EFFICACY OF $PGF_2\alpha$ AND hCG FOR IMPROVING REPRODUCTIVE PERFORMANCE IN CYCLIC COWS UNDER FIELD CONDITION

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ABSTRACT

Total 50 normal cyclic cows were selected and equally divided into 5 different groups. Group I and II cows were treated with 2 ml injection of normal saline 11 days apart. Cows from group III, IV and V were treated with $PGF_2\alpha$ injection 11 days apart. Cows from group IV and V were treated with hCG 1500 IU i/m at the time of AI and after 11 days of AI, respectively. Cows of group II, III, IV, V received pre-synchronization medicinal treatment (PSMT) comprising mineral mixture @ 50 g daily for 15 days orally, Ivermactin) @ 1 ml per 50 kg body weight s/c, Vitamin AD_3E 5 ml i/m and sodium acid phosphate 10 ml i/m 15 days prior to estrus synchronization treatment. Out of 30 cows in group III, IV and V, 25 (83.33 %) cows responded to first dose and all 30 (100 %) responded to 2nd dose of $PGF_2\alpha$. The average mean time required for onset of estrus (for pooled 30 PG treated cows) after 1st and 2nd $PGF_2\alpha$ injection was 81.20 ± 4.66 and 74.40 ± 1.01 hrs, respectively, and the average mean length of estrus was 15.68 ± 0.77 and 17.33 ± 0.47 hrs, respectively. The conception rates in groups I, II, III, IV and V was 0, 20, 40, 50 and 40 %, respectively.

KEYWORDS : Estrous synchronization, conception rate, hCG

INTRODUCTION

Synchronization of estrus with prostaglandin ($PGF_2\alpha$) and its potent analogue has been reported to be beneficial in cattle. $PGF_2\alpha$ has been shown to improve conception rate in crossbred cows (Senthil Kumar *et al*., 2007; Patnaik *et al*., 2010). Some workers reported low conception rate inspite of following proper dose and route of administration of $PGF_2\alpha$ (Ott and Gustafasson, 1981). The low conception rate may be due early embryonic mortality which refers to the losses occurring in the period between fertilization and the completion of the stage of differentiation at approximate day 42. To overcome this problem an attempt was made to develop accessory corpus luteum by injecting hCG from 0 to 14 days after AI. Rajamahendran and Sianangama (1992) reported that hCG treatment at 7 and 14 days after insemination is better to produce accessory corpus luteum.

MATERIALS AND METHODS

Total 50 normal cyclic cows were selected from farmer's door and were divided into five groups each of 10 cows. The cows of group II, III, IV, V were given pre-synchronization medicinal treatment (PSMT) comprising mineral mixture @ 50 g daily for 15 days orally Ivermactin @ 1 ml per 50 kg body weight subcutaneously, Vitamin AD_3E 5 ml i/m and sodium acid phosphate 10 ml i/m 15 days prior to estrus synchronization treatment.

Selected cows from group I were checked per rectally and treated with 2 ml injection of normal saline 11 days apart. After 15 days of the pre-synchronization medicinal treatment (PSMT), cows from group II were treated with 2 ml injection of normal saline 11 days apart. Similarly the cows from group III, IV and V after 15 days of the pre-synchronization medicinal treatment, were treated with 2 ml injection of $PGF_2\alpha$ intramuscularly 11 days apart. AI was carried out 72 hrs after the last $PGF_2\alpha$ treatment. The cows of group IV and V were treated with 1500 IU (5 ml) injection of hCG

(Chorulon) intramuscularly at the time of artificial insemination and on day 11th after AI, respectively.

The cows from all five groups which exhibited estrus were observed for onset duration of estrus as well as for length of estrus after the treatment. The pregnancy diagnosis was carried out after 45 days of AI by transrectal ultrasonography. Statistical analysis of data was carried out using student 't' test as per the standard method described by Snedecor and Cochran (1986).

