Haryana Vet. (Dec., 2017) **56 (2),** 207-209

Research Article

EFFECT OF DIFFERENT TREATMENTS ON POSTPARTUM REPRODUCTIVE PERFORMANCE OF DAIRY COWS

AKSHAY SHARMA*, MADHUMEET SINGH, PRAVESH KUMAR, AMIT SHARMA and INDU BALA
Department of Veterinary Gynecology and Obstetrics, College of Veterinary and Animal Sciences,
Himachal Pradesh Agricultural University, Palampur – 176062, India.

ABSTRACT

The objective of present study was to observe the effects of different treatments on postpartum reproductive performance of dairy cows. Cows having normal parturition were assigned into four groups including group which were given $PGF_{2}\alpha$ on day 8 (n=6) and 25 postpartum (n=6), antibiotic administration on day 1 to 5 postpartum (n=6) and untreated control group (n=6). Cows having dystocia were also administered antibiotic daily for first 5 days after calving (n=10). Body condition score of eutocia group was also recorded at the time of calving but there was no significant difference among different groups. Monitoring of fertility parameters (days to first artificial insemination, number of inseminations per conception and calving to conception interval) was done until next conception in different groups. There was no significant difference ($P>0.05$) between different reproductive parameters among control and treatment sub groups of eutocia cows. On the contrary, there was significant difference ($P<0.05$) in reproductive parameters of cows parturited normally and dystocia group except number of inseminations per conception.

Key words: Dairy cows, $PGF_{2}\alpha$, Antibiotic, Dystocia, Eutocia, Reproductive parameters

Reproductive performance in dairy cows is a key factor affecting profitability of the dairy industry. Dystocia is a complication that develops during calving resulting in postpartum uterine infections. It results in injury to uterine tissue which can easily be invaded by pathogens and leads to uterine infection. Postpartum uterine infections can delay the regeneration of endometrium and disrupt the resumption of cyclic ovarian function which leads to the postponement of first artificial insemination (AI), increase in number of inseminations per conception and thus prolonging the calving interval (Foldi *et al.,* 2006). Hence, management practices that hasten uterine involution during the early postpartum period and early resumption of ovarian cyclic activity within 60 days postpartum or before are expected to improve further reproductive performance (Cerri *et al.,* 2004). Postpartum administration of $PGF_{2}\alpha$ enhances uterine contractility and lochial clearing from the uterus after calving so it hastens uterine involution and initiate earlier postpartum cyclicity thus improving the reproductive performance (Nanda *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 postpartum uterus (McDougall, 2001). Therefore, the main objective of the present study was to find the effectiveness of different treatments on postpartum reproductive performance of dairy cows.

*Corresponding author: akshays482@gmail.com

MATERIALS AND METHODS

The present study was carried out on 24 postparturient dairy cows having normal parturition (Jersey and Jersey crossbred) of Livestock Farm, Himachal Pradesh Agricultural University, Palampur (32.6^{O}N, 76.3^{O}E, altitude 1290.8 m). Cows were reared in a loose housing system under standard management conditions, fed a total mixed ration, once daily, ad libitum, and had unrestricted access to water. Cows were milked twice daily (04:00 and 15:00 h). However, the cows having dystocia (n=10) were presented at Department of Veterinary Gynaecology and Obstetrics, DGCN COVAS, Palampur and were taken into the study. Body condition score (BCS) of the cows, only in eutocia group, was recorded before calving using five point scale of scoring (Edmonson *et al.,* 1989). Eutocia group was divided into three treatment groups (n=6 each) and an untreated control group (n=6). The first two treatment groups were administered 500 mcg $PGF_{2}\alpha$ analogue (Cloprostenol; Zydus Animal Health Ltd.) intramuscularly either on day 8 (PG8) or 25 (PG25) postpartum. In third group, cows were administered antibiotic Ciprofloxacin@ 4mg/kg body wt. intramuscularly for first 5 days after calving (C-Flox Power; Intas Pharmaceuticals Ltd.). The fourth group served as untreated control. Cows having dystocia

were also administered antibiotic Ciprofloxacin@ 4mg/kg body wt. intramuscularly for first 5 days after calving (C-Flox Power; Intas Pharmaceuticals Ltd.). Postpartum reproductive performance was assessed by days to first artificial insemination (A.I.), number of inseminations per conception and calving to conception interval (days open) in dystocia and different treatment subgroups in eutocia group. Pregnancy diagnosis was done 60 days after AI in eutocia sub groups whereas follow up for cows having dystocia was done telephonically. The data was statistically analyzed using one way ANOVA with SAS (Statistical Analysis Software), SAS® 9.2 TS Level version 2M2 for windows.

