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Original Article

Analysis of Burn Mortality in Burn Centre: Manipal

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ABSTRACT

Analysis of burn mortality was done in Kasturba Medical College Hospital, Manipal. For that we retrospectively analysed hospital records of patients admitted in the burns ward of the Department of Plastic Surgery in Kasturba Medical College hospital from January 2005 to December 2010. Mortality was high in females (13.5%) as compared to males (6.6%). Highest mortality rate was in the age group of 51 to 60 years (41.2%), followed by 21–30 years (21.8%) and 11–20 years (21.1%). Burns involving more than 90% of total body surface area were invariably fatal, followed by 81–90% of total body surface area burnt and 71–80% of total body surface area burnt. Body surface area <10% and 11–20% had the least mortality rate (0%). Superficial burn (1.7%) has least mortality rate compared to deep burn (20.4%). Most of the deaths occurred in patients who sustained flame burns, followed by scald and electrical burns. Mortality rate was high in suicidal injuries, followed by homicidal injuries and accidental injuries. Most common cause of death was septicemia, which was seen in 45 cases (73.8%) followed by electrolyte imbalance, which was seen in 5 cases (8.2%).

Key words; Burns; Analysis; Mortality

INTRODUCTION

Burns represent an extremely stressful experience for both the burn victims as well as their families. Often, the circumstances of burns are enveloped in mystery, obscurity and unreliable statements. Severe burn injury will have serious physical and psychological effects on patients life[1]. In developing countries burn mortality is very high as various authors have reported. Lack of proper burn centre, poverty and ignorance are the contributing factors for mortality. The aim is to analyse the mortality in our burn centre to find ways to reduce the mortality and improving the care given to the patients[2].

MATERIALS AND METHODS

Material consists of patients admitted in the burns Ward under department of plastic surgery in Kasturba Medical College hospital, Manipal. It was a 5-year retrospective study from January 2005 to December 2009. The information regarding survival, expired, type of burn, circumstance of burn, depth of burn, total body surface area burnt and age were extracted from patient's hospital files and was incorporated into our proforma.

Statistical analysis was done using SPSS software.

RESULTS

Mortality was high in females (13.5%) as compared to males (6.6%; Table 1). Highest mortality rate was in the age group of 51–60 years (41.2%), followed by 21–30 years (21.8%) and 11–20 years (21.1%; Table 2). Burns involving more than 90% of total body surface area were invariably fatal, followed by 81–90% of total body surface area burnt. Body surface area <10% and 11–20% had the least mortality rate (0%; Table 3). Superficial burn (1.7%) has least mortality rate compared to deep burn

(20.4%; Table 4). Most of the deaths occurred in patients who sustained flame burns, followed by scald and electrical burns (Table 5). Mortality rate was high in suicidal injuries, followed by homicidal injuries and accidental injuries (Table 6). Most common cause of death was septicemia, which was seen in 45 cases (73.8%), followed by electrolyte imbalance, which was seen in 5 cases (8.2%) (Table 7).

Table 1: Mortality

Gender	Outcome			Total
	Survived	Expired	Discharged against medical advice	
Male	141 (46.5%)	20 (6.6%)	16 (5.3%)	177 (58.4%)
Female	66 (21.8%)	41 (13.5%)	19 (6.3%)	126 (41.6%)
Total	**207 (68.3%)**	**61 (20.1%)**	**35 (11.6%)**	**303**

Table 2: Age group and mortality

Age group in years	Total number of cases	Total number of death
<10	53	7 (13.2%)
11–20	38	8 (21.1%)
21–30	101	22 (21.8%)
31–40	58	11 (19%)
41–50	33	6 (18.2%)
51–60	17	7 (41.2%)
61–70	2	0 (0%)
>71	1	0 (0%)
Total	**303**	**61**

Table 3: Total body surface area burnt and mortality (*n*=303)

Total body surface area burnt (%)	Number of cases	Number of death
<10	67	0
11–20	63	0
21–30	43	3 (7%)
31–40	40	9 (22.5%)
41–50	28	7 (25%)
51–60	18	9 (50%)
61–70	11	6 (54.5%)
71–80	8	5 (62.5%)
81–90	14	11 (78.6%)
91–100	11	11 (100%)
Total	**303**	**61**

