BACTERIOLOGICAL PROFILE OF BURNS, IN TERTIARY CARE REFERRAL CENTRE, BANGALORE.

Aruna Bhushan[1]*, Jitendra Sharma[2], Anjali Paul[2], Shobha Guido[2].

1. Department of Pharmacology, Belgaum Institute of Medical Sciences, Belgaum.
2. Department of Pharmacology, St. John's Medical Collage, Bangalore.

*Corresponding author: arunamarina@yahoo.co.in

Summary

A retrospective study was conducted at the tertiary care referral centre to analyze the bacterial isolates and antibiotic susceptibility pattern of 543 burns inpatient admitted over a period of five years. The most common isolates were Pseudomonas 736(26.9%), Non fermenting gram negative bacilli (Nfgnb) 322(11.8%), Staphylococcus aureus 206(7.5%), MRSA 185(6.8%) then followed by Enterobacter 138(5.0%). While pseudomonas was more sensitive to cefperazone and sulbactam, staphylococcus was to vancomycin. There was a high degree of resistance to commonly available antibiotics by these organisms.

Key words: Burn wound, Antibiotic, Sensitivity.

Introduction

Burns injury and the risk of infection in severe burns is a major public health issue in terms of morbidity and long-term disability throughout the world especially in developing countries[1,2] . Rapid burn debridement and wound closure and use of effective topical and systemic antimicrobial agent's decreases burn wound infections and mortality [3]. This retrospective study of bacteriological profile and antibiotic sensitivity patterns of isolates was carried out as spectrum of infective agents varies from time to time and from place to place. It is therefore, desirable to carryout periodic reviews of the bacterial flora of burns wounds so that preventive strategies could be modified as necessary.

Materials and Methods

A retrospective observational study of burn wound infection in 543 patients admitted in the burns ward at St. John's medical collage, hospital, Bangalore. Study was carried out over a period of five years from June 2001 to May 2006. Data was collected from medical case records in a specially designed proforma and was subjected to descriptive analysis.

Wound swabs were collected from the burn wound within 24 hrs of admission and then on weekly basis. Identification of bacterial isolates was performed according to standard bacteriological techniques and samples from the various sites viz. surface swabs, burn biopsy, central tip and blood culture was collected and subjected to antibiotic sensitivity test, using disc diffusion technique by Kiber Beyer method.

Results

During the five year study period, 543 patients were admitted in burns ward. Culture sensitivity was done in 438 cases, of which single isolates were found in 54 cases (9.9%), multiple isolates in 372 cases (68%), in 12 cases(2.2%) no organism were cultured (sterile), and in other 105 cases(19.3%) culture sensitivity was not done.

The commonest gram negative isolate was Pseudomonas 736(26.9%) and Nfgnb 322(11.8%), and among gram positive isolates was Staphylococcus aureus 206(7.5%) and Methicillin resistant Staphylococcus aureus (MRSA) 185 (6.8%) Table 1,2.

Table 1.
Gram Negative Isolates

Organism	Number.	Percentage
Pseudomonas	736	26.9
Nfgnb	322	11.8
Enterobacter	138	5.0
Proteus	109	4.0
E.coli	96	3.5
Klebisiella	90	3.3
Acinetobacter	27	1.0
Gnb	27	1.0
Citrobacter	23	0.8
Providencia	15	0.5
Morganella	4	0.1
Serratia	2	0.1

Table 2.
Gram Positive Isolates

Organism	Number	Percentage
S.aureus	206	7.5
MRSA	185	6.8
E.faecalis	134	4.9
Coagulase negative	62	2.3
Enterococcus	36	1.3
β-streptococcus	8	0.3
Micrococcus	1	0.1

The antibiotic sensitivity of the organisms to different antibiotics varied depending on the isolates. Pseudomonas was most sensitive to cefoperazone plus sulbactam (75%) and a aminoglycoside netilmycin(45%), while Staphylococcus aureus was sensitive to vancomycin(96%) Table 3,4.

Table 3.
Pattern of antibiotic sensitivities of Gram-negative isolates from patient

