BURNS: FREQUENCY AND MORTALITY RELATED TO VARIOUS AGE GROUPS

ISHTIAQ AHMED CHAUDHARY

ABSTRACT

Objective — *To find out frequency of burns injury and mortality related to it in different age groups and their association with various types and degree of burns.*

Study design — *Descriptive study.*

Place & Duration of study — *From July 1999 to April 2008, at Fauji Foundation Hospital, Rawalpindi.*

Patients and Methods — *Patients of all ages and both sexes received in emergency room with burns injuries whether admitted or managed on outpatient basis were included in the study.*

Results — *A total 248 patients were received during the study period. Majority (n-109 - 43.96%) had sustained flame burns followed by scalds (n-89 - 35.89%). Most of the patients were in the 1st and 2nd decade of life (n-70 - 28.23% and n-68 - 27.42% respectively). The percentage of total body surface area involved was up to 10 percent in 77- 31.04% and between 11-20 percent in 55 - 22.17%. Eleven (4.43%) patients had more than 90% total body surface area burns. Fifty two patients (20.96%) died with 100% mortality in more than 70% and none in less than 30% of total body surface area burns. Mortality was high in flame burns (n-41 - 16.53%). Sepsis was the common cause of death (75%) followed by irreversible shock (13.46%).*

Conclusion — *Mortality was high in flame burns and hot liquid burns.*

Key words — *Burns, Etiology, Mortality.*

INTRODUCTION:

Mortality from burn injuries is the most important and quantifiable outcome in burn patients. Higher fatality rates are reported in extreme of age groups, large total body surface area (TBSA) burns, deep burns and among patients who do not seek immediate medical treatment.[1] Mortality also depends upon the nature of etiological agent causing burns and management provided in specialized units.

Correspondence
Dr Ishtiaq Ahmed Chaudhary
Department of Surgery
Fauji Foundation Hospital,
Rawalpindi

Burns are a major public health problem, with long hospitalization. Patients with burn injury consume a lot of health resources and pose a major economical burden. In Israel about 5% of all hospitalized injuries are due to burn.[2] In Korea burn injuries are the sixth leading cause of death and mortality rate due to burn injury was 1.8 per 100,000 person in 2001, without long-term change from 1991.[3] The management of burns remains a challenge in developing countries due to lack of health facilities and specialized centers for burn treatment and economical factors.

There are no long-term epidemiological studies available on burn injuries in Pakistan. Some data exist to document the extent of the problem. This study is done to find out

the nature and extent of burn injuries and mortality in different age groups.

PATIENTS AND METHODS:
This was a descriptive study conducted at the Burns Unit Fauji Foundation Hospital, Rawalpindi from July 1999 to April 2008. All patients with burns injuries irrespective of age and sex were included in the study. Patients were evaluated regarding cause and nature of injury, extent of involvement of area burnt. Mortality in those admitted for in patient treatment was also noted. Findings were recorded on a performa.

RESULTS:
A total of 248 patients were received during the study period. Majority of the patients had flame burns (n-109 -43.96%), followed by hot liquid (n-89 - 35.89%). Thirty two (12.90%) patients had electric burns. Large numbers of patients were from 1st, 2nd and 3rd decade of life (n-70 - 28.23%, n-68 - 27.42% and n-38 - 15.33% respectively). Only eight patients were from 7th decade and above (Table-I).

Seventy seven (31.04%) and 55 (22.17%) patients had 10% and 11-20% total body surface area burnt respectively and 4.43% had more than 90% total body surface area involved (Table - II). Fifty two patients (20.96%) died. Mortality was almost 100% among burns involving more than 70% of total body surface area burnt. There was no mortality among patients having less than 30% of total body surface area burns. Mortality was high among patients with flame burns (16.53%) followed by burns with hot liquid (3.62%) and electric burns (0.40%) Table-III & IV. Sepsis was the common cause of death (75%) followed by irreversible shock (13.46%) and the least common was inhalation injuries (11.54%).

DISCUSSION:
Burn injuries are globally responsible for about 5% of total mortality and the overall global annual cost was estimated around 500 billion US dollars.[4,5]

Mortality from burn injuries is reported as 6.5%, 9.72% and 4.3% from Nigeria,[6] Irrua[7] and Egypt[8] respectively. A mortality figure of 36% has been reported by Adigun.[9] From Pakistan overall mortality of 29.7% was reported by Khan and 19% by Muqeem.[10,11] A mortality of 20.96% was observed in our study which is consistent with other studies published from Pakistan. This rate is comparatively high as compared to data available internationally. This probably is due to the lack of health facilities and paucity of specialized burn centers in our country.

