

Oral microflora of stray domestic cats (*Felis catus*) found in the premises of two human hospitals in Sokoto, Nigeria

A.A. Magaji¹, M.A. Saulawa³, M.D. Salihu¹, A.U. Junaidu¹, A. Shittu¹, M.L. Gulumbe¹, U.M. Chafe², S. Buhari², A.A. Raji³

¹Department of Veterinary Public Health and Animal Production

²Department of Veterinary Medicine, Surgery and Theriogenology

³Faculty of Veterinary Medicine, Usmanu Danfodiyo University, Sokoto, Nigeria

Abstract

A study was carried out to identify the various bacterial species in the oral cavity of cats in two human hospitals in Sokoto, Nigeria. The buccal cavities of 26 cats (14 from Hospital A and 12 from Hospital B) were liberally swabbed for bacterial evaluation. The samples were enriched in peptone water, inoculated on McConkey and Blood agar, and incubated aerobically at 37°C for 24hrs. The isolates were Gram stained and subjected to biochemical characterization for identification. A total of 51 bacterial isolates were made. There were *Staphylococcus aureus* 18 (35.3%), *Micrococcus* spp. 9 (17.7%), *Pasteurella* spp. 5 (9.8%), *Streptococcus* spp. 5 (9.8%), *Yersinia* spp. 4 (7.8%), *Bacillus* spp. 4 (7.8%), *Listeria* spp. 3 (5.4%) and *Corynebacterium* spp. 3 (5.9%). *Staphylococcus aureus* has the highest frequency of isolation 18 (35.3%).

Keywords: Oral Microflora, Stray Cats, Hospital.

Introduction

Bites inflicted by animals do not only cause physical trauma, but are also accompanied with introduction of infectious agents. Various bacterial organisms found in oral cavity of animals are opportunistic and potentially pathogenic. Puncture wounds, especially from cats, frequently become infected with various bacterial species. These include *Staph. aureus*, *Staph. intermedius*, *Strep. pyogenes*, *Strep. canis*, *Strep. oralis*, *Corynebacterium* spp., *Listeria* spp. and *Pasteurella multocida* (Cowan and Steel, 1993).

A huge volume of work has been done on bacterial isolation from various parts of the body of different species of animals in different parts of the world (Samuel, 1983). Approximately 28% to 80% of cat bites become infected (John, 2006). Most clinically infected cat bite wounds are mixed infections of aerobic and anaerobic bacteria (John, 2006).

From fifty swabs taken from the buccal cavities of some domestic animals within Sokoto metropolis, Sokoto State, Nigeria (20 swab samples from dogs, 10 each from cats, camels and donkeys), the following were isolated: dogs: *Micrococcus*

spp., *Staph. epidermidis*, *Bacillus* spp. From cats: *Staph. aureus*, *Bacillus* spp., *Clostridium* spp., *Pseudomonas aeruginosa*, *Pasteurella multocida* and *Citrobacter* spp. From camels: *Streptococcus* spp., *Bordetella* spp, *Fusobacterium necrophorum*, *Micrococcus* spp., *Gafrica tetragenus* and *Staph. aureus*. *Streptococcus* spp. *Enterobacter aerogenes*, *E. coli* and *Staph. aureus* were isolated from donkey (Umaru et al., 2002).

Although it is estimated that approximately 1 to 2 million animal bite wounds occur annually, less than half of these are ever reported. Animal bite wounds are fourth among the most commonly reported human illnesses each year in the United States (Beck, 1981). Nearly 1% of emergency visits of humans to hospitals are concerned with bite injuries (Zook et al., 1980). Veterinarians and animal health workers are at risk of being injured by dogs and cats than the general population (August, 1988). Animal bites accounted for 34% and scratches for 3.8% of the trauma. In their carriers, 92% of the veterinarians surveyed had sustained 81% cat bites and 72% cat scratches (August, 1988). The infecting organism in bite or scratch injury usually corresponds to the normal oral microflora of dogs and cats, although

organisms from the environment or victim's skin may contaminate the injury. Despite the numerous aerobic and anaerobic organisms that contaminate bite wounds, only a few such as *Pasteurella multocida* and *Capnocytophaga canimorsus* (formerly DF-2) consistently cause systemic manifestations (Edwards, 1987).

