

EFFECTS OF ALFAPROSTOL AND LUPROSTIOL ON THE OESTRUS SYNCHRONIZATION RESPONSES IN BLACK BENGAL GOATS

M. I. Faruk, B. Z. Fatema¹, F. Y. Bari and M. G. S. Alam

Department of Surgery and Obstetrics, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh - 2202, Bangladesh

ABSTRACT

Sixteen adult Black Bengal goats were synchronized in 2 groups with Alfaprostol (Gabbrostim[®] VETEM, Italy) or Luprostiol (Prosolvin[®], Intervet, Netherlands) @ 2 mg and 7.5 mg, equivalent to 1 ml / donor respectively during the period from January 2002 to June 2003. The IM injections were given at 11 days interval. The percent of animals responded following 1st injection of Alfaprostol and Luprostiol was 75% and 87.5%, respectively. However, all animals responded following of 2nd injection of Alfaprostol, while that of Luprostiol were 87.5%. The mean time of onset of oestrus and duration of oestrus in Alfaprostol group were 36.2 ± 7.91 h and 57.37 ± 6.56 h and 20 ± 4.4 h and 28.5 ± 0.63 h following 1st and 2nd injections, respectively. The similar parameters were 37.5 ± 8.2 h and 49.5 ± 0.46 h and 21 ± 4.6 h and 27.3 ± 0.77 h in Luprostiol group. In both groups there was no significant difference ($p > 0.05$) between the treatment groups on either the time of onset of oestrus or the duration of oestrus.

Key words: Alfaprostol, luprostiol, oestrus, synchronization, Black Bengal goats

INTRODUCTION

Interest in the synchronization of oestrus of goats has increased in recent years largely because of its successful use in goats breeding programme. Oestrus synchronization in the goat is a valuable reproductive technique for controlled breeding and facilitating artificial insemination (AI). It is a consequent part of embryo transfer technology (Kraemer, 1989). Oestrus synchronization in goats can be achieved by controlling of the luteal phase of the oestrous cycle either by the use of progestagens (Corteel, 1975) or prostaglandin $F_2\alpha$ (Perera *et al.*, 1978). Prostaglandin $F_2\alpha$ ($PGF_2\alpha$) and its analogue have been found to be more efficiently used to synchronizing oestrus in goats during natural breeding (Perera *et al.*, 1978). The objectives of this study are to observe the effects of Alfaprostol (Gabbrostim[®], VETEM, Italy) and Luprostiol (Prosolvin[®], Intervet, Netherlands) on synchronization of oestrus in Black Bengal goats in respect of the mean time of onset and duration of oestrus.

MATERIALS AND METHODS

The effects of Alfaprostol and Luprostiol on synchronization of oestrus were studied on randomly selected 16 adult Black Bengal goats during the period from January 2002 to June 2003. These 16 goats were randomly divided into two groups (A and B), each consisting of 8 goats. Each doe of group A was injected with Alfaprostol @ 1 ml (2 mg) and group B with Luprostiol @ 1 ml (7.5 mg) with two injections at 11 days intervals. The first injection was given irrespective of stage of the oestrus cycle. Each of the animals was observed closely for detecting the signs of oestrus at 4 h interval from 0700 h to 2000 h after day 1 of injection. Oestrus of the goats was detected on the basis of behavioral and clinical signs, such as restlessness, loud vocal and bleating, constant wagging of tail from side to side, swollen and relaxation of the vulvar orifice, reddening of the vulva, genital discharges, reduced feed intake, frequent urination, stand to be mounted, homosexual mounting activities and preference to walk by the side of the buck.

Vaginal mucus was collected during oestrus to determine the characteristic crystallization (fern pattern/ arborisation) pattern in the vaginal cells. Vaginal mucus was collected by sterile cotton swabbing from 16 does. Then thin smears were prepared, dried in the air and examined under microscope ($10 \times$). Biopsy samples were collected immediately before injection of prostaglandin, during oestrus, after oestrus and at mid cycle. The samples were collected from the lateral wall of the vagina by metallic biopsy catheter. The samples were preserved in 10% neutral buffered formalin and kept until processing and histological examination. Fixed tissues were sliced into pieces and washed in running tap water for overnight. Then the tissues were dehydrated in ascending grade of alcohol (70% to 90%), absolute alcohol, cleared and embedded in paraffin. The tissue was sectioned ($4-6\mu$) in the rotatory microtome. The sections were stained with Haematoxyline and Eosin stain for microscopic studies.

Statistical analysis was done by using SPSS programme. Paired 't'-test was performed to observe the difference on the time onset of oestrus and duration of oestrus between Alfaprostol and Luprostiol injection.

Present address: ¹Department of Medicine and Surgery, Dinajpur Government Veterinary College, Basharhat, Dinajpur.

RESULTS AND DISCUSSION

The effects of Alfaprostol and Luprostiol on synchronization results in does are shown in Table 1. Seventy five percent does showed oestrus following 1st injection of Alfaprostol, while that of 2nd injection was 100%. On the other hand, 87.5% does were in oestrus following 1st and 2nd injection of Luprostiol.