Degree and total body surface area burn have strong correlation with the mortality. A study done in Israel reported 4.4% mortality, with a strong correlation between degree of burn, total body surface area and mortality (i.e. 0.25% mortality with less than 10% TBSA, 5.4% with less than 10% TBSA, 5.4% with 20-39% TBSA, and 96.6% for burns > 90% TBSA).[2] On the contrary no mortality was recorded in less than 30% of total body

Table – I Causes of Burns in Different Age Groups (n 248)

Age (Years)	Hot liquid	Flame	Chemical		Electric	Explosive	Total	95% Confidence Limits
			Acid	Alkali				
0-10	28	24	-	4	12	2	70 (28.23%)	24.43 to 31.46
11-20	26	22	2	5	10	3	68 (27.42%)	23.72 to 30.56
21-30	14	18	-	2	4	-	38 (15.33%)	12.72 to 17.37
31-40	9	15	-	-	2	-	26 (10.49%)	8.23 to 12.36
41-50	8	17	-	-	3	-	28 (11.29%)	9.21 to 13.56
51-60	2	7	-	-	1	-	10 (4.04%)	2.12 to 6.56
61-70	2	4	-	-	-	-	06 (2.40%)	1.34 to 3.29
> 70	-	2	-	-	-	-	02 (0.80%)	0.50 to 1.02
Total	89 (35.89%)	109 (43.96%)	2 (0.80%)	11 (4.43%)	32 (12.90%)	5 (2.02%)	248	(Analyzed by Software Epi6)

Table – II Total Body Surface Area involved in Different Age Groups (n = 248)

Age (Years)	<10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	>100%	Total
0-10	32	18	6	3	2	4	2	2	1	-	70
11-20	16	18	6	4	6	5	3	4	4	2	68
21-30	8	4	4	-	4	1	4	5	3	5	38
31-40	7	2	3	2	2	2	1	1	4	2	26
41-50	9	9	3	-	1	-	1	2	1	2	28
51-60	3	1	2	2	1	1	-	-	-	-	10
61-70	2	2	1	-	1	-	-	-	-	-	6
> 70	-	1	1	-	-	-	-	-	-	-	2
TOTAL	77 31.04%	55 22.17 %	26 10.48 %	11 04.43 %	17 6.85 %	13 5.24 %	11 4.43 %	14 5.64%	13 5.24 %	11 4.43 %	248

Table – III Mortality in Different Age Groups and Total Body Surface Area Involved (n=52)

Age (Years)	0 -30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	> 90%	Total
<10		-	-	1	1	2	1	-	5 (2.02%)
11-20		-	1	1	1	4	4	2	13 (5.24%)
21-30		-	-	-	1	5	3	5	14 (5.65%)
31-40		-	-	1	-	1	4	2	8 (3.22%)
41-50		-	-	-	1	2	1	2	6 (2.41%)
51-60		1	1	1	-	-	-	-	3 (1.21%)
61-70		-	1	1	-	-	1	-	3 (1.21%)
> 70		-	-	-	-	-	-	-	
TOTAL		1 (0.40%)	3 (1.20%)	5 (2.01%)	4 (1.61%)	14 (5.64%)	14 (5.64%)	11 (4.43%)	52 (20.96%)

30% of total body surface area burns and 100% mortality occuurred in more than 70% total body surface area burns in our study.

Mortality was high in old age group as compared to younger age. In one study 35.3% mortality was reported in the age over of 70 years and the best prognosis from in 0-1 year age group (survival rate 99.6%).[2] In a study by Tang, the mortality was 36% among old age group. In our study almost 50% patient died in 5th and 6th decade of life where as low mortality (2.02%) noticed in less than 10 years of age in burns patient with more than 50% of total body surface area involvement. High mortality (2% to 14.40%) was reported in different studies in literature among the patients having flame burns associated with inhalation burn injuries.[3,11,12] High mortality (16.53%) was also observed among our patients having flame burns as compared to other types of burns followed by hot liquids. Extensive burns (more than 50%) due to hot liquids are uncommon especially in domestic setup. Flame burns associated with high mortality as reported in our study and international literature is because of their extensive involvement and associated inhalation injury.

