Original Article

Bacteriological profile of burn wound infections in a tertiary care hospital, Jammu

A Kumar[1], B Jad[2*], B Mahajan[3], P K Prabhakar[4], S S Sharma[5]

[1,2,3,5] Department of Microbiology, Government Medical College, Jammu, Jammu and Kashmir, INDIA.
[4]Department of Microbiology, LPU, Punjab, INDIA.
Email: beenajad@yahoo.in

Abstract

The rate of nosocomial infections are higher in burn patients due to various factors like nature of burn injury itself, immunocompromised status of the patient, invasive diagnostic and therapeutic procedures and prolonged ICU stay. Complicating this high rate of infection is the fact that the spectrum of bacterial isolates varies with time and geographical area. This necessitates periodic review of the isolation pattern and antibiogram of the burn ward. Study conducted in Department of Microbiology, GMC, Jammu. Out of 180 total samples collected 100 samples showed culture positivity. Out of total 34% Gram positive organisms maximum positivity was of Staphylococcus aureus , Coagulase negative staphylococcus and Enterococci spp. respectively On the basis of study 66% of the total samples were Gram negative, in which maximum positivity was of Escherchia coli followed by Pseudomonas spp. Antibiotic sensitivity patterns revealed that many of the isolates were resistant to commonly used antibiotics like Ampicillin, Erythromycin, Ciprofloxacin, Gentamycin etc which are being indiscriminately used on empirical basis for prolonged duration of time. The high percentage of multidrug resistant isolate is probably due to empirical use of broad-spectrum antibiotics and non-adherence to hospital antibiotic policy.

Keywords: Nosocomial infection, drug resistance, antibiogram.

[*]**Address for Correspondence:**
Dr. Beena Jad, Demostrator, Department of Microbiology, Govrenment Medical College, Jammu-180001, INDIA.
Email: beenajad@yahoo.in

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INTRODUCTION

Burn injury is a major problem in many parts of the world. It has been estimated that 75% of all deaths following burns are related to infection[1]. Burn wounds are highly susceptible to colonization and infection and this is a major problem in the management of burn victims.[2] The pathogenesis of colonization, infection and invasion of microorganisms is related to the fact that there is a disruption of the normal skin barrier at the site, as well as a large amount of necrotic tissue and protein-rich wound exudates at the burn surface, providing a rich growth medium for colonization and growth of microorganisms, which is poorly controlled due to depressed immune responses.[3] The rate of nosocomial infections are higher in burn patients due to various factors like nature of burn injury itself, immunocompromised status of the patient, invasive diagnostic and therapeutic procedures and prolonged ICU stay.[4] In addition, cross-infection results between different burn patients due to overcrowding in burn wards.[5] Complicating this high rate of infection is the fact that the spectrum of bacterial isolates varies with time and geographical area.[6], the problem of multi-drug resistance in gram-negative bacilli due to extended spectrum beta lactamases (ESBL) production is becoming a serious threat to the healthcare worker, who are likely to contract the infection, as the therapeutic options to these organisms are limited.[7] This necessitates periodic review of the isolation pattern and antibiogram of the burn ward, which forms the basis for modification of drug regimen strategy. Keeping this in mind, the present study was planned on 180 burn patients admitted in burn ward at Govt. Medical College, Jammu, to determine the bacteriological profile and the resistance pattern.

MATERIAL AND METHOD

Study was carried out on 180 burn patients admitted in burn ward at Govt. Medical College, Jammu. Wound swabs were collected from all 180 patients and transported aseptically to bacteriological labs for analysis. Burn wound swabs were taken using the standard technique of collection of microbiological specimen and were processed as per departmental protocol.[8]

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RESULTS

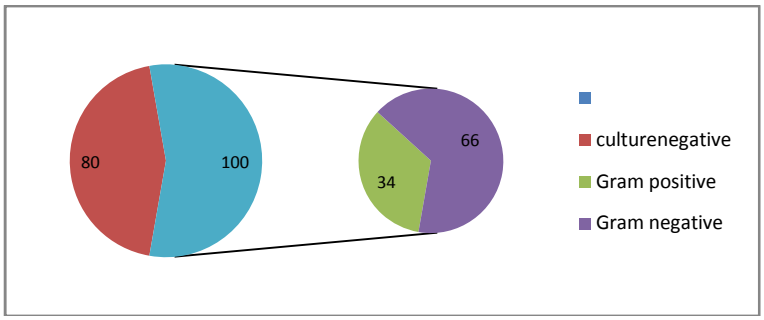

Figure 1: Bacteriological studies

Out of 180 total samples collected, 80 samples were sterile and 100 samples showed culture positivity i.e. 44.4% and 55.5% respectively..Gram negative bacteria were more as compared to Gram positive i.e. 66% and 34% respectively.

