ORIGINAL ARTICLE

ARE BURN COMMON IN CHILDREN? A SCRUTINY OF BURN ADMISSIONS IN PAEDIATRIC SURGERY UNIT OF A TEACHING HOSPITAL

Fayaz Ur Rahman, Muhammad Uzair, Waheed Akhtar, Inayat Ur Rahman

Department of Paediatric Surgery, Khyber Teaching Hospital, Peshawar, Pakistan.

ABSTRACT

Objective: To scrutinize broadly the pattern of burn injuries in the paediatric population and factors affecting the mortality.

Material & Method: This retrospective observational study was carried out from January 2017 to January 2018 in paediatric surgery unit of the Khyber teaching hospital Peshawar,Pakistan. This study includes patient up to 16 years of age who were admitted for burn management in paediatric surgery unit. Original files of all patients retrieved and factors analysed include demographic, total body surface area (TBSA) burns, mechanism of injury, monthly incidence, outcome and mortality analysis.

Results: A total of 233 burn patients admitted in paediatric surgery unit during the study period, which is 7.6% of the total admission. Mean age of burn patient was 4.15±2.88 years. Gender distribution shows 54% male and 46% female. Scald burns were most common, accounting for 55% of patients, flame burn 33% and electric burn 7.2% of total burn admission. Burn injuries are common in winter season with 60% patient admitted in 5 months from December to April. 47% patient presented with 20 to 50% TBSA burn. Mortality recorded in 12.5% of burn patients. Mortality data verified female gender, >30% TBSA burn and old burn admission as a risk factor.

Conclusion: Paediatric burn injuries are commonly seen in below 5 years of age, as children are curious in this age and try to explore. Winter season is a risk factor for paediatric burns and Scald burns is the leading mechanism of burn injuries in the pediatric population. Mortality is high for burn injuries and sepsis is the leading cause of mortality.

Keywords: Burn, scald, sepsis

This article may be cited as: Rahman UF, Uzair M, Akhtar W, Rahman UI. Are burn common in children? A scrutiny of burn admissions in paediatric surgery unit of a Teaching Hospital. J Med Sci 2018; 26: (4) 301-304.

INTRODUCTION

Burn injuries are common and children are mostly exposed to such injuries resulting in morbidity as well as mortality[1-3]. Burn injuries in children are reported even in developed countries and statistic shows 50% burn below 6 years of age[4]. Most burns occurred at home due to lack of proper supervision of children[5-7]. Scald burns are most common in preschool children, which is followed by flame and electric burn as age increases. Paediatric burn injuries are mostly managed in Paediatric surgery unit as proper burn centre facility is exceptionally limited in our country. To manage Paediatric burn injuries in limited resources is a challenging job. Burn patients, mostly develop complications like sepsis before they land in a specialized unit. These patients travel for hours to access treatment or they apply different septic substances on the wound which lead to complications.This study was conducted to analyse one year data of burn patient admission in order to establish the epidemiological pattern of burn injury and outcome.

Dr. Fayaz Ur Rahman (Corresponding Author)
Department of Pediatric surgery, Khyber teaching hospital,
Email: fayaz621@gmail.com
Phone: 0313-9857982 - 0346-9385948
Date Received: May 14, 2018
Date Revised: Aug 23, 2018
Date Accepted: Oct 20, 2018

MATERIAL AND METHODS

This retrospective observational study was conducted at Paediatric surgery unit of Khyber teaching hospital Peshawar-Pakistan, from January 2017 to January 2018. It includes all admitted burn patients having age below 16 years. Burn patients who are managed as an outpatient were excluded from this study. The charts of all patients with burn injuries were retrieved from the ward, hospital mortality registry, isolation unit record. Data regarding age, gender, address, mechanism of

injury, TBSA burn, outcome and mortality was recorded. Patient age was further divided into 3 categories having age less than 3 years, age 3-5 years and above 5 years. Mortality data of burn patient were retrieved from hospital registry and further analysed to identify the factors affecting the mortality.

RESULTS

During the study period of one year, 233 patients admitted to the paediatric surgery unit of the Khyber teaching hospital, which is 7.6% of the total admission. Mean age of burn patient 4.15 yrs±2.88 SD. Age and gender distribution is shown in Table 1.

