e-ISSN: 0975-1556, p-ISSN:2820-2643
Available online on www.ijpcr.com
International Journal of Pharmaceutical and Clinical Research 2024; 16(4); 1229-1233

Original Research Article

Bacteriological Profile and Antibiogram of Wound Discharge Isolates from a Tertiary Care Hospital, Manipur

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Received: 25-01-2024 / Revised: 23-02-2024 / Accepted: 25-03-2024
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Conflict of interest: Nil

Abstract:

Introduction: Wound infection is one of the important causes of delayed wound healing and the rampant use of antibiotics over the period to control the pathogen has added onto the incidence of antibiotic resistant organisms.

Aims and Objectives: To evaluate the bacteriological profile and their drug susceptibility pattern from the isolates of patients with wound discharge.

Materials and Methods: It is a one-year retrospective study conducted at Department of Microbiology, Jawaharlal Nehru Institute of Medical Sciences (JNIMS), Manipur from November 2022 to October 2023. The bacterial isolates from the wound discharge were identified conventionally and antibiotic susceptibility testing were done by Kirby Bauer disc diffusion method. Data were analyzed using descriptive statistics such as percentage and proportions.

Result: Out of 124 clinical samples received in one year, 83 (67%) were bacterial culture positive. 51 (61.4%) of the bacterial isolates were Gram positive and 32 (38.6%) were Gram negative. The most frequently isolated organism was *Staphylococcus aureus* (19.88%), *Klebsiella* spp (27.7%), *Escherichia coli* (22.8%), *Pseudomonas aeruginosa* (8.4%), CoNS (6.02%), *Proteus mirabilis* (1.02%) respectively.

Conclusion: Early management of the wound and sending the samples once there is high clinical suspicion and also checking the susceptibility to the antibiotics, and sticking to the antimicrobial stewardship would be very crucial in controlling wound infection specially in the hospital settings.

Keywords: Bacteriological Profile, Antibiotic Susceptibility, Wound.

Introduction

Wounds presented by patients vary from one setting to another, ranging from acute surgical wounds, traumatic wounds such as those following an accident, burn wounds or chronic wounds such as diabetic foot, leg and pressure ulcers [1]. Differently wound infection depends on the pathogenicity and virulence of the microorganisms and the immune competency of the host and it is determined by the presence of clinical signs of infection such as pain, erythema, tenderness, heat, edema cellulites and pus [2,3]. Therefore, wound infection results in active disease that is likely to delay the wound healing process [4]. Both aerobic and anaerobic bacteria have been implicated from in wound infection which commonly occur under hospital environment and results in significant morbidity, prolonged hospitalization and huge economic burden [5]. Despite advances in the control of infections, wound infections have not been completely prevented due to problem of drug resistance [6]. Knowledge of the causative agents of wound infection has proven to be helpful in the selection of appropriate antimicrobial therapy and on infection control measures taken in health institutions [7].

Objectives

The present study was aimed to evaluate the bacteriological profile, drug susceptibility pattern from the isolates and to aid in choosing the most effective antibiotic for the treatment.

Materials and Methods

A one-year retrospective study was conducted at Department of Microbiology, Jawaharlal Nehru Institute of Medical Sciences (JNIMS), Manipur

from November 2022 to October 2023.The clinical isolates from wound aspirates, surgical wound swabs and other wound swabs were identified by conventional methods [8]. Positive cultures were isolated and antibiotic susceptibility testing were performed using Kirby Bauer disc diffusion method [9]. The isolates were tested against antibiotics (HiMedia, Mumbai) namely linezolid (10 mcg), gentamicin (10 mcg), ciprofloxacin (10 mcg), erythromycin (15 mcg), cotrimoxazole (25 mcg), clindamycin (10 mcg) for Gram-positive bacteria and amoxy-clavulanic acid(30 mcg), amikacin (30 mcg), gentamicin (10 mcg), ceftriaxone (30 mcg), ciprofloxacin (5mcg), imipenem (10 mcg), meropenem (10 mcg), piperacillin-tazobactam (30/6 mcg), cotrimoxazole (25 mcg), ceftazidime (10 mcg)for Gram-negative bacteria. For routine Quality Control of antibiotic susceptibility test, *S. aureus* ATCC 25923, *E. coli* ATCC 25922, and *Pseudomonas aeruginosa* ATCC 27853 were used [10]. The data were collected from the registry of the bacteriology section of the Department of Microbiology, JNIMS after checking their completeness.

