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.

SOME STUDIES ON MASTITIS IN SOME DAIRY HERDS IN EGYPT

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(B.V.Sc., Cairo University, 2011)

For the degree of M.V.SC. in Infectious Diseases.

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2015

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Abstract

The study was conducted to precipitate the prevalence of mastitis and its risk factors in two dairy farms in El- Gharbia(A) and El-Sharkia(B) Governorates. A total of 770 (650 in farm A and 120 in farm B) Holstein milking cows were examined clinically and by California mastitis test (CMT). Prevalence of mastitis at cow level in farm (A) and (B) were (15.4% and 8.3%) and (24.6% and 21.7%) for clinical and subclinical mastitis, respectively. While at quarter level were (4.6% and 2.1%) and (10.4% and 7.3%) for clinical and subclinical mastitis respectively. In farm (A) and (B) (81.7% and 90%) of clinical samples and (77.8% and 80%) of subclinical samples were found to be culture positive, respectively. The isolated bacteria in farm (A) and (B) were *E.Coli* (31% and 23.4), *S.aureus* (24.8% and 38.3%), *CNS* (16.4% and 8.5%), *Strp. agalactiae* (12.2 and 25.5%) and *other Streptococci* (15.6% and 4.3%), respectively. Most isolates were sensitive to marbofloxacin and amoxicillin +clavulanic acid and gentamycin. Risk factors such as stage of lactation, parity, season , udder and teat shape were highly significant in the mastitis prevalence . Prevalence was higher in lactating cow at early lactation stage, with parity number (3-5), during winter months, one quarter affected cows, hind quarters, with pendulous udder and teat-end hyperkeratosis than those corresponding animals. Combination of local and systemic treatment of clinical mastitic cases was more effective in the treatment of clinical mastitis cases. Moreover, the total cost of clinical mastitic case in farm (A) was 1090.1 L.E, which was greater than that of farm (B) 818 L.E the difference was due to variation in hygienic measurements and milk production.

Key words: Mastitis, Cows, Prevalence, Risk Factors, CMT, Antibiotic Sensitivity.

ACKNOWLEDGEMENT

*Firstly, I wish to express my sincere gratitude to "**ALLAH**" who gave the ability and patience to finish this work.*

*I wish to express my deepest sincere thanks to my dear supervisor **Prof .Dr. Abou Zaid Abd El- Megid Abou Zaid,** Professor of Infectious Diseases, Faculty of Vet. Medicine Cairo University ,for his suggesting the point of research, perfect and keen supervision and help, reviewing the manuscript, as well as his valuable advices.*

*My sincere gratitude and thanks to **Prof. Dr. Amr Abd El- Aziz Abd El- kader** Professor of Infectious Diseases, Faculty of Vet. Medicine Cairo University, for his guidance, criticism and advices that help to accomplish this study, as well as his valuable advices.*

*I hope to extend my deepest thanks to **Prof. Dr. Amal Abd El-Aziz El-Molla** Professor of Infectious Diseases, Faculty of Vet. Medicine Cairo University, for her helpful suggestions, kind and continuous encouragement.*

*My thanks to **Dr. Ebtsam El-Sayed Zaky Kotb,** Senior researcher in Mastitis and Neonates Department , Animal Reproduction Research Institute(ARRI), for her help to finish the practical part of this study and continuous advices .*

*My thanks to **Prof. Dr. Hany Abd El Khalek Amer,** head of Pathology Department , Animal Reproduction Research Institute(ARRI), for his help and advices.*

I would like to thanks all staff members of Infectious Diseases Department, Faculty of Vet. Medicine, Cairo University, for their continuous encouragement and Mastitis and Neonates Department, Animal Reproduction Research Institute (ARRI), for their helping to finish the practical part of this study.

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LIST OF ABBREVIATIONS

Abbreviations	Meaning Word
AMS	Automatic milking system
A. pyogens	Actinomyces pyogens
°C	Degree Celsius
CM	Clinical mastitis
CMT	California Mastitis Test
CNS	Coagulase negative staphylococci
CPS	Coagulase positive staphylococci
DIM	Days in milk
D.W.	Distilled Water
E.coli	Escherichia coli
EC	Electrical conductivity
I/M	intramuscular
IMI	Intramammary infection
K.pneumonia	Klebsiella pneumonia
µg	Microgram(s)
NCCLS	National Committee for Clinical Laboratory Standards
NMC	National Mastitis Council
No.	Number
P.aerogenes	Pseudomonas aerogenes
S.aureus	Staphylococcus aureus
SCC	Somatic Cell Count
S/C	Subcutaneous
SCM	Subclinical mastitis
Strp.agalactiae	Streptococcus agalactiae
QMS	Quarter milk samples

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1-INTRODUCTION

Bovine mastitis is the most economically important disease affecting dairy cattle worldwide from an economic, diagnostic and public-health point of view (**Zeedan *et al* .,2014).** It causes physical, chemical and bacteriological alterations in milk along with morphopathological changes in the mammary gland (**Guha *et al*., 2012).**

