USE OF PROSTAGLANDIN (PGF2α) TO INDUCE OESTRUS IN POSTPARTUM SAHIWAL COWS

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ABSTRACT

Twenty-four postpartum Sahiwal cows that did not show oestrus up to 85 days postpartum were randomly divided into two equal groups, A and B. Group A cows were injected 2 ml Prostavet injection containing 5 mg Etiproston, a synthetic analogue of PGF2α (Virbac, France) intramuscularly at day 85 postpartum on chronological basis of calving dates without palpation. A second injection was given 11 days later to those cows that did not respond to first injection. A third injection was given at 118 days postpartum to those cows that had not responded to 1st and 2nd injection of PGF2α and did not show oestrus. The cows in group B were not given any treatment and served as control. The cows found in oestrus were artificially inseminated 12 hours after the detection of oestrus. The cumulative oestrus response was higher (66.66%) in group A than in group B (25%). Similarly, in group A the behavioral symptoms and physical changes were more pronounced as compared to group B. Mean (± SE) interval from treatment to onset of oestrus in group A was 96 ± 15.08 hours whereas, mean interval to oestrus from beginning of experiment was 25.0 ± 1.0 days in group B. Statistically non significant difference was observed in the mean duration of oestrus (23.25 ± 1.99 vs. 20.33 ± 1.45 hours) between animals of the two groups. However, a significant (P<0.05) difference was observed for the mean calving to first oestrus interval (89 ± 0.62 vs. 110 ± 0.19 days) in groups A and B. From the results, it is concluded that PGF2α is useful for treatment of unobserved oestrus in postpartum Sahiwal cows.

Key words: PGF2α, induction of oestrus, postpartum, Sahiwal cows.

INTRODUCTION

Pakistan is an inhabitant of genetically superior cow breeds i.e. Sahiwal and Red Sindhi. Sahiwal cattle are well suited to the tropical environment of Pakistan. Their heat tolerance and tick resistance are some of the few qualities that make them ideal dairy animal of the tropics. Their milk yield is 1500-2200 liters per lactation, with fat contents of 4.5% (Shah, 1994). In spite of large population of cows, demand of milk in the country is not being met satisfactorily, particularly in summer season when the requirement is even greater, compared to the winter season. Low milk production during summer is attributed to the seasonal calving trend in buffaloes (which has major share in the milk production in the country). A period of anestrus following parturition is a normal physiological event and the ovarian cyclicity resumes as the involution of uterus is completed. When postpartum anestrus period exceeds 60 days, it increases the service period and consequently the calving interval and also makes dairying an unprofitable business.

The use of hormones is a major component of cattle reproduction. Prostaglandin F2 alpha (PGF2α) is a potent luteolytic agent in cows and buffaloes and has been used successfully for induction of oestrus in cows that fail to show oestrus signs.

The present study was carried out to determine the role of PGF2α in inducing oestrus in postpartum Sahiwal cows that did not show oestrus up to 85 days after calving.

MATERIALS AND METHODS

Experimental animals

Twenty-four Sahiwal cows that failed to show oestrus up to 85 days postpartum were selected for this study. The parity of the cows ranged from 1 to 8. During the study period, the cows were allowed to graze during day and green fodder was provided ad libitum in the evening. All the cows were having uniform body condition. No concentrates were fed to these animals. The cows were divided into two equal groups (A and B: n=12/group) after considering parity, milk production, age and body weights. All the cows were kept under similar nutritional and managemental conditions during the experimental period.

Treatment

The cows (n=12) in group A received intramuscular injection of 2 ml prostaglandin F2α (Prostavet containing 5 mg of Etiproston, Virbac, France) at day 85 postpartum on the chronological basis of calving dates. Eleven days later, a second injection.
of PGF2α was given to those cows which did not show oestrus in response to the first injection. Third injection of PGF2α was given at 118 days postpartum to cows which did not respond to first two injections. The cows (n=12) in group B were not given any treatment and served as control.

**Oestrus detection**

All the animals were monitored for the manifestation of oestrus symptoms three times daily i.e., at 6 am, 2.00 pm and 10.00 pm for six days after each injection by parading a teaser bull. The cows were also monitored both for behavioral symptoms (frequent urination, bellowing, raised tail, restlessness and licking of external genitalia by other animals) and physical changes (vulvar oedema and mucus discharge) of the reproductive tract. The animals were examined rectally to confirm the oestrus phase.

The time from the injection of prostaglandin to the onset of oestrus was recorded in hours. Duration of oestrus was taken in hours from the time of first receptivity (standing firm) of a cow for teaser bull (time of onset of oestrus) to the time of refusal to teaser bull (end of oestrus).

**Artificial insemination**

Cows showing signs of true oestrus were inseminated 12 hours after the onset of oestrus. For this purpose, frozen-thawed semen (0.25 ml straw) of one bull was used for all the experimental cows and all inseminations were performed by the same technician.

