



THERAPEUTIC EFFECT OF IMMEDIATE POST-PARTUM ADMINISTRATION OF PGF_{2α} ANALOGUE ON UTERINE INVOLUTION, POST-PARTUM COMPLICATIONS AND FERTILITY IN CROSSBRED COWS

S. Praveen¹., M.P. Unnikrishnan²,
M.O. Kurien³, H.M. Harshan² and K.S. Anil⁴
Department of Animal Reproduction,
Gynaecology and Obstetrics, College of
Veterinary and Animal Sciences,
Mannuthy, Thrissur-680 651
Kerala Veterinary and Animal Sciences
University, Pookode, Wayanad, Kerala

Received - 02-07-16
Accepted - 04-07-2016

Abstract

The study was envisaged to evaluate therapeutic effect of PGF_{2α} analogue on the incidence of post-partum complications, uterine involution and fertility in crossbred cows. A total of 21 apparently healthy cows, immediately after normal calving were randomly allotted to two groups. Animals in group I were administered with 500 µg of cloprostenol sodium (synthetic PGF_{2α}) intramuscularly within two hours of calving, whereas those in group II were left untreated. Incidence of post-partum complications, number of days required for complete uterine involution and fertility indices were recorded in all the animals. Incidence of post-partum complications was higher in group II than group I. Number of days taken for complete uterine involution, as assessed by rectal examination was significantly ($p < 0.05$) shorter in group I (28.33 ± 1.67 days) than group II (32.22 ± 1.21 days). The time interval from calving to first observed oestrus and calving to first AI interval did not differ

significantly ($p > 0.05$) between groups (26.11 ± 2.87 and 53.89 ± 2.91 vs 32.22 ± 1.21 and 55.33 ± 4.45 days, respectively in group I and II, respectively). While, calving to conception interval did not differ significantly ($p > 0.05$) between groups (69.14 ± 9.02 vs 74.40 ± 9.25 days), first AI and overall conception rate was higher in group I (44.44 and 77.78 per cent, respectively) than group II (11.11 and 55.56 per cent, respectively).

Key words: Uterine involution, RFM, Cloprostenol, fertility, post-partum, cow

Reproductive efficiency of cow is largely dependent on scientific management of post-partum period. Post-partum fertility of dairy cattle is considered as the principal economic factor of milk producing dairy units. For realizing the target of one calf per year, the animal should get conceived within 80-90 days post-partum. Any delay in uterine involution adversely affects resumption of ovarian cyclicity, which in turn prolongs calving to first oestrus interval, number of days open and inter-calving interval. The main objectives of post-partum

1. Corresponding author, MVSc student, Dept. of Animal Reproduction, Gynaecology and Obstetrics,
 2. Assistant Professor, Dept. of Animal Reproduction, Gynaecology and Obstetrics
 3. Professor and Head, Dept. of Animal Reproduction, Gynaecology and Obstetrics
 4. Professor and Head, University Livestock Farm and Fodder Research and Development Scheme
- Email : praveenstcv@gmail.com, Mob. 9746183988

reproductive health management in dairy cattle are to ensure complete uterine involution, elimination of bacterial load and resumption of ovarian cyclicity, by the time they enter post-partum breeding period (40 days post-partum).

Prostaglandin, due to its luteolytic and uterotonic activity, has become a therapeutic management regimen during post-partum period. It reduces bacterial load and expel luminal contents by promoting uterine contractions and thereby enhancing uterine defense. No detailed report is available on the effect of single administration of cloprostenol (synthetic $\text{PGF}_2\alpha$) immediately after calving on incidence of retention of fetal membranes (RFM), puerperal metritis, uterine involution and subsequent fertility. Hence, the study was carried out to investigate the efficacy of immediate post-partum administration of cloprostenol sodium on incidence of post-partum complications, uterine involution rate and subsequent fertility in crossbred cattle.

Materials and Methods

The crossbred cows, maintained under uniform management conditions at University Livestock Farm and Fodder Research Development Scheme (ULF & FRDS), Mannuthy, Thrissur district of Kerala were utilized for the study. Twenty one apparently healthy normally calved crossbred cows, immediately after calving (within two hours) were selected for the study. Post-partum complications were recorded and such animals were excluded from further study. All the selected cows were randomly divided into two groups (group I and II). Animals in group I were administered with 500 µg of cloprostenol sodium (Inj. PRAGMA-

500 µg, 2 ml vial, Intas) intramuscularly within two hours of calving. In group II, animals were left untreated.