Mechanism of burn injuries was analysed and revealed 55% patients were of Scald burns, 32.6% (76 out of 233) flame burn, 7.4% (17 out of 233) electric burn and 5.2% (12 out of 233) oil burn.

Burn injuries are more common in winter season due to use to gas heater and hot beverages. One year analysis shows 60% admissions in the winter season from the month of December to April while the remaining 40% admissions in the rest of the 7 months. Burn admissions were high in the month of December at 16.3% and low in June at 4.7%. Monthly distribution of burn admission shown in fig1. TBSA burn analysed and revealed a maximum number of patients had burn injuries between 20-50%. TBSA distribution is shown in table 1.

Mortality recorded in 12.5% of burn patient during the study period. Factor affecting mortality was further analysed which include age, gender, mechanism of burn, TBSA involve in burn and sepsis. Female gender, greater than 30% burn and old burns were recongnized as risk factors for mortality. Mortality data analysis is shown in table 2.

Table 1: Gender and age distribution of burn patients

Gender	
Male	125/233 (54%)
Female	108/233 (46%)
Age	
< 3 years	92/233 (39.5%)
3-5 years	85/233 (36.5%)
> 5years	56/233 (24%)
TBSA burn	
< 20%	92/233 (39.5%)
20-50%	110/233 (47.2%)
> 50%	31/233 (13.3%)

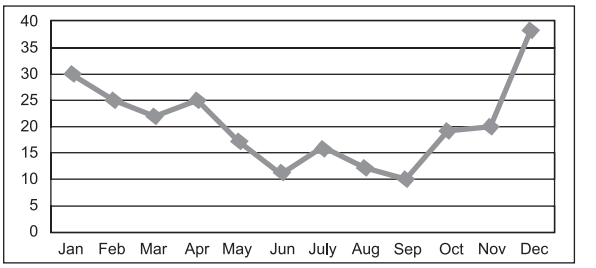

Fig 1: Monthly admission of burn injury in 2017

Table 2: Factors affecting mortality

Total mortality	**12.5% (29 out of 233)**
Age	4 ± 2.45
Gender	
Female	58.6% (17 out of 29)
Male	41.4% (12 out of 29)
Mechanism of burn	
Scald	48.2% (14 out of 29)
Flame	44.8% (13 out of 29)
Electric	7% (2 out of 29)
TBSA burn	
< 30%	27.6% (8 out of 29)
> 30%	72.4% (21 out of 29)
Old Burn with sepsis	48.3% (14 out of 29)

DISCUSSION

Burn injuries frequently occur in children. These patients need a multidisciplinary approach to provide initial accurate fluid resuscitation, aggressive wound care, sophisticated intensive care, rehabilitation and psychological support. In our setup with limited resources and lack of proper burn center, these patients directly encounter Paediatric surgeon. Literature review shows that most of the studies on Paediatric burn were conducted in burn center and plastic surgery unit. This study was conducted to analyse burn patient admission in Paediatric surgery ward of a tertiary care hospital which is the major referral center from all over the province and Afghanistan as well.

Children age is an important factor in burn patient which affect mechanism of burn and outcome. Literature review showed that children under 5 years of age mostly affected by burn injuries with incidence ranging from 34% to 70%[8,9]. In developed countries the burn injuries under 5 years is low as reported in a study conducted in china which shows 34%. In developing countries this percentage is high which is endorsed by present study as well[10]. Current study shows 76% of children admitted were less than 5 year of age. Children under 5 years

are curious as they continue to explore and discover surrounding. While doing this they can encounter hot water, fire and any hot object leading burn injury which is devastating not only for child but for whole family[11,12]. In our society this puts the whole blame on mothers who actually responsible for child supervision at home. Scald burn are common in under 5 years children but with increasing age incidence of flame and electric burn increases[10].

Gender distribution has been reported to have no significance in burn injuries in children while this is an important factor for burn injuries in adult[13,14]. Current study shows male 54% and female 46%. Some studies have reported female sex as a risk factor determining the mortality[15].

