Original Article

EPIDEMIOLOGY AND OUTCOME OF BURNS AT KHYBER TEACHING HOSPITAL PESHAWAR

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ABSTRACT

Objectives: To determine the epidemiology, describe the clinical presentation, outcome and the factors responsible for fatal outcome of burn patients.

Patients and Methods: A total of 240 patients admitted in Surgical D unit, Khyber Teaching Hospital, Peshawar from March 2004 to Feb 2005 with burn injuries were included. Patient characteristics including age, sex, type of burn, total body surface areas (TBSA) burned, any first aid received, treatment given in hospital and outcome were recorded.

Results: 52.2% of the 240 patients were females. 31.66% patients were below 10 years of age, while 21.25% and 27.08% were in the second and third decades. Majority had less than 20% TBSA burns (47.5%) and only 4.1% had more than 50% TBSA burns. Flame burns were the commonest (45%) followed by scalds 31.6% and electrical 10.83%. Scalds were common in children. 130 patients improved with daily washes, dressing and debridements, systemic and local antibiotics. Skingrafts needed in 30 patients, 36 were referred to plastic surgery unit and 16 with more than 40% TBSA burns were referred to specialized burn centres. Mortality was 19 with sepsis as the leading cause, multiple organ failure, and shock were other causes of mortality.

Conclusions: Burns injury is a major public health concern and is associated with significantly high morbidity and mortality. Flame, scald and electrical burns are commonly a result of domestic and occupation accidents and are preventable. The effectiveness of initial resuscitation, infection control and adequate surgical treatment improves short and long term outcomes.

KEYWORDS: Burns, Thermal Injury, Epidemiology, Outcome.

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INTRODUCTION

Burns and scalds are a common presentation to many of our health institutions and form 5-12 % of all traumas.[1,2] No statistical figures are exactly known here.[3] The incidence of burns in our and other developing countries is not precisely known due to non availability or incompleteness of death registration and disease reporting. Almost two million people in United State suffer from burns annually.[4] Whereas burns is among the 15 leading causes of death in India.[5]

Most of the burn incidents occurs in domestic settings because of house hold appliances, inflammable agents at home, clothing burns and in some cases also self inflicted.[3,5,6] Majority of burn injures sustained by children occur

at home as an accident.[7] Thus most of there injuries are preventable.

All cases require some degree of medical attention and many of the patients end with severe morbidity or even death.[1] People affected are mostly of poor socioeconomic status and of employable age. Our life style and social factors contribute to high occurrence of burns at homes.

Initial management of burns is very important. First aid measures like wound cooling and removal of source of injury significantly improves out come, decreases morbidity and also health costs.[8,9] Lack of facilities in most public sector hospital and insufficient personnel to take care of this group of patients increase the morbidity and mortality.

This study was undertaken to describe the epidemiology, clinical presentation and out come in burn patients in our setup and also to identify risk factors influencing the out come in burn patients.

PATIENTS AND METHODS

This prospective study was carried out in surgical 'D' Unit of Khyber Teaching Hospital, Peshawar from March 2005 to Feb 2006. All consecutive patients with different types of burn injuries requiring admission were included in the study. Patients with only minor superficial burns treated by emergency department as out patients were not included. Data was collected by using a proforma including demographic data, etiology, burn type, anatomical location and percentage of body surface area burned, any first aid measures (including whether or not the clothing was removed) use of cold water treatment, operating procedures, specialist management and out come were recorded. History regarding the etiology of burn injury was taken directly from patients in confidence or from relatives. Percentage of burn was determined by using 'rule of nine'.

On admission to the ward the patient received initial resuscitation including burn area wash, airway maintenance (if need), intravenous fluids (ringer lactate), pain relief and injectable antibiotics (co-amoxiclave) were given to those with risk of developing sepsis while others were given antibiotics after surgery. Tetanus toxoid and cimetidine were given to all patients. After the emergency measures regular wound debridements and dressing were carried out. Patients were monitored with pulse, blood pressure, temperature charts, and urine output. Wound healing was assessed clinically by granulation tissue at burn site, and improvement in general condition. CVP line was employed in few cases. Definitive treatment included skin grafts, amputations where needed. Superficial skin graft was done in our own unit, while others were referred to plastic and reconstructive surgery unit for grafting and rotational flaps. A few cases with extensive burns were referred to specialized burn care hospital (at Kharian etc.) for better management.

