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Research Article

RESPONSE OF ANESTROUS RURAL BUFFALO HEIFERS TO HYPOPHYSEAL AND GONADAL HORMONES TREATMENT

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Abstract- The objective of this study was to find efficiency of a treatment regimen that combines the use of Progesterone and gonadotropin releasing hormone (GnRH) for induction of estrus and fertility in anestrous rural buffalo heifers. A total of 30 buffalo heifers were selected for the study. All heifers were administered Prostaglandin (2 ml, I/M) injection. Animals which exhibited estrus were excluded from the study and rest 24 animals were divided in four groups. Estrus was detected (moderate to strong) in three (50%) out of six heifer buffaloes in group II and two (33.33%) out of six heifers in group III. Strong estrus was detected in five (83.33%) out of six heifers of group IV. All five heifers conceived with 100% pregnancy rate. It is concluded that the use of progesterone followed by GnRH treatment is an effective ovulation control method in late maturing anestrous buffalo heifers under field conditions where estrus detection is a problem. Routine reproductive examination and adequate hormone treatment may improve the reproductive performance of anoestrous rural buffalo heifers. The results obtained may be helpful to adopt preventive and therapeutic measures for improvement of reproductive efficiency of buffalo heifers and thus production of the dairy animals.

Keywords- *Heifers, Buffaloes, Estrus, Progesterone, GnRH*

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Introduction

India has over 93.13 million, or approximately 56.6% of the total world buffalo population [4]. Delayed maturity in female buffaloes is common throughout India. Majority of dairy buffaloes calving occurs at 4-6 years of age. This problem is more severe in suburban and rural areas. Anestrous is a functional disorder of the reproductive cycle which is characterized by absence of overt sign of estrus or failure of its detection [5]. It is observed in post pubertal heifers, during pregnancy, lactation and in early postpartum period in adult animals. In heifers, the probable causes may be due to low plane of nutrition, stress of seasonal transition or extremes of climatic conditions. The reproductive efficiency in buffalo is so alarmingly low that it poses a very serious threat of economic loss to Indian and animal husbandry professionals [14]. The main interest of farmers is to achieve more young ones in a lifetime of an animal. Hence early puberty is expected for better economic return. Different protocols consisting of hypothalamic hypophyseal and gonadal principles have been tried by different laboratories for anestrous problem in buffaloes. But all needs technical expertise and also are not cost effective even though the efficacy in resumption of estrus cyclicity may be more. So, there is a need to develop a simple and cheaper technique to solve this problem which is causing severe economic loss to our farmers. Hence, the present study was undertaken to study the effect of hypophyseal and gonadal hormones treatment in anestrous rural buffalo heifers.

Materials and Methods

Thirty anestrous buffalo heifers maintained under rural management system Patna and Vaishali district were selected and examined per rectum to confirm their reproductive status. All the animals were dewormed with Fenbendazole (3 grams, orally).

All animals were administered (day 0) a single injection of prostaglandin (25 mg) and were observed closely for their estrus behavior. Four animals exhibited estrus and were excluded from the experiment. From rest 26 animals, 24 anestrous heifers were equally divided into four groups (Group I to IV). Heifers of Group I received normal saline solution (2 ml, I/M). Heifers of Group II to IV were injected with Progesterone and GnRH as detailed in [Table-1]. The animals were monitored for behavioral symptoms of estrus like acceptance of the male and homosexuality behavior [5]. Breeding was done by natural method. The pregnancy diagnosis was done by per rectum examination on 60 days of nonreturn.