Uterine involution in both groups was assessed by rectal examination at day 10 post-partum and subsequently at five day interval till day 40. Involution of uterus was considered to be completed when both horns become almost equal size, tone and pre-gravid location (Noakes *et al.*, 2009). Animals of both groups were inseminated on the first observed oestrus after 40 days of calving. Calving to first observed oestrus interval, calving to first AI interval, calving to conception interval and conception rates to first AI and overall AI were recorded. In those animals which failed to return to cycle, pregnancy diagnosis was done by per-rectal examination at 45th day of insemination.

The data obtained were tabulated and analysed as per standard statistical procedures (Snedecor and Cochran, 1994) using SPSS version 20 (statistical package for social studies) software.

Results and Discussion

Cows with post-partum complications (three numbers) were excluded from further study and remaining nine animals in each group were monitored for the involution and fertility study.

Incidence of post-partum complications among $\text{PGF}_2\alpha$ treated and untreated animals are presented in table 1. Reduced incidence in treated animals could be due to frequent and forceful contractions of myometrium, induced by $\text{PGF}_2\alpha$, which resulted in expulsion of foetal membranes (Azawi, 2008 and Raut *et al.*, 2016). $\text{PGF}_2\alpha$

Table 1 : Per cent of post-partum complications among crossbred cattle administered with cloprostenol sodium within two hours of parturition.

Groups	Post-partum complications	
	RFM (%)	Puerperal metritis (%)
I (n=9)	0	0
II (n=12)	25.00	25.00
Total	14.29	14.29

Group I: crossbred cattle administered with 500 µg of cloprostenol sodium within two hours of parturition; Group II: control.

Table 2 : Number of days required for complete uterine involution, calving to first observed oestrus interval, calving to first AI interval, calving to conception interval and conception rates among treated and untreated animals.

Groups (n=9)	Days to complete uterine involution (Mean $\pm$ SE days)	Calving to first observed oestrus interval (Mean $\pm$ SE days)	Calving to first A.I interval (Mean $\pm$ SE days)	Calving to conception interval (Mean $\pm$ SE days)	Conception rates	
					First AI %	Over all %
I	28.33 ^B $\pm$ 1.67	26.11 ^B $\pm$ 2.87	53.89 ^C $\pm$ 2.91	69.14 ^D $\pm$ 9.02	44.44 (4)	77.77 (7)
II	32.22 ^A $\pm$ 1.21	30.67 ^B $\pm$ 4.67	55.33 ^C $\pm$ 4.45	74.40 ^D $\pm$ 9.25	11.11 (1)	55.55 (5)

(Figure within the parenthesis indicates number of animals conceived). Group I: crossbred cattle administered with 500 μ g of cloprostenol sodium within two hours of parturition; Group II: control. Mean with common superscript (A-D) within column does not differ significantly at 5% level of significance

might have stimulated uterine defense mechanism by leukocytes infiltration, thereby enhancing dehiscence of foetal membranes and elimination of bacterial contaminants (Dipyaman and Pramod, 2014).

Number of days required for complete uterine involution, calving to first observed oestrus interval, calving to first AI interval, calving to conception interval, conception rates among PGF₂ α treated and untreated group are presented in Table 2. It could be noted that number of days required for complete uterine involution among treated animals (28.33 $\pm$ 1.67 days) was significantly ($p < 0.05$) lesser than untreated group (32.22 $\pm$ 1.21 days). The faster uterine involution among PGF₂ α treated animals in the present study might be due to increased myometrial contraction caused by exogenous PGF₂ α , which was reported earlier also (Pandey *et al.*, 2007). In contrast to this, Elsheikh and Ahmed (2005) reported no beneficial effect of PGF₂ α on uterine involution.

The mean time interval from calving to first observed oestrus in group I and II was 26.11 $\pm$ 2.87 and 30.67 $\pm$ 4.67 days respectively. This was in agreement with the findings of Khatri *et al.* (2013) and Pacala *et al.* (2014), who reported that administration of synthetic PGF₂ α improved the process of uterine involution and shortened calving to first observed oestrus interval.

