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Efficacy of $PGF_2\alpha$, Calcium, Phosphorus, Oxytetracycline and Meloxicam on Fetal Membrane Retention and Postpartum Ovarian Activity in Buffaloes

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ABSTRACT

Present study was conducted on buffaloes (n=24) which were classified into two groups. In group I, 12 buffaloes after normal calving were randomly classified in treatment (n=6) and control (n=6) sub groups. Whereas in group II, 12 buffaloes after normal calving having RFM/ROP 12 hours after calving were randomly classified in treatment (n=6) and control (n=6) sub groups. In group I and II , the buffaloes in treatment group were administered Dinoprost (25 mg); Meloxicam @0.5 mg/kg body wt., Oxytetracycline @5 mg/kg body wt. i/m and calcium i/v immediately after and after 12 hours of calving, respectively. However, the buffaloes in control group were not given any treatment.There was lower incidence of RFM (16.66% vs 50.00%; P<0.05); early expulsion of fetal membranes (4.05±0.31 vs 4.66±0.99h; P>0.05), early disappearance of fetid discharge (1.83±0.10 vs 2.66±0.33 days; P>0.05), early disappearance of muco-purulent discharge (3.25±0.65 vs 4.66±0.61 days; P>0.05), early uterine involution (32.83±4.43 vs 36.00±6.91 days, P<0.05) and early resumption of ovarian activity (100.16±3.19 vs 109.83±6.34 days; P<0.05) in treatment than control group in the buffaloes of Group I. There was low incidence of RFM in treatment and control groups (00.00% vs 16.66%), early expulsion of fetal membrane (5.33±0.38 vs 8.3±0.86 h; P <0.05), early disappearance of fetid discharge (5.13±0.54 vs 7.16±0.95 days; P>0.05), early disappearance of muco-purulent discharge (5.00±0.52 vs 8.00±0.74 days; P<0.05), early uterine involution (34.00±0.62 vs 44.5±1.57 days; P <0.01) and early resumption of ovarian activity (103.66±2.09 vs 125.33±5.64 days, P<0.01) in treatment than control in the buffaloes of Group II with RFM 12 hours after calving. It could be concluded that immediate treatment regimen after calving reduces the incidence of retention of fetal membrane in buffaloes.

Key words: Buffalo, Postpartum, Prostaglandin analogue, Retention of placenta.

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INTRODUCTION

Retention of fetal membranes (RFM; synonymously 'retained placenta') is a failure of dehiscence and lack of expulsion of the fetal membranes within the duration of physiological third stage of labour (Arthur, 1979, Beagley *et al*., 2010). Retention of placenta (ROP) is one of the major reproductive problems in buffaloes (Khar, 1980) and has been found to be the single largest post parturient complication in bovines (Pattabiraman and Bawa, 1977, Cui *et al*., 2017). Hypocalcaemia and hypophosphatemia have been reported consistently in cows and buffaloes as the predisposing factor for dystocia and retention of fetal membranes (Han and Kim, 2005, Roche, 2006). Retained placenta delays uterine involution and could lead to endometritis and metritis leading to sub-fertility (Maizon*et al*., 2004).Treatment of RFM has been a controversial issue, as what should be the best method, for handling the case in terms of manual detachment of the placental villi from the maternal crypt or non-manual approach for solving the problem (Jainudeen and Hafez, 1993). However, manual removal of placenta decreases uterine defense mechanisms and impairs subsequent fertility (Peters and Laven, 1996). Meanwhile, various others myometrial stimulants like Ergonovine, Stilbesterol and Oxytocin (Roberts, 1971, Sharma, 1976, Drillich *et al*., 2006) have been tried in the treatment of retained fetal membranes in cows and buffaloes. A combination of prostaglandin ($PGF_{2\alpha}$) and oxytocin may prove to be of immense value in expelling retained fetal membranes (Patil *et al.,* 1980).The use of prostaglandin and its synthetic analogue are considered as drug of choice in reproductive management of animals (Seguin, 1981) as it is widely used to manipulate the early breeding of postpartum buffaloes and pubertal heifers (Jha, 2011), regulation of reproductive cyclicity (Singh and Madan, 1985) and in parturition (Prakash and Madan, 1985). $PGF_{2\alpha}$ is also commonly used during the early postpartum period to improve uterine involution (Nakao *et al.,* 1997) and fertility in dairy cattle (Archbald *et al.,* 1994). Considering the facts, the present research was conducted in post parturient buffaloes to study the effect of treatment in management of retention of fetal membranes under field conditions.

