A PROFILE OF WOUND INFECTIONS IN NATIONAL HOSPITAL ABUJA

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ABSTRACT
Background: Wound Infections cause prolonged hospital stay, increased costs and also result in increased patient morbidity and mortality. The current spread of multi-drug resistant bacteria has further highlighted the need for regular bacteriological review of infected wounds and regular antibiotics surveillance studies so as to avoid the unguided empirical treatment of wound infections which is quite common in this environment.

Aim: To determine the distribution of the isolates from wound specimens submitted to the medical microbiology laboratory of National Hospital Abuja for processing.

Method: A review of wound specimens results from various wards in the hospital over a period of 10 months (1st March 2010 to 31st March 2010) was conducted.

Result: A total of 314 isolates were recovered from the 380 wound specimens giving a yield of 83%. 240 (74%) yielded single isolates of various pathogens, while 74 (24%) were poly-microbial. Gram negative bacilli constituted 66% of all the pathogens with Pseudomonas aeruginosa (19%) and Proteus species (18%) as the most frequent, while gram positive isolates made up 33% with Staphylococcus aureus (27%) as most predominant and most frequently isolated bacteria from all the wound specimens. Two Candida species comprised about 1% of the isolates.

Frequency of infection was highest in surgical wards (27%), gynaecology ward (14%) and accident and emergency unit (12%). The fluoroquinolones, aminoglycosides, and Beta-lactam antibiotics were the most effective drugs for most of the isolates. Staphylococcus aureus was most sensitive to amikacin (83%) and erythromycin (79%); Pseudomonas aeruginosa to imipenem (96%) and amikacin (83%) and Proteus species to amikacin (100%) and imipenem (78%).

Conclusion: S aureus, Pseudomonas aeruginosa and Proteus species were the predominant bacteria from wounds, with surgery and gynaecology wards having the highest prevalence. Resistance to commonly used antibiotics is high. There is need to institute antibiotic stewardship and effective and efficient infection control measures in the hospital.

Keywords: Wound infections, National Hospital, Abuja

INTRODUCTION
A wound is a breach in the skin, and exposure of subcutaneous tissue following loss of skin integrity, thus providing a moist, warm and nutritive environment that is conducive for colonization and proliferation of opportunistic and pathogenic microorganisms (1). Colonization of wounds by microorganisms is seen commonly in both the hospital and community settings. Most times contaminating microbes are eliminated by the host immune system and do not persist, but species that grow and divide may become established, multiply causing wound colonization and infection. Infection results in delayed healing and may cause wound breakdown or complete wound dehiscence (2). The severity of complications depends mainly on the infecting pathogen and site of infection (3,4). Wound infection is a concern to healthcare practitioners due to associated increased morbidity, mortality and increased cost of care (1). In a study done at Ile-Ife by Shittu et al., an isolation rate of 95% from wound specimens was reported (5), while another study done in Ibadan on burn wound infections gave an isolation rate of 71.4% from wound swabs and 90.2% from wound biopsyspecimens (6). The current spread of multi-drug resistant bacteria has from clinical isolates has heightened the need for regular bacteriological review of wound infections so as to avoid the unguided empirical treatment which appears common in this environment (7).

In Abuja, the Federal capital of Nigeria and one of the fastest growing cities in Africa, there is paucity of research data on wound infections, thus justifying the need for this study, which is aimed at determining the distribution and antibiotic susceptibility pattern of bacterial isolates from wound specimens submitted to the National Hospital Abuja (NHA) Medical Microbiology laboratory with a view to providing guide for rational empirical antimicrobial choice in the management of wound infections.

METHODS
This is a retrospective study of the data of 380 wound specimens from various wards submitted to the Medical Microbiology laboratory of NMA for processing over a period of 10 months from Mar 1st 2010 to Dec 31st 2010. The hospital is a tertiary hospital serving the needs of FCT and surrounding states. The patients' bio data and results of the processed specimens from various wards and clinics were retrieved and analyzed for the purpose of this study. Information such as age, sex, ward, culture result, and antibiotic sensitivity pattern were also extracted from the records.

In our centre, wound specimens are inoculated onto MacConkey and blood agar and incubated aerobically at 35-37°C for 18-24hrs. The isolates are gram stained and identified using standard bacteriological procedures (8). Antibiotic susceptibility is tested using the modified Kirby-Bauer disk diffusion method and the results are interpreted using Clinical and Laboratory Standards Institute (CLSI) recommendations (9).

RESULTS
Of the 380 wound specimens results reviewed, 314 grew organisms giving a yield of 83%. 240 (76%) were pure single isolates and were considered pathogens while growth from 74 (24%) specimens were polymicrobial and were discarded as colonisation. 238 (99.9%) of the pathogens were bacteria, dominated by Staphylococcus aureus (27%), Pseudomonas aeruginosa (19%), Proteus species (18%), Escherichia coli (14%) and Klebsiella pneumoniae (13%). Two (1%) Candida species were isolated [table 1] The 64 (27%), 34 (14%), 29 (12) and 22 (9%) of the isolates were from surgery wards, gynaecology ward, accident and emergency unit and surgery out-patient clinic [table 1].

