

Original Research Article

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Histological Changes of Oxytocin on Postpartum Uterus in Cows

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ABSTRACT

Keywords

Crossbred cows,
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The puerperal uterine soundness is essential for the re-establishment of postpartum ovarian cyclicity and next pregnancy. Normally calved 18 healthy Holstein Friesian crossbred cows aged between 2nd and 5th lactations were selected immediately after parturition. Day of parturition was considered as day 0 of the experiment. All the selected cows were randomly and equally divided into 2 experimental groups viz., group I (Treatment) and II (control). The endometrial tissue collected on day 10 and 30 postpartum in two groups through Albuchins's biopsy catheter. In group I on day 10 postpartum, histologically the endometrium showed involution process, with mild neutrophilic and mononuclear infiltration. When compared to day 10 postpartum, the regenerative changes of epithelium and endometrial glandular activities were predominant on day 30 postpartum in group I cows than group II.

Introduction

Reproductive performance of dairy cows after the voluntary waiting period is highly related to the health status of the uterus after calving (Dijkhuizen and Stelwagen, 1985; Ferguson and Galligan, 2000). The complete uterine involution range is 26 to 52 days after calving, but the changes after 20 to 25 days after calving are generally almost imperceptible.

Pathak and Bansal (2012) observed that the endometrial glands were simple or branched tubular glands of which few were coiled distally. They were lined with simple columnar epithelium. These glands were more active during the follicular phase as compared

to the luteal phase of the oestrous cycle. But the secretory activity was more pronounced during the luteal phase in cows. Oxytocin injection in the postpartum period did not improve production and reproduction traits in buffaloes and cows (Mustafa *et al.*, 2008 and Palomares *et al.*, 2010), whereas according to Qureshi and Ahmad (2008) the uterine involution was complete after an appropriate period of time after oxytocin treatment.

Intravenous injection of oxytocin (5 IU) resulted in a strong increase in uterine contractility on day 2 postpartum, however, the amplitude and duration of the response decreased by day 4 postpartum in cows (Kundig *et al.*, 1990). At days 10, 20 or 30

postpartum, intravascular treatments with 30, 150 and 300 IU oxytocin evoked markedly elevated plasma levels of 15-ketodihydroprostaglandin $F_2\alpha$ ($PGF_2\alpha$ metabolite), although the magnitude of the response decreased with advancing puerperium (Del Vecchio *et al.*, 1990).

Materials and Methods

Normally calved 18 healthy Holstein Friesian crossbred cows aged between 2nd and 5th lactations were selected immediately after parturition. Day of parturition was considered as day 0 of the experiment. All the selected cows were randomly and equally divided into 2 experimental groups viz., group I and II (control). Therefore each group consisted of 9 cows. On day 2 postpartum, cows of group I and II were treated with an intramuscular injection of 50 IU oxytocin (10 ml, Syntophar[®], Interphar Healthcare Pvt. Ltd., Chandigarh, India) and 5 ml normal saline (Parental drugs (India) limited, Indore, Madhya Pradesh, India), respectively.

Endometrial biopsy

The ideal endometrial tissue for interpretation was found to be at least 10-20 mm × 3 mm in both epithelial cell layer and the glandular architecture (Raja *et al.*, 2012). Albuchin's uterine biopsy catheter (Plate. 1) was used to obtain endometrial biopsy samples as per the technique followed by Palanisamy (2012) with slight modifications. Endometrial biopsy was

taken from the all experimental and control cows on (i) day 10 and (ii) day 30 postpartum.

Results and Discussion

Histology of endometrium in the control cows on day 10 postpartum showed mild mononuclear infiltration and congestion in the endometrium along with few neutrophils. But, on day 30 postpartum, 2 cows in control group showed endometrial glandular proliferation with few neutrophils. In experimental cows (group I), on day 10 postpartum, the endometrium showed involution process, with mild neutrophilic and mononuclear infiltration. The mucin secretion was also noticed. The increased endometrial glandular activity was seen. Focal mild mononuclear infiltration and mild fibrosis were seen in few cases. Squamous metaplasia of uterine epithelium was noticed in one cow. These regenerative changes of endometrium on day 10 postpartum were prominent in group I (oxytocin) than control group. These proliferative changes were minimal in control group.