RESULTS

During the study period out of 2200 total admission, 240 patients were admitted with burn injuries, comprising 10.9% of total admissions. The patients included local residents and also Afghan Refugees in different camps. Age of patients ranged from 13 months to 52 years. Children less than 10 years of age comprised the largest number of burn patients (31.66%) and 70% of burns in children were scalds. Young adults between 21-30 years formed the second largest group (27.28%). One hundred ten patients were male and 130 female (Table-I), 163 cases occurred at home or dwelling places. Fig-1 shows the type of burns. Flame burn was the commonest 45%, while scalds were 31.66%. Electrical burns were 10.8% mostly young men working as line man, or due to faulty electrical appliances. Burns were more

Table-I: Demographic characteristics of patients (n=240)

Patient Characteristics		*No. of patients*	*%*
Age	1 – 10 years	76	31.66
	11 – 20 years	51	21.25
	21 – 30 years	65	27.08
	31 – 40 years	34	14.16
	> 50 years	14	5.83
Sex	Male	110	45.8
	Female	130	52.2

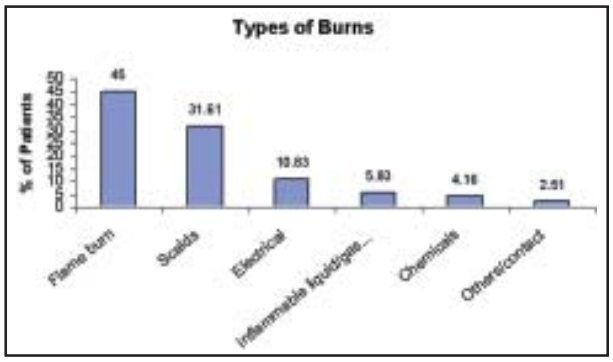

Fig-1: Etiology of burn (n – 240)

common at home and in kitchen where stove accidents or clothing caught fire and in lower socioeconomic group and camps where wood fire etc was used for cooking and heating purpose. Scalds were also common at home in women and children and were sustained due to hot water or other hot liquids. Burns as a result of stove bursting and cooker bursting were 13 and 9 respectfully. Seven patients were brought from fires in local match factories. Majority of the patients came to the hospital with in 4-6 hours.

Table-II shows the percentage of total body surface area (TBSA) involned. 32 patients had less then 10% TBSA burns mostly scalds in children. 72 patients had 10-20% TBSA burns while 10 had more than 50% TBSA burns. One hundred forty three patients (59.58%) had partial thickens burns while 97 patients (40.42%) had full thickens burns. Patients with scald burns had received some first aid like cold water washing before coming to hospital while majority of other burns patients had no first aid. Nine patient had burns on face mostly scalds and acid burns. Inhalation injury occurred in 33 patients. Minor cases were treated with oxygen and steroids in consultation with ENT department. In major inhalational injury cases multidisciplinary approach including ICU care was employed. Tracheostomy was done in two patients who were then shifted to specialized burns centre. Treatment and out come details are given (Table-III). Healing was better in scalds who had some first aid treatment. 130 patients improved with daily washes dressing debridements and local 1% Silver sulphadiazine cream application. Superficial skin graft was done in 33 cases in 2nd to 3rd week of burn injury, in 1-5 sessions. Graft was commonly taken from thigh skin. However 36 patients were referred to plastic surgery unit for extensive grafts and flap rotation etc. Usually after two weeks. Upper limb amputation was done in one patient, unilateral lower limb in one and bilateral below knee amputation in another patient. Escharotomy was done in 11 patients. 16 patients with more than 40% TBSA burns were referred to specialized burns centre either on demand and few due to severity of injury.

Table-II: Percent body surface area burned (n=240)

Surface area%	*No. of patients*	*%*
Less than 10	42	17.5
11 – 20	72	30.0
20 – 30	40	16.6
30 – 40	56	23.3
40 – 50	20	8.3
> 50	10	4.1

Mortality was 19 out of 186 remaining patients. Nine were those who had more than 40% TBSA with full thickness burns, multiple organ involvement and severe inhalational injury, who expired in 48-72 hours of arrival. Sepsis, multiple organ failure, late arrival and age were the factors leading to high mortality in other cases.

DISCUSSION

Burn injuries constitute a major health concern with respect to morbidity and mortality, as well as cost of management particularly in a developing country like Pakistan, where few specialized units exist in the public sector.

Burn injuries occur in all age groups, children under 10 years comprised 31.66% of all

Table-III: Treatment, outcome and mortality (n=240)

Treatment and Outcome	*No of patients*	*%*
Dressing/deridement/ local antibiotic application	130	54.16
Skin grafts	33	13.75
Amputations	4	1.66
Ref to plastic surgery unit	36	15.00
Ref to specialized burn unit	16	6.66
Left against medical advice	2	0.83
Mortality	19/186	10.21

burn patients in our study while young adults were the second largest group. Similar findings have been reported in a seven year burn study in Turkey with 48.6% burn patients being children of 0 to 6 years, while in another study 38% were children.[9,10] However in a study of major burns in Tokyo the mean age group was 40.4 years and 2.5% were elderly patients over 60 years.[11] In a local study, burns were the second commonest cause of injuries among children aged < or = 15.[12] About 79.21% burn cases occurred in domestic settings. Kitchen being the most common place and only 20.79% were out doors mostly at work place. A study by Durrani KM has also shown that the majority of burn incidents occur at home and in kitchen, customary cooking at floor levels and faulty cooking appliances, hot water containers used for washing, bathing etc are common cause of scalds.[3,7]