**Statistical analysis**

Data pertaining to the postpartum interval to estrus and duration of estrus were analyzed by using unpaired t-test (Steel and Torrie, 1982). Estrus response and frequency of different symptoms of estrus were expressed in percentage.

**RESULTS**

**Oestrus response**

In group A, two cows out of twelve showed signs of estrus after the 1st injection of PGF2α. The 10 cows, which did not respond to 1st injection, received 2nd injection 11 days after first injection (96 days postpartum). Four cows out of 10 exhibited oestrus behavior in response to this treatment. Six remaining cows were administered 3rd PGF2α injection at day 118 postpartum and 2 of them responded positively. The oestrus response in group A after 2nd injection was 50% and the overall response to oestrus in this group after third injection was 66.66% (Table 1). Four animals did not respond to either first, second or third injection. In group B, three out of twelve cows (25%) exhibited oestrus during the experimental period (Table 1).

**Interval to onset of oestrus**

In group A, the mean (± SE) interval from PGF2α injection to the onset of oestrus was 96 ± 15.08 hours. The average intervals to oestrus after first, second and third injections were found to be 72, 126 and 60 hours, respectively. In group B, mean interval to onset of oestrus from beginning of experiment was 25 ± 1.0 days (Table 1). The mean (± SE) postpartum period from calving to first oestrus was 89 ± 0.62 and 110 ± 0.19 days in groups A and B, respectively and the difference was statistically significant (P<0.05, Table 1).

**Duration of oestrus**

The mean (± SE) length of oestrus in animals of group A was 23.25 ± 1.99 hours, whereas it was 20.33 ± 1.45 hours in group B. The difference in duration of oestrus between the two groups was non-significant (Table 1).

**Symptoms of oestrus**

The incidence of behavioral symptoms was higher in the animals of the treated than control group whereas, for physical changes there was not much difference between the two groups. Data pertaining to behavioral symptoms and physical changes in the reproductive tract during oestrus are presented in Table 2.

**DISCUSSION**

On the basis of results obtained in the present study, the overall oestrus response in group A was higher than in group B (66.66 vs. 25%). This indicates that cows injected with prostaglandin 11 days apart have better oestrus response, since by the time of second injection most of cows had functional corpus luteum. The findings of Stum (1983), Macloughlin et al. (1987), Santos et al. (1988) and Mosesov and Ibragimov (1991) are comparable to the findings of this study, as these workers reported oestrus response as 55, 62.2, 66.7 and 64.32%, respectively after the second injection of PGF2α. However, Turman et al. (1975), Godfrey et al. (1991) and Wiggins et al. (1991) reported higher oestrus response of 92.2, 85.00 and 83.33% after the second injection of PGF2α, respectively. The differences might be due to differences in age and physiological stage of the animal at the time of...
treatment, season of the year and dose and chemical nature of PGF2α used. Moreover, low oestrus response in this study may be due to nutritional effect because of scarcity of fodders during early summer days due to late cuts of berseem and high ambient temperature. This inadequate feed results in low body condition scores, and may adversely affect the follicular growth and ovulation.

The results of present study revealed that mean interval to onset of oestrus after PGF2α treatment was $96 \pm 15.08$ hours in group A. The average intervals to oestrus in group A after first, second and third injection were $72$, $126$ and $60$ hours, respectively. Previously Roche (1974), Smith (1976), Schaneemann (1983), Santos et al. (1988), Whittier (1992) and Thakur et al. (1990) have reported an average interval to onset of oestrus as $96$, $94$, $93.3 \pm 6.1$, $96$, $120$ and $79.1$ hours, respectively, which are similar to the findings of this study.

However, Oh et al. (1986) and Perez and Florin (1992) reported average interval of $56.0 \pm 12.74$ and $50.4 \pm 4.9$ hours, respectively, which are less than that of the present study. Turman et al. (1975) and Dhole and Gupta (1987) reported average interval to oestrus of $8$ and $20.58$ days, respectively. These differences can be attributed to differences in breed, climate, method and frequency of oestrus detection, presence of large follicle at the time of treatment, body condition and milk yield of the animal.

In the present study, non-significant difference was observed between the groups A and B for the duration of oestrus ($23.25 \pm 1.99$ vs. $20.33 \pm 1.45$ hours). This indicates that prostaglandin treatment does not affect the duration of oestrus. These results are in agreement with the observations of Kanai and Shimizu (1983), who reported oestrus duration of $17.3 \pm 4.6$ hours (range from $9$ to $24$ hours) in swamp buffaloes and Chaudhry (1985), who reported oestrus duration of $24.7 \pm 1.6$ hours in Nili-Ravi buffaloes. Chenault et al. (1976) and Perez and Florin (1992) found that average duration of oestrus was $10$ and $10.6$ hours, which were lower than those of the present study. The differences may be due to the variation of species, breeds, postpartum days and different methods use to record these observations.

### References


