HAEMATOLOGICAL ALTERATIONS FOLLOWING VARIOUS THERAPIES IN SURTI BUFFALOES WITH POSTPARTUM METRITIS*

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ABSTRACT

This study was carried out under field condition on 40 Surti buffaloes with postpartum metritis divided into five groups of eight animals each. The study included use of four treatment lines and one control group, viz., Group I- Metronidazole (500 mg) I/U for 5 days; Group II- Ciprofloxacin (1500 mg) and Tinidazole (1800 mg) I/U for 5 days; Group III- Ciprofloxacin (1500 mg) and Tinidazole (1800 mg) I/U for 5 days plus $PGF_{2\alpha}$ 25 mg i/m once on first day; Group IV- Ceftiofur (long acting) @ 6.6 mg/kg body weight subcutaneously once and Group V (control)- Normal saline I/U for 5 days. The effects of these therapeutic regimes were evaluated by comparing the clinical and haematological alterations before and 6 days after treatment. The mean values of Hb, PCV and TEC after four treatments were significantly ($P<0.05$) higher than the corresponding pre-treatment values, however no significant differences were observed in pre- and post-treatment values of control group. Similarly, mean TLCs on day 6 post-treatment were significantly ($P<0.01$) lower than the pre-treatment TLC values in all four treatment groups. The mean neutrophil count was found to be significantly ($P<0.01$) decreased and the lymphocyte count increased in groups II, III and IV on day 6 post-treatment, whereas in group I, both the values were found to vary significantly ($P<0.05$). No significant differences were observed in pre- and post-treatment values of monocytes and eosinophils in the treatment groups, and control group. The changes in haematological profile were related to the degree of improvement of the clinical conditions of the animals.

Key words: Buffalo, Postpartum metritis, Therapy, Haematological alterations.

INTRODUCTION

One of the most important and common reproductive disorders in the dairy animals is postpartum metritis, which is quite prevalent throughout the world in dairy bovines (Kodagali *et al.*, 1980). The incidence of postpartum metritis has been reported to vary from 3 to 36 per cent (Chenault *et al.*, 2004). Retained fetal membrane is the most significant predisposing factor for metritis in cattle. Other risk factors for developing postpartum metritis includes dystocia, stillbirth, twinning, uterine prolapse, milk fever, season, age, unhygienic calving and ketosis (Smith and Risco, 2002[a,b]). Postpartum metritis is clinically characterized by intermittent purulent or mucopurulent vulval discharge, reduced appetite, decrease in milk yield, and incomplete/delayed uterine involution. The condition is usually treated with antibiotics or hormones alone or in combination. The clinical and haemato-biochemical indices in such cases reflect the therapeutic response. The present study was, therefore, undertaken to evaluate the haematological profile before treatment and its alterations following 5 days of therapy using different drug protocols in buffaloes affected with postpartum metritis.

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MATERIALS AND METHODS

This investigation was carried out from October 2009 to April 2010 on 40 postpartum metritic buffaloes selected at random from the villages of College Ambulatory Clinic centers and nearby villages of Anand taluka of Gujarat. The animals were screened thoroughly for their genital health and reproductive status through history and gynaecological examination per rectum. The cases were selected only with supportive evidence of genital discharge on per rectal examination of the reproductive tract. Clinical symptoms such as presence of abnormal uterine discharge, decrease in milk yield and feed intake were taken into consideration. The buffaloes so selected were of first 30 days postpartum period. Buffaloes were divided into following five subgroups, of eight animals each and studied for their haematological indices before and after various therapeutic approaches.

Groups	No. of buffaloes	Therapeutic approach
I	8	Metronidazole liquid (500 mg) I/U (Denis Lab.) for five days
II	8	Ciprofloxacin (1500 mg) and Tinidazole (1800 mg) suspension (Cflox-TZ, I/U, Intas Pharma) I/U for five days
III	8	Cflox-TZ, I/U for five days along with single i/m injection of $PGF_2\square$, 25 mg (Lutalyse, Pfizer) on first day
IV	8	Ceftiofur (Excede®, Pfizer) single S/C injection @ 6.6 mg/kg body weight
V	8	Control - Normal saline (0.9% w/v) I/U for five days

Blood samples were collected from all the animals by jugular vein puncture in EDTA vials on day 1 (before treatment) and on day 6 of treatment. The values of Hb, PCV, TEC, TLC and DLC were estimated using standard procedures (Scham *et al.*, 1975). The data on haematological profiles of animals before and after metritis treatment were compared by using paired *ft≈* test (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

There was significant (P<0.05) increase in mean haemoglobin concentration after all four treatments, particularly in group IV (Ceftiofur), while it remained almost static in control group. Pateria *et al.* (1990, 1992) also observed significant decrease in haemoglobin level of buffaloes affected with metritis and endometritis, which returned to normal after treatment. The decrease in haemoglobin level may probably be due to disintegration of erythrocytes and/ or effect of some haemolytic type of microbes and their endotoxins on the blood cells and haemopoietic system. Wahid *et al.* (1988), however, reported a high haemoglobin level in cows associated with endometritis and pyometra. Phogat *et al.* (1992) suggested that haemorrhage, haemodilution and reduced dietary intake of iron due to inappetance at parturition and iron depletion in colostrum resulted in fall of haemoglobin level at parturition.