We found burn injuries were more common in females than males, mostly due to domestic accidents. In a study from rural area in India 80.8% of all burn death cases were females, of these 82.4% were married, 50% were accidental while 47.8% were suicidal.[5] Similarly in Iran 99% of self burning cases were females.[13] In contrast other studies show a male majority with 73.7% males and a male to female ratio of 1.94 respectively.[10,14,15]

Flame burn was the most common, causing burns in 45% cases followed by scalding in 31.61%. Flame burns were common in adults while scalds were more common in children. Our findings are in accordance with other studies with flame burn 45.6% and scalds 32%.[11] Similarly kerosine accident was common in adults and scalds injuries in children.[6] In 20 years data in Brisbane flame burn were 56%, scalds 26% and electrical burn 2%.[14] In our study flame burn occurred as a result of domestic or occupational accident, a few patients being workers in match factory. Percent total body surface area (TBSA) burn, inhalation injury and age all have been shown to be independent predictors of mortality in burn victims.[16] A mortality rate of 29.3% has been reported with burn size of 40.7% TBSA.[14] In our study 124 (47.5%) patients had less than 20% TBSA burns and only 30 patients had more than 40% TBSA burn. Others have also reported 70.7% patients with 10% or less TBSA, 8.2% patients with 30% or more TBSA burns.[17] Pegg. SP, reported 80.4% cases of 20% TBSA, 12.6% cases of 21-40% TBSA burn and 3.3% cases with 41-60% TBSA burns from Brisbane.[14]

Adequate first aid by water cooling affected the outcome of the patient group with burn extent less than 30% TBSA.[14] Cooling the body part under running tap water for at least 10 minutes is safe, usually clean, readily available, analgesic and rapidly reduces heat of burned tissue as well as diluting the injurious chemical agent.[9] Cooling of the burnt tissue is an important process in limiting the degree of tissue damage (other than full thickness) and improve prognosis for optimum cosmetic healing.[18,19] Hypothermia should be avoided and ice should never be used to cool a burn.[8]

In addition to washing of the burned area we also treated burn shock with intravenous crystalloids and colloids. Initial burn shock resuscitation with crystalloid infusion (lactated ringers) 4ml/kg/ % burn in the first 24 hours in more than 20% TBSA is a standard regieme, while volume of infusion is also associated with weight (negatively) and with full thickness burn size.[20,21] All patients in our series were started on systemic antibiotics along with topical antibiotic and sulphadizine cream (flamazine). The use of topical antimicrobial agents have helped greatly reduce the incidence of burn wound sepsis but a better understanding of the principles of burn care has resulted in earlier burn wound excision and complete coverage with autograft, cadaver skin, synthetic dressing and amnion, mostly with in first 'five' post burn days.[22-24]

Majority of our patients with upto 20% TBSA improved with dialy wound dressing and debridement, topical antibiotic cream application, while in 33 patients superficial skin graft was performed in our unit. To improve the cosmetic outcome of treatment 36 patients were referred to plastic surgery unit for flap rotation and grafting including facial and hand burns cases. Amputation of unilateral upper limb in two

cases, left below knee amputation (BKA) in one and bilateral BKA in another case of electrical burns was done in our unit. Of these one BKA patient developed septicemia and succumbed while the other made good recovery and was then referred for artificial limb fixation and rehabilitation. 16 of the 30 patients with more than 40% TBSA burns were referred to specialized burn centres.

Burn injuries produce a significant morbidity and mortality. The overall mortality has been reported as 18.7%, 15.4% and 3.1% in various studies.[5,10,13] Multiple organ failure caused upto 36.9% of total mortality, sepsis 25.2 and shock 19% while pulmonary Oedema and pneumonia were also common causes of death.[2,10] In our study mortality was 10.2% (19/186). Nine among these had more than 50% TBSA and full thickness burns with multiple organ involvement. In other cases, sepsis, multiple organs failure, late-arrival and age also contributed to high mortality. They survived the initial few weeks but succumbed to complications later. Lack of facilities and properly trained personnel to care for these patients also contributed to high mortality as there is no specialized burn unit staff and the general surgical units bear the burden of burn patients.

CONCLUSION

Burn injury is a public health concern associated with individual pain, emotional stress, prolonged hospitalization, often permanent disfigurement and family stress. In addition it is associated with significantly high mortality. Most of the burns were caused by domestic accidents and are therefore preventable. Occupation related burns prevention need adoption of better fire safety measures & regulations and personal protective gears. The quality of initial resuscitation, the effectiveness of infection control and adequate surgical treatment improves short and long term outcomes. A national public health education campaign, prevention programs in school and industries could have a positive effect on reducing the incidence and improving the outcome of burn injuries.

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