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## Efficacy of intrauterine infusion of levofloxacin + Ornidazole + $\alpha$ tocopherol on recovery and conception rate in endometritic repeat breeder crossbred cows

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### Abstract

The present study was undertaken to evaluate the efficacy of intrauterine infusion of levofloxacin + ornidazole +  $\alpha$  tocopherol on recovery and conception Rate in endometritic repeat breeder crossbred cows. A total 50 crossbred cows were diagnosed for endometritis were randomly divided into 2 groups i.e. treatment group (n = 30) and untreated control group (n = 20). In treated group, 30 ml of levofloxacin (20 mg/ml) + ornidazole (40 mg/ml) +  $\alpha$  tocopherol (5 mg/ml) was infused intrauterine for 3 consecutive days. Whereas, in untreated control group, 30 ml sterile normal saline solution was infused intrauterine for 3 consecutive days. The clinical recovery was assessed by clear appearance of discharge, reduction in pH and negative white side test in cervico-vaginal mucus at subsequent estrus. The result indicated that recovery and conception rates of endometritic cows were 90.00 (27/30), 20.00 (4/20) and conception rates 88.88 (24/27) and 25.00 (1/4) %, respectively, in treated and untreated control groups of endometritic crossbred cows.

**Keywords:** Conception rates, cows, endometritis, levofloxacin + ornidazole +  $\alpha$  tocopherol, recovery rates

### Introduction

Endometritis is defined as inflammation of the glandular layer of the uterus and is associated with delayed uterine involution and poor reproductive performance. It is most commonly encountered uterine disorder causing repeat breeding in cattle. A wide variety of micro-organism infects the female genital tract and causes pathological changes leading to infertility. Besides this, endotoxins of bacteria and inflammatory exudates alter the pH of uterine and vaginal fluids resulting in failure of conception due to death of spermatozoa or fertilized ovum. Various antimicrobial agents have been advocated and tried for therapeutic management of this condition with different degree of success (Shukla and Sharma, 2005) [9]. Treatment of endometritis has been routinely carried out with intrauterine infusion of antibiotics. However, indiscriminate use of antibacterial agents to treat uterine infection has invariably resulted in emergence of drug resistant bacterial strains (Arora *et al.*, 2002) [1]. The present study was designed to evaluate the efficacy of intrauterine infusion of levofloxacin + ornidazole +  $\alpha$  tocopherol (Lenovo AP) on recovery and conception rate of endometritic repeat breeder crossbred cows.

### Materials and Methods

The present study was conducted on 50 crossbred cows with endometritis, presented to Government Veterinary Hospital, Deoranian, and Bareilly in last 3 years (2018-2020), with the history of more than 3 inseminations. These cows were selected on the basis of history of repeat breeding, through per-rectal examination and physio-chemical characteristics of cervical mucus. Cows with purulent or mucopurulent estrual discharge or containing white flakes and positive reaction to white side test (Popov, 1969) [7] were considered positive for endometritis. Moreover, animals with the history of repeat breeding and clear discharge but positive reaction to white side test were also included in the study. All the cows were examined per-rectally to rule out any anatomical defects of genitalia and ovarian abnormalities. Cows were divided into 2 groups i.e. treatment group (n = 30) and untreated control group (n = 20).

In treated group, 30 ml of levofloxacin (20 mg/ml) + ornidazole (40 mg/ml) +  $\alpha$  tocopherol (5 mg/ml) (Lenovo AP, Intas Pharmaceuticals Limited) was infused intrauterine for 3 consecutive days. Whereas, in untreated control group, 30 ml sterile normal saline solution was infused intrauterine for 3 consecutive days.

Estrual cervico-vaginal mucous from each cow was collected before treatment and at subsequent estrus by recto-vaginal technique as per Dabas and Maurya (1988)<sup>[2]</sup>. Estrual cervico-vaginal mucus was studied for its appearance, presence of white flakes, abnormal colour, white side test (Popov, 1969)<sup>[7]</sup> and pH of the cervico-vaginal mucous using pH strip.

