

Bacterial Profile and Antibiogram of Burn Wound Infections in a Tertiary Care Centre

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Abstract

Background: Burn patients are at high risk for infections related morbidity and mortality. It is essential for a burn institute to determine its specific pattern of time –related changes in microbial flora and antimicrobial profile.

Aims: To find out the bacterial profile of burn wound infection and the antimicrobial pattern of isolated organism.

Materials and Methods: This study was conducted in department of microbiology, J.L.N. Medical college, Ajmer, Rajasthan, from Jan. 2019 to Sept. 2019. The wound swabs were collected from 102 patients. The samples were processed as per standard protocol. Pathogens were isolated, identified by biochemical tests and antibiotic susceptibility testing was performed by Kirby-Bauer disc diffusion method.

Results: Out of 102 samples, 99(97.1%) were culture positive and 3(2.9%) were sterile. Most common

isolated was Pseudomonas species (34.3%) followed by CoNS species (25.2%), Klebsiella species (19.2%), Staphylococcus aureus (14.1%), Enterobacter species (7.1%), Enterococcus species (7.1%), Escherichia coli (5.1%), Streptococcus species (3%), Proteus species(1%). Gram positive cocci were most susceptible to Linezolid (95.9%) and Gram negative organism were most susceptible to Aztreonam (38.8%).

Conclusion: Continuous monitoring and careful lab testing prior to antibiotic use can reduce drug resistant. Judicious use of antibiotics can helps in proper treatment and prevention of emergence of multidrug resistant pathogens like MRSA and ESBL producers.

Keywords: Antibiotic susceptibility, Burn wound, swabs, bacterial profile, Pseudomonas spp.

Introduction

Infection is a major cause of morbidity and mortality in a hospitalized burn patients. Disrupted skin barrier, involvement of larger burnt area, immunocompromised

effects of burns and prolonged stays at hospitals were important risk factor for initiating infection. Several reports states that nearly 75% of all deaths in burn patients are due to infections.

Further, infections cause delay in maturation and deep scar formation of burn wounds. Aerobic bacteria routinely isolated from burn wounds are Pseudomonas spp , CoNS spp , Klebsiella spp, CoNS etc .Pseudomonas spp. has emerged as a predominant member of burn wound flora.

The present study was conducted to know the current aerobic bacterial profile and their antibiogram of burn wound infections in a tertiary care hospital.

Aims and objective

To isolate various bacteria from wound swab sample of burn patients.

To study their antibiotic sensitivity pattern.

Materials and Methods

This study was a hospital based observational, descriptive and retrospective type of study conducted on a total of 102 burn patient admitted in burn ward of J.L.N. Medical College and associated group of hospitals, Ajmer, Raj. The nine months data was collected from department of microbiology, J.L.N. Medical College Ajmer, Raj. From January 2019 to September 2019 of the burn patients. The samples were processed as per standard protocol by inoculating on Blood agar, MacConkey agar and incubated 18-24 hours at 37 degree C. Pathogens were isolated and identified by biochemical tests. The antibiotic susceptibility testing was performed by Kirby-Bauer disc diffusion method as per CLSI-2019 guidelines.

For Gram Positive Cocci the following drugs were used

1. Ampicillin/Sulbactam(10/10mcg)
2. Cefoxitin(30 mcg)
3. Gentamicin(10 mcg)

4. Linezoild(30 mcg)
5. Netilmicin(30 mcg)
6. Ofloxacin(5 mcg)
7. Vancomycin(30 mcg)
8. Cephalothin(30 mcg)

For Gram Negative Bacilli following drugs were used

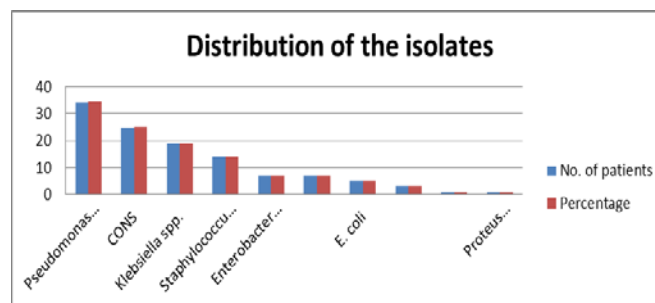
1. Ampicillin/Sulbactam(10/10mcg)
2. Aztreonam(30mcg)
3. Ceftazidime(30mcg)
4. Ceftazidime+ Clav. (30/10mcg)
5. Meropenem(10mcg)
6. Netilmicin(30mcg)
7. Ofloxacin (5mcg)
8. Piperacillin+ Tazo. (100/10mcg)

