NASAL MICROFLORA OF CAMELS (*Camelus dromedarius*) UNDER TWO DIFFERENT CONDITIONS

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ABSTRACT

A total number of sixty apparently healthy camels were investigated for the presence of nasal microflora. Fifty of these camels were presented for slaughter at Al-Ahsa slaughter house (group A), the remaining ten camels were the herd belonging to the Camel Research Unit and kept at the University Farm (group B). During six months, a total of one hundred and ten nasal swabs were collected and examined for bacterial isolation and identification. The type of microorganisms recovered included *Staphaylococcus aureus* (89.1%) of the total isolates, *Escherichia coli* (5.0%), *Streptococcus* spp. (2.5%), *Klebsiella* spp (1.7%) and *Corynebacterium* spp (1.7%). The predominant and significant bacteria, *Staphylococcus aureus* and *Streptococcus* spp. isolates were subjected to antibiotic sensitivity test and found sensitive against the examined antibiotics by various degrees.

INTRODUCTION

The upper respiratory tract and specially the nasal cavity of camels is adapted to harsh desert condition. The nares are straight and narrow leading to narrow nasal cavity (Tayeb, 1964). The respiratory tract infection by different micro-organisms in camels was reported by a number of authors, among these are Abdulrahman (1987), Hafez *et al.* (1991), Arora and Kalra (1973), Rana *et al.* (1993). Several nasal microflora are found living in apparently healthy animal species, in dogs (Smith, 1961), in camels (Shigidi, 1973; Chauhan *et al.*, 1987), in sheep (Alley, 1975), in horse (Cabassi *et al.*, 1975), in cattle (Alhendi, 1989), in poultry (Calnek *et al.*, 1991), in some zoo animals (Seddek *et al.*, 1994). The objective of this study was to identify the most common inhabitant aerobic microflora in the nasal cavities of camels kept under different rearing conditions. Also to determine the suitable antibiotic susceptibility of these microorganisms to different types of antibiotics under local conditions for such dromedaries.

MATERIALS AND METHODS

Two groups of apparently healthy camels were studied, group (A) constituted 50 camels (10 head/month) which brought from different localities to Al-Ahsa slaughter house and group (B) constituted 10 camels of a local herd of the Camel Research Unit at University Farm. All camels of both groups were sampled for a period of six months at appropriate intervals. A total of 50 nasal swabs were collected from group (A), and a total of 60 nasal swabs were collected from group (B). The samples were taken under strict aseptic conditions. The nasal swabs were inoculated in the known conventional routine media for isolation of aerobic bacteria (Nutrient agar, blood agar and Mac-Conkey agar). The inoculated media were incubated at 37°C for 24-48 hrs. The resultant growth were purified, isolated and identified according to the method of Cown (1974). The disc-agar diffusion method was used to test the predominant isolated bacteria against 11 different antibiotics, according to the method of Koneman *et al.* (1992). The dose/disc manufactured by Oxoid, U.K.

RESULTS AND DISCUSSION

The types of microorganisms isolated and the number of isolates from both groups of camels (groups A and B) are presented in Table 1 and the antibiotic sensitivity of *Staphylococcus aureus* and *Streptococcus* spp. to different antibiotics is presented in Table 2, and this because of highest and/or significant isolates in this investigation.

In this study, *S. aureus* was isolated from both groups in highest frequency. The isolation percentage from group (A) was (90.6%) and that from group (B) was (87.5%), while the isolation percentage from total the 120 isolates was 89.16. Shigidi (1973) reported that *S. aureus* was isolated from nasal swabs of 64 healthy camels represented 2.6%, and Chauhan *et al.*

(1987), who also examined bacterial culture from nasal swabs of apparently 219 healthy camels reported a recovery rate of 10.5% of *S. aureus* from the total isolates. Lung infecteion was found harbouring normal flora frequently by some other authors. Rana *et al.*, (1993), demonstrated presence of *S. aureus* in congested lungs of 100 camels at slaughter house. Many pathogenic bacteria including *S. aureus* was found frequently from pneumonic lungs of camels at slaughter house of Cairo (Farrag *et al.*, 1953). The same author stated that predisposing factors at preslaughtering were the main causes for occurrence of such diseases. *S. aureus* is known to cause variety of infections in other animals and as a frequent secondary invaders and opportunists in some diseases processes (Biberstein and Zee, 1990).

Only 3 (2.5%) *Streptococcus* spp. isolates were recovered during this study with less frequency as compared to *S. aureus* from the both groups. Most of the species of genus *Streptococcus* were considered potential pathogens, occur in nature, and some are commensal in the respiratory, genital and alimentary tracts and skin of animals and man (Biberstein and Zee, 1990). Edelsten and Pegram (1974), consistently demonstrated Streptococcus spp. from an exudate of skin necrosis in camels. Moreover, this bacteria was identified and isolated from 6 hipatized lungs out of 100 lungs at slaughter house in Pakistan (Rana *et al.*, 1993). Lung abscesses of 15 slaughtered Somali dromedaries were found with hemolytic Streptococci bacteria (Vitovec and Vladik, 1983).

