ORIGINAL ARTICLE

Frequency of Microbes in Hospitalized Burn patients in Karachi

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ABSTRACT

Aim: To evaluate the prevalence of microbial spectrum in burn wounds of hospitalized patients.
Methods: A total number of 100cases of burned patients registered in two Hospitals ofKarachi were included in this study. Altogether, 239 specimens were collected.
Results: A total of 246microbial results obtained among them were mostly gram negative rods (63%) while Gram positive were 26.42%.Among Gram negative organisms i.e., *Pseudomonas aeruginosa*were 32.52% and*Klebsiella species* were 9.75%in burned patients. The *Pseudomonas aeruginosa* and*Staphylococcus species* were dominant in cultures of burned patients.
Conclusion: The nature of microbial colonization is to be known in under treatment burn cases .
Keywords: Burn patients; *Pseudomonas aeruginosa*; Gram positive microorganisms; Gram negative rods CLSI.

INTRODUCTION

Burns are one of the most frequent emergencies, appearing as demolishing and disfiguring type of trauma (Rajput *et al*., 2010). The infections are major cause of mortality in burns patients (Murray *et al*., 2007 and Oncul*et al*., 2009). There are many ways by which burns use destruction in body but in burns skin is the fore most target otherwise there are so many sources body undergoes destruction also (the most vital organ) that is affected in burns (Williams *et al*., 2008). Burn patients are more prone to develop infection as a consequence of thrombosis of the subcutaneous blood vessels, knowing the nature of the burn injury, intensive diagnostic and therapeutic procedures (Oncul*et al*., 2009). Exposed and large wounds associated with necrotic tissues make the patients very susceptible to infections, immunosuppressed followed by neutropenia also cellular&humoral immunity turned the burned wounds for microbial cultivation(Beheshti and Zia, 2011).

The microorganisms recovered from burn patients are *Pseudomonas aeruginosa*(Mahar*et al*., 2010), *Staphylococcus aureus*, *Klebsillea*spp, and other coliform bacilli (Ekrami and Kalantar, 2007).initial prevalence of G+ve organisms is gradually superseded by G -ve opportunistic pathogens (Ahmad *et al*., 2006). *Pseudomonas* present everywhere, inhabiting soil, water, plants and animals including man (Ghorashi*et al*2010). Pseudomonas is the most frequently isolated Gram-negative bacterium and sole cause of life-threatening infections (Aloush*et al*., 2006 and Mahar*et al*., 2010). We made an attempt to determine prevalence of microorganisms in burn patients. The present study investigated gram negative pathogens responsible for more infections in burned cases.

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METHODOLOGY

From February 2011 to June 2011this study was carried out on 100 patientsin the Department of Microbiology, Basic Medical Sciences Institute (BMSI), JPMC Karachi.On writtenproformaconsent was obtained from each patient/guardian.Irrespective of age or gender, degree, percentage or duration of burn.

A total 239 culture spceimens bifurcated into two groupsi.e., 197 *samples of pus were taken from wounds* and 42 *samples of blood were taken from suspectedsepticemic patients, out of* 100 registered patients.By applying after aseptic techniques speciemens collected and data was filled in apredefined questionnaire accordingly. Each swab was taken from infected wounds after cleaning of any ointment on day 7thand 14thafter admission (Ekrami and Kalantar, 2007) andinoculation done on common decided agars i.e.,blood agar, MacConkey agar and Sabouraud Dextrose agar (SDA) (Altoparlak*et al*., 2004). After incubation aerobically at 35±2°C for 24 hours & blood culture bottles were incubated for 24 to 48 hours (and even up to one week where needed) at 37°C and then watched for sign of positive growthas turbidity after 24-48 hours for identification purpose according to CLSI criteria.

Each significant isolate was identified by colonial morphology, Gram staining and biochemical reactions according to the standard procedure. Blood samples were collected after all aseptic measures

and in case of suspected septicaemia,while 5-10ml of blood was collected in a disposable syringe aseptically. and poured into a bottle containing 50 ml of brain heart infusion broth , blood mixed in broth by tilting or rotating the bottle gently and was transported to the Microbiology Department of BMSI in minimum time(Collee and Marr, 1999)same blood culture broth incubated at 37°C for 7 day simultaneously. Three sub- cultures were made after 24 hours, 72 hours and on the 7th day over Blood, MacConkey and Sabouraud's dextrose agar respectively (Manoharan*et al*., 2010)for identification according to CLSI criteria. Each significant isolate was identified by colonial morphology, Gram staining and biochemical reactions according to the standard procedure.

