bulls.
- Careful and frequent examination of cows, prediction and confirmation of estrus and breeding.
- Specific treatment using prostaglandin or progesterone therapy and fixed time insemination.

Hormonal treatment

Prostaglandin Based Treatment

Prostaglandin (PGF2α) is the treatment of choice for persistent corpus luteum and sub estrus. Natural or synthetic analogue of PGF2α as a single dose has been used with a reasonable degree of success for management of silent estrus in cattle and buffaloes.



True Anestrus

- Small inactive ovaries - no functional CL.
- May be due to an insufficient release of gonadotropins or failure of ovaries to respond.

Causes

- A low plane of nutrition - most common cause - lack of energy and protein, deficiency of minerals namely P, Co, Fe, Cu, I and Mn and Vitamin A.
- Heavy lactation - negative energy balance.
- Chronic debilitating disease - like JD, TB etc.
- Senility with loss of teeth.
- Seasonal and environmental influence.
- Closely confined dark stables, lack of exercise combined with nutritive factors.
- Suckling - prolactin reduces the ovarian sensitivity.

Pathogenesis

concentration of gonadotropins is almost negligible in late gestation



High progesterone secreted by corpus luteum, placenta and estrogen from placenta during last trimester of pregnancy



Negative feedback

inhibition of hypothalamic–pituitary axis.

Types of True Anestrus

Physiological True Anestrus

- Prepubertal anestrus
- Gestational anestrus
- Postpartum anestrus
- Lactational anestrus

In the type, one is **Physiological**, another one is **Pathological**: -

In physiological Anestrus: you would be able to find **Pre-pubertal Anestrus**, which means that before animals attaining puberty there will be Anestrus, which you will be finding, small follicles or medium size follicles which are quite a normal one.

Another one is **Gestational Anestrus**, so which means that the animal will be pregnant, the ovary will be having a corpus luteum, this secretes progesterone and this suppresses the GnRH and because of that animal is entering into the period of Anestrus and this is also very common in pregnancy. The next one is **Postpartum Anestrus**, all the animals after parturition, will undergo a period of Anestrus, which is quite normal. In the case of cattle, it is comparatively shorter than the buffaloes during this period. This period is referred to as Puerperium, this is a period from the period of calving till the resumption of the next ovarian cyclicity and during this period all the uterine involution and uterus will come back to their original position, and after that, the ovarian rebound will happen and subsequently, the follicular development activity will be initiated.

Lactational Anestrus, during lactation Anestrus, as we said earlier prolactin is a dominant hormone which is suppressing the GnRH activity, so during lactation, the animal will be in the period of an Anestrus, that is why weaning plays a very important role in the resumption of next ovarian cyclicity. Almost all Prepubertal, Gestational, Postpartum, and Lactational are Physiological.

Congenital and hereditary causes of True anestrus

- Ovarian agenesis or dysgenesis
- Ovarian hypoplasia
- Freemartin

Diagnosis of True Anestrus, like in the case of False Anestrus, the same measures only, one is History, Clinical signs, Rectal examination, and Ultrasonography examination.

History: So, based on the information provided by the farmer, the failure of displaying the overt signs of estrus, will be briefed by the farmer to the veterinarian, which will be the first thing in Diagnosing or suspecting the animal could be in Anestrus. The second thing is Rectal examination, as I said earlier Rectal examination is the primary and fundamental procedure, for all the veterinarians should know about it for the gynaecological examination.

