STUDIES ON EFFICACY OF MELOXICAM, VITAMIN E AND SELENIUM IN CONJUNCTION WITH ANTIBIOTICS IN THE TREATMENT OF BOVINE MASTITIS

G.K. Chetan Kumar* and M. Narayana Bhat
Department of Veterinary Medicine, Veterinary College, Hebbal, Bangalore-560 024, India

Received: 29-07-2012 Accepted: 02-04-2014

ABSTRACT

A total of 24 Holstein Friesian crossbreed dairy cows with clinical signs of mastitis were subjected to therapeutic trials. Based on the time taken for complete recovery from clinical signs of mastitis, reduction in mean SCC and EC, treatment of mastitis cases with vitamin E and selenium along with antibiotic is very much useful in faster recovery of such cases. Further treatment with meloxicam along with antibiotic was also equally beneficial in the treatment of clinical mastitis. This study indicated that antioxidants like vitamin E and selenium and NSAIDs when used as adjunct therapy along with antibiotics helped in faster recovery of clinical cases of mastitis.

Key words: Electrical conductivity, Non steroid anti-inflammatory drugs, Selenium, Somatic cell count, Tri-sodium citrate, Vitamin E.

The antimicrobials are integral part in the treatment of bovine mastitis and success in the treatment of bovine mastitis by antimicrobials depends collectively on judicious use of these antibiotics, immune status of animals and appropriate hygienic measures.

Apart from selection of suitable antibiotic for treatment, supportive treatment is necessary for the rapid recovery from mastitis. Tripathi (2004) opined that anti-inflammatory drugs like meloxicam were much effective to subside inflammatory swelling. Nauriyal (1996) opined that Vitamin E and selenium have been extensively used in bovine mastitis therapy. The present study is to evaluate the efficacy of anti-inflammatory drug, antioxidant and non antibiotic chemicals in the treatment of mastitis.

A total of 24 Holstein Friesian crossbreed dairy cows with clinical signs of mastitis presented to Veterinary College Hospital, College Dairy Farm and Teaching Veterinary Clinical Service Complex, Yelahanka were confirmed taking into consideration of the SCC and milk examination, used for therapeutic trials. Clinical cases of mastitis were randomly allocated into four groups namely Group I, Group II Group III and Group IV with each group comprising of six animals. The following regimen of treatment was administered to different groups.

Group I – Animals received ceftriaxone tazobactam combination @ 5mg /kg body weight intramuscular s.i.d for 5 days.

Group II – Animals received ceftriaxone tazobactam combination @ 5mg /kg body weight intramuscular s.i.d for 5 days and Meloxicam @ 0.5 mg/kg intramuscularly s.i.d for 5 days.

Group III – Animals received ceftriaxone tazobactam combination @ 5mg /kg body weight intramuscular s.i.d for 5 days and Vitamin E and Selenium combination @ DL- á Tocopheryl acetate I.P -50mg/25 kg and Sodium selenite U.S.P – 1.5 mg/25kg B.Wt intramuscularly, single dose on day 1.

Group IV – Animals received ceftriaxone tazobactam combination @ 5mg /kg body weight intramuscular s.i.d for 5 days and tri-sodium citrate @ 30mg/kg body weight orally s.i.d for 7-9days.

The treatment was carried out till recovery from clinical signs; electrical conductivity and somatic cell count were recorded on day 0, 3 and on 5th day of treatment. Criterion used to assess the cure rate was based on recovery from clinical signs, decline in electrical conductivity and somatic cell count.

*Corresponding author’s e-mail: drchetanvet@gmail.com
Recovery from clinical signs: In the Group I and IV all the animals recovered from systemic clinical signs by 5 days of treatment but local signs such as udder swelling, pain, hotness and changes in milk colour consistency and odour persisted. These local signs disappeared only after 7 ± 0.26 and 6.34 ± 0.42 day of treatment respectively (Table 1). In the Group II and III all the local and systemic signs disappeared on 5th day of treatment.

Complete recovery from clinical mastitis was observed by about 7 ± 0.26 days in the present study using ceftriaxone and tazobactam combination (Group I). This is in agreement with the observation of Hase et al. (2008) and Stanikzai (2008) who also observed complete recovery. Ceftriaxone and tazobactam combination with meloxicam (Group II) was found to be effective in the treatment of mastitis and the complete recovery was observed in 4.33 ± 0.21 days as compared to antibiotic alone, which took 7 ± 0.26 days for complete recovery. There are no reports on the use of meloxicam with the antibiotic in the treatment of bovine mastitis. However, Tripathi (2004) opined that anti-inflammatory drugs like meloxicam was found much effective to subside inflammatory swelling.

