ABSTRACT

The present research was carried out to study the effect of GnRH and PGF$_{2\alpha}$ administration on uterine involution and post-partum fertility in buffaloes. A total of 36 normally calved Murrah buffaloes were divided into three groups. The buffaloes of Group 1 were treated with GnRH (buserelin acetate) 0.020 mg while buffaloes of Group 2 with PGF$_{2\alpha}$ (cloprostenol sodium) 1.30 mg on day 14 post-calving intramuscularly while the buffaloes of Group 3 were kept as control. The average days required for involution of the uterus were 25.08±1.04, 22.75±0.91 and 30.33±1.31 while the average days required for exhibition of first post-partum oestrus were 37.5±5.16, 26.91±1.36 and 45.08±3.77 days in Groups 1, 2 and 3, respectively. The first service conception rate was highest 41.66% in Group 2 while the rates were 33.33 and 16% in Groups 1 and III, respectively.

Keywords: buffaloes, Bubalus bubalis, post-partum, fertility, GnRH, PGF$_{2\alpha}$

INTRODUCTION

The buffalo occupies an important place in the livestock economy of Asia and India. Buffaloes are valued for milk, meat and draught power. Low reproductive efficiency in livestock in general and in buffaloes in particular remains a major economic problem globally, and its incidence is higher in India. The post-partum period is regarded as an important period in the reproductive life of bovines (Fonesca et al., 1983). Uterine involution begins and ovarian follicular waves resume soon after parturition due rising in FSH concentration (Schallenberger, 1985). However, the dominant follicle of these waves fails to ovulate due to failure to undergo final terminal maturation. Failure of post-partum dominant follicles to undergo final maturation is due to inadequate LH pulse frequency, which results in low androgen production in the follicle (Fortune, 1986) and inadequate oestriodiol positive feedback to induce an LH surge (Peters et al., 1985), which is perquisite for follicular terminal maturation prior to ovulation. Absence of LH pulses between days 15 to 30 post-partum is due to continued sensitivity of the hypothalamic GnRH pulse generator to the negative feedback effect of estradiol-17β, which results in an absence of GnRH pulses. The administration of GnRH will overcome the inadequate secretion of pituitary LH in the early post-partum period (Shah et al., 1990) and restore ovarian function earlier within the post-partum period and assists in cleansing the uterus, brining faster uterine involution and terminal maturation and ovulation of the dominant follicle (Takkar et al., 1999).
The reproductive cyclicity and its rhythm in terms of its reawakening during the early post-partum period has been linked to temporal changes of hormones, mainly prostaglandin (Perera et al., 1981). Leindell et al. (1980) reported that PG metabolites increased at the time of parturition and remained high for 8 to 16 days post-partum. So delay in involution of uterus was due to the short period of high prostaglandin F$_{2a}$ metabolite release. It has also positive effect on the uterine musculature tone (Lindell and Kindahl, 1983). PGF$_{2a}$ injection in the early post-partum period enhances the uterine involution and reproductive efficiency in normal calved buffaloes (Nazir et al., 1994). Considering these facts, the present research was carried out to evaluate the effect of GnRH and PGF$_{2a}$ administration on day 14 post-calving on uterine involution and post-partum fertility in buffaloes.

**MATERIALS AND METHODS**

A total of 36 Murrah buffaloes in their second to seventh lactation which had normally calved were selected. The buffaloes were housed in a loose housing barn and fed chopped roughages like sugarcane, alfalfa, napier grass, green maize and jowar straw three times a day. A pre-calculated quantity of concentrate mixture was fed through an automatic concentrate feeding station (AFS) to each buffalo based on milk yield, body weight and pregnancy status. The selected buffaloes were divided into three groups and buffaloes of Group 1 were treated with GnRH (buserelin acetate) 0.020 mg intramuscularly while those of Group 2 with PGF$_{2a}$ (cloprostenol sodium) 1.30 mg on day 14 post calving intramuscularly while the buffaloes of Group 3 were kept as control. The uterine involutions were monitored at weekly intervals on day 14, 21 and 28 post-partum. The finger width of left palm was pre-measured with a measuring tape and this was used as a scale for measuring internal biometry. The data pertaining to uterine involution, post-partum exhibition of oestrus, first service conception rate were analyzed by randomized block design described by Snedecor and Cochran (1989).