Antibiotic	Pseudo-monas	E.Coli	Entero bacter	Klebsiella	Nfgnb	Proteus	Acinobacter
Piperacillin	237(33)	11 (12)	25 (19)	12 (13)	17 (5)	32 (30)	1 (3)
C+S	49 (75)	12 (86)	3 (100)	6 (60)	18 (95)	13 (87)	3 (100)
Cephalexin	31 (13)	3 (9)	10 (16)	5 (15)	14 (9)	4 (9)	1 (8)
Cefuroxime	18 (11)	2 (9)	4 (13)	5 (19)	10 (11)	2 (8)	1 (14)
Ceftazidime	27 (23)	1 (7)	2 (10)	2 (15)	7 (10)	2 (9)	0 (0)
Cefperazone	44 (23)	3 (19)	5 (29)	5 (22)	15 (33)	2 (11)	2 (66)
Ceftriaxone	78 (26)	13(28)	16 (35)	14 (27)	31 (24)	14 (26)	5 (33)
Gentamycin	130(21)	21 (24)	35 (31)	30 (38)	63 (25)	17 (18)	7 (30)
Amikacin	192(39)	27 (37)	42 (46)	33 (45)	76 (38)	24 (32)	7 (39)
Netilmycin	146(45)	27 (52)	18 (46)	27 (52)	59 (61)	26 (40)	9 (64)
Tetracycline	26 (16)	21 (54)	14 (39)	11 (40)	45 (38)	4 (15)	4 (40)
Ciprofloxacin	84 (22)	7 (16)	26 (33)	12 (28)	50 (33)	10 (19)	2 (20)

Results shown are number with percentages in parenthesis

Table 4.
Pattern of antibiotic sensitivities of Gram-positive isolates from patient

Antibiotic	S.aureus	MRSA	E.faecalis	Enterococcus	Coagulase negative	ß-Hemolytic streptococci
Pencillin	19 (11)	0 (0)	110 (86)	29 (88)	13 (21)	8 (100)
Ampicillin	2 (4)	0 (0)	1 (25)	1 (100)	5 (21)	2 (100)
Cloxacillin +Methicillin	144 (83)	1 (0.6)	-	-	34 (62)	-
Cefperazone +Sulbactum	9 (90)	14 (82)	28 (90)	4 (100)	2 (100)	-
Cephalexin	25 (30)	6 (7.5)	5(9)	1 (7)	7 (41)	0 (0)
Cefuroxime	12 (26)	4 (11)	8(18)	3 (30)	4 (40)	0 (0)
Ceftazidime	10 (37)	2 (5)	4 (13)	2 (25)	4 (50)	0 (0)
Cefperazone	7 (21)	4 (16)	3 (7)	3 (43)	2 (13)	0 (0)
Ceftriaxone	34 (47)	16 (24)	16 (21)	5 (28)	10 (42)	0 (0)
Ciprofloxacin	57 (53)	-	35 (33)	12(48)	11 (36)	-
Teicoplanin	7 (100)	-	-	1 (100)	-	-
Vancomycin	52 (96)	117 (98)	87 (98)	20(100)	22 (96)	
Erythromycin	24 (29)	3 (3%)	3(100)	-	14 (37)	1 (50)
Piperacillin +Tazobactam	2 (100)	2 (100)	8 (100)	1 (100)	-	-

Results shown are number with percentages in parenthesis

Discussion

In this study out of 543 patients, the culture sensitivity was done in 438 cases (80.6%) of which the total body surface area (TBSA) varied from 12-76%. Whereas in other 76 and 29 cases with TBSA 1-16% and 75-95% culture sensitivity was not done due to financial constraints or as the prognosis was very grave, but all these patients were treated empherically.

Among the cultures done, the most common isolate among gram negative organism was Pseudomonas aeruginosa which was similar to other studies [4,5] and followed by Nfgnb. However in some centers Klebsiella sps topped the list [6, 7]. The common gram positive isolate was Staphylococcus aureus, again similar to other observation [5, 6, 8]. As in other studies, it is a well established fact in burn patients that the infection is often associated mainly with gram negative organisms. And we have also noted in our study the low incidence of ß-Hemolytic streptococci which is only 0.3% in the isolates of burn patients, when compared to other studies which ranges from 1% [9] and as high as 13.6%[8], which is a prognostically significant in skin grafted patients as ß-Hemolytic streptococci has deleterious role in causing skin graft failure [9].

The pattern of antibiotic sensitivity is important for epidemiological and clinical purposes. As many of the isolates, are resistant to commonly available antimicrobials and poses a challenge to burn care since it decreases effectiveness of treatment and increases morbidity, mortality and cost of care.

Pseudomonas sensitivity to gentamicin which was 53.3% and 83.5% in other studies and in this report it has shown 21% sensitivity. They showed more sensitivity to cephalosporins and aminoglycosides, S.aureus showed only 11% susceptibility to penicillin, but ß-Hemolytic

streptococci showed 100% . S.aureus was more sensitive to vancomycin (96%) and only eight isolates showed resistance. MRSA was also sensitive to vancomycin and 3rd generation of cephalosporins.

These studies of antibiotic sensitivity pattern and periodic surveillance of the isolates are useful in choosing the appropriate therapy against the isolated organisms and to enable the hospital to formulate a drug policy for burn patients and to take measure to check on antibiotic misuse. This will also help surgeons to take empherical decisions on antibiotic use.

Acknowledgement

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