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PREVALENCE OF SUBCLINICAL MASTITIS IN A DAIRY HERD IN BENI-SUEF GOVERNORATE

A.M.S. Meshref and M.H.A. Tolba

Food hygiene and control department

Fac. of Vet. Med., Beni-Suef University

ABSTRACT

A total of 115 dairy cows were screened by California mastitis test (CMT) to estimate the prevalence of subclinical mastitis in a dairy herd in Beni-Suef Governorate, as well as Somatic cell count (SCC) of 28 bulk tank milk samples were estimated using De-Laval cell counter. Mean bulk tank SCC (BTSCC) was $9.5 \times 10^5 \pm 7.5 \times 10^4$ *with the highest frequency of distribution (64.3%) lies within the range of* 5×10^5 *to* 1×10^6 *. The prevalence of subclinical mastitis was 15.2 % on an udder quarter basis and 39.1% on a cow basis. The organisms that were most frequently isolated were E.coli (35.4%), Str.bovis (21.5%), Str.agalactiae (10.8%), Coagulase negative Staphylococci (CNS) (7.7%), S.aureus (6.2%), Str.dysgalactiae (3.1%) and Str.faecalis (3.1%) for single infection while for double infection were Str.bovis with S.aureus (6.2%), Str.bovis with E.coli (3.1%), Str.agalactiae with S.aureus (1.5%) and Str.bovis with CNS (1.4%). In conclusion subclinical mastitis is a serious problem in dairy industry and its early detection is the corner stone in its control.*

INTRODUCTION

Mastitis is a major cause of economic loss in the dairy industry worldwide. It occurs in both clinical and subclinical forms. Subclinical form is believed to be more prevalent than clinical form in most countries ***(Schukken et al., 1995)***. The prevalence of subclinical mastitis on farms could range from 19 to 78% ***(Tuteja et al., 1993)***. Of great

economic significance is the fact that subclinical mastitis may cause between 15 and 45 % reduction in milk production in affected lactating cows ***(Dohoo and Meek, 1982)*.**

Somatic cell count (SCC) has been accepted as the best index to use to both evaluate milk quality and predict udder infection in cow ***(Pyorala, 2003)*.** Under field conditions determination of SCC in cow's milk is usually performed by California mastitis test (CMT).

Certain species of bacteria notably S. aureus, Str. agalactiae, Str. dysgalactiae, Str. uberis, E .coli and C.bovis are most commonly implicated in mastitis .Str. agalactiae and S. aureus are most commonly implicated in mastitis and are spread between udder quarters and cows primarily during milking, since the major source of the organisms within the herd is the infected udder.Other organism like E. coli, Str. uberis, Str. dysgalactiae and C.bovis are less dependent on the milking process for their dissemination within the herd, as they are mainly found on cow and in the environment and related to poor hygienic measure ***(Bramley and McKinnon, 1990)*.**

Therefore, the purpose of our study was : 1) To provide information in udder health. 2) To estimate the prevalence of subclinical mastitis in a dairy farm in Beni-Suef Governorate and 3) To investigate the aetiological agent of subclinical mastitis.

MATERIALS AND METHODS

1- Bulk tank milk examination:

28 bulk tank milk samples (each 2 days) were collected regularly from storage tank (after thorough mixing) of a dairy herd in Beni-Suef governorate for determination of bulk tank somatic cell count (BTSCC) using **De-Laval cell counter** according to the manufacture's instructions.

2- Individual cow examination:

A- ***California mastitis test (CMT)***:

A total of 460 quarters from 115 dairy cows in a dairy herd in Beni-Suef governorate were investigated for sub-clinical mastitis using CMT. The results were read and evaluated according to ***APHA, (1993)***. Scores represented 4 categories; 0, negative or trace; 1+, weak positive; 2+ distinct positive and 3+, strong positive.

B- ***Bacteriological examination***:

70 milk samples were collected aseptically from quarters diagnosed with CMT ≥ 1+. Loopfuls of the milk sediment (after centrifugation at 3000 rpm for 20 minutes) were streaked onto sheep blood agar, Mac Conkey's agar and Edwards agar media and incubated aerobically at 37 ˚C for 48 hours. Suspected colonies were isolated in a pure culture and identified according to ***Bailey and Scott (1994)*.**

RESULTS AND DISCUSSIONS

Table (1): Statistical analytical result of BTSCC (/ml milk).

