

BACTERIOLOGICAL STUDIES IN CAMEL MASTITIS IN TAMBOUL AREA, SUDAN

Nasareldien A. Hussein and Amir M. Saad

¹Department of Pathology, Faculty of Veterinary Medicine, University of AL-Butana, Sudan

²Department of Pathology, Faculty of Veterinary Medicine, University of Khartoum, Sudan

ABSTRACT

This study was carried out to identify the causative agents of different types of mastitis in Tamboul area. Sixty one milk samples from a field survey positive for change of colour using California mastitis test (CMT) were obtained from 10 herds comprising 1649 camels during 3 seasons (summer, winter and autumn) of same year. In the slaughter house investigation, 37 tissue samples and swabs obtained from different udder pathological lesions of 353 mastitis cases out of 2158 female camels of Arabi breed were tested by conventional bacteriological methods. The results revealed 98 isolates which consisted of 85 Gram-positive (86.73%) and 13 Gram-negative ones (13.27%). The isolates in order of frequency were *Staphylococcus* spp. (46.94%), *Streptococcus* spp. (18.37%), *Bacillus* spp. (13.27%), *Micrococcus* spp. (4.08%) and *Corynebacterium* spp. (4.08%). The Gram-negative bacteria isolates were *Escherichia coli* (8.16%), *Pseudomonas* spp. (4.0%) and *Salmonella typhimurium* (1.02%).

Key words: Bacteriological study, camel, mastitis, Sudan

Camel mastitis has been estimated to affect more than 25% of lactating she-camel (Saleh and Faye, 2011 and Alamin *et al*, 2013). Occurrence of mastitis in camels has been reported from some camel-keeping countries including Sudan (Obeid, 1983), Ethiopia (Regassa *et al*, 2013) and Egypt (Karmy, 1990). In Sudan the investigation of mastitis in the camel has been reported by various authors (Obied, 1983; Salwa, 1995; Nuha, 2001; Suheir, 2004; Yagoub, 2005; Alamin *et al*, 2013 and Abdella, 2015). Few studies indicate that some bacterial infections have been implicated as causes of mastitis in camels. This study was carried out to investigate the causes of mastitis in the herds at the field level and the female camels slaughtered at Tamboul slaughterhouse.

Materials and Methods

Ten herds from different parts of Butana area comprising 1649 she camels were examined in summer, winter and autumn during one year for change in milk using California mastitis test (CMT). Sixty one positive milk samples were taken aseptically into a sterile plastic container and placed in thermos flask containing ice for bacteriological examination. In addition, 37 tissue samples and swabs representing all types of pathological lesions encountered in 353 mastitis cases out of 2158 female camels of Arabian breed slaughtered at Tamboul slaughter house were taken for bacteriological examination. All these

samples (98) were tested by conventional bacterial culture medium and other convenient media suitable for gram +ve and gram -ve bacteria (Barrow and Feltham, 1993).

Results

Tissues and swabs for bacteriological examination were taken from 37 udders representing all types of pathological lesions encountered in this study and 61 milk samples that were positive for CMT. These samples were tested by conventional bacteriological methods. All milk samples and lesions examined were positive for bacterial growth with the exception of one tissue lesion that didn't show any growth in media.

A total of 98 isolates were obtained from the samples of pathological lesions and milk (positive for CMT). They consisted of 85 Gram-positive isolates (86.73%) and 13 Gram-negative (13.27%).

The order of frequency of isolates was *Staphylococcus* spp. (46.94%), *Streptococcus* spp. (18.37%), *Bacillus* spp. (13.27%), *Micrococcus* spp. (4.08%) and *Corynebacterium* spp. (4.08%). The Gram-negative bacterial isolates were *Escherichia coli* (8.16%), *Pseudomonas* spp. (4.0%) and *Salmonella typhimurium* (1.02%).