Based on the severity of the inflammatory respone, mastitis manifests itself in clinical and /or subclinical forms which can affect more or less severe short term impaction. In case of no cure or long-term acting, it has overlapping effects exceeded to the next lactation (**Zaki *et al*., 2010).**

Clinical mastitis is characterized by inflammation, redness, pain in udder, reduced and altered milk secretion from the affected quarters. The milk may be containing light clots, heavy clots, flakes, watery in consistency and accompanied by fever, depression, anorexia and etc (**Baloch *et al*., 2011).**

Subclinical mastitis form is characterized by apparently normal animals without visible changes in the milk appearance but with decrease milk production , it is the most prevalent and important form of mastitis in dairy herds **Bandoch and Melo (2011)**and **Oliveira *et al*.(2011).**

The subclinical form of mastitis in dairy cows is important because this form is 15 to 40 times more prevalent than the clinical form, it usually precedes the clinical form. It is of long duration, difficult to detect, reduces milk production and adversely affects milk quality **(Seegers *et al*., 2003).**

Mastitis is directly accompanied by an increase of somatic cell count (SCC) in milk, which increase in response to bacterial infection, tissue injury and stress. Somatic cells are protective for the animal body and fight infectious(**Sharma *et al.*, 2011).** It included lymphocytes, macrophages, polymorphonuclear cells and some epithelial cells(**Pillai *et al.*, 2001).** Milk from normal uninfected quarters generally contain below 200,000 somatic cells/ml. An elevation of SCC to 300,000 and above is an indication of inflammation in the udder **Jones (2006).** Therefore , many reports have considered SCC as a significant marker for subclinical mastitis(**Dürr *et al.*,2008).** SCC can be measured by Somatic Counter or quantitatively by California mastitis test (CMT). CMT is a simple, easy and low cost screening test for detection subclinical mastitis at dairy farms (**Bastan *et al.*,2008)** and **Abd El-Rady and Sayed (2009).**

The causes of mastitis involve a complex relationship of three major factors, that were , host resistance, bacterial agents and the environmental factors(**Gera and Guha,2011).**

The most common mastitis pathogens are caused by a wide variety of bacteria,which can be classified as environmental bacteria (*Escherichia coli, Streptococcus dysgalactiae, Streptococcus uberis, Enterococcus spp*. and *coagulase-negative Staphylococci (CNS)* or contagious bacteria (*Staphylococcus aureus ,Streptococcus agalactiae and Mycoplasma spp.*)(**Keane *et al*.,2013).** Contagious mastitis pathogens are generally transmitted from cow to cow , via milk-contaminated fomites at milking, Milker's hands, or by the milking machine (**Sudhakar *et al*.,2009).**. Environmental mastitis pathogens transmission by contact of the teats with contaminated soil, bedding and water with fecal materials **Mekonnen and Tesafaye (2010).** In Egypt, field surveys of major livestock disease have indicated that mastitis

is one of the most important health hazards in the country (**Seleim *et al*., 2002)** and **(Abdel-Rady and Sayed , 2009**). And the most common mastitis pathogens are *Staphylococcus spp., E. coli* and *Streptococcus spp*. (**Sayed and Abdel –Rady ,2008).**

Risk factors such as age difference, stage of lactation, parity, and farm hygiene were highly significant in the mastitis prevalence (**El-Bably *et al*., 2013) .**

Identifying and treatment of intramammary infection (IMI) conjunction with good farming practices may have significant economic benefits as preventing clinical mastitis and decreasing the amount of discarded milk (**Dingwell *et al*., 2003)** and (**Pieterse and Todorov , 2010).**

Mastitis economic losses mainly due to loss in milk production, discarding abnormal milk and milk withheld from mastitc cows treated with antibiotics, costs of drugs, veterinary services and increased labor costs , herd replacement and culling (**Getahun *et al*., 2008)** and(**Ebtsam *et al* .,2014)** . Culling sometimes take place before the animal reaches maximum production **(Seegers *et al*., 2003)** and **(Henna *et al*.,2014).**

Also mastitis has zoonotic important as milk from the affected cows act as vehicle for transmission of serious microorganisms T.B, *Staph spp. Strept spp.* Q-fever, *Brucella*, *Salmonella, leptospira* and etc. **(Sharma *et al*., 2011) .**Generally healthy milk from healthy cows(**Hogeveen and Osterås, 2005).**

Aim of the study

Due to these economic and public health importance of mastitis , the aim of this study was to throw more light on the following aspects:

1-Detection of the prevalence of clinical and subclinical mastitis of lactating dairy cows using CMT in dairy farms as screening test.

2-Isolation and identification of causative agents of clinical and subclinical mastitis of lactating dairy cows.

3-Sensitivity test to detect the best antibiotic to be used against isolated microorganisms.

