

EFFECT OF DOMINANT FOLLICLE ABLATION ON OVARIAN FOLLICLE COUNT IN SAHIWAL CATTLE

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ABSTRACT

The present study was conducted to investigate the effect of dominant follicle ablation on follicle count in Sahiwal cattle. All the selected donor animals were randomly divided into two equal groups. Donor cows in group 1 (n=10) were subjected to dominant follicle(s) ablation, donor cows in group 2 (n=10) without ablation and both groups were administered with 10 µg GnRH followed by FSH in 3 divided doses @ 100 mg, 60 mg and 40 mg at 48, 60 and 72 hrs after GnRH administration. OPU was carried out 24 hrs after the last FSH administration in all the donor cows. The overall mean number of follicles available for aspiration by Ovum pick up (OPU) method were 7.43 ± 0.22 in group 1 and 6.19 ± 0.22 in group 2 and the difference in the number of follicles between groups was significant ($p < 0.05$). Mean follicular count on right and left ovaries of group 1 cows were 7.87 ± 0.30 and 7.00 ± 0.30 , respectively with a significant difference ($p > 0.05$), whereas, mean follicular count on right and left ovaries of group 2 cows were 6.14 ± 0.32 and 6.24 ± 0.32 , respectively without significant difference ($p < 0.05$). While, the mean follicular count in group 1 at different timings of 0 hr, 48 hrs and 96 hrs were 7.15 ± 0.36 , 7.60 ± 0.36 and 7.55 ± 0.36 , respectively and in group 2 cows were 6.03 ± 0.39 , 6.25 ± 0.39 and 6.30 ± 0.39 , respectively without significant ($p > 0.05$). In conclusion, ablation of dominant follicle had higher follicular count in Sahiwal donor cows compared to non-ablation group cows.

Key words: Dominant follicle ablation, Follicular count, FSH, Ovum pick-up.

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INTRODUCTION

Sahiwal (*Bos indicus*) is considered as one of the best milch breeds of indigenous cattle with high reproductive potential, heat tolerance, which plays a significant role in rural community's income.

Transvaginal ultrasound guided ovum pick up (OPU) technique has brought

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significant transformation in the livestock industry by enhancing the efficiency in conservation of various breeds of cattle (Callesen *et al.*, 1987). OPU and in-vitro embryo production (IVEP) currently accounts for 72.7% of the total bovine embryos produced worldwide (Viana 2019). Dominant follicle ablation followed by follicle stimulating hormone (FSH) stimulation significantly improved the OPU efficiency (Chaubal *et al.*, 2006) by proportionality increasing the numbers of medium-sized follicles suitable for aspiration (Nawaz *et al.*, 2022). The present study was conducted to investigate the effect of dominant follicle ablation on follicle count in Sahiwal cattle.

MATERIALS AND METHODS

The current study was undertaken at Sri Venkateswara Gosamrakshana shaala, Tirumala Tirupati Devasthanam, Tirupati and at IVF laboratory, College of Veterinary Science, Tirupati. Normally cyclic Sahiwal donor cows (n=20) aged 6-10 years were selected for the study and were randomly divided into two groups. Group 1 (n=10): Donor cows were subjected to dominant follicle(s) ablation at random stages of the estrous cycle. The size of follicles were measured and the dominant follicles (> 9 mm) were ablated by using trans-vaginal ultrasound guided OPU procedure (Amiridis *et al.*, 2006). Immediately they were administered with GnRH analogue (Buserelin acetate: 10 µg I/M) followed by FSH (Folltropin-v, Vetoquinol) administration at a total dose rate of 200 mg I/M in three divided doses

(100 mg, 60 mg and 40 mg) at 48, 60 and 72 hrs after GnRH administration. Donor cows in Group 2 (n=10) were administered with GnRH analogue (Buserelin acetate: 10 µg I/M) at random stage of oestrous cycle without follicle ablation followed by FSH administration as described in Group 1. Initial OPU was carried out 24 hrs after the last FSH administration (coasting period) in all the donor cows of both the groups.

