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Research Article

INCIDENCE OF ANOVULATORY FOLLICLES (>8MM) IN POST-PARTUM DAIRY COWS FOLLOWING VARIOUS TREATMENTS

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ABSTRACT: Dairy cows assigned to four treatment groups were administered $PGF_2\propto$ analogue (Cloprostenol) on day 8 or day 25 post-partum (n=6 each), or antibiotic from day 1 to 5 post-partum (n=6), or kept as untreated control (n=6). Body condition score recorded at the time of calving was significantly different (p>0.05) between PG8 and PG25 treatment group. The monitoring of anovulatory follicles (>8mm) was performed by transrectal ultrasound scanning at weekly interval. Incidence of atretic follicles was significantly lower (p<0.01) in cows administered $PGF_2\propto$ on day 8 post-partum as compared to antibiotic and control group. In brief, $PGF_2\propto$ administration on day 8 post-partum can lead to lower incidence of anovulatory follicles and subsequently, improves the reproductive efficiency of dairy cows.

Key words: Anovulatory follicles, BCS, Dairy cattle, $PGF_2\propto$, Ultrasonography.

INTRODUCTION

In dairy cattle, reproductive performance is the key factor affecting the profitability of dairy industry (Galvao *et al.* 2013). In cows having active corpora lutea, $PGF_2\propto$ administration results in evacuation of uterine contaminants, improvement of uterine defenses by temporarily increasing estrogen and decreasing progesterone concentrations in plasma (Kasimanickam *et al.* 2005). In cows that do not have active corpora lutea, $PGF_2\propto$ may enhance immune functions or increase uterine motility to help the uterus to resolve infections (Hirsbrunner *et al.* 2003). Antibiotic administration helps in improving the uterine defense and uterine clearance mechanism, decreasing persistent infections and consequently reducing persistent inflammation in the post-partum uterus (McDougall 2001). Anoulatory (atretic) follicles tend to delay the first post-partum ovulation and thus, affect the reproductive performance of dairy cattle (Imani *et al.* 2017). Therefore, the present study aimed to find the effectiveness of $PGF_2\propto$ or antibiotic administration during early post-partum period on incidence of anovulatory follicles in dairy cattle.

MATERIALS AND METHODS

The present study was carried out on 24 post-parturient dairy cattle (Jersey and Jersey crossbred) at University Dairy Farm, Himachal Pradesh Agricultural University, Palampur (32.6^{O}N, 76.3^{O}E, altitude 1290.8 m). Body condition score (BCS) of all the animals was recorded at the time of calving using five point scale of scoring as the animals were randomly drawn into treatment groups (Edmonson *et al.*1989). The animals were divided into three treatments and a control group. Two treatment groups were administered (i.m.) 500 µg PGF2∝ analogue (Cloprostenol) either on d8 (PG8) or d25 (PG25) post-partum. The cattle of third group were administered (i.m.) antibiotic (Ciprofloxacin, 4mg/kg body wt.) for first 5 days after calving. The fourth group served as untreated control. Transrectal ultrasonography of anovulatory follicles (>8mm) was performed using linear transducer of frequency 7.5 MHz (Sonosite M turbo; Sonosite India Pvt. Ltd.) on a weekly interval basis between day 8 to 43 post-partum (Fig. 1-2). The data was statistically analyzed using one-way ANOVA with SAS® 9.2 TS level version 2M2 software for windows.

RESULTS AND DISCUSSION

The dairy cattle of present study had significantly higher (p<0.05) BCS in PG8 group as compared to antibiotic and PG25 group (Table 1). BCS at calving had effect on post-partum period as it is often correlated with Negative Energy Balance (NEB) and it affects post-partum anovulatory period. Greater NEB in the post-partum period results in lower peripheral concentrations of luteinizing hormone (LH), which leads to disrupted ovarian follicular development. Also, NEB adversely affects the number and size of large ovarian follicles and leads to lowering of plasma progesterone and estradiol -