4- Determine the association of some risk factors with the disease.

5-Calculation the economic impact of mastitis in dairy farms.

2- LITERATURE

1- Prevalence of mastitis in dairy farms:

Romain *et al.* (2000) conducted across-sectional study on 177 dairy farms in eight milking centers in Trinidad to determine the prevalence of subclinical mastitis by using CMT. The farm prevalence of subclinical mastitis was 52.5%, with range from 21.2% to 92.9%.

Ebtsam (2001) examined 450 dairy cows in El-Behera governorate by clinical inspection and CMT. She found that the prevalence of clinical and subclinical mastitis was 6 (1.33%) and 41 (9.11%), respectively.

Prasad *et al.* (2001) examined 106 cows for subclinical mastitis (SCM) by CMT . The results showed that 61.32% were positive for SCM. Based on quarter milk samples, out of 409 quarter milk samples 35.45% had prevalence of subclinical mastitis.

Workineh *et al.* (2002) monitored the prevalence of mastitis in hand milking cows in two major Ethiopian dairies. The CMT and culturing for bacteria revealed that 21.5% of cows were clinically infected and 38.2% had subclinical mastitis.

Alaa (2003) examined 765 lactating dairy cows in Egypt using CMT. He found that 58 (7.58%) cows were showing signs of mastitis while the remainders 707(92.42%) were apparently healthy. Out of them 77(10.89%) having subclinical mastitis .

Mustafa (2003) stated that only a small proportion of udder infections resulted in "clinical mastitis" whereby there were changes in udder condition and milk quality. The vast majority of cases existed as subclinical; with an estimated 20 - 40 cases for

every clinical mastitis case within the herd. Therefore mastitic problems may be present within a herd despite no visible presence within cows or milk.

Hanaa (2004) recorded that the prevalence of clinical mastitis was 3.6% among examined cows in some Egyptian farms.

Kivaria *et al.* (2004) examined 182 lactating cows from 62 herds by clinical inspection and CMT for the prevalence of mastitis . They found that 3.8% of the lactating cows had clinical mastitis and 90.3% of lactating cows had subclinical mastitis .

Ghaleb *et al.* (2005) determined the prevalence of subclinical mastitis in manually and mechanically milked cows in the north of Palestine. They stated that culturing for bacteria revealed that 59.2% of tested cow`s milk had subclinical mastitis.

Sori *et al.* (2005) examined 180 dairy cows by CMT in Sebeta, Ethiopia .They stated that the overall mastitis prevalence in the area was 52.78% .In which 16.11% and 36.67% were clinical and subclinical mastitis, respectively.

Tarek (2006) reported that the prevalence of clinical mastitis in some Egyptian dairy cows farms was 15.73%, while the subclinical mastitis was 29.04%.

Argaw and Tolosa (2008) examined 153 lactating cows for subclinical mastitis by using CMT. They found that the prevalence of subclinical mastitis was 89.54%.

Ebtsam (2008) examined 601 milking cows by clinical inspection and CMT. She found that the prevalence of clinical and subclinical mastitis were 11(1.8%) and 69 (11.5%), respectively.

Abd El- Hameed and Sharaf (2009) examined Nine small-scale dairy farms included 565 Friesian cows at Kaluobia and Menofia Governorates in Egypt by

clinical inspection and CMT. The results indicated that the prevalence of clinical and subclinical mastitis were 9.56% and 27.61%, respectively.

El-Bassiony *et al.* (2009) examined 379 milk samples collected from105 cows at different localities and farms in Assiut governorate in Egypt using CMT for subclinical mastitis (SCM) detection. Results revealed that SCM prevalence was 59.05 %.

Abd El-Naser *et al.* (2010) examined 180 milk samples from 50 dairy cows at different smallholder farms in Assiut city in Egypt using CMT. Results revealed that subclinical mastitis prevalence was 53.7%.

Abera *et al.* (2010) examined 300 lactating cows in Ethiopia, by clinical inspection and CMT and found 140 (46.7%) mastitis cases; 10.0% and 36.7% for clinical and subclinical infections, respectively.

Mekibib *et al.* (2010) examined 428 quarters from 107 cross bred milking cows using CMT .The results revealed that the Prevalence of mastitis at cow level was 76 (71%) ,out of which 24 (22.4%) and 52 (48.6%) were clinical and subclinical, respectively. The quarter level prevalence was 192 (44.9%) from which the clinical and subclinical forms were 43(10%) and 149 (34.8%) , respectively.

Hashemi *et al.* (2011) examined 6180 quarters from 1545 dairy cows by clinical examination and CMT. 4714 (76.28%) quarters were healthy, 1335 (21.6%) quarters were positive by CMT (as indicated to subclinical mastitis), 44 (0.71%) quarters showed clinical mastitis signs and 87 (1.41%) quarters were blind. The clinical and subclinical mastitis prevalence at cow level were 2.2% and 42.5%, respectively.