Minimum	Maximum	Mean	SEM
5×10^5	1.7×10^6	9.5×10^5	7.5×10^4

Table (2): frequency distribution of BTSCC.

$< 5 \times 10^5$		5×10^5 - 1×10^6		$> 1 \times 10^6$	
No	%	No	%	No	%
0	0	18	64.3	10	35.7

Table (3): Prevalence of subclinical mastitis in examined dairy herd defined by positive CMT

No of examined quarters	No. of positive quarters		No. of positive dairy cows		No. of negative dairy cows	
460	No.	%	No.	%	No.	%
	70	15.2	45	39.1	70	60.9

Table (4): incidence of bacteria isolated from CMT positive quarter milk samples.

positive quarters		**Single infection**			**Double infection**		
No	**%**	**Organism**	**No**	**%**	**Organism**	**No**	**%**
65	92.9	Str. agalactiae	7	10.8	Str. agalactiae + S. aureus	1	1.5
		Str. dysgalactiae	2	3.1	Str. bovis + S. aureus	4	6.2
		Str. bovis	14	21.5	Str. bovis + CNS	1	1.4
		Str. faecalis	2	3.1	Str. bovis + E.coli	2	3.1
		S. aureus	4	6.2			
		CNS*	5	7.7			
		E.coli	23	35.4			
Total			**57**	**87.8**		**8**	**12.2**

*CNS: Coagulase negative Staphylococci.

The data summarized in Table (1 &2) revealed that the bulk tank milk samples contained SCC from 5×10^5 to 1.7×10^6 with a mean count of $9.5 \times 10^5 \pm 7.5 \times 10^4$ cells/ml. The highest frequency of distribution 64.3% lies within the range of 5×10^5 to 1×10^6 cells/ml milk.

In comparison similar finding was reported by ***Kinabo and Assey (1993)*** they found the mean SCC of university farm in Tanzania was 9 x 10^5 cells/ml. on the other hand lower values were reported by ***Barkema etal., (1998), Buato etal., (2000), Jayarao etal., (2004), Meshref, (2004), Van Schaik etal., (2005), Hamilton etal., (2006), and Richard et al., (2006)***. While higher higher values were reported by ***Weidmann et al., (1986) and Sobeih, (2000)*** during winter season.

It well established that BTSCC are a good indicator of general state of udder health and the condition under which milk is produced in the dairy herds. Herds with BTSCC < 2.5 x 10^5 cells /ml are approaching the optimal level of udder health ***(Peeler et al., 2002)***, while herds with BTSCC > 5 x 10^5 cells /ml have important problems with subclinical mastitis ***(Dohoo and Meek, 1982)***. Elevated SCC are associated with decrease in milk production, rise in whey protein plus a decrease in casein resulting in considerably decreased cheese yields and shorter shelf life and adverse milk flavour ***(Harding, 1995)*.**

The prevalence of subclinical mastitis (CMT > 0) at the quarter level was 15.2 %, while at the cow level (at least one positive quarter per cow) was 39.1% (Table. 3).

The obtained prevalence of subclinical mastitis was nearly similar to that recorded by ***Kassa et al., (1999), Mulei, (1999) and Roesch et al., (2007),*** while was higher than those reported by ***Wilson and Richards, (1980) and Hamilton et al., (2006)*** and lower than those reported by ***Todorov et al., (1981); Busato et al., (2000); Ahmed and Deeb-Azza (2001); Gianneechini et al., (2002); Mdegela et al., (2004); Abdel-Khalek and El-Sherbini (2005); Haltia et al., (2006); Karimuribo et al., (2006) and Kivaria et al., (2007).***

Regarding the main etiological agent of subclinical mastitis, it is clearly observed that the most frequently isolated pathogens were E.coli (35.4%), Str.bovis (21.5%), Str.agalactiae (10.8%), CNS (7.7%), S.aureus (6.2%), Str.dysgalactiae (3.1%) and Str.faecalis (3.1%) as a single infection while as a double infection were Str.bovis with S.aureus (6.2%), Str.bovis with E.coli (3.1%), Str.agalactiae with S.aureus (1.5%) and Str.bovis with CNS (1.4%) (Table, 4).