Discussion

All these bacteria (Table 1 and 2) were isolated from affected udder and milk samples with the

SEND REPRINT REQUEST TO NASARELDIEN A. HUSSEIN [email: amrasaa@hotmail.com](mailto:amrasaa@hotmail.com)

exception of *Micrococcus* spp. and *Salmonella typhimurium* which were isolated from milk samples.

Table 1. Percentage of microorganisms isolated from pathological lesions.

Species	Total No. of isolates	%
<i>Staphylococcus</i> spp.	22	59.45
<i>Bacillus</i> spp.	6	16.22
<i>Escherichia coli</i>	4	10.81
<i>Streptococcus</i> spp.	2	5.41
<i>Corynebacterium</i> spp.	2	5.41
<i>Pseudomonas</i> spp.	1	2.70
Total	37	100%

Table 2. Percentage of microorganisms isolated from milk samples (positive for CMT) in the survey.

Species	Total No. of isolates	%
<i>Staphylococcus</i> spp.	24	39.34
<i>Streptococcus</i> spp.	16	26.23
<i>Bacillus</i> spp.	7	11.47
<i>Micrococcus</i> spp.	5	8.20
<i>Corynebacterium</i> spp.	3	4.92
<i>Pseudomonas</i> spp.	3	4.92
<i>Escherichia coli</i>	2	3.28
<i>Salmonella typhimurium</i>	1	1.64
Total	61	100%

In present study, the isolated Gram-positive bacteria constituted 86.7% of the total isolates. This is concordant with the findings of Hawari and Hassawi (2008), Hussein *et al* (2013), Wanjohi *et al* (2013) and Abdella (2015) who reported that Gram- positive cocci of the genera *Staphylococcus*, *Streptococcus* and *Micrococcus* were the most dominant udder pathogen isolated and were regarded as important pathogens in camel. The prevalence of Gram negative bacteria in the present study was lower than that given by Al-Tofaily and Alrodhan (2011), who reported 23.8% prevalence of *Salmonella*, *Klebsiella pneumoniae* and *Mannheimia haemolytica*.

Micrococcus spp. was only isolated from milk positive for CMT. This result was similar to the findings of Al-juboori *et al* (2013) who reported 5% prevalence, but lower than that of Abdella (2015) who reported 8.11% prevalence.

Salmonella typhimurium represented 1.02% of the total bacterial isolates and 7.69% of the total Gram-negative bacteria isolated. This result was similar to that reported by Abdella (2015) and Al-Tofaily and Alrodhan (2011) who found only 2 isolates. *Salmonella*

typhimurium is known to be hazardous to human health.

Escherichia coli represented 8.16% of the total bacterial isolates and 61.54% of the Gram- negative bacteria isolated. This is lower than the 18.9% prevalence reported previously (Abdella, 2015).

Pseudomonas spp. represented 4.08% of the total bacterial isolates and 30.77% of the Gram- negative bacteria isolated. *Pseudomonas* spp. were isolated from pathological lesions and milk samples. This finding constitutes the first record of the isolation of *Pseudomonas* spp. from mastitis of camels.

Escherichia coli and *Streptococcus* were the major infectious organisms in endometritis in camelids (Tibary *et al*, 2006). Some of these bacteria are part of the normal vaginal flora whereas others are opportunistic and can become pathogenic if the favourable conditions are present (Tibary and Anouassi, 2001).

The variations in types of organisms isolated indicate that camel environment are contaminated with organisms which tends to flourish under stressful condition.

The predominant isolated organisms associated with clinical mastitis in the survey were *Staphylococcus* spp. (39.34%). This result agrees with the studies of Abdella (2015) who reported that the *Staphylococcus* spp. was 37.8%. This result was similar to that reported by percentage by Saleh and Faye (2011) and Hussein *et al* (2013) who reported that the *Staphylococcus* spp. was 42.9% and 43.8%, respectively. Alamin *et al* (2013) reported that 80.3% of she-camels examined suffered from wounds on the teats caused by pieces of wood and cloth used in the anti-suckling devices. *Staphylococcus* spp. might spread between she-camels due to these anti-suckling devices. In this study *Staphylococcus aureus* has been identified as the most commonly isolated (54.34%) *Staphylococcus* spp. that causes mastitis.