In the present study, vitamin E and selenium with ceftriaxone and tazobactam combination (Group III) was found to be most effective in the treatment of mastitis with the recovery by about 4 ± 0.26 days. This is in agreement with the findings of Batra et al. (1992) and Saluja et al. (2005). Who found that vitamin E and selenium was very useful as a supportive treatment in mastitis.

Trisodium citrate with ceftriaxone and tazobactam combination (Group IV) resulted in 100 per cent recovery. This is in agreement with the Reddy et al. (1999), Dhillon et al. (2000) and Sreeramachandramurthy (2001) who found that combination of antibiotic and trisodium citrate was superior compared to antibiotic alone or trisodium citrate alone. In the present study in this group, complete recovery from local and systemic clinical signs were observed by about 6.34 ± 0.42 days, which is significantly (P ≤ 0.05) more compared to Group II and III but when compare to Group I, Group IV is marginally better but there is no significant difference between Group I and Group IV.

Somatic cell count: Reduction in mean SCC in different groups of treatment is shown in the Table 1. The reduction in mean SCC from 0 to 5th day of treatment was significant (P ≤ 0.05) in all the groups. Further, the reduction in mean SCC was higher in Group III closely followed by Group II. This was followed by Group IV and Group I in the order of reduction in mean SCC. Perusal of available literature failed to provide any information regarding the use of meloxicam, vitamin E and selenium along with antibiotic in reducing SCC in clinical cases of mastitis. But deficiencies of either vitamin E or Se have been associated increased clinical mastitis cases and higher somatic cell counts (SCC) in individual cows and bulk tank milk (Smith et al., 1997).

But in none of the groups mean SCC came to normal after 5th day treatment, because antibiotic treated udder takes five weeks for the cell counts to return to normal after the elimination of mastitis organism.

Electrical conductivity: Reduction in mean EC in different groups of treatment is shown in the Table 1. The EC of the milk is returned to normal in all the cases of mastitis following 5-7 days of treatment. The reduction in mean EC from 0 to 5th day of treatment was significant (P ≤ 0.05) in all the groups. Further, the reduction in mean EC was higher in Group III closely followed by Group II. This was followed by Group IV and Group I in the order of reduction.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean ± SE number of days taken for recovery</th>
<th>Mean SCC 50 Day (Pre treatment) (lakhs/ml)</th>
<th>Reduction (%)</th>
<th>Mean SCC 5 Day (Post treatment) (lakhs/ml)</th>
<th>Mean EC 50 Day (Pre treatment) mS/cm</th>
<th>Reduction (%)</th>
<th>Mean EC 5 Day (Post treatment) mS/cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>7±0.26</td>
<td>90.54±1.54</td>
<td>55.51</td>
<td>10.07±0.24</td>
<td>6.73±0.07</td>
<td>33.11</td>
<td></td>
</tr>
<tr>
<td>Group II</td>
<td>4.33±0.21</td>
<td>93.96±2.24</td>
<td>72.40</td>
<td>10.38±0.40</td>
<td>5.68±0.16</td>
<td>43.37</td>
<td></td>
</tr>
<tr>
<td>Group III</td>
<td>4±0.26</td>
<td>94.15±2.31</td>
<td>74.57</td>
<td>10.18±0.27</td>
<td>5.76±0.18</td>
<td>45.26</td>
<td></td>
</tr>
<tr>
<td>Group IV</td>
<td>6.34±0.42</td>
<td>92.29±2.63</td>
<td>58.23</td>
<td>10.13±0.28</td>
<td>6.68±0.20</td>
<td>34.04</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 1: Recovery pattern, somatic cell count and electrical conductivity changes in different treatment groups.
reduction in mean EC. No literature is available comparing the reduction in EC after treatment of mastitis with vitamin E and selenium and meloxicam along with antibiotic in clinical cases of mastitis. But Atroshi. et al, (1987) observed negative correlation between milk vitamin E and electrical conductivity.

In general, the NSAIDS helps in reducing inflammatory reactions in the udder, reducing the migration of neutrophils to the udder, thereby reducing pain, swelling and udder tissue damage and antioxidants vitamin E and Se enhances the phagocytic activity of PMNs, thereby reduces the number of PMNs required for the defense mechanism, reduces the tissue damage, reduces inflammation, and reduces SCC and EC. And the main function of vitamin E in udder defense is linked to maximize PMN cells activity as it protects PUFA of in the PMN membranes from destruction by free radicals that are produced during phagocytosis. Selenium is an important component of GSH-px. GSH-px is a second line of defense that destroys peroxides before they have opportunity to cause damage to neutrophil membranes. Further, selenium and vitamin E enhance chemo tactic migration of bovine PMN’S towards the infective agents. Thus, antioxidants vitamin E and se enhances the phagocytic activity of PMNs, thereby reduces the number of PMNs required for the defense mechanism, reduces the tissue damage, reduces inflammation, and reduces SCC and EC.

REFERENCES