SUBCLINICAL MASTITIS AT AN ORGANISED FARM: PREVALENCE, ETIOLOGY AND ANTIBIOGRAM

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ABSTRACT

A total of 262 quarters of 66 apparently healthy dairy buffaloes at an organised farm were screened for subclinical mastitis. Following IDF criteria the quarter-wise prevalence of subclinical, latent and non-specific mastitis was 4.58% (SCC> 500,000/ml and culturally positive), 13.74% (SCC <500,000/ml and culturally positive) and 2.62% (culturally negative and SCC> 500,000/ml), respectively. Out of 48 culturally positive quarters, 50 isolates were recovered and two quarters had mixed infection. Staphylococcus spp. (n=32) was observed to be the predominant pathogen followed by Streptococcus spp. (n=18). All the isolates were subjected to antimicrobial sensitivity test by disc diffusion method. Staphylococci showed 100% susceptibility to ampicillin, cloxacillin, amoxycillin, ceftriaxone and cefoperazone followed by 95% susceptibility to penicillin, chloramphenicol, tylosin and enrofloxacin. Streptococci revealed 100% sensitivity towards chloramphenicol, ampicillin, enrofloxacin, amoxycillin, ceftriaxone and cefoperazone.

Key words: Subclinical mastitis, prevalence, staphylococci, streptococci, antimicrobial sensitivity

MATERIALS AND METHODS

Source of Milk Samples: A total of 262 quarter buffalo milk samples were collected aseptically from 66 apparently healthy buffaloes of Murrah breed located at an organized farm, Hisar, Haryana.

Bacteriological Examination of Milk: The prevalence of SCM was determined following International Dairy Federation Criteria based on bacteriological examination of milk and somatic cell count (SCC). For bacteriological examination, milk samples were inoculated on blood agar and MacConkey’s lactose agar plates and incubated at 37°C for 18-24 hours. Bacterial identification was carried out by studying morphology, culture characteristics and Gram’s staining (Quinn et al., 2004).

Somatic Cell Count: The SCC on milk samples was performed as described by Schalm et al. (1971) and the milk smears were stained with Newman-Lampert stain.

Antimicrobial Sensitivity Testing: A standard disc diffusion method (Bauer et al.,1966) was employed for carrying out antimicrobial sensitivity test using 14 antimicrobials viz., ampicillin (25 mcg), ceftriaxone (30 mcg), amoxycillin (10 mcg), streptomyecin (25 mcg), cloxacillin (30 mcg), chloramphenicol (30 mcg), neomycin (30 mcg), tylosin (15 mcg), enrofloxacin (10 mcg), cefoperazone (75 mcg), amikacin (30 mcg), penicillin (10 mcg).
units), gentamicin (30 mcg), and oxytetracycline (30 mcg) (Hi media). Zones of inhibition were measured and the results were interpreted as sensitive (S), intermediate (I) and resistant (R) using the chart provided by manufacturer.

RESULTS AND DISCUSSION

The prevalence of SCM was found to be higher on the basis of cultural examination (28.78%) as compared to SCC (>5x10^6/ml; 13.63%) alone (Table 1). Quarter-wise prevalence by SCC and bacteriological examination was 7.25% and 18.30%, respectively. Pankaj et al. (2013) also reported higher prevalence by bacteriological examination which might be due to the presence of resident microorganisms contaminating the milk. By IDF criteria, 4.58% (SCC above 500,000/ml of milk and culturally positive), 13.74% (SCC below 500,000/ml of milk but culturally positive) and 2.62% (culturally negative and SCC above 500,000/ml) of the quarters were found to suffer from subclinical, latent and non-specific mastitis, respectively (Table 1). In contrast to our study, Sindhu et al. (2009) reported very low prevalence of SCM at the same farm. However, Sharma and Sindhu (2007), Chavan et al. (2007), Kurjogi and Kaliwal (2011) observed higher prevalence of SCM. Since bacteriological examination requires aseptic collection and SCC is influenced by several physiological factors (climatic condition, parity, stage of lactation), it is therefore, suggested that prevalence should be determined by both the tests following IDF criteria.

Of the 48 culturally positive quarters, a total of 50 isolates were recovered and two quarters showed mixed infection. Staphylococcus spp. was found to be predominant pathogen (64%) followed by streptococci (36%). Several reports (Chavan et al., 2007; Sharma and Sindhu, 2007; Roychoudhury and Dutta, 2009; Pankaj et al., 2013) from India have indicated staphylococci and streptococci to be the main etiological agents of mastitis.

The antibiotic susceptibility test revealed that Staphylococcus spp. were 100% susceptible to ampicillin, cloxacillin, amoxycillin, ceftriaxone and cefoperazone followed by 95% susceptibility to penicillin, chloramphenicol, tylosin and enrofloxacin (Fig. 1). Staphylococcus spp. isolates were found least susceptible (85%) to amikacin, neomycin and oxytetracycline. The results of this study with respect to cloxacillin, cefoperazone and amoxycillin are in close agreement with that of Malinowski et al. (2008). However, Ranjan et al. (2010) reported higher resistance of mastitis pathogens to cloxacillin, ampicillin and amoxycillin. While results with regard to enrofloxacin and amikacin were similar to sensitivity pattern observed in this study.

Chloramphenicol, ampicillin, enrofloxacin, amoxycillin, ceftriaxone and cefoperazone showed 100% sensitivity to streptococci spp. (Fig. 1). Higher sensitivity (90.90%) was also observed for amikacin, cloxacillin and tylosin and least sensitivity to neomycin (63.63%). Results of the sensitivity pattern to enrofloxacin, cefoperazone and amikacin are in close agreement to those reported by Ranjan et al. (2010), whereas these were different in case of ampicillin, amoxicillin and ceftriaxone. Studies conducted by several workers (Sharma et al., 2007; Chavan et al., 2007; Roychoudhury and Dutta, 2009; Sharma et al., 2010) have showed increased resistance of mastitis causing pathogens to different traditional and newly introduced antibiotics. Indiscriminate use of antibiotics, irregular doses of antibiotics or under dosing of antibiotics may lead to resistant mutants. Antibiotic resistance patterns vary among different farms, regions, states and countries depending upon the type of organisms and use of antibiotics in a particular area; therefore, antimicrobial sensitivity is suggested before institution of treatment. In contrast to these studies, the antibiogram obtained in the current study indicated higher sensitivity to newer and older antibiotics, showing rational use of these antibiotics at farms under study.

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| Table 1
Prevalence of sub-clinical mastitis based on IDF criteria in buffaloes at an organized farm, Hisar

<table>
<thead>
<tr>
<th>No of buffaloes/ quarters</th>
<th>Animals culturally positive</th>
<th>Animals showing SCC&gt;5 lac/ml</th>
<th>Quarters culturally positive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>66/262</td>
<td>19 (28.78%)</td>
<td>9 (13.63%)</td>
<td>48 (18.32%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SCC&gt;5 lac/ml and culturally positive</th>
<th>SCC&gt;5 lac/ml and culturally positive</th>
<th>SCC&lt;5 lac/ml and culturally positive</th>
<th>SCC&lt;5 lac/ml and culturally negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 (7.25%)</td>
<td>12 (4.58%)</td>
<td>36 (13.74%)</td>
<td>7 (2.67%)</td>
</tr>
</tbody>
</table>
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REFERENCES


Fig 1. Sensitivity (%) of Staphylococcus and Streptococcus spp. to various antimicrobials.