MATERIALS AND METHODS

The experiment was conducted on buffaloes (n = 24) in 2nd to 5th calving after screening of 605 post parturient buffaloes in various dairy farms of Durg and Rajnandgaon District of Chhattisgarh State. The animals were maintained in well ventilated, hygienic sheds and were fed Napier grass, hay, straw and compound concentrate mixture as per standard feeding schedule followed in the farm. The animals were broadly classified randomly into two groups. In group I, the twelve buffaloes after normal calving with no further complications were randomly classified in treatment (n=6) and control (n=6) sub groups. Whereas in group II, the twelve buffaloes after normal calving having retention of fetal membranes 12hour after calving were randomly classified in treatment (n=6) and control (n=6) sub groups. In group I and II , the buffaloes in treatment group were administered Dinoprost (PGF2α analogue, 25 mg); Meloxicam (anti-inflammatory drug 0.5 mg/kg body weight,); Oxytetracycline (Broad spectrum antibiotic, 5 mg/ kg body weight) intramuscularly and intravenous calcium therapy (Calcium gluconate, 1.86% w/v; Magnesium hypophosphite, 5% w/v; Dextrose anhydrous, 20% w/v; Chlorocresol 0.1% w/v, 450 ml) immediately after calving and after 12 hours of calving, respectively. However, the buffaloes in control group were not given any treatment.

Efficacy of the treatment on expulsion of placenta and reproductive performance was evaluated in all experimental buffaloes by recording average time (hour) required for expulsion of fetal membrane after calving, disappearance of fetid discharge and mucopurulent discharge (in days), time required for uterine involution (days) by per rectum examination of both uterine horn till the completion of involution of uterus to symmetric state and appearance of first post-partum ovarian activity was recorded by close observation of animals and confirmation by rectal examination of internal genitalia. The mean of treatment group and control group was compared by Independent 't' test was carried out with the help of SPSS computer software.

RESULTS AND DISCUSSION

Group I (Normal calving)

There was lower incidence of retention of fetal membranes (16.66% vs 50.00%; P<0.05); early expulsion of fetal membranes (4.05±0.31 vs 4.66±0.99 hours; P>0.05), early disappearance of fetid discharge (1.83±0.10 vs 2.66±0.33 days; P>0.05),early disappearance of muco-purulent discharge (3.25±0.65 vs 4.66±0.61 days; P>0.05), early uterine involution (32.83±4.43 vs 36.00±6.91 days, P<0.05) and early resumption of ovarian activity (100.16±3.19 vs 109.83±6.34 days; P<0.05) in treatment than control group (Table 1). Similar to our findings early expulsion of fetal membranes (El-Malky *et al*., 2010; Thakur *et al.,* 2013); early disappearance of fetid discharge (Singh *et al*., 1997; Azawi *et al*., 2008); early disappearance of muco-purulent discharge (Sheldon *et al*., 2006; Barlund *et al*., 2008); early

uterine involution (Goff, 2006) and early resumption of ovarian activity (Khatri *et al.,* 2013) in treatment group was reported.

The treatment with $PGF_{2\alpha}$(Lutalyse, Pfizer), anti-inflammatory drugs (Meloxicam, Intas), calcium therapy (Mifex , Novartis) and broad spectrum antibiotic (Oxytetracycline , Pfizer) given immediately after calving with positive beneficial effect might be due to increase myometrial contraction by $PGF_2\alpha$ (Tiwari *et al*., 2004); early separation of fetal villi from maternal crypt due to anti-inflammatory drugs (Perumal *et al.,* 2013); increased uterine tonicity by calcium therapy (Mulligan *et al.,* 2006) and control of uterine infection by broad spectrum antibiotic(Kunbhar and Iah Memon,2011).