Inclusion Criteria: All the wound swabs and wound aspirate samples sent to the bacteriology laboratory of Department of Microbiology from all the wards of the institute.

Exclusion Criteria: Samples that have been contaminated.

Results:

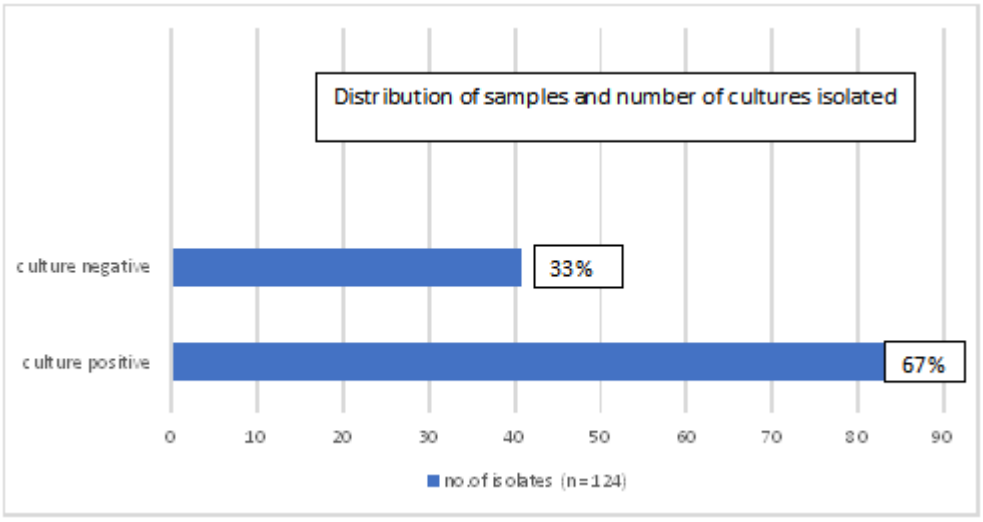

Figure 1: Distribution of samples and number of cultures isolated

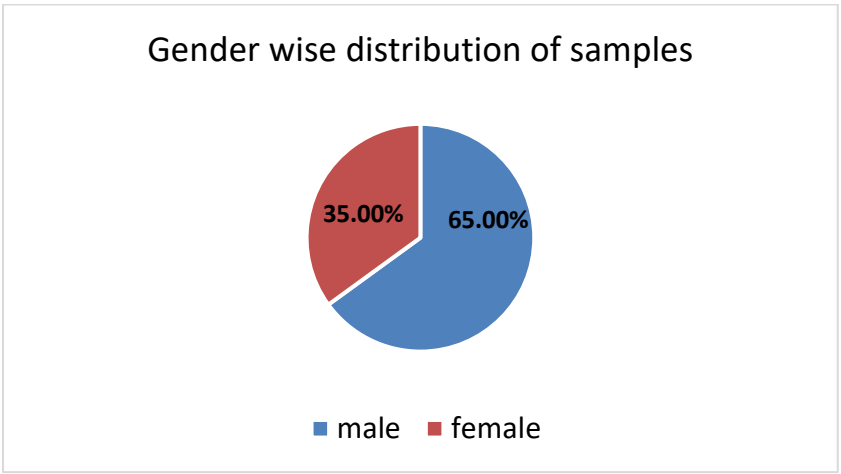

Figure 2: Gender wise distribution of samples

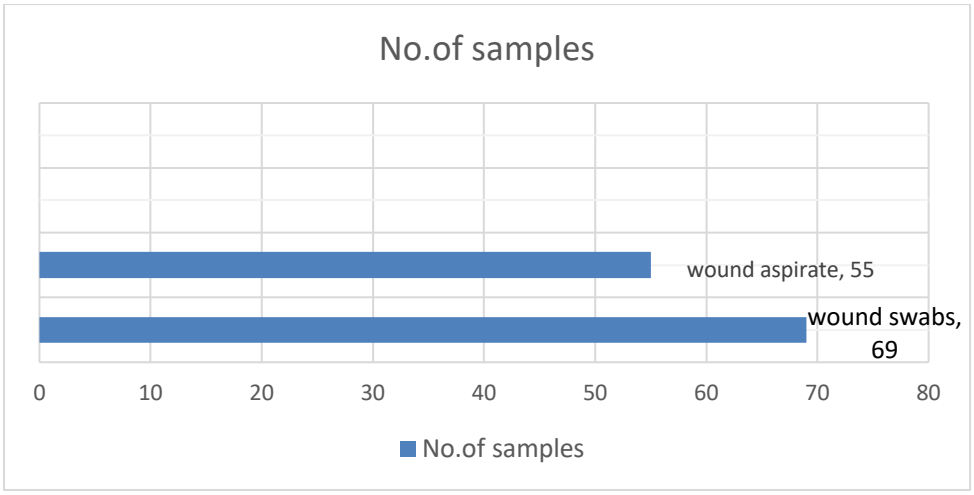

Figure 3: Distribution of type of samples

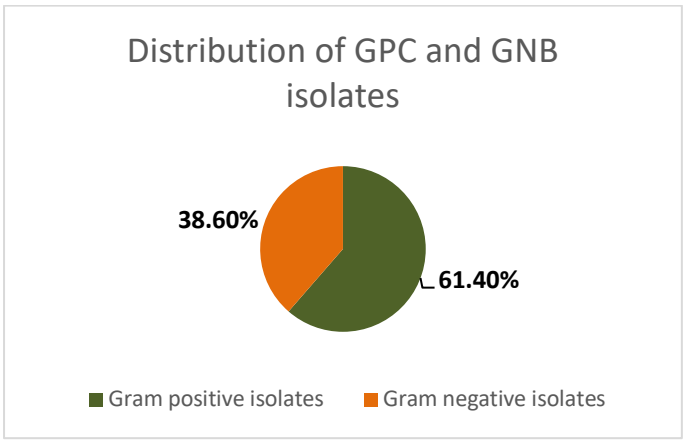

Figure 4: Distribution of Gram-positive cocci and Gram-negative bacilli isolates

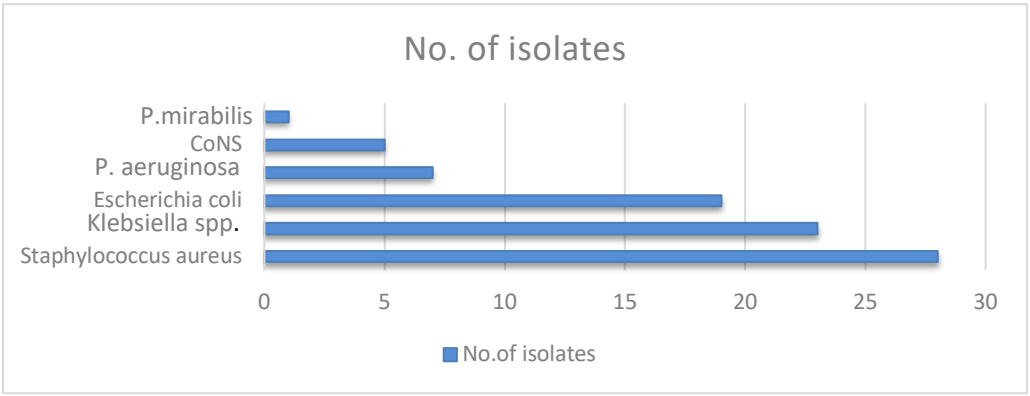

Figure 5: Distribution of various isolates

Table 1: Susceptibility of Gram-positive cocci to various antibiotics

Organism	Antibiotic Susceptibility (%)					
	LZ	GEN	CIP	E	COT	CM
MRSA	91%	67%	20%	39%	42%	38%
MSSA	95%	72%	32%	40%	45%	42%
CoNS	96%	65%	38%	51%	56%	59%
MRSA- methicillin resistant *Staphylococcus aureus*; MSSA- methicillin sensitive *Staphylococcus aureus*; CoNS-coagulase negative *Staphylococcus*; LZ – linezolid, GEN – gentamicin, CIP – ciprofloxacin, E- erythromycin; COT- co-trimoxazole, CM-Clindamycin,						

Table 2: Susceptibility of Gram-negative bacilli to various antibiotics

Organism	Antibiotic Susceptibility (%)									
	AMC	AK	GEN	CTX	CIP	IMP	MRP	PIT	COT	CTZ
E. coli	80%	79%	76%	62%	67%	95%	92%	78%	64%	67%