The presence of *E. coli* in the nasal swab samples is not uncommon. This could be due to inhalation of dry faeces or from water container as *E. coli* is a normal resident of intestinal tract. In this study, 6 isolates of *E. coli* were identified (5.45%). Shigidi (1973) and Chauhan *et al.* (1987) in their examinations of microflora in apparently healthy camels demonstrated the presence of *E. coli* as well. Abdulrahman (1987) found *E. coli*, *Staphylococcus* spp. and other bacteria in affected lungs of 6 camels (3%) of 200 Somali dromedaries. Two isolates of *Klebsiella* spp. (1.7%) were identified in the nasal samples of group (B). In the investigation by Chauhan *et al.*, (1987), *Klebsiella pneumoniae* was recovered from 26 (11.8%) out of 219 apparently healthy Indian dromedaries. This bacterium occurs widely in nature, notably in wood products of the kind used for bedding cattle (Newman, 1975). *Klebsiella pneumoniae* was the main findings in 24 out of 219; cases characterized by chronic bronchopneumonia in camels in India (Arora and Kalra, 1973). Two isolates of *Corynebacterium* spp. (1.81%) was obtained during this investigation from group (B), without any observable clinical signs in camels. Shigidi (1973) recovered *Corynebacterium pyogenes* from 14 nasal swabs of 64 healthy Sudanese camels. Also *Corynebacterium* spp. was reported to be present in pulmonary abscesses in the dromedary by Richard (1979) and Rana *et al.* (1993). Similar to Shigidi (1973), De Alwis (1977) found *Corynebacterium pyogenes* in the nasopharynx of clinically normal calves in Sri Lanka.

The presence of microorganisms in the respiratory tract was found to be associated with eructation suggested that aerosolization and consequent transport of microorganisms might occur from the rumen to the respiratory tract (Mullenox *et al.*, 1964). This was demonstrated in experimental trial. From upper respiratory tract, it was found that nasophyngeal swabs never reflected presence of infection in the lower respiratory tract (Alhendi, 1989), as colonization of microorganisms in the nasal cavities is not an indication that infection present. Mucocillia work as protective tissues in the upper respiratory tract, which flush out microorganisms that enter respiratory system (Bang, 1961).

Only two types of five types of nasal aerobic flora were subjected to antibiotic sensitivity. 107 isolates of *S. aureus* showed different range of sensitivities. Ampicillin showed the highest sensitivity to *S. aureus*. Amoxillin Doxycyclin, Erythromycin, Polymyxillin and Streptomycin were equally sensitive whereas Carbenicillin, Gentamicin, Penicillin, Neomycin showed equal sensitivity and only (Nitrofurantion) was least sensitive to *S. aureus*.

The other bacteria, *Streptococcus* spp., 3 isolates from both groups of camels, were all sensitive to (Ampicillin, Amoxicillin, Doxycyclin, Erythromycin, Polymyxillin and Streptomycin). Based on these resutls it can be concluded that the preference of antimicrobial drugs are the first six antibiotics as shown in Table 2. It is important to emphasize that antibiotic susceptibility tests are tended to be a guide for the clinician, not a guarantee that antimicrobial agent will be effective *in vivo* therapy (Koneman *et al.*, 1992).

Table 1: Types of nasal microflora of 60 camels from 110 samples collected during six months and number and incidence of 120 isolates.

Microorganisms	Group A (n = 50)		Group A (n = 10)		Total	
	Number	Percentage	Number	Percentage	Number	percentage
Staphylococcus auresu	58	90.6	49	87.5	107	89.1
Escherichia coli	4	6.2	2	3.6	6	5.0
Streptococcus Spp.	2	3.1	1	1.7	3	2.5
Klebsiella Spp.	0	0	0	3.6	2	1.7
Coprynebacterium Spp.	0	0	0	3.6	2	1.7
Total isolates	64		56		120	

Table 2: *In vitro* antibiotic sensitivity of *Staphylocuccus aureus* (107) and Streptococcus Spp. (3) isolates from 60 camels.

Antibiotics	Dose/disc (μg)	*S. aureus* (n)	Inhibition zone	Strept. Spp.	Inhibition zone
Ampicillin	10	22	+++	3	+++
Amoxicillin	30	17	++	3	++
Doxycyclin	10	17	++	3	++
Erythromycin	15	17	++	3	++
Polymyxillin	30	17	++	3	++
Streptomycin	10	17	++	3	++
Carbenicillin	50	5	+	ND	
Gentamicin	10	5	+	ND	
Penicillin	10	5	+	ND	
Neomycin	10	5	+	ND	
Nitrofurantion	300	4	+	ND	

N = number of isolates; ND = not done; (+++) = Wide inhibition zone; (++) = Moderate inhibition zone; (+) = Narrow inhibtion zone

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