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# Intrauterine plasma treatment for endometritis in Jersey crossbred cows*

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## ABSTRACT

Intrauterine therapy with autologous plasma was evaluated for its therapeutic efficiency in cross bred Jersey cows with endometritis. Eight cows with endometritis were given intrauterine infusion of 50 ml autologous plasma on day 1, 2 and 3 of oestrous cycle considering day of estrus as day 0. The cows were evaluated in terms of physico-chemical characteristics of estrual mucus (viz., pH, nature of estrual mucus and white side test), histopathology of uterine biopsy and conception rate. The treated cows showed improvement in all the above parameters mentioned and conception rate was 50%. Hence, the intrauterine autologous plasma treatment recovers cross bred Jersey cows from endometritis.

**Key words:** Endometritis, autologous plasma therapy, uterine biopsy

At present, endometritis is treated widely with antibiotics, antiseptics and less frequently with hormones. The result of the studies on the use of antibacterials varies from beneficial (Roberts, 1971; Vahida, 1992; Sheldon and Noakes, 1998), to non-beneficial (Bretzlaff *et al.*, 1982 and Dowlen *et al.*, 1983), to recommendation against their use (Vandeplassche and Bouters 1976; Hussain and Daniel, 1991; Youngquist, 1997). Hormones namely estrogen, oxytocin and prostaglandin F2α were also reported as line of treatment in bovine endometritis by various workers with varying degree of success rate (Roberts, 1971; Frank *et al.*, 1983; Murray *et al.*, 1990; Sadasiva Rao, 1995). Alternative to present line of treatment, autologous intrauterine plasma therapy that substitutes uterine defense mechanism, can give fruitful results and was reported in mare to treat endometritis (Asbury, 1984, Waelchi *et al.*, 1987; Watson, 1988). This study was undertaken with an objective of treating endometritis in cows with autologous plasma.

## MATERIALS AND METHODS

**Selection of animals** : Eight crossbred Jersey cows with endometritis and eight apparently healthy cows maintained at Livestock Research Station, Kattupakkam, Kancheepuram Dist., Tamil Nadu, were selected based on breeding history, physico-chemical characteristics of estrual mucus and thorough gynaecological examination.

**Physico chemical characteristics of estrual mucus** : Estrual cervical mucus was collected in glass petridish from all cows to study the pH, physical nature and to conduct white side test. The pH of the estrual mucus was assessed by using pH meter. The nature of estrual mucus was graded as purulent, mucopurulent and clear. Based on white side test the estrual mucus was classified positive when the colour of the mucus turned yellow after boiling with an equal volume of 0.5% sodium hydroxide solution.

**Autologous plasma preparation for intrauterine treatment**: Autologous plasma for intrauterine therapy was obtained from each cow with endometritis, while they were in estrum. Approximately 300ml of blood was collected aseptically from jugular vein, in blood bags (350 ml JML blood bag). The blood collected in blood bag was kept in ice and transported to the laboratory for plasma separation. Blood was aseptically transferred to 50ml sterile plastic vials in laminar air bench and centrifuged at 3000rpm for 15 minutes. The plasma was aspirated aseptically and transferred into three 50 ml sterile

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plastic vials and stored at -20°C. The frozen plasma was transported in ice to the farm. Intra uterine infusion of 50 ml of autologous plasma was given on day 1, 2 and 3 of oestrous cycle considering day of estrum as day 0.

**Histopathological examination** : Uterine biopsy was done before the start of therapy and day 0 of the subsequent estrum following the autologous plasma therapy. The biopsy technique consisted of collecting a piece of endometrium aseptically with Albuche's biopsy catheter. The collected endometrial tissues were fixed in Bouin's solution. The fixed tissues were embedded in paraffin blocks, micro sectioned and stained with standard Hematoxylin and Eosin stain for histopathological examination.

**Artificial insemination and pregnancy diagnosis** : Artificial insemination was carried out on subsequent estrum in autologous plasma treated cows and control animals with good quality semen. Pregnancy diagnosis was done after 45 days by rectal examination.

## RESULTS AND DISCUSSION

**Physico-chemical characteristics of estrual mucus** : The pH was neutral in healthy control group of animals (7.00±0.13). In cows with endometritis before treatment, the mean pH recorded was 8.69±0.13, which is due to infection and inflammation. It is in agreement with the findings of Boiter *et al.* (1980) who stated that due to infection and inflammation the pH would be increased. After treatment with intrauterine autologous plasma the pH was 7.06±0.15, which revealed that above treatment was effective in controlling infection (Table 1).

**Nature of estrual mucus** : The estrual mucus was purulent (25%) and mucopurulent (75%) in cows with endometritis. On treatment with autologous plasma, 75% of the cow at subsequent estrum showed clear estrual mucus discharge (Table.1). The clearing of the estrual mucus would be attributed to increase in phagocytosis and elimination of infection by the opsonin present in plasma.

**White side test** : The colour of estrual mucus from infected uterine discharge of cow turned yellow after boiling with sodium hydroxide. This is in concurrence with Papov (1969) who reported that the colour of mucus from endometritis cows turned to yellow after boiling with sodium hydroxide. Seventy five per cent of cows (Table.1) were negative at subsequent estrum after treatment with autologous plasma. This indicates that the treatment with autologous plasma is effective in reducing uterine infection.

