ETIO-PREVALENCE OF SUB CLINICAL MASTITIS IN HOLSTEIN X HARYANA CROSSBRED CATTLE

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ABSTRACT : The purpose of the investigation was to evaluate the efficacy of Somatic cell count (SCC), California mastitis test (CMT) and Chloride test in detecting SCM and study its etioprevalence in Holstein X Haryana cattle. SCC prevalence for SCM, latent infected quarters and non-specific infected quarters were found to be 28.63%, 8.63% and 6.67%, respectively, when divided on the basis of International Dairy Federation criteria. Staphylococcus sp. (47.37%) and Streptococcus sp. (33.68%) was most prevalent bacterial agent. The present study revealed that CMT in conjunction with SCC is better to diagnose SCM than alone.

Key words : Sub clinical mastitis, etio-prevalence, Somatic cell count, California mastitis test and Chloride test.

INTRODUCTION

Mastitis is a multifaceted disease with varied etiology, damaging the dairy economy, worldwide. Hence, the importance of timely diagnosis of this disease is represented well in saying, "A day lost is quarter lost"! Focus was to investigate the etio-prevalence of sub clinical mastitis (SCM) in Holstein x Haryana crossbred cattle. The relationship between somatic cell count (SCC) and cultural examination and efficiency of California mastitis test (CMT) and Chloride test in detecting SCM under field condition were also assessed.

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MATERIALS AND METHODS

Milk samples were collected aseptically from 176 apparently healthy Holstein x Haryana crossbred (F1) cattle with no history of mastitis from organized dairy farms. Initial screening of crossbred cattle was performed by CMT and Chloride test. CMT was performed by the method of Pandit and Mehta (1969) and Chloride test by the procedure described in the laboratory manual of milk industry foundation (2005). The animals showing either CMT or Chloride test positive for a single udder was examined culturally in 5% ovine blood agar media for all the udders. The percent sensitivity, specificity were calculated by the formulae of Thrusfield (2005) and percent accuracy by the formula of Reddy et al. (2001). The identification of bacteria was done on the basis of colony characteristics, morphology and Gram's reaction (Tuteja et al., 2001). The SCC was done microscopically (Schalm et al. 1971).

RESULTS AND DISCUSSION

From 702 milk samples from 176 cows, 255

quarters of 64 cows were put to cultural examination. The prevalence of SCM on the basis of cultural examination was found to be 57.81%, which was lower than (67.94%) as reported by Shukla et al. (2005). The dissimilarity might be due to the differences in the managemental practices, breeds of the animal, genetic divergence, immune response and climatic conditions (Ramprabhu and Rajeswar, 2007).

Amongst different mastotogenic agents isolated (Table 1), most prevalent etiological agent was Staphylococcus sp. (47.37%) followed by Streptococcus sp. (33.68%). Ten mixed infections were detected in the study, of which, 3 Staphlococcus sp. and Streptococcus sp., 1 Staphlococcus sp., Streptococcus sp., Escherichia .coli and Bacillus sp. 4 Streptococcus sp., E.coli and Bacillus sp.and 2 Staphlococcus sp. and Corynebacterium sp. Bacillus sp. was isolated. The high frequency of the Staphylococcus sp. and Streptococcus sp. causing SCM was probably due to their abundance in the atmosphere. (Chavan et al. 2007).

Table 1: Frequency of isolation of different bacteria from culturally positive quarters of Holstein x Haryana crossbred cows.

Genus	No. of cases	Percentage
Staphylococcus spp.	45	47.37
Streptococcus spp.	32	33.68
Escherichia coli	8	8.43
Mixed infection	10	10.52
Total	95	100

Taking into account International Dairy federation (IDF, 1991) criteria of SCC alone, 54.69% of the cows (35.29% of the quarters) were found SCM positive. Chahar et al. (2001) reported comparatively same figures. Apparao et al. (2009) reported a threshold limit of 2 to 2.5 lacs cell/ml as optimal for occidental field condition. But taking this threshold limit into account no. of false negative cases was high. Hence, for India the IDF threshold for SCC should be followed. The per cent accuracy calculated in the present study for SCC was 84.7 (Table 3), which is in consonance with the report of Bhatnagar and Malhotra (1969). Though, elevation of somatic cells reflected inflammation yet with SCC the infected milk samples detected were less as compared to cultural examination. From Table 2, we can infer that the possible reasons for this could be recent latent infections (8.63 %). Latent infections may be due to colonization of teat canals by mastitogenic agents (Nickerson 1986). The non-specific infections observed was 6.67%. Comparable figure was reported by Chahar et al. (2001.). Failure to detect pathogens in such cases might be due to intermittent excretion of the organism or their disappearance because of spontaneous recovery (Tolle, 1975). Seasonal effects, diurnal variations, physiological stress and environmental heat stress were reported to increase SCC without any inflammatory reaction (Wanger et al. 1976).

The percent accuracy of CMT observed was 86.3, which is in agreement with the observation of Bhatnagar and Malhotra (1969). The percent accuracy of Chloride test observed was 58.8, which is in agreement with the finding of Chander and Baxi (1975). CMT was found to be more sensitive, specific and accurate than Chloride test in the

present investigation (Table 3). This might be due to quick immune response to foreign agents by the immune cells than alternation in the chloride concentration in the milk (Chander and Baxi, 1975).

Thus, it can be concluded that SCC alone is diagnostically insufficient sometimes, due to latent and non-specific infections. Hence, to substitute cultural examination, which is field inadaptable as it is cumbersome, time consuming and costly to screen a farm, the result of CMT supported by SCC is better for pinpoint diagnosis of SCM in crossbred cows, than alone.

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Cows culturally positive	Quarters culturally positive	Cows showing SCC > 5 x 10^5 cells/ml	Quarters showing SCC > 5 x 10^5 cells/ml	Quarters showing SCC > 5 x 10^5 cells/ml and culturally positive (SCM)	Quarters showing SCC < 5 x 10^5 cells/ml and culturally positive (Latent)	Quarters showing SCC > 5 x 10^5 cells/ml and culturally negative (Non-specific)
37/64 (57.81)	95/255 (37.25)	35/64 (54.69)	90/255 (35.29)	73/255 (28.63)	22/255 (8.63)	17/255 (6.67)

Name of the test	Total samples examined	Test positive samples	Test reaction as compared to cultural examination				Percent sensitivity	Percent specificity	Percent accuracy
			True positive	False positive	True negative	False negative			
CMT	255	100	80	20	140	15	84.2	87.5	86.3
Chloride test	255	120	55	65	95	40	57.9	59.4	58.8
SCC	255	90	73	17	143	22	76.8	89.4	84.7
Bacterial cultural examination	255	95	95	-	160	-	100	100	100

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