Rectal examination: you could be able to find either small and smooth ovaries in buffaloes, which is almost spindle-shaped and it should be confirmed by repeated examination at 10 days interval, the reason is, when you are examining the animal by Rectal examination, you could be able to find an ovary, it may be in any stage. For example, there may be a regressing corpus luteum or developing corpus luteum also, the animal would have been expressing in heat signs, it may be unnoticed also in such conditions when you perform rectal examination if you are finding both ovaries are smooth, then probably you can suspect it could be of True Anestrus, anyway, it is better to re-examine the animals after 10 days interval to re-confirm whether the ovary is smooth if suppose if it is not a True Anestrus,

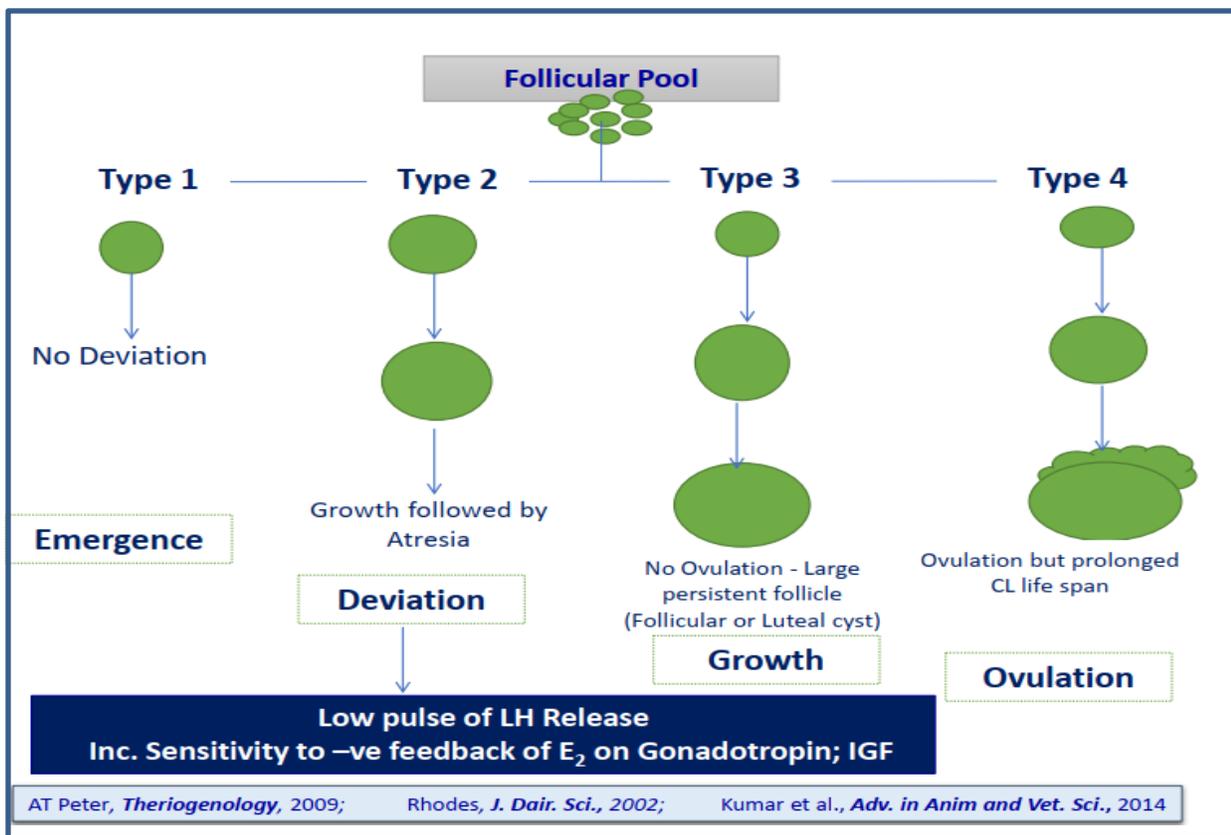
then after 10 days interval, you will be finding a prominent corpus luteum. If, suppose no prominent corpus luteum is there, then you can diagnose the condition as True Anestrus.

Ultrasonography: Ultrasonography is an accurate method in diagnosing the ovarian status of the animal. Small to developing follicles often you will be finding in True Anestrus, without corpus luteum. These are all different animal images: (showing images) In this condition (1st image), you would be able to find multiple small follicles. Here (2nd image) you could able to find a medium-sized follicle is there, and Here (3rd image) this image, with all the different animals, you would be able to find almost a dominant follicle.