Table 1. Comparison of Alfaprostol and Luprostiol on synchronization responses in does (mean \pm SE)

Groups	Synchronizing agent	No. of injection per doe	Total No. of does injected	Does showed oestrus		Time of onset of oestrus (h)	Duration of oestrus (h)
				No.	%		
A	Alfaprostol (Gabbrostim®)	1st injection	8	6	75	36.2 \pm 7.92	20.0 \pm 4.40
		2nd injection	8	8	100	57.4 \pm 6.56	28.5 \pm 0.63
B	Luprostiol (Prosolvin®)	1st injection	8	7	87.5	37.5 \pm 8.20	21.0 \pm 4.60
		2nd injection	8	7	87.5	49.5 \pm 0.46	27.3 \pm 0.77

The mean time of onset of oestrus and duration of oestrus were 36.2 \pm 7.92 h, and 57.4 \pm 6.56 h and 20 \pm 4.4 h and 28.5 \pm 0.63 h, respectively following 1st and 2nd injections of Alfaprostol (Table 1). The similar parameters were 37.50 \pm 8.20 h and 49.50 \pm 0.46 h and 21 \pm 4.6 h and 27.3 \pm 0.77 h, respectively following 1st and 2nd injections of Luprostiol. In paired *t*-test, there were no significant difference ($p > 0.05$) in response between the Alfaprostol and Luprostiol in does on either the mean time of onset of oestrus and duration of oestrus following 1st and 2nd injections.

This mean time of onset of oestrus in does following Alfaprostol injection is similar to some of the published works (Armstrong and Even 1983; Bretzlaff *et al.*, 1983; Pandey and Ishwar, 1990), where they used cloprostenol and lutalyse for synchronization. There are limited literatures available on the effects of Luprostiol as synchronizing agent. The mean time of duration of oestrus in does in this study is similar to the other published works in goats (Martemucci *et al.*, 1992). However, this result differs from other works (Pandey and Ishwar, 1990; Armstrong and Even, 1983 and Biswas *et al.*, 2000). This difference could be due to difference in types of synthetic prostaglandins, individual response to treatment and accuracy in the observation of oestrus.

Vaginal mucus during oestrus showed characteristic cyclical changes as crystallization pattern on smear due to high oestrogenic activity occurs during the follicular phase of the cycle. Crystallization pattern was observed in the present study on smear of vaginal mucus during oestrus. The similar crystallization pattern of vaginal mucus has been reported by Bishnoi *et al.* (1980) in bovine.

In both the treated groups, during oestrus, the epithelial layer of the lateral wall of the vagina attained maximal height (at least twice than normal thickness) due to increase in the length / height of the epithelial cells. In this phase, the water holding capacity of the mucus and the epithelial cells are also higher than luteal phase due to the presence of high oestrogen concentration in the circulation. In both treatment groups, the superficial squamous cells were found and filled with mucus. The cornified layer was found broken in many places with adherent mucus secretion, where neutrophils and lymphocytes invaded the vaginal epithelium. The blood vessels adjacent to the epithelial layer were found congested. Immediately after oestrus, the height and width of the epithelium become normal, invaded neutrophils were disappeared, surface cells were found more squamous than oestrus and cornification began. At mid cycle (luteal phase), the superficial cells contained normal squamous cells and fully cornified without any cellular infiltration.

The results of this study lead to the conclusion that both Alfaprostol and Luprostiol may be suitable for synchronization of oestrus in Black Bengal goats in respect of time of onset of oestrus and duration of oestrus.

REFERENCES

1. Armstrong DT and Even G (1983). Factors influencing embryo transfer in sheep and goats. *Theriogenology* 19: 31-42.
2. Bishnoi BL, Dwaraknath PK and Vyas KK (1980). Note on spinnbarkeit and crystallization pattern of bovine cervical mucus during oestrus. *Indian Journal of Animal Sciences* 52: 438-440.
3. Biswas S, Ghosh BB, Bandyopadhyay SK, Roy MM and Senapati PK (2000). Response of Buserelin (GnRH) on synchronization of oestrus and multiovulation in Black Bengal Goats treated with PMSG and PGF_{2a}. *Journal of International* 4: 290-293.

Effects of alfaprostol and luprostiol on oestrus synchronization

4. Bretzlaff KN, Hill A and Ott RS (1983). Induction of luteolysis in goats with prostaglandin F_{2α}. *American Journal of Veterinary Research* 44: 1162-1164.
5. Corteel JM (1975). The use of progestagen to control the oestrous cycle of the dairy goat. *Annales de Biologie animale Biochimie Biophysique* 15: 353-363.
6. Kraemer DC (1989). Embryo collection and transfer in small ruminant. *Theriogenology* 31: 141-148.
7. Martemucci G, D'Alessandro A, Toteda F, Facciolongo AM and Gambacorta M (1992). Embryo production and endocrine response in ewes superovulated with PMSG, with or without monoclonal anti-PMSG administered at different times. *Theriogenology* 44: 691-703.
8. Pandey JN and Ishwar AK (1990). Estrus synchronization and fertility behavior in Black Bengal Goats follows progesterone and prostaglandin treatment. *Theriogenology* 34: 1015-1024.
9. Perera BMA, Bongos TA and Abeynaike P (1978). Oestrus synchronization in goats using cloprostenol. *Veterinary Record* 102: 314.