IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 16, Issue 9 Ver. VI (Sep. 2017), PP 20-23
www.iosrjournals.org

Bacteriological Profile And Antimicrobial Susceptibility Pattern of Isolates Among Burn Wound Patients At A Tertiary Care Hospital of Odisha, India

Madhumita Swain[1], *Bimoch Projna Paty[2],Nirupama Chayani[1]
[1(]*Department of microbiology, Scb Medical College,Cuttack, India)*
[2 (]*Department Of Microbiology, Mkcg Medical College, Berhampur, India)*
[1(]*Department Of Microbiology, Scb Medical College,Cuttack, India)*
*Corresponding author:*Bimoch Projna Paty*

Abstract:
Background: *Burns are the most common & devitalising forms of trauma. Infections are the most common cause of mortality and morbidity in these patients.Approximately 75% of mortality following burns are because of infection.*
Aims and objectives: *This study was conducted to determine the bacteriological profile of burn wound infection along with evaluation of antimicrobial susceptibility pattern of the organism isolated*
Material and methods: *Samples from 110 burn patients were collected. Organisms were isolated and identified using standard microbiological methods. AST was done by Kirby Bauer disc diffusion method an ESBL detection done by combined disc test.*
Results: *High culture positivity(92.72%) was seen in our study.Females were affected more. Predominant burning agent was flame (86.3%).Isolation rate of gram negative bacilli was higher compared to gram positive cocci. Pseudomonas aeruginosa was predominant offending agent in 42.4% of cases followed by Staphylococcus aureus . 94.7% of our Staphylococcal isolates were found to be MRSA and 55% of gram negative isolates are ESBL producing. The MRSA isolates were found to be sensitive to Vancomycin and Linezolid and the gram negative organisms were found to be sensitive to Imipenem.*
Conclusion: *Careful microbiological survillence antibiotic susceptibility testing shoud be done before the start of antibiotic therapy.Following hospital antibiotic policy will help grately in prevention and treatment of MDR isolates in burn units thus reducing overall morbidity and mortality*
Keywords: *Burns, MRSA, Pseudomonas aeruginosa,Staphylococcus aureus*

Date of Submission: 08 -09-2017 Date of acceptance: 20-09-2017

I. Introduction

Burns are the most common & devitalising forms of trauma. Major burns can be defined as any burn that requires intravenous resuscitation fluid or covers 10% of body surface area in adult and/or burn that involves the airways.[1-5]Burn site which remains relatively sterile during the first 24 hours became colonised commonly by gram negative bacteria[6].Clinical diagnosis of bacteremia and or sepsis is difficult for a number of reasons. It could be symptomatic or asymptomatic as a result of immunodeficiency secondary to thermal injury, malnutrition, anemia due to impaired reperfusion and damage to immunological barrier.[7,8]Infections are the most common cause of mortality and morbidity in these patients. Approximately 75% of mortality following burns are because of infection[9,10,11].

Pseudomonas aeruginosa has emerged as a predominant member of the burn wound flora and in absence of topical therapy it is cultured from 70% patients with burn wound by third week.[12]
Microorganism routinely isolated from burn wounds include aerobic organisms like Staphyloccocus aereus, Streptococcus pyogenes, Escherichia coli, Klebsiella spp,Proteus etc,anerobic organisms like Bacteroides spp, Peptostrep tococcus, Propionibacterium and fungi like Aspergillus niger, Candida spp,Zygomycetes.[13]Periodical culturing and survillence of potential microorganisms and their sensitivity pattern may alert early management & help in decrese in morbidity and mortality in burn patients.

This study was conducted to determine the bacteriological profile of burn wound infection in the 1st week post burn along with evaluation of antimicrobial susceptibility pattern of the organism isolated.

II. Materials And Methods

2.1 Study type and study design: Observational descriptive study with Cross sectional design was conducted .
2.2 Study duration: February 2016 to July 2016

2.3 Settings and location: The study was conducted in the department of Microbiology, SCBMCH, Cuttack, India

2.4 Materials And Methods:

Hundred and ten(110) burn patients were evaluated over a period of 6 months from February2016 to July 2016. Specimens were collected in 1st week preferably between 3rd to 5th day post admission in the form of wound swabs(two) .One swab was inoculated onto Blood agar and MacConkey agar and put into nutrient broth and incubated at 37 degree overnight. Gram stain was performed from the second swab. Isolated organisms were & identified by standard microbiological methods[23].Antimicrobial susceptibility test of the isolates was done by Kirby Bauer disc diffusion method. Among the gram negative organisms ESBL detection was done by combined disc test using ceftazidime & ceftazidime+clavulanic acid discs. Among the *Staphylococcus aureus* isolates methicillin resistance was detected using cefoxitin disc method.