Classification of Pathological Anestrus,

Pathological True anestrus

- Anovulatory anestrus–I (Emergence)
- Anovulatory anestrus–II (Deviation)
- Anovulatory anestrus–III (Growth)



Diagnosis

History: Based on the information viz., failure of displaying the overt signs of estrus

Rectal Examination

- Small and smooth ovaries in buffaloes - spindle like.
- Should be confirmed by repeated examinations at 10 days' interval.

Ultrasonography: Small to developing follicles without CL



Progesterone Estimation: Presence of basal level (0.5–1 ng/ml) of progesterone in the blood samples at an interval of 8–10 days further confirms the diagnosis.

Treatment

Improve nutrition

Supplement minerals

Management- Foggers 20 min/time-3times/day

Utero–Ovarian Massage

Lugol's Iodine

Improve managerial practice

Managerial care in small farm conditions

- Utero–Ovarian Massage: Utero–ovarian massage is the oldest, simplest, cheapest and effective method to induce estrus in anestrus cattle and buffaloes
- Eradication of internal and external parasitism.
- Proper housing.
- Elimination of stressful factors

Treatment-Hormonal approach

- GnRH 0.5 mg. may be repeated after 10 days
- GnRH analogue Buserelin 0.02 mg.
- PMSG or FSH is not advisable as they can cause superovulation
- Short term progestogens- CIDR, PRID or Ear implant induces heat even in anestrus animals
- Progesterone injection followed by hCG or combination of progesterone +PMSG + estrogen.

- Clomiphene citrate. 300 mg. daily for 5 days drenched as suspension after drenching of CuSO₄ solution.
- Insulin Based Treatment: Use of insulin for induction of estrus in animals either alone or in combination is a fairly recent development and results are very encouraging. The recommended dose is 0.25 IU/kg body weight subcutaneously for 3–5 days.

Plant Based Heat Inducers

Plants synthesize varieties of phytochemicals such as alkaloids, glycosides, terpenes and tannins (secondary metabolites) as a part of their normal metabolic activity and many of these have therapeutic actions when consumed by animals.



Murraya koenigii (curry leaves)

koenigii

Nigella (kalonji),

sativa

Saraca asoca (Ashoka),

Bambusa aruninacea,

Commercial Heat Inducers

Prajana (Hs)

Janova

Himfartin



Prevention

- Maximize the appetite at and after calving
- Provide a palatable well balanced and highly digestible diet to allow cows to meet their nutritional requirements
- Maintain immune function
- Maintain calcium and magnesium at and after calving.
- Must be maintained at less stress environment around parturition
- Reduce the weaning period

Summer Anestrus

Cattle and buffalo express apparent cessation of estrus cyclicity during extreme climatic conditions especially during hot and humid weather in some tropical and subtropical countries. Compared to cattle, buffaloes are more sensitive to such hot and humid conditions owing to their black skin colour, a lower number of sweat glands per unit area and lower hair density on the skin resulting into poor thermoregulation that adversely affects normal physiological parameters. Domestic buffaloes have a tendency to breed seasonally showing a suspension of sexual activity during summer in many countries except those close to the Equator. Authors from India and Pakistan attribute the decline of reproductive activity in buffaloes observed during summer to the heat stress. During this period, buffaloes remain sexually inactive without any overt signs of oestrus. This condition is popularly known as summer anoestrus. Furthermore, a similar condition in Mediterranean buffaloes is observed during spring period and is thus, referred to as 'spring anestrus'. The incidence of summer anestrus generally varies between 36.6% and 59.5%. Furthermore, summer anoestrus was reported to be higher in nomadic buffaloes (83.0%) than in housed rural ones (63.0%), probably because nomadic buffaloes were more exposed to direct sunlight. The condition is characterized by inactive, smooth ovaries and an abnormal hormonal profile. The heat stress causes hyperprolactinemia, reduced luteinizing hormone (LH) secretion, poor follicle maturation and decreased estradiol production in buffaloes leading to ovarian inactivity and anestrus.

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