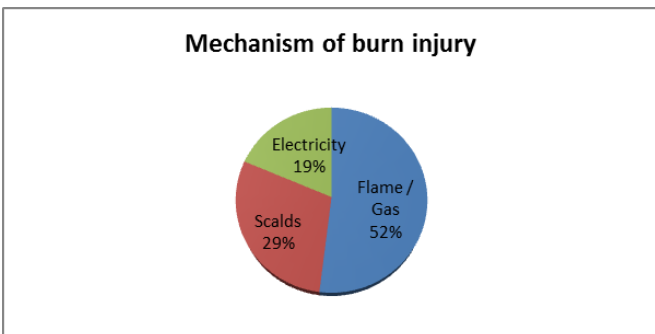
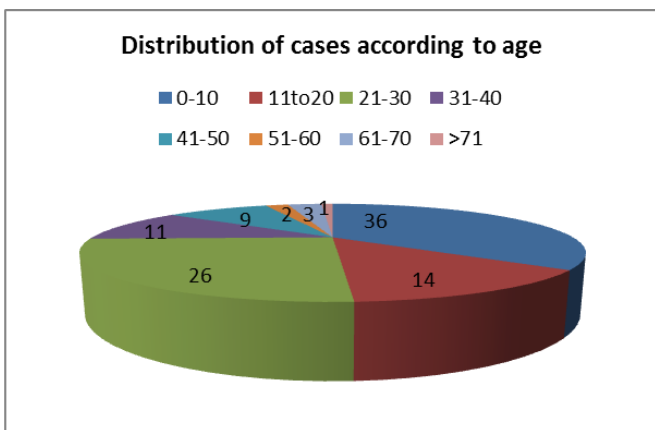
Results

Out of 102 samples, 58(56.8%) were from males and 44 were from females (43.1%).

Majority of the cases were from 0 to 10 years age group (35.3%).

Most common cause of burn injury was flame/ gas 53(51.9%) and less by scalds 30(29.4%) and electricity 19(18.6%). Out of 102 samples, 99(97.1%) were culture positive and 3(2.9%) were sterile.





Most common isolated was Pseudomonas species (34.3%) followed by CoNS species (25.2%), Klebsiella species (19.2%), Staphylococcus aureus (14.1%), Enterobacter species (7.1%), Enterococcus species (7.1%), Escherichia coli (5.1%), Streptococcus species (3%), Proteus species (1%).

Gram positive cocci were most susceptible to Linezolid (95.9%) and Gram negative organism was most susceptible to Aztreonam (38.8%).

Mixed growth of organisms seen in 15 samples.

Table 1: Mixed Growth in 15 Samples

Name of isolates	No of isolates
Pseudomonas spp + CoNS	1
Pseudomonas spp+ Klebsiella spp	3
Pseudomonas spp+ Staphylococcus aureus	1
Pseudomonas spp+Proteus	1
CoNS+ Klebsiella spp	3
CoNS + Streptococcus spp+CoNS	1
CoNS + Enterobacter spp+ CoNS	1
Staphylococcus aureus + Enterobacter spp	1
Staphylococcus aureus+ Acinetobacter spp	1
Klebsiella spp+Enterococcus spp	1