III. Results

Among 110 samples, 102 (92.72%)were culture positive from which a total 125 organisms were isolated. Multiple organisms were isolated in 23(22.55%) cases. Females(64%) were affected more than males(36%).The predominant age group affected is 15-30 years. The burning agent was predominantly flame 92((83.6%) followed by scald7(6.3%)electrical 6(5.4%), blast injury 4(3.6%) and 1 was due to acid. Of the 125 isolates gram negative organisms were found to be the major isolates (77%). Predominant organism was *Pseudomonas aeruginosa* 53(42.4%)followed by *Staphylococcus aureus* 19(15.2%),*Klebsiella* spp 13(10.4%),*Proteus* spp 9 (7.2%),*Escherichia coli* 9 (7.2%),*Enterobacter spp 7(5.6%),Enterococcus spp 7(5.6%),Acinetobacter spp 6(4.8%)Candida albicans 2(1.6%)*only. Among the Staphylococcus aureus 18(94.7%) were found to be MRSA and among the gram negative isolates 53(55%) were found to be producer of ESBL by combined disc method. The MRSA isolates were found to be sensitive to Vancomycin and Linezolid and the majority of gram negative organisms were found to be sensitive to Imipenem.

IV. Discussion

Burn wound monitoring requires the study of changing bacterial flora and their antibiotic susceptibility pattern[14] .This will help to have the knowledge about the predominant organisms in a particular health care facility and antimicrobial pattern of those isolates will help to formulate the antibiotic policy. Incidence of burn was found to be higher in females(90%)because they mostly do the kitchen work where accidents occur. The age group mostly affected was between 15-30yrs[15] .The burning agent was predominantly flame 92(84%),followed by elctrical 6(5%) which was similar to findings of Sharma L etal.[16] High culture positivity(92.72%) was seen in our study which was at par with other studys[16] .Isolation rate of gram negative bacilli was higher compared to gram positive cocci. This is in contrast to other studies where isolation of Staphylococcus aureus was much higher[17,18] .*Pseudomonas aeruginosa* was predominant offending agent in 42.4% of cases which was at par with the study conducted by Sharma S etal[19] . Among the gram positive cocci *Staphylococcus aureus* was predominant in 15,2% of cases followed by *Enterococcus spp.*

Antibiotic sensitivity pattern revealed that many of the isolates were resistant to commonly used antibiotics. MRSA prevalence in our centre was very high 94.73% which was in contrast to other studies[13,16.20] These isolates were found to be sensitive to Vancomycin and Linezolid. Among the gram negative isolates 55% were found to be ESBL producer which was similar to a study by Bayram Y etal [22] . Imipenem was the most active antimicrobial agent for ESBL producing strain.[20,21] The high percentage of multidrug resistant isolates is probably due to empirical use of broad spectrum antibiotics and non-adherence to hospital antibiotic policy. Early detection of isolates is very important to prevent treatment failure. In case of polymicrobial infection which is seen in 22.5% of our cases the potential virulence of one organism will affect another organism growing alongside. Multidrug resistant organisms further complicate the scenario.

V. Conclusion

Careful microbiological survillence and antibiotic susceptibility testing shoud be done before the start of antibiotic therapy.Following hospital antibiotic policy will help grately in prevention and treatment of MDR isolates in burn units thus reducing overall morbidity and mortality.

References

[1]. Warrick A. Ames. Management of the major burn, update in anesthesia. 1999; 10 (10)
[2]. Clinton M, Duane R. Burn wound infection: follow up, infectious disease fellowships 2008. http://www.emedicine.mediscape.com
[3]. Clinton M, Duane R. Burn wound infections, health education consortium 2008 http://www.emedicine.mediscape.com
[4]. Forjouh S.N. Burns in low and middle income countries. Burns 2006; 32 (12), 529-537.
[5]. Al Akyaleh A.T, Invasive burn wound infection. Ann Burns Fire disasters. 1999; 12 (4):1-5. 7
[6]. Pruitt BA,McManus AT,Kim SH,Goodwin CW.Burn wound infection:current status.World J Surg.1998;22:135-45