RESULTS

Table 1: Distribution of total patients according to gender

Gender	n
Male	60(60%)
Female	40(40%)

Table 2: Distribution of total isolates according to different groups of microorganism (n=246)

Isolated organisms	n
Gram-negative organism	155(70%)
Gram-positive organism	65(29.5%)
Others	26(10.56%)

Table 3: Distribution of different groups of microorganisms (n=246)

Organisms	n
Pseudomonas species	80(32.52%)
Other GNNF	15(6.09%)
Staphylococcus species	65(26.42%)
Proteus species	20(8.13%)
Klebsiella species	24(9.75%)
Other GNR	16(6.49%)
Others	26(10.56%)

GNNF=Gram negative non fermenters
GNR=Gram negative rods

Table 1 shows gender wise distribution: A total 100 patients was study target in which 60(60%) were males while 40(40%) were females. Data shows a higher percentage of males as compared to female patients i.e., 1.5:1.

Table 2 shows the distribution of total isolates according to different groups of microorganisms where out of 246 total isolates, 155(63%) were Gram-negative organisms, 65(26.42%) were Gram-positive organisms while 26(10.56%) were others.

Table 3 shows the prevalence of various organisms among 100 burn patients. Out of 246 isolates recovered from wound as well as from blood specimens, the prevalence of Pseudomonas aeruginosa was the highest in NFGNB i.e., 80(32.52%), followed by Acinetobacterbaumannii i.e., 15(6.09%). Staphylococcus species were 65(26.42%). In family Enterobacteriaceae, Klebsiella species were more prevalent i.e., 24(9.75%), while Proteus species were 20(8.13%), E.coli 8(3.25%), Serratia species were equal i.e., 4(1.62%) and Citrobacter species were 4(1. 62%)

The results of present study is highlighted the high prevalence of P.aeruginosa is in agreement with other study and it is fact that opportunistic microorganisms grow mainly in moist body areas such burn wounds and also with prolong hospital stay.

DISCUSSION

Burn injury being one of the commonest injuries, accounts 3% of overall admissions in ward. Infection is great challenge for the clinician, due to the presence of dead and denatured burn scar and moist environment, which is good growth medium for microbes (Naqvi et al., 2005).

The risk factors of antibiotic resistance include antibiotics given before establishing the infection, longer hospitalization, invasive procedures, comatose state and advancing age(Church et al., 2006). In many developing countries rate of bacterial resistance are markedly higher, probably because of lack of supervision, poor infection prevention practices, inappropriate use of limited resource and over-crowding of hospitals (Khorshidi and Sharif, 2010).

In the present study male and female patients were not equally affected i.e., males were 60% while females were 40% giving male to female ratio of 1.5:1. This coincides with the study of Santucci et al (2003) in which 58% males was affected while 42% females were affected. Kumar et al. (2010) observed high number of female patients (80.8%) as compared to males (19.2%), which is in contrast to our study.

Infectionsdue to*Pseudomonas aeruginosa* are increasing in numbers from 11% to 30% of burns are contaminated by microorganisms of the gastrointestinal tract, skin and upper respiratory system, including *Pseudomonas aeruginosa, Staphylococcus aureus,Candida species (commensals) Escherichia coli, Klebsiella species, Enterococcus species*(Begum et al., 2011).

In the present study, 32.52% (80/246) strains of *Pseudomonas aeruginosa* were recovered from burn patients.Our study is analogous with study by Ekrami and Kalantar (2007) 37.5% (65/173) *Pseudomonas aeruginosa* strains in burn patients and study done by Srinivasan et al (2009)found klebsiella(33.9%)while Pseudomonas (31.84%) in

their burn unit .Higher incidence instudy of (Aloush et al,2006 and Mahar et al,2010). This pathogen is the major cause of morbidity & mortality in immunocompromised patients (Sadeghi et al2012).

CONCLUSION

In view of thefindings of the present study, it is recommended that a regular surveillance of microorganisms infecting burned patients and awareness of nursing staff in burns wards regarding hand washing and change of gloves after changing dress ofeach patient should be carried out.