**RESULTS AND DISCUSSION**

**Uterine involution**

The average days required for involution of the uterus in these buffaloes were 25.08±1.04, 22.75 ±0.91 and 30.33±1.31 for Groups 1, 2 and 3, respectively. In Group 2, the least time was required for whereas Group 3 required more time

<table>
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<th>Sr. No.</th>
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<tr>
<td>1</td>
<td>Group 1</td>
<td>25.08±1.04</td>
</tr>
<tr>
<td>2</td>
<td>Group 2</td>
<td>22.75±0.91</td>
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<tr>
<td>3</td>
<td>Group 3</td>
<td>30.33±1.31</td>
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Column wise superscript (a, b and c) denoted the significant difference at P<0.05 and P<0.01 levels.
for involution of the uterus. The results were statistically significant at the P<0.05 and P<0.01 levels (Table 1).

The present findings regarding the effect of GnRH administration on the uterine involution is in close accordance with Barkawi et al. (1995) who reported 27.90±0.9 days while Takkar et al. (1999) recorded 31 days for uterine involution in GnRH treated buffaloes, which was slightly more than present findings. The results of the present study for the number of days required to complete uterine involution after PGF2α treatment were slightly less than those reported by Nazir et al. (1994) who observed 24.88±0.97 days required for uterine involution in Nili-Ravi buffaloes. Nasr et al. (1994) observed 29.9 days and Iqbal et al. (2003) observed 28.90±1.79 days for uterine involution in after PGF2α treatment. In the present study, the effect of PGF2α treatment on uterine involution was in close agreement with those of Malvi et al. (2004) who observed 22.7±1.75 days and Tiwari et al. (2004) who observed 18.20±1.47 days required for uterine involution in buffaloes.

The finding of days required for uterine involution in the control group was in accordance Nazir et al. (1994) who observed 29.75±0.75 days in Nili-Ravi buffaloes, Khasatiya et al. (2005) observed 30.00±1.36 and 33.75±1.65 days in post-partum fertile and infertile Surti buffaloes. The variation between values obtained by the above mentioned researcher and the present findings may be due to factors like difference in age, parity, nutrition of dams during late gestation, season of calving, sex and birth weight of the calf and the post-partum husbandry practices and hygiene of buffaloes.

**Days required for exhibition of first post-partum oestrus**

The average days required for exhibition of first post-partum oestrus were 37.5±5.16, 26.91±1.36 and 45.08±3.77 days in Groups 1, 2 and 3, respectively. The results are significant at P<0.05 and P<0.01 (Table 2).

The average days required for first post-partum estrus exhibition after GnRH treatment in Group 1 were 37.5±5.16 days. The results are in concurrence with Barkawi et al. (1995) who reported 33.6±3.1 days in GnRH treated buffaloes. Fewer days required for PPE after GnRH treatment than present findings are reported by Takkar et al. (1999) who reported 24.0±2 and 27.3±4 days when GnRH was administered at doses of 8 μg and 12 μg, respectively in buffaloes.

The average days required for exhibition of first post-partum oestrus in Group 2 were 26.91±1.36. However, the days required for first post-partum exhibition after PGF2α treatment in the present study were less than those reported Nasr et al. (1994) 43.00 days and Tiwari et al. (2004) 54.00±3.19 days in buffaloes. In Group 3 (control group), the average days required for first

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<td>45.08±3.77</td>
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</table>

Column wise superscript (a, b and c) denote a significant difference at the P<0.05 and P<0.01 levels.
The variation between values obtained by the above mentioned research scientists and the present findings may be due to factors like difference in nutrition of dam during late gestation and the post-partum husbandry practices and hygiene, and estrus detection aids.

**First service conception rate**

The first service conception rate was highest 41.66% in Group 2 which is indicative of the fact that PGF$_{2\alpha}$ treatment was most beneficial. That the first service conception rate was 33.33% in Group 1 buffaloes indicates that GnRH treatment also yielded good results. Group 3 yielded the lowest results i.e. a 16.16% first service conception rate. The present results are low in comparison with Takkar *et al.* (1999) who reported a 50% conception rate in GnRH treated and a 38% rate in control buffaloes.

**CONCLUSION**

The buffaloes treated with PGF$_{2\alpha}$ showed the least time i.e. 22.75±0.91 days required for uterine involution and their first service conception rate was highest: 41.66%, which is indicative of the fact that PGF$_{2\alpha}$ treatment is beneficial for improving postpartum fertility in buffaloes.

**REFERENCES**


