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Microbiological Profile, Drug Resistance and Surgical Treatment Modalities in Burn Patients of a Tertiary Care Hospital of Kashmir- A Record Based Study

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Abstract

Introduction: -Nosocomial infections are a major cause of mortality and morbidity among burn patients. The magnitude of the problem is further multiplied by the emergence of drug resistant organisms, worsening the prognosis further. In the recent past, the surgical management of burn patients has improved, considerably, with targets of not merely saving the life and function, but also rendering them fully capable to perform their duties and earn their livelihood.

Methods: -This was a hospital based retrospective study wherein data of the burn victims admitted in hospital for the year 2017 was evaluated and analyzed.

Results: - Pseudomonas and klebsiella were the commonest organisms to be isolated. SSG with debridement was the commonest surgical procedure performed. **Conclusion**: -Microbial surveillance of burn wounds, along with patient education, will go a long way in bringing down the mortality and morbidity associated with burn injuries.

Keywords: Nosocomial, Graft, resistance

INTRODUCTION

Burns are an important cause of mortality and morbidity across the globe, especially the Indian subcontinent. Burns provide a suitable site for bacterial multiplication and are more persistent richer sources of infection than surgical wounds, mainly because of the larger area involved and longer duration of patient stay in the hospital.[1] Infection is a major cause of morbidity and mortality in hospitalized burn patients.[2] It has been estimated that about 75% of the mortality associated with burn injuries is related to sepsis especially in developing countries.[3].Historically, staphylococci and beta hemolytic streptococci were the commonest organisms causing burn wound infection in early part of the century.[4]Immediately, following injury, gram positive bacteria colonize the burn wound.[5]Gram negative bacteria also rapidly colonize the burn wound surface in the first few days after injury [6,7]. Wound colonization by yeasts and fungi usually occurs later due to the use of broad spectrum antibiotic therapy.[8]

Disrupted skin barrier, involvement of larger burnt area, immunocompromised effects of burns and prolonged stay at the hospitals were major risk factors for initiating infection.[9.]

Use of antibiotics as systemic prophylaxis is a common practice with burnt patients[.10]. Drug resistant bacteria with intrinsic resistance towards antibiotics, ability to survive longer in the hospital environment and hand to hand transmission of bacteria reflects their easy spread and cause outbreaks.[11,12]

The bacterial infections in burnt patients vary both with time and place[. 13,14]

Modality of treatment in a burn case depends on a number of factors like, degree and depth, total body surface area (TBSA) involved, complications, associated comorbidities, patient factors and type of health care facility, among others. In the past few decades, the management of burn wounds has improved, thereby largely improving the outcome of such patients. Usually, patients with TBSA >45% burn wounds are candidates for split skin grafting.

Split skin Autografts are ideal for wound coverage, but in case of extensive burns there may not be sufficient donor sites, so allografts come to the surgeons' rescue. Allografts, which are considered the best biological dressing, can be applied either temporarily until autografts become available, in conjunction with widely meshed autografts, or when complete healing and epitheliasation of the burn wound occur.[15]. From a practical point of view, the burn wound is covered and the cells involved in the healing process are protected so that the body homeostasis is maintained.[16].

Now a day, various skin substitutes are also in vogue.

Various surgical procedures performed in burn patients include: - excision and grafting, fasciotomy, escarotomy and amputation.

Aims and Objectives: -

1. To study the prevalence of burn associated infections and the occurrence of drug resistance.
2. To study various surgical treatment modalities used in burn patients.

Methods

Study design: -Record based descriptive study.

Study setting: - SMHS hospital, an associated hospital of Government Medical College, Srinagar- Duration of study: -October 2018- December 2018

Study population: - Patients admitted in burn unit of SMHS Srinagar from 1st Jan 2017 to 31st December 2017.

Study instrument: - The data was entered into a Proforma framed after the review of literature.

Data analysis: - Microsoft Excel 2010

This was a retrospective observational study. Data was obtained from the inpatient files, prescriptions and culture reports of the burn's patients admitted in the department of surgery SMHS Hospital, Srinagar. The case files and other records were obtained from Medical Record Section after proper permission and were examined to note the demographic details and clinical profile of the patients. The study was taken after taking a due permission from Institutional Ethics Committee (IEC). Also being a retrospective observational study, consent waiver was also obtained from IEC. A pilot testing was done on about 10% of the cases and some modifications in the proforma were made accordingly. All the data was entered in MS Excel 2010.

Results

A total of 265 patients were admitted in burn unit of the department of surgery, SMHS, Srinagar from 1/1/2017 to 31/12/2017. About 45% of the patients were aged below 20 years, followed by the age group of 21-40 years (38.9%). (Table 1) . A surgical procedure was done in approximately 31.3 % of the patients with Split skin grafting (SSG) along with debridement being the commonest surgical procedure. (Table 2). Commonest microorganism isolated from the infected specimens of the patients was pseudomonas and klebsiella spp. (Table 4) Most of the isolates were resistant to aminoglycosides-amikacin, gentamicin (10.2%), while a few (1.9%) were resistant to methicillin and penicillin and an extremely small percentage of the isolates (1.1%) were resistant to multiple classes of antimicrobials. (Table 4)

Discussion

The commonest microorganisms to be isolated were pseudomonas and Klebsiella spp. Similar findings were reported by Khadija Yousef AL Aali.[17] High prevalence of these pathogens is associated with their

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ability to flourish well in a moist environment and persistence in hospital environment [20,21]

The commonest complication was Infections. Similar findings were reported by Palak Agarwal et al.[18]

Most of the cases were reported in summer season. This was also reported by SM Carroll et al.[19]

The commonest operative procedure done in the patients was SSG with debridement. Similar findings were reported by other studies as well

Conclusion: -

An effective infection surveillance system needs to be present for all the burn patients so as to cut down the mortality and morbidity associated with burns. Further, data needs to be prepared from time to time regarding the prevalence of various microbes and their antibiotic sensitivities, in burn patients, from time to time, so as to guide the clinician in prescription of various antimicrobials and to minimize the incidence of drug resistant bugs.

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Table1- Distribution of burn patients as per their gender, age group and religion.

Gender	**Frequency**	**Percentage**
Male	133	50.2
Female	132	49.8
Total	265	100
Age group	**Frequency**	**Percentage**
0-20 years	120	45.3
21-40 years	103	38.9
41-60 years	34	12.8
>60 years	8	3.0
Total	265	100
Religion	**Frequency**	**Percentage**
Hindu	11	4.2
Muslim	252	95.1
Sikh	2	0.8
Total	265	100

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Table 2- showing various surgical procedures done in the burn victims.

Surgery	Frequency	Percentage
No surgery	182	68.7
Fasciotomy	1	0.4
Amputation	6	2.3
Split skin grafting	64	24.2
Fasciotomy and Split skin grafting	5	1.9
Fasciotomy, Split skin grafting and amputation	7	2.6
Total	265	100

Table 3- Showing various microorganisms isolated from the victims.

Organism	Frequency	Percentage
No organism	230	86.8
Pseudomonas spp.	5	1.9
Klebsiella Spp.	4	1.5
Methicillin resistant S. aureus(MRSA)	5	1.9
Pseudomonas and klebsiella spp.	18	6.8
Pseudomonas and Enterococcus spp.	3	1.1
Total	265	100

Table 4- showing antibiotic resistance in burn infection isolates.

Antimcrobial	Frequency	Percentage
No organism isolated	230	86.8
Amikacin, Gentamicin, Imepenem , ceftriaxone	27	10.2
Methicillin, penicillin	5	1.9
Multi drug resistant (MDR)	3	1.1
Total	265	100

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