On day 30 postpartum, many uterine ecbolics treated cows had increased glandular activity with extensive lymphocytic infiltration and increased vascular spaces. The glandular secretion was predominant in few cases. Moderate neutrophilic and mononuclear infiltration was noticed. Few cows showed the presence of fibrous tissue.

Plate.1 Albuchin's uterine biopsy catheter-with open tissue grasper



Fig.1 Histology of endometrium in postpartum cows treated with uterine ecboic

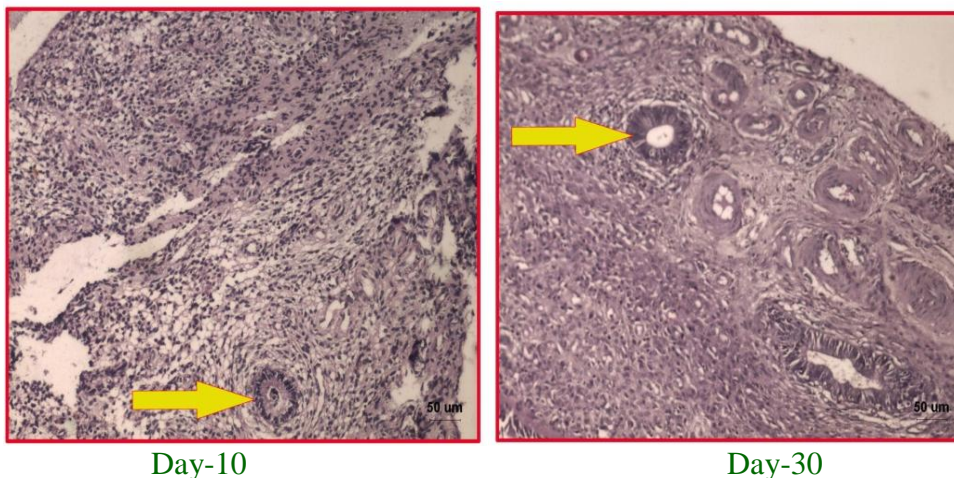


Fig.1 Group-I indicates endometrial gland and its secretory activity

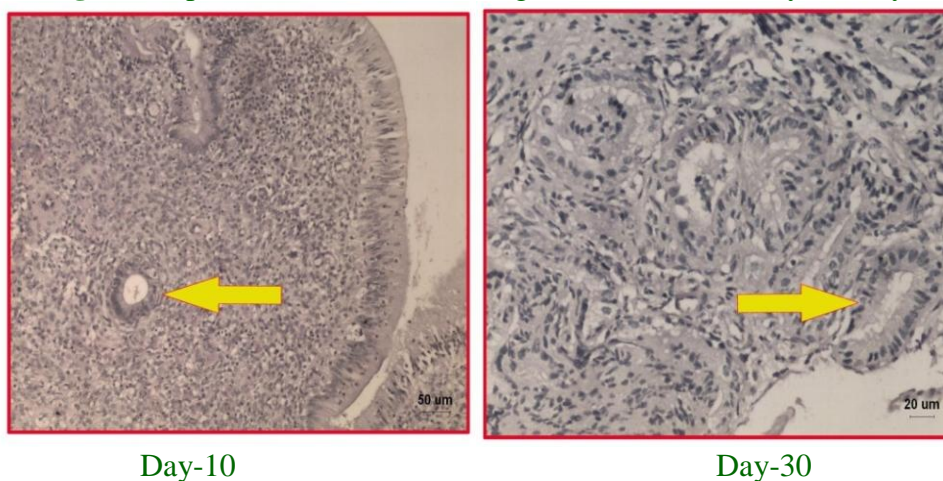


Fig.2 Group-II indicates endometrial gland and its secretory activity

When compared to day 10 postpartum, the regenerative changes of epithelium and endometrial glandular activities were predominant on day 30 postpartum in experimental groups especially in group I cows (Fig. 1). These regenerative changes were very minimal in group II (control) (Fig. 2) on day 30 postpartum.

In this study, on day 10, postpartum uterine lining epithelium was found to be normal with pseudostratified columnar type. Endometrium showed involution process with mild neutrophilic and mononuclear infiltration. The endometrial glandular activity was seen in few cases with increased vascular spaces. On

day 30 postpartum there was an increased endometrial glandular activity with extensive lymphocytic infiltration. These observations were in accordance with the findings of Prasad and Krishna (2009) in postpartum normally calved cows. These endometrial involution and regenerative changes clearly reflected on the conception rate in each treatment and control groups.

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