Table 4: Depth of burn and mortality (*n*=303)

Depth of burn	Total number of cases	Total number of death
Superficial	58	1 (1.7%)
Deep	49	10 (20.4%)
Superficial and deep	196	50 (25.5%)
Total	**303**	**61**

Table 5: Burns etiology and mortality (*n*=303)

Burn aetiology	Total number of patients	Total number of deaths
Flame	**184**	**56 (30.4%)**
Scald	60	4 (6.7%)
Electrical	51	1 (2%)
Chemical	8	0 (0%)
Total	**303**	**61**

Table 6: Circumstance of burn and mortality (*n*=303)

Manner of burn	Total number of cases	Total number of death
Suicidal	12	8 (66.7%)
Accidental	288	52 (18.1%)
Homicidal	3	1 (33.3%)

Table 7: Causes of death in burns

Cause of death	Number of cases	Percentage (%)
Hypovolemic shock	5	8.2
Respiratory burns	4	6.6
Sudden cardiac arrest	2	3.2
Electrolyte imbalance	5	8.2
ARDS with sepsis	5	8.2
ARF with sepsis	3	4.9
Sepsis with MODS	15	24.6
Sepsis	22	36.1
Total	**61**	**100**

ARDS: Adult Respiratory Syndrome, ARF: Acute Renal Failure, MODS: Multiple Organ Failure

DISCUSSION

Mortality rate was 20% in our study, which is consistent with studies done by Olaitan *et al*[2], but lower than reported by Bang *et al*.[3] (28%), Yoshika *et al*.[4] (42.2 %) and Ashish[5]. Age of the person, percentage of total body surface area burned and inhalational injury are the important risk factors for mortality rate.

Mortality rate was high in females who were involved in 41 cases, whereas males were involved 20 cases. These findings are in concurrence with the studies reported by Subramanyam[6], Usama[7] and Kamran *et al*.[1] The reason could be high rate of serious burn injuries in female compared to males.

We observed in our study that mortality was high in 51–60 years age group (41.2%). This correlates with the study done by Olaitan *et al*.[2] who reported mortality of 50% in the age group of more than 65 years, reason being that elderly people could not withstand the burning injury.

Elderly people have thinner skin, poorer microcirculation and increased susceptibility to infection and the rate of burn shock, inhalation injury, pulmonary pathology, septicemia and renal failure is higher than in younger people. Children have lower mortality than adult due to smaller number of flame burns and a lower total body surface area.

Suicidal injuries (66.7%) had high mortality rate followed by homicidal injuries (33.3%). These findings are similar to those of Subramnyam[6] and Laloe[8] studies. This can be explained by the fact that fire accelerants that are used to commit suicide cause severe burns associated with inhalational injury.

Flame burns accounted for 30.4% mortality, followed by scalds, which accounted for 6.7% mortality rate. This is in accordance with the findings observed by Subramanyam[6], Benito-Ruiz *et al*[9], Olaitan[2] and Ashraf[10]. This can be explained by the fact that flame causes severe burns and greater depth along with inhalational injury.

The mortality rate increased as the body surface area burns increased. Burns over 90% of total body surface area showed 100% mortality rate, while no mortality was reported in burns <20%. This is consistent with study done in Brazil by De Souza *et al*.[11] and Olaitan[2].

Septicemia accounted for 73.6% of deaths. This is in accordance with findings of Mago[12], Ragheb *et al*.[13] and Singh *et al*.[14] Infection in burn patients is the leading cause of morbidity and mortality. Thermal injury destroys the skin barrier that normally prevents invasion by microorganisms, making the burn wound the most frequent area of sepsis in these patients. The dysfunction of immune system, large cutaneous bacterial load, the possibility of gastrointestinal bacterial translocation, prolonged hospitalisation and invasive diagnostic and therapeutic procedure, all contributes to sepsis.

CONCLUSION

Mortality was high in females as compared to males. Highest mortality rate was in the age group of 51–60 years (41.2%). Burns involving more than 90% of total body surface area were invariably fatal. Body surface area <10% and 11–20% had the least mortality rate (0%). Mortality was more in Flame burn, followed by Scald. As the burn surface area increases mortality also increased. Septicemia was the major cause of burn death.

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