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STUDIES ON PREVALENCE, ETIOLOGY AND DIAGNOSIS OF SUBCLINICAL MASTITIS AMONG CROSSBRED COWS

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ABSTRACT

Incidence of subclincial mastitis (SCM) among crossbred cattle from organized dairy farms was studied. The quarter-wise and animal-wise incidence of SCM was 15.62 and 43.33 per cent, respectively. Maximum number of animals (74.36 %) were having one quarter infection. Right-hind quarters were having higher incidence (38.18%) compared with other quarters. The incidence of SCM was lowest during first lactation which increased with subsequent lactations and was highest in sixth and above lactations. Bacteriological isolations revealed that *Staphylococcus aureus* was the major pathogen (56.89%) followed by *Micrococcus spp.*(15.51 %) *Bacillus spp.* (12.06 %) , *Staphylococcus epidermidis* (8.62 %), *Klebsiella spp* (3.44 %), E. coli (1.72 %) and *Corynebacterium spp.* (1.72 %). Among the indirect tests, SLS was found to be highly (19.03 %) effective in detection of subclinical mastitis followed by WST, BTB Card test and CMT (15.90, 15.62 and 14.77 %, respectively). The percentage of agreement of CMT, SLS, BTB Card test and WST with bacteriological examination were found to be 57.89, 62.07, 64.46 and 68.65 per cent, respectively.

INTRODUCTION

Mastitis continues to be a major problem concerning dairy industry. This disease manifests in two forms i.e., Clinical and Subclinical. Most of the dairy farmers in India are hardly aware of subclinical mastitis and as such attach no importance to it. Early detection of subclinical mastitis by using a suitable field diagnostic aid is very essential for its successful treatment and control. As such, different methods have been described for its detection. Culturing of milk samples for identifying the microbial pathogen is time consuming and costly. Moreover, the bacteria are not necessarily shed at each milking even when an infection is present. Financial loss to the tune of Rs. 6053.21 crores per year in India due to mastitis among cattle and buffaloes has been reported (Dua, 2001). The present work was undertaken to ascertain the incidence of subclinical mastitis among crossbred cows in relation to stage of lactation and number of lactation and also to find out the agreement between indirect field test for diagnosis of subclinical mastitis and bacterial isolation from affected quarters.

MATERIAL AND METHODS

A total of 352 milk samples were collected aseptically from apparently healthy quarters of lactating crossbred cattle of two different organized farms. The relevant data including animal number, lactation number and date of calving were recorded. Milk samples were subjected to California mastitis test (CMT) (Sharma and Rajani, 1969), Sodium lauryl sulphate test (SLST) (Pandit and Mehta, 1969), Bromothymol blue card test (BTB Card test) (Randhawa *et al.*,1983) and White side test (WST) (Chanda *et al.*,1989) for the diagnosis of subclinical mastitis. The milk samples found positive by one or many indirect tests were transferred to the laboratory and were subjected to bacterial isolation and characterization as per the standard bacteriological methods (Cruickshank *et al.*,1982).

RESULTS AND DISCUSSION

The overall quarter-wise incidence of subclinical mastitis among crossbred cows was 15.62 per cent and animal-wise incidence was 43.33 per cent (Table 1). In agreement to present study Verma *et al.* (1978) reported 43.30 per cent animal-wise and 20.00 per

Table 1. Incidence of subclinical mastitis in relation to its distribution among quarters

Total animal		Total quarters		No. of quarters involved			
Examined	Positive	Examined	Positive	One	Two	Three	Four
90	39 (43.33)	352	55 (15.62)	29 (74.36)	4 (10.26)	5 (12.82)	1 (2.57)

Figures in parenthesis indicate percentage.

cent quarter-wise incidence.. Various other Indian workers have reported varying levels of incidence of SCM among crossbred cattle. Saini *et al.* (1994) observed lower animal-wise (17.33 %) and quarter-wise (4.87 %) whereas, higher incidence of 78.10 per cent animal-wise and 42.20 % quarter-wise was reported by Tuteja *et al.* (1993). The difference observed in various studies might be due to difference in the managemental practices, hygienic conditions, care of the teat injuries, prompt treatment of clinical cases, culling of carriers, selective breeding and adaptation of mastitis control programme.

