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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 can result in increased patient morbidity and mortality. The current spread of multi -drug resistant bacteria has further heightened the need for regular bacteriological review of infected woundsand regular antibiotics surveillance studies so as to avoid the unguidedempirical treatment of wound infections which is quite common in this environment
Aim: To determine the distributionof theisolates from wound specimens submitted to the medical microbiology laboratory of National Hospital Abuja for processing.
Method: A reviewand analysis of 380 woundspecimens results from various wards in the hospital over a period of 10 months (1st Marto Dec 31st 2010) was conducted.
Result: A total of 314 isolates were recovered from the 380 wound specimens giving a yield of 83%. 240(76%) 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 *S 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 maycause 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% form 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 determiningthedistribution and antibioticsusceptibility 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 themanagement of wound infections.

METHODS

This is a retrospective study of the data of 380 woundspecimens from various wards submittedto the Medical Microbiology laboratory of NMA for processing over a period of10 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 wardsand clinics were retrieved and analyzed for thepurpose 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 specimensare inoculated onto MacConkeyand blood agar and incubated aerobicallyat 35-37°C for 18-24hrs. The isolates are gram stained and identified usingstandard bacteriological procedures[8]. Antibiotic susceptibility is tested using theModified Kirby-Bauer disk diffusion method and the results are interpreted usingClinical and Laboratory Standards Institute (CLSI) recommendations (9).

RESULTS

Of the 380 wound specimens results reviewed, 314grew 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.%)ofthe pathogens were bacteria, dominated by Staphylococcus aureus (27%), Pseudomonas aureus (19%), Proteus species (18%), Escherichia coli (14%) and Klebsiellapneumoniae (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.

Wards/Clinics	Isolates						
	S. aureus	*P. aeruginosa*	*E. coli*	*K. pneumoniae*	*Proteus spps*	*Others*	Total
Gynae Ward	10	4	4	7	5	4	34(14)
Surgery Ward	19	13	8	6	13	5	64(27)
Accid/Emergency	9	1	9	3	7		29(12)
Oncology Ward	2	3	-	3	4	2	14(6)
Medical Wards	6	6	2	2	5		21(9)
Intensive care unit	-	3	1	-	-	1	5(2)
SCBU/NICU/IPP	3	3	3	2	-	-	11(5)
Orthop OPD	3	2	3	-	2	1	11(5)
General OPD	5	5	3	1	-	3	17(7)
Surgery OPD	5	3	1	6	4	3	22(9)
Medical OPD	2	-	-	-	4	-	6(3)
Others	-	2				4	6(3)
TOTAL	64(27)	45(19)	34(14)	30(13)	44(18)	23(9)	240(100)

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.

TABLE 2.ANTIBIOTIC SENSITIVITY PATTERN OF THE FIVE COMMONEST ISOLATES

Antibiotics	Isolates									
	E. coli		K. pneumonia		Proteus spp		P aeruginosa		S. aureus	
	No Tested	% S	No Tested	% S	No Tested	%S	No Tested	%S	No Tested	% S
Cefuroxime	25	32%	17	35%	24	63%	-	-	33	55%
Gentamicin	19	26%	14	43%	31	65%	27	59%	41	68%
Imipenem	9	100%	5	100%	9	78%	27	96%	-	-
Ciprofloxacin	18	67%	18	67%	25	68%	29	66%	24	67%
Amox/Clavulanate	6	83%	5	20%	13	54%	-	-	18	61%
Amoxicillin	-	-	-	-	-	-	-	-	13	53%
Cefotaxime	13	46%	14	64%	17	65%	-	-	-	-
Amikacin	8	88%	6	67%	3	100%	12	83%	12	83%
Ofloxacin	-	-	-	-	-	-	38	61%	32	72%
Ceftazidime	-	-	-	-	-	-	22	60%		
Erythromycin	-	-	-	-	-	-	-	-	24	79%
Clindamycin	-	-	-	-	-	-	-	-	11	55%
Chloramphenicol									12	100%

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 hospitalare 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.

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[1].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 backposition, 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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