Table 2: Sensitivity pattern of Gram positive isolates

Isolates	A/S	CX	GEN	LZ	NET	OF	VA	CEP
CoNS (n=25)	16 (64%)	7 (28%)	7 (28%)	25 (100%)	13 (52%)	17 (68%)	25 (100%)	8 (32%)
Staphylococcus aureus(n=14)	9 (64.3%)	1 (7.1%)	3 (21.4%)	13 (92.8%)	14 (100%)	7 (50%)	14 (100%)	1 (7.1%)
Enterococcus	3	1	2	6	4	3	4	1

spp(n=7)	(42.8%)	(14.3)	(28.6%)	(85.7%)	(57.1%)	(42.8%)	(57.1%)	(14.3%)
Streptococcus	1	0	1	3	3	2	3	1
Spp(n=3)	(33.3%)	(0)	(33.3%)	(100%)	(100%)	(66.7%)	(100%)	(33.3%)
Overall GPC	59.2%	18.4%	26.5%	95.9%	69.4%	59.2%	93.8%	22.44%

Note: CoNS= Coagulase Negative Staphylococcus, Overall GPC 95.9% sensitive to Linezolid and 93.8% sensitive to Vancomycin.
 A/S= Ampicillin+Sulbactam, CX= Cefoxitin,
 GEN=Gentamycin, LZ= Linezolid, NET= Netilmicin,
 OF=Ofloxacin, VA=Vancomycin, CEP=Cephalothin

Coagulase Negative Staphylococcus spp. 100% sensitive to Linezolid and Vancomycin while Staphylococcus aureus 92.8% sensitive to Linezolid and 100% sensitive to Vancomycin.

Table 3: Sensitivity pattern of Gram negative isolates

Isolates	A/S	AT	CAZ	CAC	MRP	NET	OF	PIT
Pseudomonas spp (n=34)	0 (0)	15 (44.1%)	2 (5.9%)	2 (5.9%)	4 (11.7%)	4 (11.7%)	2 (5.9%)	5 (14.7%)
Klebsiella spp(n=19)	4 (21%)	5 (26.3%)	2 (10.5%)	2 (10.5)	7 (36.8%)	4 (21%)	8 (42.1%)	4 (21%)
Enterobacter spp(n=7)	2 (28.8%)	2 (28.8%)	0 (0)	0 (0)	1 (14.3%)	1 (14.3%)	1 (14.3%)	0 (0)
Escherichia coli spp(n=5)	4 (80%)	3 (60%)	4 (80%)	4 (80%)	5 (100%)	5 (100%)	4 (80%)	3 (60%)
Acinetobacter spp(n=1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (100%)	0 (0)	0 (0)	1 (100%)
Proteus mirabilis(n=1)	1 (100)	1 (100%)	0 (0)	1 (100%)	1 (100%)	1 (100%)	0 (0)	1 (100%)
Overall GNB	16.4%	38.8%	7.4%	11.9%	13.4%	28.35%	22.38%	22.4%

Note: A/S= Ampicillin+Sulbactam, AT=Aztreonam, CAZ=Ceftazidime, CAC= Ceftazidime+Clavulanic acid, MRP Gram negative isolates were sensitive to Aztreonam (38.8%), Netilmicin (28.3%), Piperacillin+Tazobactam (22.4%) followed by Ofloxacin, Ampicillin+Sulbactam, Meropenem, Ceftazidime+Clavulanic acid, Ceftazidime.

Discussion

In our study out of 102 samples, 99(97.1%) were culture positive which was near to S. Datta study W.B. 2016.

In this study males(58) affected more than females(44) was similar to Ekrami and Kalantar2007, probably due to more thermal injuries. Burn due to

flame (52) was most common cause, was near similar to Sapana G study 2015.

In the present study, isolates rate was 97%, comparable to Sapana G study (89.6%).

The commonest isolates was *Pseudomonas* spp. (34.3%) which correlates with study of N. Lakshmi et al (33.6%).

Gram negative bacteria were maximum sensitivity towards Aztreonam (38.8%) followed by Netilmicin (28.3%).

Gram positive bacteria were maximum sensitivity towards Linezolid (95.9%) followed by Vancomycin (93.8%).

Conclusion

The result of this study is helpful for identifying the common causes of burn wound infections in our region.

Thus the result will be also helpful to select the appropriate antibiotics in appropriate dosage to control the infection and also to prevent the emergence of antibiotic-resistant bacteria.

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