

Etiology Of Burns And Expected Mortality Risk Factors In Paediatric Burn Patients Admitted In Burns Centre Of Civil Hospital Karachi.

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ABSTRACT:

OBJECTIVE:

To assess the etiology of burns and risk factors associated with mortality amongst the pediatric patients in Burns Units of Civil Hospital Karachi.

METHODS:

Cross sectional study nonprobability descriptive study of Pediatric Burn Patients admitted in Burns Ward, Civil Hospital Karachi was conducted. A sample size of 227 was calculated. Records of patients were obtained after proper consent from the Burns ward of Civil Hospital Karachi. Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) Version 20.00. Chi square test and descriptive frequencies were used.

RESULTS:

The total patients were 227 which included 59.5% (135) males and 40.5% (92) females. Most cases were accidental, and Scald was the most common type of burn. Amongst the total admissions 89% (202) had 10-50% total body surface area burnt. Highest mortality was seen in patients with multiple burns. Significant relationship was analyzed between the nutritional status of patients as assessed by albumin levels and mortality ($p=0.004$). Total mortality reported was 28.2% (64 patients) with highest mortality in patients aged 1-5 years.

CONCLUSION:

Our study suggests that the most important single predictor of mortality in pediatric burn patients is %TBSA. Early access to fluid resuscitation, appropriate management of associated complications and proper nutritional support are needed to improve pediatric burn survival.

Keywords:

Pediatrics, burn, mortality, totalbodysurfaceareaburnt (TBSA)

INTRODUCTION:

The subject of pediatric mortality due to burns has been thoroughly investigated in many countries worldwide. Inhalational injury^{1,2,3,4}, Total body surface area (TBSA) involved, the degree of burns⁵, the age of the patient⁷, location of wound⁸ were strong predictors of mortality amongst pediatric patients. severe pneumonia and septicemia following burn injury accounted for a major cause of mortality⁶.

Appropriate and timely First aid at the site of accident significantly contributes in decreasing mortality. Long distance travel leading to late presentation to health facilities, lack of well-equipped burn centers and trained medical personnel and non-existing early excision and skin grafting contributes significantly to increasing

morbidity and mortality². Lack of awareness amongst general population regarding injury prevention and control measures and ineffective ambulance system for transportation of burned patients to specialized burn centers are important factors responsible for most of the deaths in cases of critical burns². Wound sepsis also contributes significantly to high mortality among burn injury patients^{2,3} where multi-drug resistant organisms causing significantly higher mortality⁸. Studies conducted in Pakistan show that the highest mortality was noted in children more than six year and least in age group between 3 - 6 years.⁹

MATERIALS AND METHODOLOGY:

A cross sectional non-probability descriptive study of Pediatric Burn Patients admitted in Burns' ward, Civil Hospital Karachi was conducted. The sample size was calculated to be 227 using open epi software, taking 95% as confidence interval and 5% as confidence level. Self-Administered Questionnaire including patient's Age, gender, Cause of injury, Type of injury, Total body surface area (TBSA), Nutritional Status (Total Protein) and other variables have been included in the study

Records of patients were obtained after taking permission from Burn Centre, Civil Hospital Karachi. Study includes all patients who are eligible into the inclusion

criteria and were admitted in the Burns Center, Civil Hospital Karachi. Questionnaires were completed by the investigators using the provided records.

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) Version 20.00. The data of categorical variables were presented as counts and percentages; the data of continuous variables were presented as the mean and standard deviation. Chi-square test and descriptive frequencies were used for analyzing all categorical data (gender, mortality).

The inclusion criteria included children from birth till 12 years of age, children only from Karachi and children with diseases other than congenital anomalies, Epilepsy, Asthma, Malignancies will be included. patients who left against medical advice were excluded from the study.

RESULTS:

The total number of admissions were 227 with 59.5% (135) males and 40.5% (92) females with a mean age of 4.8 (SD 3.3 years) with %of mortality being highest in the age group ranging from 1-5 years. Mean Duration of hospital stay was 10.6 days (SD 1.1 days)

Scald was the most common type of burn occurring in 139 (61.2%) of the patients, followed by fire burns 77 (33.9%), electrical burns 7 (3.1%) while chemical burn was the least common with only 4 (1.8%) patients reported chemical burn injury.

Except for 1 suicidal cause of burn, the rest 226 were accidental in nature. Only 3.1% (7) patients burnt outdoor, 0.4% (1) burnt on a ship whereas 96 % (218) patients were burnt indoors.

Amongst the total admissions 89% (202) had 10-50% total body surface area burnt (being the most common category), whereas 9.7% (22) had <10% TBSA burnt while only 1.3% (3) had >50% TBSA burnt. The percentage of TBSA burnt is significantly associated with mortality ($p=0.003$), with 92% (59) deaths having TBSA 10-50 %.