The clinical recovery was assessed by clear appearance of discharge, reduction in pH and negative white side test at subsequent estrus. Cows during subsequent estrus were inseminated twice, 12 h apart, using French mini Sahiwal semen straw. Cows which returned to estrus after first AI were again inseminated at second subsequent estrus. Pregnancy was confirmed per-rectally 60 days after insemination.

Statistical analysis was done according to method described by Snedecor and Cochran (1994)<sup>[11]</sup> by using Normal Deviate test.

### Results and Discussion

In the present study, the recovery rates were 90.00 (27/30) and 20.00 (4/20) % and conception rates 88.88 (24/27) and 25.00 (1/4) %, respectively, in treated and untreated control groups of endometritic crossbred cows. The recovery rate from endometritis and further conception rate were significantly ( $P < 0.05$ ) higher in intrauterine infused levofloxacin + ornidazole +  $\alpha$  tocopherol treated group as compared to normal saline infused control group.

The cows with endometritis had purulent or mucopurulent discharge and 100 % cows in both the groups were positive to white side test prior to treatment. Positive reaction to white side test could be explained on the basis of number of leucocytes present in the uterine discharge. The normal discharges have less number of leucocytes to cause any change of colour whereas in clinical and subclinical cases of endometritis, discharge contains increased number of leucocytes causing colouring reaction (Pateria and Rawal, 1990)<sup>[6]</sup>. The pH of estrual cervico-vaginal mucous of both the groups was alkaline (above 8) prior to treatment. This increase in pH might be due to endotoxins of bacteria and inflammatory exudates in estrual mucus (Sulphale *et al.*, 1993) and once the infection was eliminated, the pH of cervical mucus returns towards the neutral side (Markusfeld, 1984). After treatment, pH declined in all treated animals at subsequent estrus (become 6.6-6.8) whereas in control animals pH remained towards alkaline side.

In treated group, 90.00 % animals showed recovery from endometritis, animals under Levofloxacin + Ornidazole +  $\alpha$  tocopherol treatment discharged clear estrual cervico-vaginal mucous with negative white side test at subsequent estrus and out of that 88.88 % animals were conceived. Singh *et al.* (2011)<sup>[10]</sup> reported 82 % recovery rate from endometritis and further 68 % conception rate by intrauterine use of Levofloxacin +  $\alpha$  tocopherol in repeat breeder endometritic crossbred cows. The present finding showed higher recovery (90.00 %) and conception rate (88.88 %). Levofloxacin, a recently introduced second generation fluoroquinolone, possess excellent activity against gram positive, gram negative and anaerobic bacteria (Nath *et al.*, 1998)<sup>[5]</sup> as compared to other fluoroquinolones, ofloxacin and

ciprofloxacin. It also has more pronounced antibactericidal activity against organism like *Pseudomonas*, *Enterobacteriaceae* and *Klebsiella*.  $\alpha$ -Tocopherol is an important lipid soluble antioxidant within membrane and influences both cellular and humoral immunity, thereby increasing the phagocytic activity of neutrophils. The antibactericidal activity of levofloxacin, antiprotozoal activity of ornidazole with synergistic action on anaerobes and immuno-stimulant activity of  $\alpha$ -tocopherol might be the reason for higher efficacy obtained in treated group. Markandeya *et al.* (2011)<sup>[3]</sup> reported that synergism of levofloxacin-ornidazole and  $\alpha$ -tocopherol showed superior efficacy in the treatment as well as prevention of postpartum affections and had favourable effect on the productivity in buffaloes.

From the present study it is concluded that the recovery rate from endometritis and further conception rate were significantly ( $P < 0.05$ ) higher in intrauterine infused levofloxacin + ornidazole +  $\alpha$  tocopherol treated group as compared to normal saline infused control group.

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