[7]. Ulku A, Serpil A, Mufide N, Fehimi A, Ayten A. The time related changes of anti microbial resistance patterns and predominant bacterial profiles of burn wounds and body flora of burned patients, Journal of the international society of burn injuries. 2004;30(7):660-664.
[8]. Di Lonardo A, Ferrante M., Maggio G., Bucaria V., Del Zotti M., Brienza E. Histological assessment of the level of burn wound infection: diagnostic and therapeutic strategies. Ann. Medit. Burns Club.1993; 6(3):433-5.
[9]. Macedo JLS,Santos JB.Bacterial and fungal colonization of burns wounds.Mem Inst Oswaldo Cruz 2005 ;100:535-39.
[10]. Taneja N,Emmanue IR,Chari PS,Sharma M.A prospective study of hospital acquired infections in burns patients at a tertiary care referral centre in North India.Burns 2004;30:248-53.
[11]. Vindenal H & Bjerknes R .Microbial colonization of large wounds.Burns 1995;21:575-79.
[12]. Church D,Elsayed S,Reid O,Winston B &Lindsay R.Burn wound infections. Clin.Microbiol.Rev. 2006; 19:403-34.
[13]. Revathi G, Puri J, Jain BK. Bacteriology of burns. Burns. 1998;24(4):347-9 .
[14]. Bairy I, Shivananda PG. Aerobic bacterial flora of burn wound infection. Indian J Surg. 1997;59:215–8.
[15]. Sapna G. Bacterial and fungal profile of burn wound infection in tertiary care center.Indian J Burn.2015;23(1):71-5
[16]. Sharma L, Srivastava H,Pipal DK,Dhawan R,Purohit PM,Bhargava A.Bacteriological profile of burn patients and antimicrobiologicalSusceptibility pattern of burn wound isolates.Int Surg J 2017;4:1019-23.
[17]. Dhar S,Saraf R,Singh K ,Raina B.Microbiological profile of chronic burn wounds among patients admitted to Santucci SG, Gobara S, Santos CR, Fontana C, Levin AS. Infections in a burn intensive care unit : experience of seven years. J Hosp Infect 2003; 53, 6-13.
[18]. Singh NP,Goyal R,Manchanda V,Das S,Kaur Z,Talwar V.Changing trends in the bacteriology of burns in the burns unit ,Delhi ,India .Burns .2003;29:129-32.
[19]. Sharma S,Hans C .Bacterial infection in burn patients: a three years study at RMI hospital Delhi.J Commun Dis.1996;28:101-6
[20]. Bacteriological profile and susceptiblity pattern of burn wound isolates in a tertiary care hospital 1Dr Roopa Hegde, 2Dr Sanath Bhandary .Indian Journal of Basic and Applied Medical Research; December 2015: Vol.-5, Issue- 1, P. 99-103
[21]. Buzaid N,Elzouki AN,Taher I,Ghengesh KS.Methicillin resistant Staphylococccus aueus (MRSA) in a tertiary surgical and trauma hospital in Benghazi,Libya.J Infect Dev Ctries .2011 ; 5(10):723-26.
[22]. Bayram Y, Parlak M, Aypak C, Bayram İ: Three-year review of bacteriological profile and anti-biogram of burn wound isolates in Van, Turkey**.** *Int J Med Sci* 2013,**10**(1):19-23.
[23]. Collee JG, Miles RS, Watt B, Tests for identification of bacteria. Mackie & McCartney Practical Medical Microbiology; Collee JG, Fraser AG, Marimon BP, Simmons A; Churchill Livingstone, p 131-150

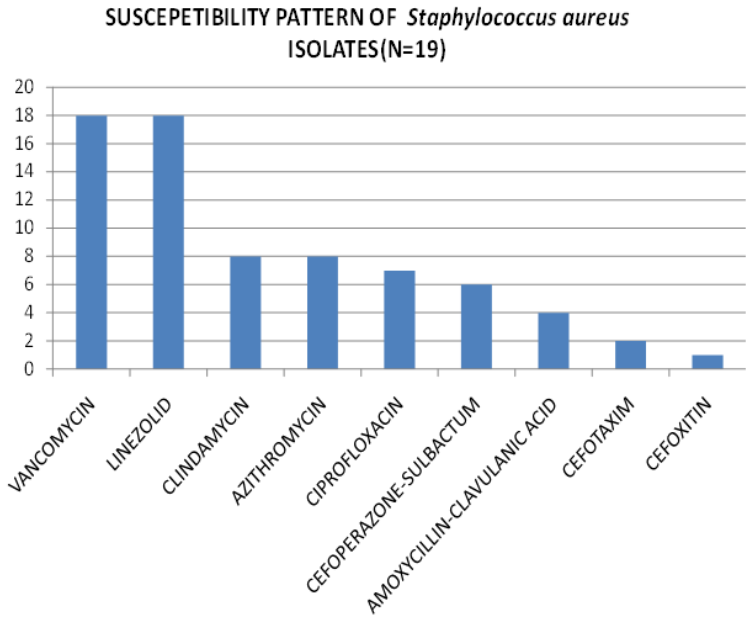
Tables

Table 1. Agents causing burn injury

Burning Agents	**Number(Percentage)**
Flame	92(83.6%)
Scald	7(5.4%)
Electrical	6(5.4%)
Blast Injury	4(3.6%)
Acid	1(.01%)

Table 2. Isolates from burn injury cases

Name Of The Bacteria	**Number(Percentage)**
Pseudomonas Aeruginosa	**53 (42,4%)**
Staphylococcus Aureus	**19 (15.2%)**
Klebsiellaspp	**13 (10.4%)**
Proteus Spp	**9 (7.2%)**
Escherichia Coli	**9 (7.2%)**
Enterobacter Spp	**7(5,6%)**
Enterococcus Spp	**7 (5.6%)**
Acinetobacter Spp	**6 (4.8%)**
Candida Spp	**2 (1.6%)**



*Bimoch Projna Paty. "Bacteriological Profile And Antimicrobial Susceptibility Pattern of Isolates Among Burn Wound Patients At A Tertiary Care Hospital of Odisha, India." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) 16.9 (2017): 20-23