Cat has very sharp, pointed teeth usually causing puncture wounds and lacerations that may inoculate bacteria into deep tissue (Callaham, 1995).

Materials and Methods

Study Area

Sokoto State is located between longitude 11°30 to 13°50 East and latitude 40 to 6°40 North. The state shares common borders with Niger Republic to the North, Kebbi State to the south and Zamfara State to the East. The study areas were two hospitals located within Sokoto Metropolis in Sokoto State designated (for the purpose of this work, Hospital A and Hospital B).

The simple random sampling technique was used. The cats in both hospitals were given fried fish to attract them and ease their catching during our sampling visits. The cats were held on the scruff around the neck and placed in woven

polythene sacks. In the laboratory, the cats were anaesthetized using 10% chloroform soaked in cotton wool.

Sterile swabs were used to swab the buccal cavity of the cats liberally. Samples were enriched in peptone water and subsequently inoculated on McConkey and blood agar plates for each of the samples. The plates were incubated aerobically at 37°C for 24hrs. Isolates were Gram stained and subjected to biochemical tests which were Triple Sugar Iron (TSI), Catalase and Coagulase tests.

Isolates were identified based on the techniques described by Greenwood *et al.* (1985) and Lindsley *et al.* (1983).

Results

A total of 51 bacterial isolates were made from the samples and these include both the Gram positive and Gram negative organisms. The isolates were: *Staphylococcus aureus*, 18 (35.3%), *Micrococcus* spp. 9 (17.7%), *Pasteurella* spp. 5 (9.8%), *Streptococcus* spp. 5 (9.8%), *Yersinia* spp. 4 (7.8%), *Bacillus* spp. 4 (7.8%), *Listeria* spp. 3 (5.9%) and *Corynebacterium* spp. 3 (5.9%). *Staphylococcus aureus* has the highest isolates (Table 1).

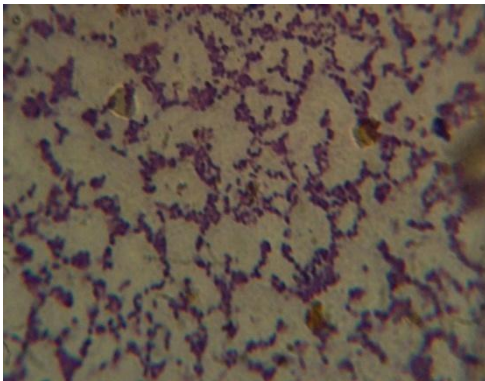


Plate1

Gram positive non-spore forming short rods isolated from the oral cavity of a cat (X40).

Table 1: Summarizes the bacterial species identified from oral cavity swabs of each cat found at Hospital A and Hospital B with their sex and ages.

