

# ULTRASONOGRAPHIC EVALUATION OF UTERINE INVOLUTION IN PGF<sub>2α</sub> TREATED COWS

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## ABSTRACT

Eighteen postpartum Holstein Friesian crossbred cows (lactation, 2 - 5) were randomly and equally divided to receive (i.m.) on day 2 postpartum either 25 mg PGF<sub>2α</sub> (Dinoprost Tromethamine) or 5 ml normal saline. In PGF<sub>2α</sub> group, cervical and uterine involution, as detected per rectally, progressed rapidly compared to controls. Ultrasonography of cervix and uterine body on day 2, 10, 20 and 30 postpartum, revealed that cervical and uterine diameter decreased quickly in PGF<sub>2α</sub> group. In brief, exogenous PGF<sub>2α</sub> administration on day 2 postpartum lead to better cervical and uterine involution by day 30 postpartum in crossbred cows.

**Keywords:** Cervix, Involution, PGF<sub>2α</sub>, Postpartum, Uterus

## INTRODUCTION

Prolonged postpartum period with failure or delay in conception results in progressive economic loss to farming community. The hastening of uterine involution during the puerperal period can shorten the postpartum interval. The uterotonic effect of exogenous prostaglandin F<sub>2α</sub> (PGF<sub>2α</sub>) during the early postpartum period can improve uterine involution and subsequent fertility status in dairy cattle (Bajcsy *et al.*, 2006). Hence, a study was conducted in crossbred cows to assess the efficacy of PGF<sub>2α</sub> administration on cervical and uterine involution rate.

## MATERIALS AND METHODS

Eighteen Holstein Friesian cows (lactation 2 - 5) were randomly and equally divided into experiment (PGF<sub>2α</sub>) and control (no PGF<sub>2α</sub>) group. On day 2 postpartum, PGF<sub>2α</sub> group cows were administered (i.m.) 25 mg PGF<sub>2α</sub> (Dinoprost Tromethamine) and controls received 5 ml normal saline (i.m.). The gross and ultrasonographic evaluation of cervical and uterine involution was carried out on day 2, 10, 20 and

30 postpartum. By rectal examination, the involution of cervix and uterus (at the level of uterine horn bifurcation and uterine body) was assessed with palm and fingers. The approximate dimensions ascertained by palpation were expressed in millimeter. By ultrasonographic examination, the changes in the diameter of cervix and body of uterus at the level of bifurcation and uterine body were measured and recorded in millimeter. The collected data was analyzed statistically using SPSS@ 20.0. Software package and *Post hoc* analysis was done by Tukey's Honestly Significance Difference.

## RESULTS AND DISCUSSION

The rectal examination revealed that by day 30 postpartum, the cervix involuted from abdominal cavity or pelvic brim to pelvic cavity in all the cows of PGF<sub>2α</sub> group, whereas, during the same period, the cervical involution in controls was slower than treatment groups (Table 1), thus suggesting PGF<sub>2α</sub> induced involution of the cervix in cows. A similar trend was observed for uterine involution in PGF<sub>2α</sub> treated cows compared to their counterparts receiving no treatment (Table 1). However, not much difference was observed in percent animals of both the groups with palpable uterine ridges, retractable uterus and palpable uterine contour (Table

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**Table 1: The postpartum (pp) assessment of cervical and uterine involution by rectal palpation in cows (%)**, n=9 in each group) treated with PGF<sub>2α</sub>. Abd - Abdominal

Cervical involution									
Parameters		Day 2 pp		Day 10 pp		Day 20 pp		Day 30 pp	
		PGF <sub>2α</sub>	No PGF <sub>2α</sub>	PGF <sub>2α</sub>	No PGF <sub>2α</sub>	PGF <sub>2α</sub>	No PGF <sub>2α</sub>	PGF <sub>2α</sub>	No PGF <sub>2α</sub>
Location, %	Abd cavity	55.6	55.6	0	22.2	0	0	0	0
	Pelvic brim	44.4	44.4	55.6	44.4	11.1	77.8	0	77.8
	Pelvic cavity	0	0	44.4	33.3	88.9	22.2	100	22.2
Uterine involution									
Location, %	Abd cavity	88.9	88.9	55.6	66.7	11.11	33.3	0	0
	Pelvic brim	11.1	11.1	44.4	33.3	88.9	44.4	55.6	77.8
	Pelvic cavity	0	0	0	0	0	22.2	44.4	22.2
Ridges palpable, %	Yes	77.8	88.9	100	100	0	0	0	0
	No	22.2	11.1	0	0	100	100	100	100
Retractable, %	Yes	0	0	88.9	77.8	100	100	100	100
	No	100	100	11.1	22.2	0	0	0	0
Contour palpable, %	Yes	0	0	100	77.8	100	88.9	100	100
	No	100	100	0	22.2	0	0	0	0

1). In dairy cattle, usually uterine involution takes place between days 25-35, depending upon the myometrial contraction stimulated by PGF<sub>2α</sub>, bacterial elimination and endometrial regeneration (Noakes *et al.*, 2001).

The ultrasonographic evaluation revealed similar ( $p>0.05$ ) diameter of cervix and uterine body between experiment and control groups on day 2 postpartum (Table 2). Thereafter, a significant ( $p<0.05$ ) reduction in the diameter of cervix and uterine body was recorded till day 30 postpartum in both the groups (Table 2). Similarly, in another study, 45% reduction in the cervical diameter till day 7 postpartum was recorded in cows (Atanasov *et al.*, 2012). Between group comparisons on different postpartum days revealed that cervical and uterine body involution was faster in PGF<sub>2α</sub> group compared to their control counterparts ( $p<0.05$ , Table 2). Similarly, administration of PGF<sub>2α</sub> shortly after calving in cows significantly decreased uterine involution period (Nazir *et al.*, 1994). An increase in myometrial contraction and enhanced

immune function by exogenous PGF<sub>2α</sub> might be the reasons for faster uterine involution in PGF<sub>2α</sub> treated cows (Pandey *et al.*, 2007).

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**Table 2: The postpartum (pp) assessment of cervical and uterine involution by ultrasonography in cows (n=9 in each group) treated with PGF<sub>2α</sub>**

Day pp	Diameter of cervix, mm		Diameter of uterine body, mm	
	PGF <sub>2α</sub>	No PGF <sub>2α</sub>	PGF <sub>2α</sub>	No PGF <sub>2α</sub>
2	45.63±0.28 <sup>p</sup>	45.73±0.52 <sup>p</sup>	47.13±0.18 <sup>p</sup>	47.63±0.91 <sup>p</sup>
10	35.25±0.41 <sup>a,q</sup>	40.88±0.54 <sup>b,q</sup>	40.63±0.09 <sup>a,q</sup>	46.01±0.24 <sup>b,p</sup>
20	27.25±0.65 <sup>a,r</sup>	35.72±0.23 <sup>b,r</sup>	26.88±0.08 <sup>a,r</sup>	32.50±0.76 <sup>b,q</sup>
30	22.63±0.87 <sup>s</sup>	30.38±0.67 <sup>s</sup>	21.50±0.46 <sup>a,s</sup>	25.50±0.05 <sup>b,r</sup>

<sup>a</sup> vs. <sup>b</sup> p<0.05, within a group; <sup>p</sup> vs. <sup>q</sup> vs. <sup>r</sup> vs. <sup>s</sup> p<0.05, within a column

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