Monthly analysis of data in current study showed that 60% of burn in the winter season from December to April. The highest percentage of burn is recorded in December. Temperature is very low in the month of December to April. Use of hot beverages and gas heater on rise in these months leading to burn injuries. A study in china showed a high percentage of burn in hot season due to increased use of air conditions and use of short clothes with exposed body while another study conducted in UK showed no significant seasonal variation[10,16].

Scalds are the leading cause of burn injury in Paediatric population and mostly due to hot water, tea and milk[5,17,18]. The Current study also showed scald burn is leading cause at 55%. Followed by flame burn at 32.6%, electric burn 7.4% and oil burn. Flame burns from blast due gas leak are reported in 5.1% and these burn involves the whole family. Electric burn injuries can be high voltage of above 1000 Volt and low voltage of household appliances. Such injuries have small entry and exit point, but the underlying injury is very high due to neurovascular damage. Such patient may require fasciotomy, multiple debridement and amputation. In Current study, we have verified that high voltage electric burn injuries are common areas with frequent electric shutdown and these patient require frequent surgeries[19,20].

TBSA involve in burn is an important predictor of outcome and mortality increases with a percentage of burn greater than 40%. Some studies have reported 25% burn in children leads to high inflammatory response in the body and should be considered as critical[19]. Some studies have reported a mortality of 100% for a percentage of burn greater than 60%. The current study showed 47.2% patient with burn area of 20-50%.

Burn wound left the child at risk of infection and has serious consequences if not treated in time. Burn wound infection is the 2nd leading cause of mortality in children. Such infection can be classified as localized or systemic. Systemic infection usually leads to multi organ failure and has a poor outcome. Ideally burn wound needs to be managed in clean and moist environment which is extremely lacking in our setup with limited resources. Akhtar et al reported Pseudomonas aeurogenosa as a common microorganism responsible for burn wound infection. The same study showed Multi drug resistant staph aureus(MRSA) in 15.2%[21]. And these infections can lead to sepsis and mortality if not treated in time.

In this study 29 mortality cases recorded which is 12.4% of total burn admissions. Mean age of 4 years, female gender, >30% TBSA burn and sepsis was recorded as a risk factor for burn injuries. Due to lack of health care facilities these critical patients were referred from fanfling areas and they travel for hours to reach the specialized unit. Low socioeconomic status and poverty also reported to be the main reason to present late to the hospital and in critical condition. Literature review verified age below 4 years, female gender, burn greater than 30%, low socioeconomic status and infection as the leading factor affecting mortality[22,23,24].

CONCLUSION

Winter season is a risk factor for paediatric burns and Scald burns is the leading mechanism of burn injuries in the pediatric population. Mortality is high for burn injuries and sepsis is the leading cause of mortality

RECOMMENDATIONS

Maternal education has a greater role in preventing such injuries and home condition should be modified to reduce risk of burn.. Gas leak leads to blast injuries affecting whole family are quite often reported. Legislation is required to avoid illegal gas connection and to add some odorant to gas, which can help in the detection of leak gas. Electric burn injuries mostly results in amputation of upper limb and has long term effect. Children are reported to climb over the electric pole resulting in serious burn injuries. Such injuries can be prevented by educating people regarding safety and need legislation for safe transmission of main supply line.Mortality in burn can be reduced by establishing proper burn center , intensive care units and providing infection free environment.

REFERENCES

1. Chipp E, Walton J, Gorman DF, Moiemen NS. A 1 year study of burn injuries in a British Emergency Department. Burns : journal of the International Society for Burn Injuries. 2008;34(4):516-20.

2. Alemayehu H, Tarkowski A, Dehmer JJ, Kays DW, St. Peter SD, Islam S. Management of electrical and chemical burns in children. Journal of Surgical Research. 2014;190(1):210-3.

3. Chien WC, Pai L, Lin CC, Chen HC. Epidemiology of hospitalized burns patients in Taiwan. Burns : journal of the International Society for Burn Injuries. 2003;29(6):582-8.

4. D'Souza AL, Nelson NG, McKenzie LB. Paediatric burn injuries treated in US emergency departments between 1990 and 2006. Paediatrics. 2009;124(5):1424-30.

5. Krishnamoorthy V, Ramaiah R, Bhananker SM. Paediatric burn injuries. International Journal of Critical Illness and Injury Science. 2012;2(3):128-34.