Sample identification	Age	Sex	Specie found on MacConkey	Species found on BA	Source of sample
A	Adult	Male	<i>S. aureus</i>	<i>Strep. spp.</i>	Hospital A
B	Adult	Female	<i>S. aureus</i>	<i>Strep. spp.</i>	Hospital A
C	Adult	Male	<i>S. aureus</i>	<i>Listeria spp.</i>	Hospital A
D	Adult	Male	<i>S. aureus</i>	<i>Listeria spp.</i>	Hospital A
E	Adult	Male	<i>Pasteurella spp.</i>	<i>Micrococcus spp.</i>	Hospital A
F	Young	Male	<i>S. aureus</i>	<i>Bacillus spp.</i>	Hospital A
G	Kitten	Female	<i>Pasteurella spp.</i>	<i>Micrococcus</i>	Hospital A
H	Kitten	Male	<i>S. aureus</i>	<i>Pasteurella spp.</i>	Hospital A
I	Kitten	Female	<i>Pasteurella spp.</i>	<i>Micrococcus spp.</i>	Hospital A
J	Kitten	Male	<i>Micrococcus spp.</i>	<i>Corynebacterium spp.</i>	Hospital A
K	Young	Male	<i>Yersinia spp.</i>	<i>Corynebacterium spp.</i>	Hospital A
L	Young	Male	<i>Yersinia spp.</i>	<i>Bacillus spp.</i>	Hospital A
M	Young	Female	<i>S. aureus</i>	<i>S. aureus</i>	Hospital A
N	Adult	Female	<i>Micrococcus spp.</i>	<i>Pasteurella spp.</i>	Hospital A
O	Young	Male	<i>Bacillus spp.</i>	<i>Micrococcus spp.</i>	Hospital B
P	Young	Male	<i>S. aureus</i>	<i>Micrococcus spp.</i>	Hospital B
Q	Kitten	Female	<i>Strep. spp.</i>	<i>S. aureus</i>	Hospital B
R	Kitten	Female	<i>S. aureus</i>	<i>S. aureus</i>	Hospital B
S	Adult	Female	<i>Strep. spp.</i>	<i>S. aureus</i>	Hospital B
T	Adult	Female	<i>Strep. spp.</i>	<i>Bacillus spp.</i>	Hospital B
U	Adult	Male	<i>Yersinia spp.</i>	<i>Micrococcus spp.</i>	Hospital B
V	Young	Male	<i>S. aureus</i>	<i>Micrococcus</i>	Hospital B
W	Adult	Male	<i>Yersinia spp.</i>	<i>S. aureus</i>	Hospital B
X	Young	Female	<i>Listeria spp.</i>	<i>S. aureus</i>	Hospital B
Y	Kitten	Male	<i>S. aureus</i>	<i>S. aureus</i>	Hospital B
Z	Young	Female	<i>Corynebacterium spp.</i>	Nil	Hospital B

Keys:

Kitten: Birth to 6 month

Young: 6 month to 2 years

Adult: > 2 years

A, B, C, D.....Z: No. of samples

Mac C: MacConkey Agar

BA: Blood Agar

Table 2

Species of bacteria isolated from the oral cavity of cats

Organisms	Frequency	Total Isolation (%)
Gram Positive		
<i>Corynebacterium spp.</i>	3	5.9
<i>Listeria spp.</i>	3	5.9
<i>Bacillus spp.</i>	4	7.8
<i>Streptococcus spp.</i>	5	9.8
<i>Micrococcus spp.</i>	9	17.7
<i>Staphylococcus aureus</i>	18	35.3
Total	42	82.4
Gram negative		
<i>Yersinia spp.</i>	4	7.8
<i>Pasteurella spp.</i>	5	9.8
Total	9	17.6
Grand total	51	100



Plate II
A cat interacting with a patient in gynaecology ward of Hospital B.



Plate III
Cats in Female ward of Hospital B expecting to get a meal from the patient's relatives.

Discussion

The finding shows that some of the isolates are pathogenic, such as *Listeria* spp., *Pasteurella* spp., *Yersinia* spp. and *Corynebacterium* spp. The result is of public health concern when viewed from the closeness of these animals to the patients and other people in the two hospitals. *Staphylococcus aureus*, though a normal microflora of both humans and animals is capable of causing conditions such as Toxic shock syndrome, (TSS) in humans, especially the coagulase positive *Staphylococcus* (Talen, *et al.*, 1999). Other conditions such as Toxoplasmosis and cat scratch disease (CSD) have also been reported from cats.

There is the need to eliminate the cats from the hospital environments through provisions of tamper proof doors and windows screens and continuous elimination of the stray cats from the hospitals and its environments through the use of traps and chemicals to discourage them from breeding in and around the hospitals.

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