EFFECT OF OXYTOCIN, $PGF_{2\alpha}$ AND GnRH ON UTERINE INVOLUTION AND POSTPARTUM FERTILITY IN MURRAH BUFFALOES SUBJECTED TO FETOTOMY

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ABSTRACT

Out of dystocia affected Murrah buffaloes subjected to fetotomy operation (n=40), one group of 20 buffaloes was administered a) Oxytocin (50IU I/M) immediately and 4h after fetotomy, b) Prostaglandin $F_{2\alpha}$ (500µg I/M on d7 and d21 postpartum), and c) GnRH (buserlin acetate @ 20µg I/M) on day 28 postpartum. The second group of 20 animals subjected to fetotomy were not administered any test medication. The third group consisting of 10 normally calving buffalo served as control. The buffaloes of frist group had improved uterine health, ovarian rebound and became pregnant in lesser time than others. In brief, administration of ecbolics and GnRH in early postpartum period hastens uterine involution and improves reproductive efficiency of dystocia affected buffaloes.

Key words: Buffalo, Ecbolics, Fetotomy, GnRH, Involution, $PGF_{2\alpha}$, Postpartum

INTRODUCTION

During postpartum period, the important events include uterine involution, regeneration of endometrium, elimination of bacterial contamination of uterus and the return of ovarian cyclical activity (Peter *et al.,* 1987). Dystocia leads to uterine contamination and affects involution and subsequently fertility. Thus, dystocia affected buffaloes subjected to fetotomy were administered uterine ecbolics like oxytocin and $PGF_{2\alpha}$ and GnRH postpartum to augment the process of involution and revival of ovarian cyclicity.

MATERIALS AND METHODS

In 40 Murrah buffaloes, the dystocia was corrected by fetotomy and the animals were divided into two groups. Group I buffalo (n=20) were a) Oxytocin (50IU I/M) immediately and 4h after fetotomy, b) Prostaglandin $F_{2\alpha}$ (500µg I/M on d7 and d21 postpartum), and c) GnRH (buserlin acetate @ 20µg I/M) on day 28 postpartum. Group II buffalo (n=20) were injected only with routine antibiotics, analgesics and calcium. Group III comprised of 10 normally calved buffaloes and were not given any medication.

All the buffaloes subjected to fetotomy were sampled for blood and uterine fluid immediately after obstetrical treatment and subsequently on d7, 14, 21 and 28 postpartum. An autoclaved one-way stainless-steel catheter 15 inches length and 3 mm diameter was used for collection of uterine fluid with the help of a sterile syringe. Five ml of the aspirated fluid was transferred to a sterile plastic tube, placed in ice, and transported to laboratory within 4 h of collection for further analysis. A drop of the uterine fluid collected was put on a clean grease free slide and a smear was prepared immediately. The smears were air dried, wrapped in a tissue paper and transported to laboratory. The smear was stained with Leishman stain for 10 min and allowed to dry on slide warming stand. Under a microscope (100x), 100 cells per slide were calculated for total percentage of PMN cells and lymphocytes.

The uterine dynamics were obtained by palpation

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per rectum during postpartum period. The complete involution was judged on rectal palpation by return of uterus to its normal location in the pelvic cavity, normal and approximately equal size of uterine horns, and attainment of normal uterine texture, tone and consistency. On each per rectal examination, the observations regarding location and size of uterine horns and cervix, consistency and tonicity of uterine musculature, degree of reduction in size of gravid and nongravid uterine horns, exhibition of ovarian activity were recorded. In addition, exhibition of behavioural estrus signs and service period postpartum were also recorded.

The data was analysed by SPSS software programme and one-way analysis of variance. The significant interactions were tested using Duncan's multiple range test.

