EFFICACY OF GnRH-PGF$_{2\alpha}$-GnRH, PMSG AND PMSG + hCG IN POSTPARTUM ANESTROUS CROSSBRED COWS

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ABSTRACT

A total of 80 Frieswal crossbred cows having history of postpartum anestrum for more than 45 days were selected. The cows were randomly divided into 4 groups. Three groups were treated with ovy-synch protocol, PMSG and PMSG + hCG, and the group 4 was control group. The time interval between the treatment and estrus was 7.00 ± 1.46, 2.75 ± 0.23, 3.90 ± 1.17 and 16.45 ± 2.92 days in group 1, 2, 3 and 4, respectively. The A.I index was 1.44, 1.71, 1.75 and 1.66, in group 1, 2, 3 and 4, respectively, and the corresponding service period was 81.33 ± 5.62 (58-158), 70.50 ± 5.24 (48-99), 73.37 ± 5.16 (49-105) and 69.50 ± 7.44 (52-98) days. The overall conception rate was 90, 70, 80 and 30 %, in group 1, 2, 3 and 4, respectively. The conception rate was higher in GnRH-PGF$_{2\alpha}$-GnRH group than in the other groups. All the three groups were effective for induction of estrus in postpartum anestrus crossbred cows.

Key words: Crossbred cattle, Postpartum anestrum, Hormonal therapy

INTRODUCTION

Prolonged postpartum anestrus is a common problem particularly amongst high producing cows. A normal fertile cow should calve first at two years of age and then at every 12 months with a minimum service period of 85 days postpartum, 1.6 services per conception and should maintain a full term pregnancy. The re-establishment of regular estrus cycle after parturition in cows/buffaloes is delayed for a variable period of time. The factors influencing are genetic, environmental, nutritional status, milk yield, parity, breed, calving difficulties, postpartum diseases, ovarian disorders and inadequate amount of gonadotrophins (Hukeri, 1995). Maintenance of regular calving interval of desirable length is dependent on the cow's ability to conceive within the shortest possible time after parturition. Failure to resume ovarian activity after calving is the main reason for delay in conception (Aboul Ela *et al*, 1988). This study is an attempt to compare the efficacy of GnRH-PGF$_{2\alpha}$-GnRH, PMSG alone and PMSG plus hCG on induction of estrus, conception rate, service period and services per conception (AI index) in crossbred cows.

MATERIALS AND METHODS

The study was conducted on Frieswal crossbred cows maintained at Military Dairy Farm, Hyderabad, Andhra Pradesh. A total of 80 postpartum anestrus crossbred cows with a history of anestrum more than 45 days were selected for the study. The cows were randomly divided into four groups consisted of three treatment groups and one control group. Each group consisted of 20 animals. In group-1 the cows were given 2.5ml injection of 10 µg of buserelin acetate (Receptal) intramuscularly on day "0". On day 7, prostaglandin F$_{2\alpha}$ 12.5mg of intramuscular injection (Lutalyse) and day 9 again 2.5ml of Receptal was given. In group-2, the cows were treated with 1000 IU of serum gonadotrophin (Folligon) injected intramuscularly. In group-3, the cows selected were injected 1000 IU of PMSG (Folligon) intramuscularly and hCG 1500 IU

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(Chorulon) intramuscularly 8 hours before AI, at estrus. The cows in group-4 were served as controls and injected 5ml of normal saline. Cows exhibiting estrus in all the groups were bred by A.I.

RESULTS AND DISCUSSION

The mean number of days from cessation of treatment to the onset of induced estrus in GnRH-$PGF_{2\alpha}$-GnRH treated cows was found to be 7.00 ± 1.46. In the cows treated with PMSG the mean interval between treatment and onset of estrus was found to be 2.75 ± 0.23 days. In PMSG + HCG group it was found to be 3.90 ± 1.17 days and in control group 16.45 ± 2.92 days. The mean interval between treatment and onset of estrus was significantly longer than the PMSG and PMSG + hCG groups and shorter than the control group in postpartum anestrus cows. In the present study, the fixed time insemination (FTAI) was also conducted 12-24 hours after last injection of GnRH in cows treated with GnRH-$PGF_{2\alpha}$-GnRH protocol by Fernandes *et al.* (2001), Tenhagen *et al.* (2004), and Keith *et al.* (2005). Similar studies with PMSG was conducted by Shukla and Dabas (2004).