REFERENCES

1. Ahmad M, Hussain SS, Khan MI and Malik SA. Pattern of bacterial invasion in Burn patients at the Pakistan Institute of Medical Sciences, Islamabad. Ann Burns Fire Disasters 2006; 9(1):18-21.
2. Aloush V, Navon-Venezia S, Seigman-Igra Y, Cabili S and Carmeli Y. Multidrug resistant *Pseudomonas aeruginosa*: Risk factors and clinical impact. Antimicrob Agent Chemother 2006; 50(1):43-48.
3. Altoparlak U, Erol S, Akcay MN, Celebi F and Kadanali A. The time related changes of antimicrobial resistance patterns and predominant bacterial profiles of burn wounds and body flora of burned patients. Burns 2004; 30:660-664
4. Begum H, Quamruzzaman M and Talukdar M. Microbial isolates from patients and their antibiogram at the tertiary care Burn Unit in Bangladesh. J Bangladesh CollPhysSurg 2011; 29:62-66.
5. Beheshti S and Zia M. Bacteriology of burns and antibiogram in an Iranian burn care center. African J Pharmacy Pharmacol 2011; 5(4):538-541.
6. 6 . Church D, Elsayed S, Reid O, Winston B and Lindsay R. burn wound infections. ClinMicrobiol Rev 2006; 19(2):403-434.
7. Collee JG and Marr W. Specimen collection, culture containers and media In: Mackie and McCartney. Practical Medical Microbiology, 14th edition, by Collee JG, Marmion BP, Fraser AG and Simmons A, Churchill Livingstone, 1999; pp.95-111.
8. Ekrami A and Kalantar E. Bacterial infections in burn patients at a burn hospital in Iran. Indian J med Res 2007; 126:541-544.
9. Ghorashi Z, Nezami N, Ghotaslou R and Ghorashi S. Pattern of *Pseudomonas aeruginosa* drug resistance in Tabriz children hospital.Pak J Biol Sci 2010 ; 13(8):400 -404
10. Khorshidi A and Sharif AR. Imipenem resistance among gram negative and gram positive bacteria in hospi Kumar CA, Mathur M, Salunke P and Baweja S. Time related changes of microbial flora in burns unit at tertiary care hospital. Bombay Hospital J 2010; 52(2):205-209.
11. Kumar CA, Mathur M, Salunke P and Baweja S. Time related changes of microbial flora in burns unit at tertiary care hospital. Bombay Hospital J 2010; 52(2):205-209
12. Mahar P, Padiglione AA, Cleland H, Paul E, Hinrichs M and Wasiak J. *Pseudomonas aeruginosa*bacteraemia in burns patients: Risk factors and outcomes. Burns 2010; 36:1228–1233.
13. Manoharan A, Chatterjee S, Mathai D. Detection and characterization of metallo beta lactamases producing *Pseudomonas aeruginosa*. Indian J Med Microbiol 2010; 28(3):241-244.
14. Murray CK, Hoffmaster RM, Schmit DR, Haspenthal DR, Ward JA, Cancio LC and Wolf SE. Evaluation of white blood cell count, neutrophil percentage, an elevated temperature as predictors of blood stream infection in burn patients. Arch Surg 2007; 142(7):639-642.
15. Naqvi ZA, Hashmi K, Rizwan QM and Kharal SA. Multidrug resistant *Pseudomonas aeruginosa*: A nosocomial infection threat in burn patients. Pak J Pharmacol 2005; 22(2):9-15.
16. Oncul O, Ulkur E, Acar A, Turhan V, Yeniz E, Karacaer Z and Yildiz F. Prospective analysis of nosocomial infections in a Burn Care Unit Turkey. Indian J Med Res 2009; 130:758-764.
17. Rajput A, Saxena R, Sindh KP, Kumar V, Singh S, Gupta A and Singh RK. Prevalence and antibiotic resistance pattern of metallo-β-Lactamase producing *Pseudomonas aeruginosa* from burn patients. Experience of an Indian tertiary care hospital. J Burn Care Res 2010; 31:264-268.
18. Sadeghi A, Rahimi B and Shojapour M. Molecular detection of metallo-β-lactamase genes bla_{VIM-1}, bla_{VIM-2}, bla_{IMP-1}, bla_{IMP-2} and bla_{SPM-1} in *Pseudomonas aeruginosa* isolated from hospitalized patients in Markazi province by Duplex-PCR. African J Microbiol Res 2012; 6(12):2965-2969.
19. Srinivasan S, Vartak AM, Patit A and Saldanha J. Bacteriology of the burn wound at the BarjerbaiWadiaHospital for children Mumbai India- A 13 years study PartI Bacteriological profile. Indian J PlastSurg 2009; 42:213-218.
20. Williams NS, Bulstrode CJK and O'connell PR. Bailey and Love's short practice of surgery, 25th Edition, Hodder Arnold, Hachette Liver UK.