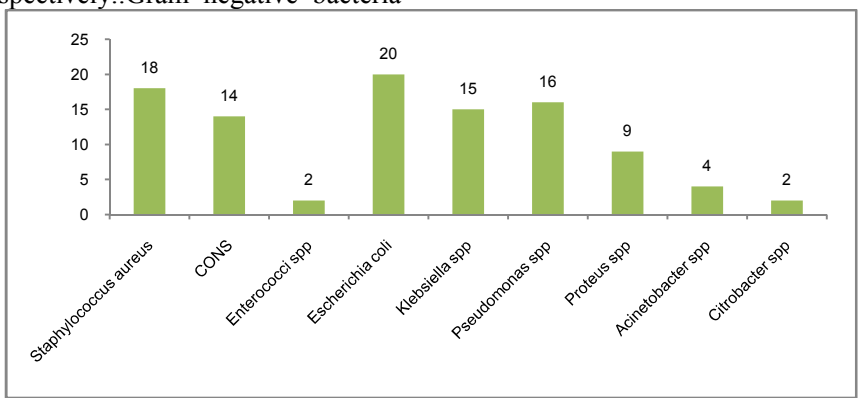

Figure 2: Organism Isolated

Out of total 100 positive organisms percentage of Escherchia coli 20% followed by Staphylococcus aureus 18% then Pseudomonas spp 16%, Klebsiella spp 15%, Coagulase negative staphylococcus14% Proteus spp 9%, Acinetobacter spp. 4% and Citrobacter spp and Enterococci spp. was 2% each.

ANTIBIOTIC SUSCEPTIBILITY PATTERN:

E.coli was resistant to

Amoxy-clav 70%,
Ciprofloxacin 55%
Gentamycin 50%
Amikacin 30%
Pipericillin-tazobactum 25%.

Staphylococcus aureus was resistant to

Ampicillin72.22%
Ciprofloxacin 44.4%
Cefoxitin 33.33%,
Erythromycin 6(33.33%)
Cotrimoxazole 4 (22.22%)

Pseudomonas spp. was resistant to

Gentamycin 50%
Piperacillin 50%
Amikacin 37.5%
Cefipime 37.5%
Imipenam is 6.25%.,
Ceftazidime(31.25%)

Klebsiella was resistant to

Amoxy-clav 66.6%,
Ciprofloxacin 53.3%
Gentamycin 46.6%,
Amikacin 53.3%
Pipericillin-Tazobactum 20%.

DISCUSSION

Burn patients are ideal hosts for opportunistic infections[9]. The burn site remains relatively sterile during the first 24 hour; thereafter, colonization of the wound by gram negative bacteria is common [10]. Microorganisms routinely isolated from burn wounds include aerobic organisms like Pseudomonas aeruginosa, Staphylococcus aureus, Streptococcus pyogenes, E.coli, Klebsiella Spp., Proteus etc., and anaerobic organisms like Bacteroides fragilis, Peptostreptococcus, Propionibacterium Spp., Fusobacterium Spp and fungi like Aspergillus niger, Candida Spp , Zygomycetes[11].Out of total 180 samples 55.5% were culture positive rest negative ,out of which Gram positive were 34%and Gram negative 66% .This is in agreement with the previous study by Nasser S *et al*,[12] who found Gram positive cocci in 40.3 % and Gram negative bacilli in 55.7 % cases. The present study has

shown that E.coli, S.aureus and P.aeuginosa are the most common isolates in burn injuries (20%,18%.16% respectively). Other studies also showed that nosocomial inection caused by P. aeruginosa was the major danger in burn patients[13,].Staphylococcus aureus has also been reported as a major cause of nosocomial infection[14] In the present study no isolate of β-haemolytic Strepto-cocci was seen which is in agreement with the previous studies[15] but contrary to findings in other study[16]. Antibiotic sensitivity patterns revealed that many of the isolates were resistant to commonly used antibiotics like Ampicillin, Erythromycin, Ciprofloxacin, Gentamycin etc which are being indiscriminately used on empirical basis for prolonged duration of time. Resistance to various antibiotics routinely used has been reported from several studies.[17-22] Staph. aureus was found to be sensitive to Vancomycin and Linezolid. Amikacin a second generation aminoglycoside was effective against Pseudomonas, E.coli and Klebsiella in our study. Sensitivity of various organisms to Amikacin in our study has also been demonstrated by other studies.[19] The high percentage of multidrug resistant isolate is probably due to empirical use of broad-spectrum antibiotics and non-adherence to hospital antibiotic policy. Our study indicated that the burn wound infection was the most common cause of nosocomial infection.

CONCLUSION

Escherichia coli, Staphylococcus aureus and Pseudomonas spp. were the main culprit in burn wound infections. This suggests that burn patients overcrowding and hygiene problem are main causes of these infections. A nosocomial infection surveillance system may be introduced to reduce the rate of nosocomial infections among burn patients and for better therapeutic options. A careful microbiological surveillance and in vitro testing before the start of antibiotic therapy and restrictive antibiotic policy may be of great help in prevention and treatment of MDR isolates in burn units and thus overall reduction in infection related morbidity and mortality.

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