Analysis of data was carried out by using student t-test and ANOVA. SPSS 20.0 for windows was employed in the analysis. The level of significance of all the parameters was measured at P<0.05 (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

The overall mean number of follicles available for aspiration by OPU method were 7.43 ± 0.22 in Group 1 (ablation group) and 6.19 ± 0.22 in Group 2 (non-ablation group) in Sahiwal donor cows (Table. 1). The overall mean number of follicles available for aspiration at the time of OPU method was significantly ($p < 0.05$) higher in Group 1 than in Group 2. These findings are in agreement with Bergfelt *et al.*, (1994) who observed total number of follicles was greater in ablation group than in control group. Similar to the present study, Kim *et al.*, (2001) and Getz *et al.*, (2007) observed higher total number of follicles in dominant follicle removal group. On the contrary, Matoba *et al.*, (2014) and Ongaratto *et al.*, (2018) observed higher number of follicles in control group than in ablated group. While, Ciftci and

Dinc (2023) did not observe any difference between the dominant follicle removal and control groups in terms of total number of follicles during OPU.

Findings from this study has revealed that the follicular development in terms of numbers and size of follicles was influenced by the FSH administration and follicular ablation improved the ovarian response leading to more follicular development for aspiration. It suggests that elimination of the dominant follicle prior to OPU might have induced a new follicular wave emergence and improved the ovarian response to gonadotrophic stimulation (Grasso *et al.*, 1989; Bergfelt *et al.*, 1997; Baracaldo *et al.*, 2000 and Shaw and Good 2000) by causing a rapid decline in oestradiol concentration followed by a strong FSH surge leading to a new follicle wave emergence (Amiridis *et al.*, 2006). The FSH is known to stimulate development of follicles starting at a diameter of 4 to 5 mm and reestablishment of a pool of large antral follicles corresponding with an FSH surge (Webb *et al.*, 1999).

Mean follicular count on right and left ovaries of group 1 cows (Table 2) were 7.87 ± 0.30 and 7.00 ± 0.30 , respectively with a significant difference ($p > 0.05$). whereas, mean follicular count on right and left ovaries of group 2 cows (Table. 2) were 6.14 ± 0.32 and 6.24 ± 0.32 , respectively without significant difference ($p < 0.05$). While, the mean follicular count in group 1 cows at different timings of 0 hr, 48 hrs and 96 hrs were 7.15 ± 0.36 , 7.60 ± 0.36 and 7.55 ± 0.36 , respectively and in group 2 cows were 6.03 ± 0.39 , 6.25 ± 0.39 and 6.30 ± 0.39 , respectively (Table 3) without significant difference ($p > 0.05$).

In the present study, even though there was no significant variations, follicular development was found to be more in right ovary than left ovary. Similarly, Srimannarayana (2019) recorded significantly higher follicle count on right ovary than on left ovary at the time of OPU in Ongole (*Bos indicus*) cows.

Table 1 Overall mean follicular count in Sahiwal donor cows subjected to transvaginal ovum pick up

Attribute	Group 1	Group 2
No. of Donor Cows	10	10
No. of OPU sessions	10	10
No. of follicles available for aspiration	453	376
Mean Number of Follicles / Donor	7.43 ± 0.22^a	6.19 ± 0.22^b

Values bearing different superscripts within a row differ significantly ($P < 0.05$)

Table.2 Mean follicular count on the right and left ovaries

Follicular count	Group 1	Group 2
Right ovary	7.87 ± 0.30 ^a	6.14 ± 0.32 ^a
Left ovary	7.00 ± 0.30 ^b	6.24 ± 0.32 ^a

Values bearing different superscripts differ significantly (P < 0.05)

Table.3 Mean follicular count at 0, 48 and 96 hrs interval

Duration (Hours)	Group 1	Group 2
0	7.15 ± 0.36 ^a	6.03 ± 0.39 ^a
48	7.60 ± 0.36 ^a	6.25 ± 0.39 ^a
96	7.55 ± 0.36 ^a	6.30 ± 0.39 ^a

Values bearing same superscripts don't differ significantly (P < 0.05)

CONCLUSION

It was concluded that the ablation of dominant follicle had higher follicular number in Sahiwal donor cows compared to non-ablation group cows. Further, there was no significant variation in the follicular number between right and left ovary.

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