Comparative Antibiotic Sensitivity of *Staphylococcus 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: *Staphylococcus, 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 susceptibilities 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 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
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Results
and acid from D-mannitol aerobically and
anaerobically (10,11, 12,13). Most
importantly, they were identified with free
cogulase in a tube- test, as a clumping
factor in human plasma (10).
The antibiotic susceptibility 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

For the sensitive strains of Staph.
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 \( \beta \)-lactamase inhibitors.

Table 1

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

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Pyoderma isolates (%)</th>
<th>Wound isolates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pn</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>Ap</td>
<td>24</td>
<td>8</td>
</tr>
<tr>
<td>Am</td>
<td>24</td>
<td>8</td>
</tr>
<tr>
<td>Cl</td>
<td>48</td>
<td>36</td>
</tr>
<tr>
<td>Cf</td>
<td>60</td>
<td>44</td>
</tr>
<tr>
<td>Ct</td>
<td>64</td>
<td>44</td>
</tr>
</tbody>
</table>

**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 antimicrobial 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.

References