Similar causative organisms in a different percentages were reported by ***Gonzalez et al., (1988); El-Kholy et al., (1994); Busato et al., (2000); Ahmed and Deeb-Azza (2001); Gianneechini et al., (2002);Anwer et al., (2003); Janosi and Baltay, (2004); Mdegela et al., (2004); Shitandi and Kihumbu (2004);Green et al., (2005); Karimuribo et al., (2006) and Bradley et al., (2007).***

S.aureus and Str.agalactiae are serious problem that affects many dairy cows resulting in a significant loss of milk production. They are extremely contagious and found primarily in the infected quarters. Infections with these organisms are transmitted from quarter to quarter and from cow to cow primarily at milking time through milking units. It is also spread by not disinfecting teats, milker's hand and by lack or improper post-milking teat dipping.

Among the organisms causing mastitis, Str.agalactiae, S.aureus and E.coli, are pathogenic for man. Str.agalactiae is responsible for a variety of clinical conditions, of which the most serious is an often fatal bacteraemia and meningitis of the newborn. Some bovine strains of S.aureus produce enterotoxins during milk storage (heat stable) which cause nausea, diarrhea and abdominal pain, moreover high number of E.coli may be present in milk as a consequence of mastitis, and this species is responsible for several different diseases of man of varying severity ***(Bramley and McKinnon , 1990).***

The presence of subclinical mastitis results in decreased milk production, a greater incidence of clinical mastitis, higher treatments costs, increased culling rate as well as reduced the suitability of raw milk for manufacture and processing into products for human consumption in addition to risk of milk contamination with pathogens and antibiotics residues.

In conclusion subclinical mastitis is a serious problem in dairy industry and its early detection is the corner stone in its control. In addition to dry cow therapy, post-milking teat dipping , application of strict hygienic measures during milking, maintenance of clean and dry environment, special attention to equipment sanitation and milker's hygiene and culling of persistent offenders from the herd is also important in control of mastitis.

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مدى تواجد التهاب الضرع الكامن فى قطيع حلاب فى محافظة بنى سويف

عرفة مشرف سليمان مشرف و منى هاشم عبد الجواد طلبة

أجريت هذه الدراسة على 115 بقرة حلابة تم فحصها بواسطة اختبار الكاليفورنيا وذلك لتعيين مدى تواجد التهاب الضرع الكامن فى قطيع حلاب بمحافظة بنى سويف بالإضافة إلى 28 عينة لبن أخذت من الحليب المجمع فى المزرعة لتعيين عدد الخلايا الجسدية بها. وقد أظهرت النتائج أن متوسط عدد الخلايا الجسدية في اللبن المجمع كان $9.5 \times 10^5 \pm 7.5 \times 10^4$ بأعلى معدل انتشار (3 .64%) يقع فى المدى من 5×10^5 الى $< 10^6$ وان مدى تواجد التهاب الضرع الكامن على مستوى

ربع الضرع كان بنسبة 15.2 % فى حين كانت النسبة 39.1 % على مستوى البقرة. وقد أمكن عزل كل من الايشيريشيا كولى (4 .35%) والمكور السبحى البقرى (21.4%) والمكور السبحى أجالاكتى (10.8%) والمكور العنقودى السلبى لاختبار تخثر البلازما (7.7%) والمكور العنقودى الذهبى (6.2%) والمكور السبحى الديسجالاكتى (3.1%) والمكور السبحى فيكاليز (3.1%) وذلك من ناحية العدوى الفردية بينما أمكن عزل كل من الميكروب السبحى البقرى و المكور العنقودى الذهبى معا بنسبة 6.2% وكذا المكور السبحى البقرى مع الايشيريشيا كولى بنسبة 3.1% والمكور السبحى أجالاكتى مع المكور العنقودى الذهبى بنسبة 1.5% والمكور السبحى البقرى مع المكور العنقودى السلبى لاختبار تخثر البلازما بنسبة 1.4% وذلك من ناحية العدوى الزوجية. هذا ... وقد نوقشت الأهمية الصحية و الاقتصادية لالتهاب الضرع الكامن.