Results and Discussion

Response of four buffalo heifers to the administration of prostaglandin in terms of exhibition of estrous is due to the fact that these heifers might have luteal tissue in the ovary that degenerated after prostaglandin administration as prostaglandin is known to have a potent luteolytic effect [5]. Estrus was detected (moderate to strong) in three (50%) out of six heifer buffaloes in group II and two (33.33%) out of six heifer buffaloes in group III. These heifers might be having lower threshold level of progesterone in circulation and not sensitizing hypothalamic pituitary system. Upon withdrawal of progesterone, the normal follicular phase of the cycle is stimulated. The concentration of progesterone declines abruptly and onset of estrus and ovulation occurs within 2-8 days after the end of treatment [2,5]. The result shows estrus response with progesterone-based treatment, however, conception rates are usually low at induced estrus probably due to altered follicular growth, high rate of follicular atresia, poor sperm transport, failure of fertilization, low cleavage rate, poor transport of fertilized ova and early embryonic death [7,6,10 and 21].

Table-1 *Response of anestrous rural buffalo heifers to PGF 2α, Progesterone and GnRH administration on estrous cyclicity*

Groups	Treatment Schedule				Interval from last injection to estrus (Days)	Intensity of estrus	Remarks
	Day 0 PGF 2α (I/M)	Day 5 Progesterone (I/M)	Day 10 Progesterone (I/M)	Day 15 GnRH (I/M)			
I(6) Control	25 mg	2ml NSS	2ml NSS	2ml NSS	-	Nil	Nil
II (6)	25 mg	250 mg	500 mg	-	5 to 10 (3)	Moderate to Strong	Pregnant (2)
III (6)	25 mg	500 mg	-	-	12 (2)	Moderate	Pregnant (1)
IV (6)	25 mg	250 mg	500 mg	20 µg	3 to 4 (5)	Strong	Pregnant (5)

N.B: Figures in parenthesis indicates number of animals, NSS: Normal Saline Solution

For the treatment of anestrus only Progesterone therapy is not particularly effective; hence other hormones like Prostaglandins, GnRH, PMSG/eCG and Estradiol have been incorporated and estrus induction rate has been reported between 80 to 100% by most of the workers [9,15,8,11,17 and 3].

Detection of strong estrus in five (83.33%) out of six heifers of group IV might be due to the fact that after administration of GnRH the level of FSH rises within 5 to10 minutes [16]. This high level of FSH directly stimulates folliculogenesis and the animal enters into proestrus stage. GnRH induces ovulation, if mature follicle is present at the time of administration by inducing the LH surge. The follicular waves in pre–pubertal animals are similar to that of adult but follicles grow in response to FSH secretion only up to the stage where they have a theca interna and then regress. Such heifers remain in anestrus before the onset of puberty. The reasons of pre–pubertal anestrus includes low LH pulse frequency that results in insufficient growth of follicles; inhibitory effect of opioids on LH secretion and high threshold for positive feedback effect of estradiol on LH surge [12].

It has been reported by [13] and [18] that GnRH is effective in inducing ovulation in buffaloes. But single injection of GnRH is not always effective in deep anestrus animals as it stimulates emergence of new follicular wave through enhanced secretion of FSH. Long term (4–14 days) intramuscular injections of progesterone @ 50–100 mg either alone or in combination with other hormones [20,19 and 1] have been used for induction/synchronization of estrus. The results of this study correspond to these earlier reports. The efficacy of Progesterone and GnRH in anoestrous buffalo heifers shown by the present study and the earlier reports mentioned above suggests that routine reproductive examination of buffalo heifers that are not observed to be showing estrus symptoms along with adequate treatment may improve their reproductive efficiency.

Conclusion

The administration of GnRH in progesterone primed buffalo heifers 5 days later brought them in fertile estrus within 3 to 4 days. It is concluded that the use of single GnRH (20 µg) after Progesterone treatment on Day 5 and 10 is an effective ovulation control method that is compatible with normal fertility at precisely induced synchronous estrus in anestrous buffalo heifers under field conditions where detection of estrus is a problem.

Application of research: Study of anestrous rural buffalo heifers to hypophyseal and gonadal hormones treatment

Research Category: Veterinary Physiology

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Cultivar / Variety / Breed name: Buffalo

Conflict of Interest: None declared

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