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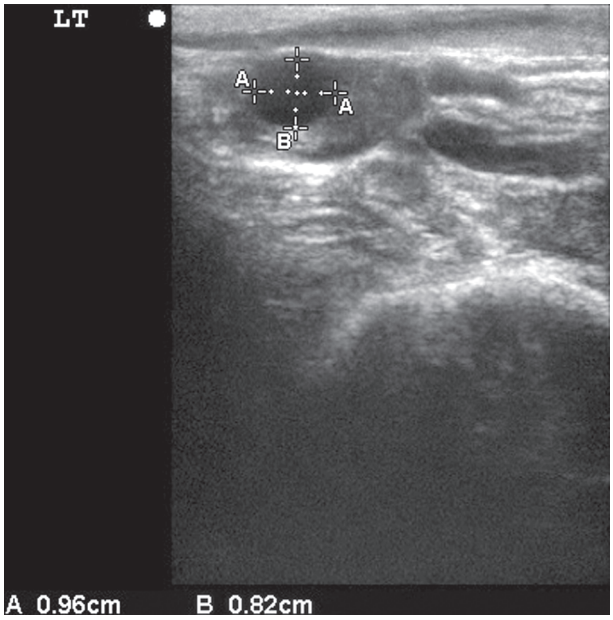

Fig. 1. Anovulatory follicle on day 15 post-partum (Left ovary).

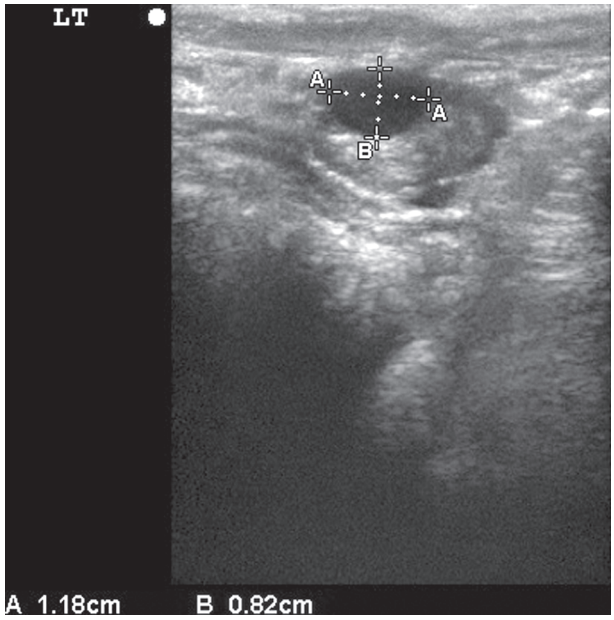

Fig. 2. Increase in size of follicle was evident but remains anovulatory on day 22 post-partum (Left ovary).

17β concentrations (Justyna *et al.* 2011). Also, decreased LH and Insulin Like Growth Factor-I (IGF-I) can compromise ovarian follicular growth and development leading to increase in incidence of inactive ovaries, ovarian cysts and non-functional corpora luteal in the post-partum cows, resulting in a prolonged interval to first ovulation after calving and delayed post-partum resumption (Hemanta *et al.* 2005).

Anovulatory follicles were significantly lower ($p<0.01$) in cows administered $PGF_2\propto$ on day 8 post-partum when compared to antibiotic and control groups. Sharma *et al.* (2018) also found a positive effect on resumption of ovarian cyclicity following administration of $PGF_2\propto$. Also, it helps in expulsion of unwanted uterine contents and resumes first post-partum estrus in cattle (Deori and Phookan 2015). The main objective of antibiotic administration was to eliminate the pathogens from the uterus, the induction of the uterine immune system, elimination of the adverse effects of inflammation products on fertility and improvement in future reproductive performance (Azawi 2008).

In conclusion, $PGF_2\propto$ administration on day 8 post-partum can lead to lower incidence of anovulatory follicles which may be due to earlier resumption of ovarian cyclicity and more estrogen release by mature follicles. However, use of $PGF_2\propto$ as a standard treatment in post-partum period should be critically reconsidered but further research is required to assess and quantify the efficacy of this treatment.

Table 1. Body Condition Score and incidence of atretic follicles (>8 mm) in different treatment groups up to 6 weeks post-partum.

Treatment Groups	BCS at calving (Mean±SE)	Anovulatory follicles (Mean±SE)
PG8 (n=6)	2.74 ± 0.09^{x}	$^{x}1.00\pm0.26^{a}$
PG25 (n=6)	2.53 ± 0.08^{y}	2.00 ± 0.37^{ab}
Antibiotic (n=6)	2.69 ± 0.10^{xz}	$^{y}2.67\pm0.49^{b}$
Control (n=6)	2.66 ± 0.12^{xyz}	3.17 ± 0.48^{b}

^{a,b}Values with different superscripts within the same column are significantly different ($p<0.01$).
^{x,y,z}Values with different superscripts within the same column are significantly different ($p<0.05$).

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