The first service conception rate among induced estrus was 60, 30, 40 and 15 per cent and the second service conception rate was recorded as 20, 30, 20 and 10 per cent and the conception rate at third service was observed as 10, 10, 20 and 5 per cent in GnRH-$PGF_{2\alpha}$GnRH, PMSG, PMSG + hCG and control groups, respectively. The overall conception rate among estrus induced cows was recorded as higher in GnRH-$PGF_{2\alpha}$-GnRH (90%) than the PMSG (70%), PMSG + hCG (80%) and in control (30%) groups. Such type of studies were also conducted with GnRH-$PGF_{2\alpha}$-GnRH protocol by Fernandes *et al* (2001), Tenhagen *et al.* (2004) and Keith *et al.* (2005) in postpartum anestrus crossbred cows with variable conception rates. Higher conception rate in GnRH-$PGF_{2\alpha}$-GnRH treated cows might be due to the second injection of GnRH analogue 48 hours after $PGF_{2\alpha}$ injection which would have induced ovulation of the newly developed dominant follicle in all the treated cows, and resulted in better conception rate.

The administration of GnRH analogue in the experiment might have provided the necessary threshold stimulus to initiate the estrous cycle by the release of gonadotrophins. The treatment with a GnRH analogue either causes medium size follicles to continue growing and large follicles to undergo atresia or induces ovulation and the formation of new corpus luteum. Ovulation would occur 2 days after treatment, a new dominant follicle could be identified with in 6 days after the treatment with GnRH and the follicle became ovulatory follicle after $PGF_{2\alpha}$ induced luteolysis. The conception rate recorded in postpartum anestrus cows treated with PMSG was supported by the studies of Kasthuri (2006). Similarly, PMSG + hCG protocol was also used by Bhela *et al.* (1996) and Shukla and Dabas (2004).

The number of services required per conception in postpartum anestrus cows treated with GnRH-$PGF_{2}\alpha$-GnRH, PMSG, PMSG + hCG and control groups were recorded as 1.44, 1.71, 1.75 and 1.66, respectively, the corresponding service period was recorded to be 81.33 ± 5.62 (58-158) days, 70.50 ± 5.24 (48-99) days, 73.37 ± 5.16 (49-105) days and 69.50 ± 7.44 (52-98) days respectively. The AI index was lower and service period was higher in GnRH-$PGF_{2\alpha}$-GnRH group than the other groups. These observations for services per conception were more (or) less similar to the reports by Tamuli *et al.* (2000) and Shukla and Dabas (2004).

However, Keister et al. (1999) reported longer (112 and 118 days) service period in postpartum cows, by using ovy-synch treatment of GnRH-$PGF_{2\alpha}$-GnRH protocol.

The present study revealed that the PMSG treated cows conceived significantly ($p<0.05$) earlier than the cows of other three groups. The results also indicated that the treatment with PMSG in handling the anestrus problem in animals was less effective than GnRH. The difference could be because of long half life of PMSG which might be responsible for altered physiology of the reproductive tract during all the critical time of fertilization and of embryo transport from oviduct of uterus (Singh *et al*, 2003).In the present investigation, the conception rate was higher in PMSG + hCG group than in PMSG group, which might be due to LH like

activity of hCG as LH plays an important role in ovulation and luteinization of follicle, its treatment at the time of insemination has resulted in increased conception rate. It was concluded that all the three GnRH-PGF$_{2\alpha}$-GnRH, PMSG and PMSG + HCG treatment groups were effective to induce fertile estrus in postpartum anestrus crossbred cows. The intensity of estrus was higher and duration of estrus was longer in PMSG and PMSG + hCG groups. The conception rate was higher in GnRH-PGF$_{2\alpha}$-GnRH groups than in other groups.

ACKNOWLEDGEMENT

The authors are thankful to authorities of Sri Venkateswara Veterinary University, Tirupathi and Dr. Pawar, Lt. Col., and other Staff Members of the Military Dairy Farm, Hyderabad for their timely Co-operation and help.

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