Group II (Retention of fetal membranes after calving)

There was low incidence of retention of fetal membrane in treatment and control groups (00.00% vs 16.66%).There was early expulsion of fetal membrane (5.33±0.38 vs 8.3 ±0.86hrs;P<0.05), early disappearance of fetid discharge (5.13±0.54 vs 7.16±0.95 days; P>0.05),early disappearance of muco-purulent discharge (5.00±0.52 vs 8.00±0.74days; P<0.05),early uterine involution (34.00±0.62 vs 44.5±1.57days; P<0.01) and early resumption of ovarian activity (103.66±2.09 vs 125.33±5.64 days; P<0.01) in treatment than control group. The present study indicated that although treatment did not have significant effect on lowering the incidence of retention of fetal membranes but it has definite effect on uterine involution and ovarian activity (Table 1).

Similar to our findings early expulsion of fetal membranes in buffaloes (Shalaby *et al.,*1994; Sinha *et al*., 2002; Thakur *et al*., 2013)and in cattle (Muhammad and Muhammad, 2002); early disappearance of fetid discharge (Singhal, 1996); early disappearance of muco-purulent discharge(LeBlanc *et al*., 2002; Hendricks *et al*., 2006); early uterine involution(Iqbal *et al*., 2003; Mavi *et al*., 2004; Tiwari *et al*., 2004) and early resumption of ovarian activity (Darwash *et al*., 1997; Roche *et al*., 2000) in treatment group was reported.

The treatment with $PGF_2\alpha$ (Lutalyse, Pfizer), anti-inflammatory drugs (Melonex, Intas) calcium therapy (Mifex, Novartis health care) and broad spectrum antibiotic (Oxytetracyclin, Pfizer) given 12h after calving have positive beneficial effect due to increase myometrial contraction by $PGF_2\alpha$ (Tiwari *et al*., 2004); early separation of fetal villi from maternal crypt due to anti-inflammatory drugs (Perumal *et al.,*2013); increased uterine tonicity by calcium therapy (Mulligan *et al.,* 2006) and control of uterine infection by broad spectrum antibiotic (Kunbhar and Iah Memon, 2011) resulted early uterine involution and ovarian activity.

Table 1: Effect of treatment given immediately and 12h after calving in buffaloes on retained fetal membranes (RFM)

	Treatment immediately after calving			Treatment 12 hours after calving		
Parameter	**Control (n=6)**	**Treatment (n=6)**	**P-value**	**Control (n=6)**	**Treatment (n=6)**	**P-value**
Retention of fetal membranes	3 (50.00%)	1 (16.67%)	P<0.05	1 (16.67%)	0	P>0.05
Time for expulsion of fetal membranes (hours)	4.66 ± 0.99	4.05 ± 0.31	P>0.05	8.30 ± 0.86	5.33 ± 0.38	P<0.05
Disappearance of fetid discharge (days)	2.66 ± 0.33	1.83 ± 0.10	P>0.05	7.16 ± 0.95	5.16 ± 0.54	P>0.05
Mucopurulent discharge (days)	4.66 ± 0.61	3.25 ± 0.65	P>0.05	8.00 ± 0.74	5.00 ± 0.52	P<0.05
Uterine involution (days)	36.00 ± 6.91	32.83 ± 4.43	P<0.05	44.50 ± 1.57	34.00 ± 0.62	P<0.01
Ovarian activities (days)	109.83 ± 6.34	100.16 ± 3.19	P<0.05	125.33 ± 5.64	103.66 ± 2.09	P<0.01

P<0.05 and P<0.01 - Differ Significantly; P>0.05 - Non Significant difference

CONCLUSIONS

From the present study, it could be concluded that treatment regimen consisting of $PGF_2\alpha$, anti-inflammatory drug, calcium therapy and antibiotics gave immediate after calving resulting in early expulsion of fetal membranes, early disappearance of fetid discharge, early disappearance muco-purulent discharge, early uterine involution and early onset of ovarian activity and treatment after 12 hours after calving does not reduce the incidence of retention of fetal membrane.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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