Klebsiella spp.	56%	61%	65%	56%	58%	91%	89%	69%	51%	62%
Pseudomonas aeruginosa	-	55%	57%	-	49%	81%	83%	74%	-	73%
Proteus mirabilis	-	79%	74%	64%	59%	96%	94%	71%	65%	73%
AMC- amoxy-clavulanic acid; AK- amikacin, GEN – gentamicin, CTX- ceftriaxone, CIP- ciprofloxacin; IMP- imipenem; MRP- meropenem; PIT- piperacillin-tazobactam; COT- Co-trimoxazole; CTZ- ceftazidime;										

Out of the total 124 clinical samples received in one year, 83 (67%) of the isolates were culture positive, and 41 (33%) came out to be negative for culture as shown in Fig 1. Male patients constituted 80 (65%) and female patients constituted 44 (35%) as summarized in Fig 2. Out of the 124 samples, 69 (55.6%) were wound swab samples and 55 (44.3%) were pus aspirate samples. In our study, most of the bacterial isolates were found to be Gram-positive cocci at 51 (61.4%) while the remaining were Gram-negative bacilli at 32 (38.6%) as shown in Fig 3.The most frequently identified isolates were Staphylococcus aureus28 (33.7%), followed by Klebsiella spp.23 (27.7%),Escherichia coli 19 (22.8%), Pseudomonas aeruginosa7 (8.4%), CoNS5 (6.02%),Proteus mirabilis 1 (1.2%).Table 1 shows the antimicrobial susceptibility rates of the Gram-positive cocci to various antibiotics namely linezolid, gentamicin, ciprofloxacin, erythromycin, cotrimoxazole, clindamycin. Antimicrobial susceptibility rates of Gram-negative bacilli to various antibiotics such as amoxy-clavulanic acid, amikacin, gentamicin, ceftriaxone, ciprofloxacin, imipenem, meropenem, piperacillin-tazobactam, cotrimoxazole, ceftazidime as shown in Table 2.

Discussion

Among 124 clinical samples, 83 (67%) were bacterial culture positive. The isolation rate is slightly lower compared to a study done by Muluye D et al [11] where they have reported to be 70.2%. This variation may be due to smaller time frame of our study. Among the total isolates, 51 (61.4%) were Gram positive and 32 (38.6%) were Gram negative. The most pre dominantly isolated organism was Staphylococcus aureus which was 33.7% which is slightly lower to a study done by Malik S et al [12], with an isolation rate of S. aureus being 37.5%. Among the Gram Negative isolates, Klebsiella species were frequently isolated (27.7 %) in our study whereas E.coli was the most common gram negative isolate reported by Roy et al [13]. The susceptibility of antibiotics to first line and second line of the isolates is reduced in our study which corelates with the study done by Roy A et al [14] done in the same institute.

Conclusion

Early management of the wound and sending the samples once there is high clinical suspicion and also checking the susceptibility to the antibiotics, and sticking to the antimicrobial stewardship would be very crucial in controlling wound infection specially in the hospital settings.

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