Higher incidence of subclinical mastitis (71.42%) was observed among crossbred cows in sixth and above lactations and lowest (38.70 per cent) was recorded in first lactation. In 2nd, 3rd, 4th and 5th lactations the percentage occurrence of subclinical mastitis was 40.62, 42.85, 66.67, and 66.67. Saini *et al.* (1994) also observed increase in the incidence of subclinical mastitis with the increase in lactation number. This may be ascribed to gradual loss in immune system in the body of the animal with the increase in lactation number, which makes it susceptible to infection and it may also be ascribed due to inefficient sphincters.

It was observed in the present study that maximum number of animals were having one quarter infection (74.36 per cent) which is in agreement with the finding of Saini *et al.*(1994). However, Kumar (1988) reported higher per cent of two quarter involvement. The incidence of SCM was higher in right-hind quarters (38.18 per cent) compared with 21.81, 20.00 and 20.00 per cent in RF, LF and LH quarters, respectively. Saini *et al.* (1994) also observed higher prevalence in hind-quarters. The higher incidence of SCM in right-side quarters could be ascribed to the fact that cows mostly sit on right-side with the result right-side quarters are frequently exposed to dung and soil and moreover due to pressure of the body of animal the milk dribbles out through the teats of high yielders and thus increasing their susceptibility to infections.

Out of 58 bacterial isolates majority belonged to *Staphylococcus aureus* (56.89 %) followed by *Micrococcus spp.* (15.51 %), *Bacillus spp.* (12.06 %), *Staphylococcus epidermidis* (8.62%), *Klebsiella spp* (3.44%), *E. coli* (1.72 %) and *Corynebacterium spp.* (1.72 %). The pattern of bacterial isolation resembles with earlier observations of Kalorey *et al.*(1983) and Saini *et al.*(1994). Streptococci could not be isolated in the present study which could be due to the reason that these organisms cannot survive longer in the environment and are more sensitive to the most of the commonly used antibiotics (Schalm *et al.*, 1971). The increased incidence of staphylococci may be attributed to ubiquitous nature of organisms secondly, due to drug resistance. Higher incidence of *Micrococcus spp.* and *Bacillus spp.* among subclinically infected quarters has been earlier reported by Tuteja *et al.* (1993).

Among the indirect tests, SLS was found to be highly (19.03 %) sensitive in detection of subclinical mastitis followed by WST, BTB Card test and CMT (15.90, 15.62 and 14.77 %, respectively) (Table 2). Various other workers have reported varying levels of efficiency of different tests used for diagnosis

Table 2. Efficacy of various indirect tests used for the diagnosis of subclinical mastitis

S.No.	Name of test	No. of positive samples (N=352)	Percentage
1	California mastitis test (CMT)	52	14.77
2	Sodium lauryl sulphate (SLS)	67	19.03
3	Bromothymol blue card (BTB)	55	15.62
4	White side test (WST)	56	15.90

Table 3. Correlation of various various indirect tests used for the diagnosis of subclinical mastitis with bacteriological examination of milk samples

S. No.	Name of test	Positive samples (N=352)		Negative samples (N=352)		Percentage agreement
		True	False	True	False	
1	California mastitis test (CMT)	40 (76.92)	12 (23.08)	285 (95.00)	15 (5.00)	57.89
2	Sodium lauryl sulphate (SLS)	51 (76.11)	16 (23.89)	281 (98.60)	4 (1.40)	62.07
3	Bromothymol blue card (BTB card)	44 (80.00)	11 (20.00)	286 (96.30)	11 (3.70)	64.46
4	White side test (WST)	46 (82.14)	10 (17.86)	287 (96.96)	9 (3.04)	68.65

Figures in parenthesis indicate percentage.

of SCM. The percentage of agreement of CMT, SLS, BTB Card test and WST with bacteriological examination were found to be 57.89, 62.07, 64.46 and 68.65 per cent, respectively (Table 3). With CMT similar findings were reported by Domi *et al.* (1990) whereas, Sharma (1993) reported higher percentage of bacteriological agreement which differed from the present finding. Singh (2000) reported higher percentage of agreement with SLS compared to present study. Observations with BTB card test in the present study are in close proximity with Buragohain and Dutta (1991).

As observed in the present study, the results of indirect tests are not comparable with bacteriological examination as there are either false positive or false negative results. The false positive results can be explained on the basis that generally release of bacteria in milk from the udder is not a constant feature during milking or at different milking and some pathogens might be missing from milk samples taken for study (Wesen *et al.*, 1968). False negative samples may be explained on the basis that infection is probably in its early stages and sufficient change has not taken place in the glands or the organisms isolated may not be pathogenic for the particular quarter/gland (Wesen *et al.*,1968).

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