Although statistical analysis revealed no significant difference between groups, mean calving to first AI interval was comparatively shorter in PGF₂ α treated group than the control (53.89 $\pm$ 2.91 days vs 55.33 $\pm$ 4.45 days)

Treated animals had comparatively short calving to conception interval than the control group (69.14 $\pm$ 9.02 vs 74.40 $\pm$ 9.25 days). Short calving to conception interval in group I is due to improved first AI conception (44.44 per cent) in PGF₂ α treated animals compared to other group.

The first AI conception rate and overall conception rates among group I and II were 44.44 and 77.78; 11.11 and 55.56 per cent respectively. Similar findings were reported earlier also by Melendez *et al.* (2004), who concluded that better post-partum first service conception in cloprostenol treated cows might be due to hastened uterine involution following synthetic PGF₂ α therapy, which might have enhanced the uterine environment for establishment of a successful conception. Contrary to this Tahawy and Sharkawy (2014) reported that the first service per conception rates were not significantly different between the PGF₂ α treated and control groups, but overall conception rate increased in control group.

Conclusion

The study revealed that incidence of retention of fetal membranes was reduced considerably by administration of PGF₂ α within two hours of calving. Prostaglandin therapy significantly reduced the number of days required for uterine involution. Though statistically non-significant, PGF₂ α treatment reduced calving to first observed oestrus interval, calving to first AI interval, calving to conception interval, compared to untreated

group. First AI conception rate as well as overall conception rate was also found to be better in PGF₂α - treated group.

Acknowledgement

The authors are thankful to the Dean, College of Veterinary and Animal Sciences, Mannuthy for providing the facilities for this study.

References

- Azawi, O. I. 2008. Post-partum uterine infection in cattle. *Anim. Reprod. Sci.* **105** (3-4):187-208.
- Dipyaman, S. and Pramod, R.N. 2014. Effect of different treatment protocols on the incidence of retained placenta and postpartum reproductive health of cross bred cows upon induction of parturition. *Int. J. Advanc. Res.* **2** (1):129-133.
- Elsheikh, A.E. and Ahmed, F.O. 2005. Backing up post-partum dairy cows with PGF₂α. *J. Anim. Vet. Adv.* **4**: 506-509.
- Khatri, P., Tunio, S.A., Kaka, I., Samo, M.U., Bhutto, B. and Memon, M.R. 2013. Effect of exogenous PGF₂α and oxytocin on postpartum anoestrus and uterine involution in Kundhi buffaloes. *J. Anim. Reprod. Adv.* **54**: 2251-7677.
- Melendez, P., McHale, J., Bartolome, J., Archbald, L.F. and Donovan, G.A. 2004. Uterine involution and fertility of Holstein cows subsequent to early postpartum PGF₂α treatment for acute puerperal metritis. *J. Dairy. Sci.* **87**:3238-3246.
- Noakes, D.E., Parkinson, T.J. and England, G.C.W. 2009. *Veterinary Reproduction and Obstetrics*. (9th Ed.). Saunders Elsevier, Philadelphia, 950p.
- Pacala, N., Sipetan, C., Bencsik, L., Dronca, D., Cean, A., Caraba, I., Nicula, M., Sipetan, M., Nedeljkovic, N. and Ganta, C. 2014. The influence of synthetic analogues of PGF₂α on the evolution of puerperal period and the duration of the interval from calving to the first oestrus in cows. *Anim. Sci. Biotech.* **47** (1): 57-59.
- Pandey, A.K., Shukla, S.P., Pandey, S.K. and Sharma, Y.K. (2007). Haemato-biochemical profile in relation to normal parturition buffaloes and buffaloes with retained fetal membranes. *Buffalo Bull.* **26**: 46-49.
- Raut, M.R., Ingawale, M.V., Deshmukh, S.G., Hajare, S.W. AND Ingole, R.S. 2016. impact of cloprostenol sodium treatment during early post partum period on fertility in dairy cattle. *Indian J. Anim. Reprod.* **37** (1):39-40.
- Snedecor, G.H. and Cochran, W.G. 1994. *Statistical methods*. (8th Ed.). Iowa State University Press, USA, 564p.
- Tahawy, A.S.E. and Sharkawy, A.E. 2014. Reproductive, productive and economic efficiency of early postpartum dairy cows. *J. Dairy Vet. Anim. Res.* **1**(2):11-20.

■