RESULTS AND DISCUSSION

On d7 postpartum, in all the buffaloes, uterus and cervix were hanging below pelvic symphysis and located in the abdominal cavity. By d14, 80% and 100% buffalo of group I and III had their genitilia returned to pelvic brim and pelvic cavity, respectively, whereas, the group II buffalo had their genitilia still in abdominal cavity. On d28 postpartum, all the animals in group I and III had their genitilia in pelvic cavity, whereas in group II only 60% had their genitilia in pelvic cavity. The diameter of cervix, non-gravid and gravid uterine horn were 4.70±1.00, 4.20±0.74, >5.0 cm and 7.00±2.91, 5.50±1.22, >5.0 cm in group I and II, respectively as compared to 3.50±0.70, 3.16±3.36 and 3.20±2.83 cm, respectively in control group on d28 postpartum.

Polymorphonuclear (PMN) cells in the uterine fluid of buffaloes of group I and II were higher ($p<0.05$) than group III during postpartum period (Table 1). However, PMN cells in group I buffaloes on d28 postpartum were lower ($p<0.05$) than group II buffaloes (Table 1), which indicated better uterine environment in group I.

Table 1: Polymorphonuclear (PMN) cells in uterine fluid as well as postpartum (pp) reproductive behavior of fetotomy operated and control buffaloes

Parameter	Day	Ecbolic+GnRH, n=20	No Ecbolic/ GnRH, n=20	Control, n=10
PMNs	7	68.10 ± 2.16^{C2}	83.10 ± 1.56^{C3}	60.80 ± 3.00^{D1}
	14	66.50 ± 4.22^{BC2}	75.10 ± 2.95^{B3}	50.20 ± 2.57^{C1}
	21	60.80 ± 1.27^{B2}	72.30 ± 4.09^{B3}	46.00 ± 4.33^{B1}
	28	56.85 ± 5.90^{A2}	63.10 ± 2.39^{A3}	41.60 ± 0.74^{A1}
First postpartum behavioural estrus				
Days		110.2 ± 6.2^{D}	127.4 ± 6.4^{E}	65.00 ± 3.53^{F}
Range, days		$80\text{-}128^{2}$	$86\text{-}135^{23}$	$55\text{-}75^{1}$
Estrus in d<120 pp		$95\%^{3}$	$30\%^{2}$	$100\%^{1}$
Estrus in d>120 pp		$5\%^{1}$	$70\%^{2}$	-
Postpartum fertility				
Service period, days		111.20 ± 6.15^{D}	127.60 ± 6.38^{E}	88.60 ± 4.80^{F}
Range, days		$105\text{-}148^{2}$	$116\text{-}156^{3}$	$74\text{-}122^{1}$
d75-120 pp		$30\%^{2}$	-	$90\%^{1}$
d≥120 pp		$70\%^{1}$	$30\%^{2}$	$10\%^{3}$
Conception rate				
d120 pp		70%	30%	80%

$^{A,B,C}p<0.05$, within the groups; $^{D,E,F,1,2,3}p<0.05$, between the groups

During postpartum period, the number of days for the occurrence of first behavioural estrus, animals showing estrus within d120 postpartum, overall service period, animals subjected to AI within study period as well as conception rate were better in group I (ecbolic+GnRH) compared to group II (no ecbolic or GnRH; Table 1).

The bacterial presence in uterus is usual in >90% of cows in first 10-14 days postpartum, regardless of disease signs (Sheldon and Dobson, 2004). In the present study, the average bacterial count (CFU/ml) in buffaloes subjected to fetotomy was higher ($p<0.05$) than the eutocic buffaloes on all days of sampling, which increased from d7 postpartum to d14 postpartum, followed by a decline in all the groups. On d28 postpartum, average colony counts were 240.00±45 CFU/ml, 354±66 CFU/ml and 82.00±9 CFU/ml in group I, II and III, respectively.

Thus, the administration of $PGF_{2\alpha}$ in early puerperum had a positive chronotropic effect on the uterine musculature, which facilitates quick expulsion of lochia and induction of estrus. The latter is responsible for physical expulsion of bacterial contaminants and inflammatory products as well as a possible improvement in uterine defences under low progesterone (Kasimanickam *et al.,* 2004).

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