**TABLE 1. WARD AND CLINIC DISTRIBUTION OF WOUND ISOLATES.**

<table>
<thead>
<tr>
<th>Wards/Clinics</th>
<th>Isolates</th>
<th>S. aureus</th>
<th>P. aeruginosa</th>
<th>E. coli</th>
<th>K. pneumoniae</th>
<th>Proteus spp</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gynae Ward</td>
<td></td>
<td>10</td>
<td>4</td>
<td>7</td>
<td>5</td>
<td>4</td>
<td></td>
<td>34(14)</td>
</tr>
<tr>
<td>Surgery Ward</td>
<td></td>
<td>19</td>
<td>13</td>
<td>8</td>
<td>6</td>
<td>13</td>
<td>5</td>
<td>64(27)</td>
</tr>
<tr>
<td>Accid/Emergency</td>
<td></td>
<td>9</td>
<td>1</td>
<td>9</td>
<td>3</td>
<td>7</td>
<td></td>
<td>29(12)</td>
</tr>
<tr>
<td>Oncology Ward</td>
<td></td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>14(6)</td>
</tr>
<tr>
<td>Medical Wards</td>
<td></td>
<td>6</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td></td>
<td>21(9)</td>
</tr>
<tr>
<td>Intensive care unit</td>
<td></td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>5(2)</td>
</tr>
<tr>
<td>SCBU/NICU/IPP</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>11(5)</td>
</tr>
<tr>
<td>Orthop OPD</td>
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<td>3</td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td>11(5)</td>
</tr>
<tr>
<td>General OPD</td>
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<td>5</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>17(7)</td>
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<tr>
<td>Surgery OPD</td>
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<td>3</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Medical OPD</td>
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<td>-</td>
<td>4</td>
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<td>6(3)</td>
</tr>
<tr>
<td>Others</td>
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<td>2</td>
<td>-</td>
<td>2</td>
<td></td>
<td>6(3)</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>64(27)</td>
<td>45(19)</td>
<td>34(14)</td>
<td>30(13)</td>
<td>44(18)</td>
<td>23(9)</td>
<td>240(100)</td>
</tr>
</tbody>
</table>

Other Wards/Clinics: Private wing; Special Treatment clinic; SCBU –special care baby unit; NICU- neonatal intensive care unit; IPP- in-patient paediatric; OPD- out-patient department
Other isolates: Enterococci spp -12; Coagulase negative staphylococcus – 4; Citrobacterfreundii – 3; Providentiaspp – 3; Candida spp – 2

Staphylococcus aureus was most sensitive to amikacin (83%) and erythromycin (79%) and least sensitive to amoxicillin (38%), clindamycin (55%) and cefuroxime (55%);
Pseudomonas aeruginosa was most sensitive to imipenem (96%) and amikacin (83%) and least to gentamicin (59%), ceftazidime (60%) and ofloxacin (61%); Proteus species most sensitive to amikacin (100%) and imipenem (78%) and least to amoxicillin/clavulanate (54%) and cefuroxime (63%) [table2]. Escherichia coli and Klebsiella pneumonia 100% showed sensitive to imipenem, but highly resistant to gentamicin 26% and 43% respectively.
DISCUSSION
Organisms from 12 different genera were found to be responsible for causing wound infections in the hospital. This study revealed that S. aureus was the most frequently isolated bacterial pathogen isolated within the period, followed by P. aeruginosa, Proteus spp, E. coli and K. pneumonia. This finding is consistent with reports of similar studies conducted in various parts of the country such as Ibadan (10), Benin-City (11), Ekpoma (12,13), Maiduguri (14) and elsewhere outside the country (15,16). A similar study in Enugu, Nigeria however, found K. pneumoniae as the predominant bacterial isolate (17). Most surgical and traumatic wound infection occurring in hospital are endogenously acquired, and might explain the predominance of normal flora amongst the pathogens (18). Surgery and gynaecology wards and the accident and emergency unit recorded the highest numbers of infection. These are areas in the hospital that have high numbers of patients with breaches on their skin either from surgery or from road traffic accidents, and are such predisposed to infections (18,19). The out-patient surgery also recorded the highest rate of infection among all the out-patient clinics. This may be as a result of post-discharge infections or infected wounds presenting to surgery from the community.

REFERENCES

With the exception of E. coli which showed substantial sensitivity to amoxicillin/clavulanate (83%), and S. aureus to erythromycin (79%) and chloramphenicol (100%), all the five commonest isolates were more than 30% resistant to all the commonly used first line drugs for their treatment, particularly to the third generation cephalosporins and gentamicin. This level of resistance makes the choice for empiric treatment very challenging, with attendant increase in morbidity, cost of care following prolonged hospital stay and use of more expensive drugs and in some cases increased mortality. The susceptibility of Staphylococcus aureus to chloramphenicol is particularly interesting, as this is one of the drugs that were commonly used in the past, but rarely used today due to its toxicity in the bone marrow and newborn. In the face of daunting multiple resistance the drug may become useful. Consideration for chloramphenicol has been recommended for eye infection due to Staphylococcus aureus and infection due to susceptible methicillin resistant Staphylococcus aureus (21,21). The substantial level of sensitivity to the carbapenems and amikacin may also provide some kind of fall back position, but caution must be exercised to avoid losing this window. The findings of this study reinforce the need for antibiotic stewardship and efficient and effective infection control measures.

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