



EFFICACY OF *E. coli* LIPO POLYSACCHARIDE IN THE TREATMENT OF SUBCLINICAL ENDOMETRITIS IN POSTPARTUM COWS

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Abstract

A study was conducted in 24 crossbred cows and endometrial sampling was performed by uterine cytobrush (UC) on 30, 40 and 50 days postpartum (DPP) to diagnose subclinical endometritis (SCE). Out of which 10 cows were diagnosed to be positive for SCE and were treated with *E.coli* lipopolysaccharide (LPS). Polymorphonuclear (PMN) cells count by UC showed a significant reduction ($P < 0.001$) in the subsequent oestrus after treatment. All the animals showed significant improvement in tonicity of the uterus after treatment. The post-treatment pH (8.20 ± 0.11) was significantly lower ($P < 0.01$) when compared to pre-treatment (7.40 ± 0.12). The overall conception rate of SCE cows was 60 per cent after treatment. So it is concluded that *E.coli* LPS could be used as an effective immunomodulator and as an alternative to antibiotic therapy.

Keywords: Subclinical endometritis, cytobrush, polymorphonuclear cells, lipopolysaccharide

Introduction

Bacterial contamination of cow uterus is ubiquitous following parturition. Establishment and persistence of non-specific uterine infections prejudices the normal reproductive functions and cause considerable economic loss. Economic impact of endometritis is quite alarming as a result of undue calving to conception interval and long term consequences can cause irreversible changes of genital tract leading to metritis and sterility (Sheldon *et al.*, 2009). Various antibiotics are used for treatment of endometritis through intrauterine route. But time to time evaluation of efficacy of antibiotics is needed since new strains of bacteria can develop due to indiscriminate use of antibiotics. As an alternative now a day uses of immunomodulator has gained attention to give a new dimension on therapeutic procedures (Shuvranshu Sh. Biswa *et al.*, 2013). Therefore, the present study was planned with the objective to determine the efficacy of *E.coli* lipopolysaccharide (LPS) for treatment

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of subclinical endometritis in postpartum cross bred cows and its subsequent effect on conception rate.

Materials and method

Twenty-four apparently healthy postpartum cows (9 primiparous cows, 15 pluriparous cows) were enrolled in the study. All these animals belonged to University Livestock Farm and Fodder Research and Development Scheme, Mannuthy and Cattle Breeding Farm, Thumbboormuzhi where standard nutritional and managerial practices were followed. All the cows were screened for subclinical endometritis (SCE) on 30, 40 and 50 days postpartum (DPP) using uterine cytobrush (UC) technique. Those animals diagnosed to be positive for SCE were treated with single intrauterine infusion of lipopolysaccharide of *E.coli* (Serotype 026:B6, Sigma Chemicals Co., USA) at the dose rate of 100 µg dissolved in 30 mL of phosphate buffer saline on the day of subsequent oestrus after parturition as per Singh *et al.* (2000). UC technique, haematological analysis, uterine tonicity and pH of vaginal discharge were assessed on pre and post treatment period at the time of oestrus. The data were analysed statistically as per Snedecor and Cochran (1994).

Results and Discussion

The mean (\pm SE) percentage of PMN cells at 50 DPP was 17.25 ± 4.03 . After intrauterine treatment when PMN cells percentage was declined during subsequent oestrus it reduced to 2.95 ± 0.79 . This significantly ($P < 0.01$) lower proportion of PMN cells in the

post treatment indicated the efficacy of LPS as an immunomodulator. The mean (\pm SE) pH of vaginal discharge in pre and post treatment was 8.20 ± 0.11 and 7.40 ± 0.12 , respectively. The post-treatment pH was significantly lower ($P < 0.01$) when compared to pre-treatment. In agreement with the present study, Palanisamy *et al.* (2014) found that the mean (\pm SE) pH value of the cervical mucus pre-treatment was 8.62 ± 0.02 and after the treatment it was 7.01 ± 0.02 in *E.coli* LPS treated cows. Similarly, Salphale *et al.* (1993) found that the drastic reduction in pH values following treatment was correlated to the declining levels of metabolites of bacteria and inflammatory exudates.

After intrauterine treatment the tonicity of SCE cows had shown significant ($P < 0.05$) improvement to high, medium and low tonicity (60, 30 and 10 per cent, respectively) from low tonicity and doughy condition (40 and 60 per cent, respectively), which is attributed to increased PMN cells aided by *E.coli* LPS. Moreover, the proliferated PMN cells in the uterus had helped to eliminate the infection.

Haematological values obtained during pre-treatment (0 h), post-treatment (24h 48h, and 72h) and subsequent oestrus after treatment are presented in Table 1. There was no significant difference in most of these haematological parameters except haematocrit value which significantly ($P < 0.05$) decreased after treatment. Contrary to this study, Heidarpour *et al.* (2012) reported that the white blood cell, neutrophil, lymphocyte, and monocyte counts decreased significantly after treatment with cephapirin in cows affected with subclinical endometritis. Similarly, Sarma

Table 1. Haematological parameters in sub clinical endometritis cows during pre and

Parameters	0 h	24 h	48 h	72 h	Post treatment	P value
White Blood Cell ($10^3/\mu\text{l}$)	14.79 ± 1.50	13.04 ± 1.82	13.84 ± 1.74	13.42 ± 1.41	14.51 ± 1.80	0.941
Lymphocyte (%)	57.20 ± 4.10	66.65 ± 1.80	63.13 ± 3.35	63.92 ± 2.46	60.73 ± 2.89	0.255
Monocyte (%)	3.48 ± 0.77	3.67 ± 0.23	3.46 ± 0.56	3.50 ± 0.43	2.97 ± 0.81	0.943
Granulocyte (%)	39.72 ± 3.40	31.82 ± 2.36	34.52 ± 2.88	34.77 ± 2.44	37.73 ± 2.37	0.297
Red Blood Cell ($10^6/\mu\text{L}$)	5.35 ± 0.15	5.35 ± 0.23	5.36 ± 0.18	5.13 ± 0.11	4.65 ± 0.31	0.107
Haemoglobin (g/dL)	7.72 ± 0.42	7.51 ± 0.26	8.00 ± 0.26	7.74 ± 0.31	8.01 ± 0.24	0.763
Haematocrit (%)	25.14 ± 1.08^a	25.91 ± 0.69^a	25.72 ± 0.79^a	24.92 ± 0.92^a	21.42 ± 1.55^b	0.027*

post-treatment *Significant at 5 % level

et al. (2012) observed that white blood cell and red blood cell indices changed significantly towards the normal ranges when compared to pre-treatment values.

The conception rates after first AI, second AI and third AI (overall) in this study are 20, 50 and 60 per cent, respectively. Statistical analysis revealed no significant difference between normal and abnormal group with regard to this parameter.

Conclusions

In veterinary practice, the treatment of subclinical endometritis in postpartum period is usually based on parenteral or intrauterine infusion of antibiotics and intrauterine antiseptics. However, the use of antibiotic drugs in food producing animals is under critical public concern. Also, it has been concluded by Parkinson (2009) that antiseptics are at best useless and at worst injurious to the uterine endometrium and therefore the author has questioned the efficacy of intrauterine antiseptics. In the present study, it could be inferred that the LPS could be considered as an alternative therapy for treatment of SCE in postpartum dairy cows.

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