RESULTS AND DISCUSSION

Reproductive Performance: Mean duration for restoration of fertility parameters has been shown in Table 1. The present study revealed that the mean time required for days to first A.I. was numerically shorter in the PG8 group but there was no significant difference between different treatment and control sub-groups. However, there was a significant difference ($P< 0.05$) between the dystocia and eutocia group in terms of days to first A.I. Uterine infections due to dystocia extend the period of days open and days to first A.I. and decrease the rate of conception (De Vries, 2006). Sharawy *et al.* (2015) also reported a shorter interval from calving to first A.I. i.e. (60.94±2.9 days pp) in cows administered $PGF_{2\alpha}$ during early postpartum period. McClary *et al.* (1989) and Melendez *et al.* (2004) found that administration of $PGF_{2\alpha}$ in the early postpartum was associated with higher fertility. Low endogenous $PGF_{2\alpha}$ production during the first 14 days postpartum increases the susceptibility to uterine infection in dairy cows so treatment with exogenous $PGF_{2\alpha}$ is an effective preventive measure to reduce postpartum infection (Seals *et al.,* 2002). During early postpartum period, exogenous $PGF_{2\alpha}$ administration can increase the rate of uterine involution which results in evacuation of bacterial contamination from the uterus and subsequently improve conception rate (Archbald *et al.,* 1990; Risco *et al.,* 1994). However, improvement in fertility has been observed after $PGF_{2\alpha}$ administration at 25-32 days postpartum (Pankowski *et al.,* 1995). Also, $PGF_{2\alpha}$ helps in expulsion of the unwanted uterine contents and bring the cows to first postpartum estrus (Deori and Phookan, 2015).

In our study, calving to conception interval (days open) was significantly ($P<0.05$) shorter in eutocia group when compared to dystocia group. However, in eutocia sub group, days open were numerically shorter ($P>0.05$) in PG8 subgroup as compared to other subgroups. Our observations support the findings of $PGF_{2\alpha}$ in the early postpartum period (between 7 and 28 days) reduced the postpartum interval to conception (Sharawy *et al.,* 2015; Sani *et al.,* 2016) and had a positive effect on reproductive performance (Nakao *et al.,* 1997; Schofield *et al.,* 1999). On the other hand, no beneficial effect of $PGF_{2\alpha}$ on the reproductive parameters has been reported (Stephen, 2010; Sharawy *et al.,* 2015). Present study revealed that calving to conception interval in dystocia group was significantly higher than eutocia group. In support to our study, Buckley *et al.* (2010) and Quintela *et al.* (2004) reported the increased calving to conception interval following dystocia.

However, there was no significant difference ($P> 0.05$) between the dystocia and eutocia group in terms of number of inseminations per conception. Our study was well supported by the findings of Zainalabdein and Elfagir (2015) who found no significant difference

Table 1
Postpartum reproductive parameters following different treatments (Mean±S.E.)

Group	Treatment Sub-groups	Body condition score at calving	Days to first AI	No. of AI per conception	Calving to conception interval* (days)
Eutocia group	PG8 (n=6)	2.74±0.09	86.00±4.21[a]	1.50±0.22	96.50±6.42[a]
	PG25 (n=6)	2.53±0.08	97.67±7.58[a]	1.50±0.22	106.50±10.85[a]
	Antibiotic (n=6)	2.69±0.10	94.33±6.96[a]	1.33±0.21	101.33±9.46[a]
	Control (n=6)	2.66±0.12	97.00±8.99[a]	1.66±0.21	111.00±11.45[a]
Dystocia group	Dystocia (n=10)	-	140.60±15.64[b]	1.90±0.23	159.50±10.28[b]

[a,b]Values with different superscripts within the same column are significantly different ($P<0.05$)

between the dystocia and normal parturition group. But, in eutocia group, lesser number of inseminations results in conception as compared to dystocia group.

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 (LeBlanc, 2008; Azawi, 2008). In this study, antibiotic administration led to significant difference in reproductive performance between eutocia and dystocia groups.

$PGF_{2\alpha}$ administration in the early postpartum phase improved reproductive performance in dairy cows. However, dystocia may result in delayed uterine involution which can increase the opportunity for bacteria to colonise the uterus and may result in uterine infection. So, calving management, general hygiene, immediate diagnosis through clinical examination and early antibiotic and hormonal treatment is necessary in order to avoid the prolonged effect of cow postpartum uterine infection.

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