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Comparative Antibiotic Sensitivity of *Straphylococcus aureus* isolates from two clinical sources

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Abstract

Fifty isolates of *Staphylococcus aureus* from pyoderma and wound infections were screened for their respective sensitivities to six β-lactam antibiotics by the microtitre plate broth-dilution method. The results consistently showed higher percentage sensitivity of the isolates from wounds. It is suggested that the site of isolation of a specific bacterium may influence the choice of antibiotic against an infection.

Key words: ***Straphylococcus, aureus* Antibiotic sensitivity, Pyoderma and Wounds.**

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Introduction

Staphylococcus aureus is known to form suppurative diseases (1,2), which may or may not be easily treated with common antibiotics due to the recognized potential of the organism to offer antibiotic resistance. The resistance is normally attributed to plasmid genes which mediate the production of two antibiotic inactivating enzymes pemicillinase and cephalosporinase (β – lactamases) (3,4). Thus, both the β –lactamase sensitive and stable β – lactams have been regularly implicated in the resistance episode (5,6,7).

It has been established that many factors may influence antimicrobial susceptibilities (8,9) but the possibility of a correlation between the site of isolation of a specific bacterium and its antimicrobial susceptibilities (8) remains a novel suggestion. In a preliminary

study, such correlation was drawn between antimicrobial susceptilities and site of infection with *Staph. aureus* and *Staph. intermedius* from dog and cat, as an hypothetical suggestion (9).

This study is an attempt to determine the possibilities of human isolate of *Staph. aureus* varying in their antibiotic susceptibilities with their sites of isolation.

Materials and Methods

The 50 isolates of *Staph. aureus* used in this study were from different clinical specimens collected at the Routine section, Department of Medical Microbiology and Parasitology, University college Hospital, Ibadan, Nigeria. Of the 50 isolates, 25 were from each of pyoderma and wounds. All the isolates were identified as Gram – positive cocci producing β-haemolysis on blood agar and acid from D-mannitol aerobically and anaerobically (10,11, 12,13). Most importantly, they were identified with free coagulase in a tube- test, as a clumping factor in human plasma (10).

The antibiotic susceptility test was carried out on the 50 isolates by the microtitre plate broth-dilution similar to the Checkerboard MIC determinations (14,15) against penicillin G (Pn), ampicillin (Ap), amoxycillin (Am), Cloxacillin (Cl), Cefuroxime (Cf) and Cefotaxime (Ct). Bacterial growth as an indication of resistance was shown by a pinkish colour of formazan due to the growth indicator (2,3,5 – Triphenyl 2H – tetrazolium chloride monohydrate). The minimum inhibitory concentrations (MICs) obtained were used to describe the isolates as either sensitive or resistant. The numbers of sensitive and resistant isolates for pyoderma and wound were isolates for pyoderma and wound were then ranked on percentage basis. In all the tests carried out, *Staph. aureus* NCTC 6571 served as the control.then ranked on percentage basis. In all the tests carried out, *Staph. aureus* NCTC 6571 served as the control.

Results

For the sensitive strains of *Stph. Aureus*, the MICs occurred within the range of 0.02µg to 0.49µg/ml for the parent penicillins (penicillin G, ampicillin and amoxycillin), 0.12µg/ml to 0.97µg/ml for cloxacillin, and 0.03µg/ml to 0.97µg/ml for cefuroxime and cefotaxime. In respect of the resistant strains, the MICs varied between 1.95µg/ml and

beyond 250µg/ml for all the six antibiotics. The percentage antibiotic sensitivity of *Staph. aureus* isolates from pyoderma ranged between 24 and 64% against 4 and 44% of the isolates from wounds (Table 1). For either of the two clinical sources, lower percentage sensitivities were obtained for penicillin, ampicillin and amoxycillin while higher levels occurred for cloxacillin, cefuroxime and cefotaxime, which are known to be β-lactamase inhibitors.

Table 1

Percentage antibiotic susceptibilities of *Staph aureus* isolates from pyoderma and wound infections.

Antibiotic	Pyoderma isolates (%)	Wound isolates (%)
Pn	24	4
Ap	24	8
Am	24	8
Cl	48	36
Cf	60	44
Ct	64	44

NOTE:

Pn = Penicillin G
Ap = Ampicillin
Am = Amoxycillin
Cl = Cloxacillin
Cf = Cefuroxime
Ct = Cefotaxime

DISCUSSION

The percentage susceptibility results showed that the *Staph. aureus* isolates from pyoderma were consistently more sensitive to the six antibiotics used than those isolates from wounds. This lends credence to the suggestion that animicrobial susceptibilities of a specific bacterium may vary with its site of infection (8). The results also agreed with the hypothesis stated in a previous report (9) on *Staph. aureus* and *Staph intermidis* isolates from canine and feline origin of dog and cat. Further studies involving more bacterial species and clinical sources should facilitate a more reliable

rational choice of empirical therapy. In this study however, it is noteworthy that the site of infection may be an important factor in choosing the proper antibiotic treatment for human-borne pathogens in some environments.

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