The mean packed cell volumes obtained on day 6 post-treatment in all four treatment groups were significantly (P<0.05) higher than the pre-treatment values. However, no significant improvement was observed in control group-V. Response was better with Ceftiofur in group-IV. Pateria *et al.* (1990, 1992) also reported a significantly lower packed cell volume in metritic buffaloes before treatment, which increased significantly (P<0.05) after treatment. On the contrary, Ahmad *et al.* (2003) reported a high packed cell volume in crossbred cows with endometritis. As the PCV is associated with total erythrocyte count, the decreased level of PCV observed in this study might be due to haemodilution and disintegration of erythrocytes as reported by Pateria *et al.* (1992).

The mean total erythrocyte counts post-treatment were significantly (P<0.05) higher than the pre-treatment values in all the four treatment groups. However, no significant difference was

observed in pre and post-treatment values of control group. Among the four treatment groups, the animals of group III (Ciprofloxacin and Tinidazole Plus Prostaglandin) showed good response. Wahid *et al.* (1988) observed erythrocytopenia in cows with endometritis and pyometra. Pateria *et al.* (1990) recorded a significantly (P<0.05) lower erythrocyte count in buffaloes with metritis. Further, they observed a significant (P<0.05) increase in TEC after treatment, which was in occurrence with the present findings. Ahmad *et al.* (2003), however, reported a high TEC in crossbred cows with endometritis. In this study, the reduction in total erythrocyte count observed was attributed to the disintegration of erythrocytes caused by haemolytic-type of microbes as suggested by Pateria *et al.* (1992).

The mean total leucocyte counts on day 6 post-treatment were significantly (P<0.01) lower than the pre-treatment values in all four treatment groups, but in control group no such clear trend was observed. Among the four treatment groups, the animals of group IV (Ceftiofur) showed good response, where the mean pre-treatment TLC value of 10.24Ø0.54 thousand/cmm was reduced to 7.79Ø0.37 thousands/cmm after treatment. Similar findings were reported by Wahid *et al.* (1988), Pateria *et al.* (1990, 1992), Ahmad *et al.* (2003) and Illhwa *et al.* (2005) in metritic animals. Pateria *et al.* (1992) observed a significant (P<0.05) decrease in leucocyte count of metritic buffaloes after treatment which was in concurrence with the present finding. They reported that the elevated level of leucocyte count in metritis might be due to stress coupled with inflammatory changes in tissues.

Leukocytosis occurs as a result of infection in the body. The degree of leukocytosis depends upon several factors including nature of the causative agent, severity of infection, resistance of animal and localization of inflammatory response (Benjamin, 1978). The increase in leucocyte count in this study might also be due to inflammatory changes caused due to the bacterial infection. The significant decrease observed during post-treatment period may be due to the effectiveness of drugs with progression of days postpartum as indicated by Pateria *et al.* (1992).

There was a highly significant (P<0.01) decrease in the mean neutrophil count and increase in lymphocyte count on day 6 post-treatment over the pre-treatment values in groups II, III and IV, while in group I, they varied just significantly (P<0.05) and no significant difference was recorded in the control group. Among the four treatments, Ceftiofur (group IV) gave good response in reducing neutrophil counts from pre-treatment value of 52.50Ø1.24 % and the post-treatment value was 39.38Ø1.12 %, whereas a combination of Ciprofloxacin and Tinidazole Plus Prostaglandin (group III) showed good response in increasing the lymphocyte counts from 43.00Ø2.91 % before treatment to 54.88Ø1.20 % after treatment.

The present findings are comparable with the results of Wahid *et al.* (1988), Javaid *et al.* (2004) and Illhwa *et al.* (2005). They all reported significant (P<0.05) increase in neutrophil and decrease in lymphocyte count in metritic animals. Pateria *et al.* (1990) observed a significant (P<0.05) decrease in neutrophil count and increase in lymphocyte count in metritic buffaloes after treatment, which was in accordance with the present findings. Illhwa *et al.* (2005), however, reported higher lymphocyte count in cows that developed endometritis. While Ahmad *et al.* (2003) did not find significant variation in lymphocyte count of endometritic and cyclic cows.

In the present study lymphopenia observed in metritis affected buffaloes might be due to stress coupled with inflammatory changes in body tissues as suggested by Pateria *et al.* (1990). Leukocytosis induced as a result of infection promotes the release of neutrophils from the bone marrow through leukocytosis-inducing-factor (LIF) of the plasma. The concentration of LIF is increased in bacterial diseases by bacterial products; hence leukocytosis (neutrophilia) occurs in such diseases (Sastry, 1989).

The mean monocyte and eosinophil counts (%) for different treatment groups of metritic buffaloes under study did not reveal any significant difference in pre- and post-treatment values in any of the five

groups. Ahmad *et al.* (2003) also observed non-significant difference in monocyte and eosinophil counts in endometritic cows compared with cyclic or non-cyclic cows. On the contrary, Illhwa *et al.* (2005) reported significantly ($P<0.01$) higher monocyte count in cows that developed endometritis than the control cows.

In general, the changes in haematological indices from pre-treatment to post-treatment status in metritic buffaloes were related to the degree of improvement of the clinical conditions of the animals.

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