**Histopathological examination** : The characteristic lesions observed in the uterine biopsy samples of cows with endometritis were diffused moderate infiltration of neutrophils, desquamation of lining epithelium and necrosis of endometrial glands with periglandular fibrosis (Fig.1). These observations were in accordance with those reported by Brus (1952), Kampel Macher (1954), Sadasiva Rao and Seshagiri (1998). After treatment with intrauterine autologous plasma, biopsy taken at subsequent estrum showed regeneration of glandular lining epithelium with infiltration of mononuclear cells (Fig.2).

The histological observation confirmed intrauterine infusion of autologous plasma was effective in improving the endometritis at glandular level.

**Recovery and conception rate** : The recovery and conception rates were 75% and 50% (Table 2) respectively in cows treated with intrauterine infusion of autologous plasma as compared

**Table. 1 Physico-chemical characteristics of estrual mucus**

| Parameters | Control Animals (n=8) | Intrauterine Plasma Treatment (n=8) | |
|---|---|---|---|
| | | Estrus | Subsequent Estrus |
| A) pH (Mean ± SE) | 7.00 ± 0.13[a] | 8.69 ± 0.13[b] | 7.06 ± 0.15[a] |
| B) Nature of estrual mucus | | | |
| i) Purulent | - | 25% | - |
| ii) Muco purulent | - | 75% | 25% |
| iii) Clear | 100% | - | 75% |
| C) White Side Test | | | |
| i) Positive | - | 100% | 25% |
| ii) Negative | 100% | - | 75% |

Means bearing different superscripts in row differ significantly (P<0.01)

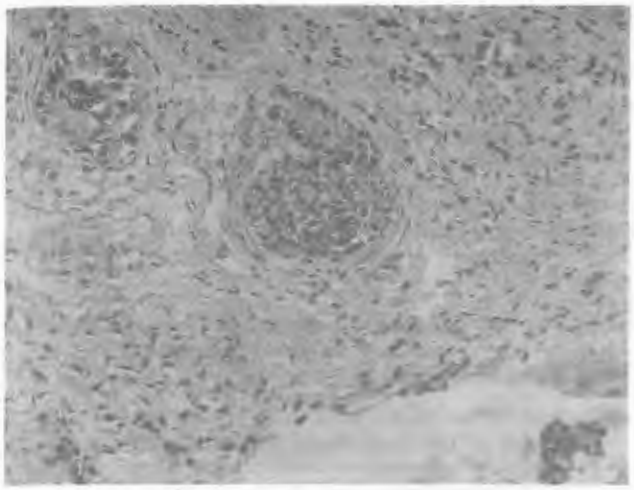

Fig. 1 : Photomicrograph showing desquamation of the lining endometrium and necrosis of endometrial glands with mild periglandular fibrosis (HE X400)

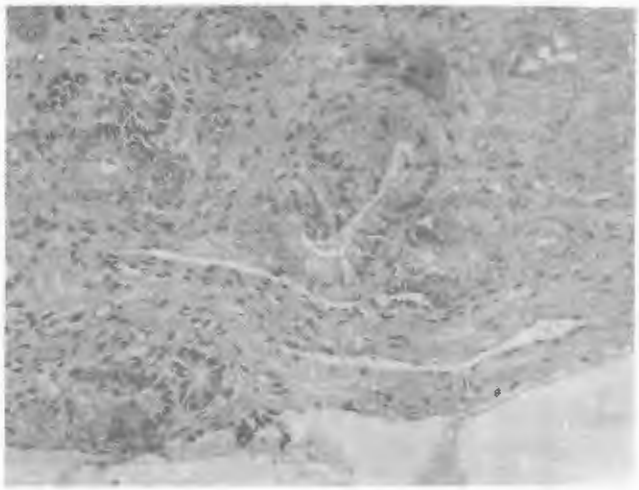

Fig.2 : Photomicrograph showing mononuclear cell infiltration, regeneration of glandular epithelium while lining epithelium is restoring under the process of restoration (HE X400)

**Table 2. Therapeutic efficacy of autologous plasma in cows with endometritis**

| Serial No. | Group (n=8) | Recovery Rate | Conception Rate |
|---|---|---|---|
| 1. | Plasma treatment | 75% | 50% |
| 2. | Healthy Control | – | 37.5% |

to 37.5% conception in control group. Plasma is a rich source of opsonins which mainly include the immunoglobulins and components of the complement system. Intrauterine infusion of plasma supplements opsonins and significantly enhances the phagocytic ability of polymorphonuclear granular leukocytes in the uterine lumen which intern favours non-specific uterine defense mechanism (Hakansson *et al.*, 1993). Encouraging results in terms of increased conception rate in mare with endometritis following intra uterine infusion of plasma were also reported (Asbury, 1984; Waelchli *et al.*, 1987). Furthermore, it has long been shown that plasma has bactericidal and bacteriolytic activity against certain Gram negative bacteria (Waelchli *et al.*, 1987).

From the present study, it is concluded that autologous plasma has components that are effective in controlling uterine infection in endometritis cow. Future areas of research in this line lie in identifying the active principles that recovers uterine endometrium from infections and exploiting them for therapeutic purpose as alternative therapy to bovine endometritis.

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