ABSTRACT

Introduction: Use of prostaglandin is common during the early postpartum period to improve uterine involution and fertility in dairy cattle (Archbald et al., 1994). PGF₂α is widely used to manage postpartum reproductive efficiency through reduction of postpartum interval “backing up” (Elsheikh and Ahmed, 2004). The administration of exogenous PGF₂α during postpartum improved the conception rate (Michel et al., 1999) and reduced the calving to conception interval (Schofield et al., 1999). But both beneficial and a failing uterotonic effect have been reported with PGF₂α treatment in cows (Bajcsy et al., 2006).

The examination of the endometrial biopsy, inflammatory, periglandular fibrosis and cystic glandular degeneration were studied to provide prognosis for cow fertility (Singh et al., 1983). Uterine biopsy was a valuable diagnostic tool in identifying morphological alterations in the uterine endometrium (Prasad and Krishna, 2009).

Krishna et al. (2010) suggested that characteristic changes of endometrial infection were glandular hyperplasia with periglandular fibrosis of the endometrial layer and necrotic changes with cystic dilatation of endometrial glands. These changes indicated poor fertility.

Immunohistochemistry is used to confirm the identity of the immune cell types present in the endometrium. Positive immune-staining was detected for tyrosine protein phosphatase non-receptor type substrate 1 (CD172A, representing macrophages and granulocytes), CD14 cell surface antigen (a macrophage marker), CD2 molecule (T-cell and natural killer (NK) cell marker) and T-cell surface glycoprotein CD8 (Uthai et al., 2013).

Lower percentage of T lymphocytes and decreased CD2, CD4 and CD8 subsets of T lymphocytes were observed in the peripheral blood of healthy cows (Van Kampen and Mallard, 1997). CD8+ T lymphocytes are mainly of a cytotoxic nature during mid to late lactation, but they are mainly suppressed in postpartum animals. A decrease in CD2⁺, CD4⁺ and CD8⁺ T lymphocytes on 7 days after parturition, but subpopulations were observed (Shafer-Weaver and Sordillo, 1997). 

Immunohistochemical studies of chronic endometritis biopsies revealed more number of CD3 positive cells (pan T lymphocytes) in stratum compactum. Six chronic endometritis biopsies revealed CD138 positive cells (plasma cells) in endometrial stroma (Samatha et al., 2013).

Endometritis is mediated by presence of T and B lymphocytes and plasma cells. Although bovine endometrium supported large number of immune cells, the diagnosis of chronic endometritis depends upon detection of plasma cells within inflammatory infiltrate in endometrium (Crum et al., 1983 and Garner et al., 2004).

Tawfik et al. (1996) observed increase in CD20 positive cells and CD3 positive cells up to 50 and 3 folds respectively in endometritis cases. No difference in number of T lymphocytes in normal and endometritis cases was reported by Dise et al. (2004).

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 (prostaglandin F2α) and IV (control). Endometrial tissue was collected on day on day 10 and 30 postpartum in all the two groups of animal through Albuchin’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 experimental groups especially in group I cows. Immunohistochemistry of endometrium showed mild expression for CD 20+ cells in groups I and moderate expression of CD20 +ve cells in control cows on day 10 and 30 postpartum. None of the cows in experimental and control groups expressed positive for CD3+ cells.

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 was used to obtain endometrial biopsy samples as per the technique followed by Palanisamy (2012) with slight modifications. The closed, sterilized biopsy catheter was introduced into the uterus adopting aseptic technique. The biopsy catheter was advanced into one of the uterine horns of uterus and the catheter was opened. The uterine wall was pressed with the thumb against the opening of the catheter. The catheter was closed, rotated and retracted slowly. Slight pressure was applied against catheter to prevent haemorrhage before retracting the instrument. A piece of endometrium was released from the cutting edge of the catheter into a vial containing Bouin’s fluid and stored for 24 hours and processed by routine paraffin technique and stained with haematoxylin and eosin as per technique described by Bancroft and Gamble (2008). Endometrial biopsy was taken from the all experimental and control cows on (i) day10 and (ii) day 30 postpartum.

Immunohistochemistry of Endometrium: The endometrial tissue collected on day 10 and 30 postpartum in...

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