6. McGarry S, Elliott C, McDonald A, Valentine J, Wood F, Girdler S. Paediatric burns: From the voice of the child. Burns : journal of the International Society for Burn Injuries. 2014;40(4):606-15.

7. Sharma RK, Parashar A. Special considerations in paediatric burn patients. Indian Journal of Plastic Surgery : Official Publication of the Association of Plastic Surgeons of India. 2010;43(Suppl):S43-S50.

8. Labib JR, Shalaby SF. Epidemiology and Outcomes of Paediatric Burn Injuries in Cairo University Hospital-Egypt. 2014.

9. Cox SG, Martinez R, Glick A, Numanoglu A, Rode H. A review of community management of paediatric burns. Burns : journal of the International Society for Burn Injuries. 2015;41(8):1805-10.

10. Li H, Yao Z, Tan J, Zhou J, Li Y, Wu J, et al. Epidemiology and outcome analysis of 6325 burn patients: a five-year retrospective study in a major burn center in Southwest China. Scientific Reports. 2017;7:46066.

11. Peden M. World report on child injury prevention: World Health Organization; 2008.

12. Rybarczyk MM, Schafer JM, Elm CM, Sarvepalli S, Vaswani PA, Balhara KS, et al. A systematic review of burn injuries in low- and middle-income countries: Epidemiology in the WHO-defined African Region. African Journal of Emergency Medicine. 2017;7(1):30-7.

13. Blom L, Klingberg A, Laflamme L, Wallis L, Hasselberg M. Gender differences in burns: A study from emergency centres in the Western Cape, South Africa. Burns : journal of the International Society for Burn Injuries. 2016;42(7):1600-8.

14. Jeschke MG, Mlcak RP, Finnerty CC, Norbury WB, Przkora R, Kulp GA, et al. Gender differences in Paediatric burn patients: does it make a difference? Annals of surgery. 2008;248(1):126-36.

15. Shahabi Shahmiri S, Kolahdouzan M, Omrani A, Khazaei M, Salehi H, Motavalian A, et al. Determinants of Mortality and the Lethal Area 50 Index (LA50) in Burn Patients Admitted to a Large Burn Center; A Single Center Experience. Bulletin of Emergency & Trauma. 2017;5(3):184-9.

16. Verey F, Lyttle MD, Lawson Z, Greenwood R, Young A. When do children get burnt? Burns : journal of the International Society for Burn Injuries. 2014;40(7):1322-8.

17. Elmasry M, Steinvall I, Abdelrahman I, Olofsson P, Sjoberg F. Changes in patterns of treatment of burned children at the Linkoping Burn Centre, Sweden, 2009–2014. Burns : journal of the International Society for Burn Injuries. 2017;43(5):1111-9.

18. Rawlins JM, Khan AA, Shenton AF, Sharpe DT. Epidemiology and outcome analysis of 208 children with burns attending an emergency department. Paediatric emergency care. 2007;23(5):289-93.

19. Goutos I, Tyler M. Early management of paediatric burn injuries. Paediatrics and Child Health. 2013;9(23):391-6.

20. Al-Shehri M. The pattern of paediatric burn injuries in Southwestern, Saudi Arabia. West African journal of medicine. 2004;23(4):294-9.

21. Akhtar W. Culture and sensitivity pattern of burns wound infections in paediatric patients. J Med Sci 2017; 25: (1) (Supplement) 171-174

22. Rosanova MT, Stamboulian D, Lede R. Risk factors for mortality in burn children. Brazilian journal of infectious diseases. 2014 Apr;18(2):144-9.

23. Laitakari E, Koljonen V, Rintala R, Pyörälä S, Gissler M. Incidence and risk factors of burn injuries among infants, Finland 1990–2010. Journal of Paediatric surgery. 2015 Apr 30;50(4):608-12.

24. Agbenorku P, Agbenorku M, Fiifi-Yankson PK. Paediatric burns mortality risk factors in a developing country's tertiary burns intensive care unit. International journal of burns and trauma. 2013;3(3):151.

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE NIL

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Rahman FU: Idea and data collection.

Uzair M: Data Collection, bibliography.

Akhtar W: Analysis of data.

Rahman I: Overall Supervision.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.