RESULTS AND DISCUSSION

Response to $PGF_2\alpha$ treatment

Cows from group I does not responded for estrus, whereas only 2 cows from group II responded and exhibited estrus. Out of total 30 cows of group III, IV and V treated with $PGF_2\alpha$ 11 days apart, 25 (83.33 %) cows responded to 1st dose of $PGF_2\alpha$ whereas, all 30 (100 %) cows responded to 2nd dose of $PGF_2\alpha$. The result obtained after 1st dose of $PGF_2\alpha$ (83.33 per cent) was in close agreement with Hussain and Honnappa (2008), who reported 83.33 per cent estrus response. The 100 per cent response obtained after 2nd $PGF_2\alpha$ injection is in agreement with Hafs *et al.* (1978) and Adeyemo *et al.* (1979). Variation in the response in different groups may be because of $PGF_2\alpha$ which is helpful for corpus luteum regression.

Time required for onset of estrus (hrs)

The average mean time required for onset of estrus in $PGF_2\alpha$ treated cows (group III, IV and V) after 1st $PGF_2\alpha$ and 2nd $PGF_2\alpha$ injection was 81.20 ± 4.66 and 74.40 ± 1.01 hrs, respectively. The average time required for onset of estrus after I st $PGF_2\alpha$ injection is in agreement with Pawshe (1990) and Patil *et al.* (2008), who reported the time as 75.16 ± 1.08 and 72.00 ± 2.38 hrs, respectively. The difference recorded in present study for onset of estrus following 1st and 2nd PG injection might be due to functional status of corpus luteum, response of corpus luteum to $PGF_2\alpha$.

Duration of estrus (hrs)

The average mean length of estrus in $PGF_2\alpha$ treated cows (group III, IV and V) was 15.68 ± 0.77 and 17.33 ± 0.47 hrs for 1st and 2nd $PGF_2\alpha$ treatment, respectively. The length of estrus recorded is in agreement with Pawshe (1990), who recorded 16.80 ± 0.66 hrs and 17.33 ± 0.35 hrs in crossbred cows but it was low as compared to that reported by Patil (2000) as 21.27 ± 0.94 and 20.83 ± 0.81 hrs. The differences recorded in the studies for length of synchronized estrus might be due to differences in health status of animal, size of the animal and differences in managemental practices.

Conception rate

In group II, out of 10 cows, only 2 (20 %) cows were conceived. In group III out of 10 cows 4 (40 %) cows were observed pregnant on ultrasonography 45 days post-AI. Further, 5 (50 %) out of 10 cows from group IV were confirmed pregnant. In group V out of 10 cows inseminated, 4 (40 %) cows were confirmed pregnant by USG. However, the conception rates between groups did not differ significantly, probably due to limited number of observations.

The cows from group III treated with $PGF_2\alpha$ 11 day apart showed 40.00 per cent conception rate, which is in close agreement with Chauhan *et al.* (1985) who reported 41.3 per cent conception rate in subestrus cows treated with $PGF_2\alpha$. Gupta *et al.* (1978) reported 37 per cent conception rate after 500 µg of $PGF_2\alpha$ injection in 9 lactating Haryana cows.

The conception rate observed in group IV (50 %) is in close agreement with the report of Swanson and Young (1990) following 3000 IU of hCG at the time of AI. Whereas, result obtained in group V (40 %) is in close agreement with Rajamahendran and Sianangama (1992), who reported 44.00

per cent conception rate when hCG was injected on day 14th after AI. The higher conception rate in group IV may be because hCG has activity similar to LH, is able to bind to tissue LH receptors and mimics effects of LH by causing small luteal cells to increase P_4 synthesis (Stevenson *et al.*, 2007). Niswender *et al.* (2000) reported that when hCG is given early in the estrus cycle (day 0 estrus) alters total P_4 production from large luteal cells. Rajamahendran and Sianangama (1992) observed that cows receiving hCG on the day of AI had larger corpus luteum on day 7 after AI. Santos *et al.* (2001) reported increased conception rate for hCG treated cows after AI.

The formation of accessory corpora lutea sometime was found to be greater when hCG was given during the early luteal (day 4 to 7) than during the follicular (day 0 to 3) or mid luteal (day 8 to 12) stage of estrous cycle (Price and Webb, 1989).

CONCLUSIONS

$PGF_2\alpha$ injection 11 days apart with timed AI along with hCG injection at the time of AI was the better treatment protocol to improve reproductive efficiency in normal cyclic cows under field conditions.

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