References

- Abdella ME (2015). Studies on clinical, aetiological and antibiotic susceptibility of mastitis in she-camels (*Camelus dromedarius*) in Butana area, Sudan. M.V.Sc. thesis, Sudan University of Science and Technology, Sudan.
- Alamin MA, Alqurashi AM, Elsheikh AS and Yasin TE (2013). Mastitis incidence and bacterial causative agents isolated from lactating she-camel (*Camelus dromedarius*). Journal of Agriculture and Veterinary Science 2(3):7-10.
- Al-Juboori AA, Kamat NK and Sindhu JI (2013). Prevalence of some mastitis causes in dromedary camels in

- Abu Dhabi, United Arab Emirates. Iraqi Journal of Veterinary Sciences. pp 27.
- Al-Tofaily YIKh and Alrodhan MAN (2011). Study on clinical mastitis (Bacteriological) in she-camels (*Camelus dromedarius*) in some areas of middle Euphrates in Iraq. AL-Qadisiyah Journal of Veterinary Medicine Sciences 10(2):66-76.
- Barrow GC and Feltham RKA (1993). Manual for the Identification of Medical Bacteria. 3rd edition, Cambridge University Press.
- Hawari AD and Hassawi DS (2008). Mastitis in one humped she-camels (*Camelus dromedarius*) in Jordan. Journal of Biological Science 8(5):958-961
- Hussein A, Berhu H, Abbasalem H and Asamenew T (2013). Prevalence of camel (*Camelus dromedarius*) mastitis in Jijiga Town, Ethiopia. African Journal of Agricultural Research 24:3113-3120.
- Karmy SA (1990). Bacteriological studies on mastitis in small ruminants and she-camels in Upper Egypt, Egyptian Journal of Veterinary Medicine 50:67-79.
- Nuha IE (2001). Staphylococcal species in normal and mastitis milk of some domestic farm animals, MVSc Thesis, University of Khartoum, Sudan.
- Obeid AI (1983). Field investigation, clinical and laboratory finding, of camel mastitis, MVSc Thesis, University of Khartoum, Sudan.
- Regassa A, Golicha G, Tesfaye F, Abunn F and Megersa B (2013). Prevalence, risk factors and major bacterial causes of camel mastitis in Borana Zone, Oromia Regional State, Ethiopia. Tropical Animal Health and Production 45:1589-1595.
- Saleh SK and Faye B (2011). Detection of subclinical mastitis in dromedary camels (*Camelus dromedarius*) using somatic cell counts, California mastitis test and udder pathogen. Emirates Journal of Food and Agriculture 23(1):48-58.
- Salwa MS (1995). Studies on camel mastitis, aetiology, clinical picture and milk composition. MVSc Thesis, University of Khartoum, Sudan.
- Suheir IA (2004). Some bacterial species, mycoplasma and fungal isolates associated with camel mastitis. MVSc Thesis, University of Khartoum, Sudan.
- Tibary A and Anoussi A (2001). Uterine infectious in camelidae. Veterinary Science Tomorrow. Issue (3) August pp 1-12.
- Tibary A, Fite E, Anoussi A and Sghiri A (2006). Infectious causes of reproductive loss in camelids. Theriogenology 66:633-647.
- Wanjohi M, Gitao CG and Beboru L (2013). Sub clinical mastitis affecting hygienic quality of marketed camel milk from North-eastern Province, Kenya. Microbiology Research International 1:6-15.
- Yagoub SO (2005). Bacterial diseases of the reproductive system of camels (*Camelus dromedarius*) in eastern Sudan. Journal of Animal and Veterinary Advance 4(7):642-644.