The regions of body burnt included the head and neck, trunk, arms, legs, buttocks and genitalia; with multiple burns (“involving more than three region) being the most common category constituting 156 (68.7%) of the patients, and mortality reported in this category was highest, constituting 56 (87.5%) of total deaths reported. Amongst single region burnt, trunk was the most common constituting 20 (8.8%) of the patients and buttocks and genitalia being the least common category, constituting 6 (2.6%) of all patients.

Significant relationship was analyzed between the nutritional status of patients as assessed by albumin levels and mortality ($p=0.004$). Regarding the length of time to IV access 7.5%(17) patients were resuscitated with IV fluids within the first hour of burn, 21.1% (48) within 1-4 hours and 71.4% (162) presented after 4 hours of injury.

Total mortality among the reported cases was 28.2% (64 patients). Mortality was higher among the 1-5years of age accounting for 60.94% (39) of all deaths reported.

DISCUSSION:

According to our study, children between 1-5 years of age most prone burns which is similar to studies^{10,11} conducted elsewhere, our study also confirms that higher percentage of total body Surface Area (TBSA) involved results in higher morbidity and mortality amongst pediatric patients.¹² According to our study the highest number of deaths were in the burn series from 10 – 50% while none of the patients with more than 50% burns survived. 3% deaths in children with less than 10% burns indicates that minor burns can cause mortality in children if not managed adequately and that there are other factors contributing to mortality.

Nutritional status is an important predictor of mortality amongst burn patients especially children, the reason being that a poor nutritional status leads to decreased immunity and slow healing of tissues therefore leading to a higher risk for sepsis and hypovolemic shock after burn injury¹³. According to our study respiratory failure was also an important cause of mortality along with wound infection and sepsis.

According to our study scald burns were the most common type of burns, this is similar to studies conducted by Magshoudi et al.¹⁴ who reported that most of fatal injuries result from flame burns of the skin and associated inhalation injury but our study reports more deaths due to scald burns than flame burns making it the most frequent type of burn causing pediatric mortality

According to our study, the frequency of scald burns decrease as the child's age increases. While scald burns are most commonly encountered in children less than 5 years, but flame burns are the most common type in children up to 12 years of age. Though electrical and chemical burns are rare in children less than 1 year of it, the frequency is highest in children 5-12 years of age.

The higher scalds and electrical burns in our population owes due to smaller housing facilities, overcrowded residential areas, improper construction and

insulation, improper electrical wiring, frequent power breakdowns, easy access to inflammables, improper disposal of inflammables. Boys sustain more injuries than girls in all age groups. The increased number of male patients compared with female patients is common in studies from Iran.¹⁴

Another major predictor in mortality was the length of time to intravenous access. Burns that received resuscitation fluids within the first hour had a significantly higher chance of survival. Our study was conducted in the only Burns Unit present in Karachi which facilitates patients from not only Karachi but also the urban and rural areas of Sindh and Balochistan province so longer distance to hospital access, lack of awareness in rural areas, lack of First Aid facilities is a major factor contributing to significant morbidity and mortality.

CONCLUSION:

Our study suggest that although length of time to IV access and development of respiratory failure are associated with increasing mortality, the most important single predictor of mortality, in pediatric burn patients is % Total body surface area burnt in which most of the cases were found to have TBSA burnt between 11-50%. Early access to fluid resuscitation, appropriate management of

associated complications and proper nutritional support are important measures that are needed to be taken to improve pediatric burn survival.

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TABLE 1: TABLE SHOWING THE REGION OF BURNS AND MORTALITY ASSOCIATED WITH THE REGION OF BURN.

REGION OF BURNS	FREQUENCY OF ADMISSIONS n (%) TOTAL =227	DEATHS n (%) TOTAL =64
HEAD AND NECK	11 (4.8)	1(1.5)
TRUNK	20(8.8)	3(4.6)

UPPER LIMBS	15(6.6)	2(3.1)
LOWER LIMBS	19(8.4)	2(3.1)
BUTTOCKS AND GENITALIA	6(2.6)	0(0)
MULTIPLE	156(68.7)	56(87.5)

TABLE 2: TABLE SHOWING THE % OF TOTAL BODY SURFACE AREA BURNT AND MORTALITY ASSOCIATED WITH SEVERITY OF BURNS.

% OF TOTAL BODY SURFACE AREA BURNT	FREQUENCY OF ADMISSIONS n (%) TOTAL =227	DEATHS n (%) TOTAL =64
1-10	22(9.7)	2(3)
11-50	202(89)	59(92.1)
51-100	3(1.3)	3(4.6)