Highest incidence of chemical burns is reported from

Table – IV: Mortality in Different Types of Burns (N=52)

Age (Years)	Hot liquid n = 89	Flame n = 109	Chemical n = 13	Electric n = 32	Explosive n = 5	Total
0-10	3	2	-	-	-	5
11-20	2	10	-	1	-	13
21-30	1	12	-	1	-	14
31-40	-	8	-	-	-	8
41-50	-	6	-	-	-	6
51-60	1	2	-	-	-	3
61-70	2	1	-	-	-	3
Total	9	41	-	2	-	52
% Among total	(3.62%)	(16.53%)		(0.40%)		
% Among group	(10.11%)	(37.61%)		(6.25%)		
95% Confidence Limits	7.27 to 13.30	33.42 to 41. 87		4.12 to 8.83		

Uganda, Bangladesh, Taiwan, Jamaica and Cambodia with up to 0.7% mortality.[13,14] In our study 5.23% of patients had chemical burns and no mortality was noted. The reason of no mortality among our patients was small (less than 10% of total body surface area) burns and they reported immediately to hospital for treatment. Chemical burns are not common in our set up as reported in other studies and were usually of minor nature.

Electrical burn injury is a relatively infrequent but potentially devastating form of multisystem injury with high morbidity and mortality. In various studies 2 -3% case fatality is reported.[15,16,17] The mortality rate for the electrical burn group is lower as compared to the other type of burns however, the opposite is true for complications rate in electric burns.[18] 1In our study 12.90% of our patients had electric burns and mortality was 0.40%. Majority of patients sustained injury at home with low voltage (up to 220 V) with minor burns.

In our study sepsis and its related complications were the leading cause of mortality (75%). Irreversible shock was observed among 13.46% patients who received extensive burns and these patients died within 72 hours of injury. Mortality due to inhalation injuries (13.46%) was observed among patients who sustained flame burns especially in close spaces. 38.1% overall mortality was reported from Iran by Rajabian and among them 76% of the total deaths were due to septic complications followed by irreversible burn shock in 20%.[19] In a study from Pakistan, reported sepsis rate as the leading cause death was 25.2% followed by multiple organ failure (36.9%) and shock (19%).

CONCLUSIONS:

Mortality was high in our set up especially from flame burns and hot liquid burns. Mortality from chemical and electric burns was significantly low in our country because these injuries usually occur at home.

REFERENCES:

1. Olabanji JK, Oginni FO, Bankole JO, Olasinde AA. A ten-year review of burn cases seen in Nigerian teaching hospital. J Burns 2003;2:1-11.

2. Haik J, Liran A, Tessone A, Givon A, Orenstein A, Peleg K. Burns in Israel: demographic, etiologic and clinical trends, 1997-2003. Isr Med Assoc J. 2007 ;9:659-62.

3. Shin SD, Suh GJ, Sung J, Kim J. Epidemiologic characteristics of death by burn injury from 1991 to 2001 in Korea. Burns. 2004;30:820-8.

4. Nordberg E. Injuries as a public health problem in Sub-Saharan Africa: epidemiology and prospect for control. East Afr Med J. 2000;77:1-4.

5. Atia RF, Reda AA, Mandil AM, Arafa MA, Massoud N. Predictive model for mortality and the length of hospital stay in an Egyptian burn centre. Easr Mediterr Health J. 2000;6:1055-61.

6. Mungadi IA. Child hood burn injuries in north western Nigeria. Niger J Med 2002;11:30-2.

7. Dongo AE Nil, Irekpita EE Nil, Oseghale LO Nil, Ogbebor CE Nil, Iyamu CE Nil, Onuminya JE Snr. A five-year review of burn injuries in Irrua. BMC Health Serv Res. 2007 23;7:171.

8. El-Badawy A, Mabrouk AR. Epidemiology of childhood burns in the burn unit of Ain Shmas University in Cairo, Egypt. Burns 1998;24:728-32.

9. Adigun IO, Oluwatosin OM, Amanor-Boadu SD, Oluwole OA. Inhalation injury in burn patients in Ibadan. Nig J Surg Res 2001;3:50-54.

10. Khan N, Malik MA. Presentation of burn injuries and their management outcome. J Pak Med Assoc. 2006;56:394-7.

11. Muqim R, Zareen M, Dilbag, Hayat M, Khan I. Epidemiology and outcome of Burns at Khyber Teaching Hospital Peshawar. Pak J Med Sci 2007;23:420-4.

12. Tang K, Jian L, Qin Z, Zhenjiang L, Gomez M, Beveridge M. Characteristics of burn patients at a major burn center in Shanghai. Burns 2006;32:1037-43.

13. Asaria J, Kobusingye OC, Khingi BA, Balikuddembe R, Gomez M, Beveridge M. Acid burns from personal assault in Uganda. Burns 2004 ;30:78-81.

14. Xie Y, Tan Y, Tang S. Epidemiology of 377 patients with chemical burns in Guangdong province. Burns 2004;30:569-72.

15. Adukauskiene D, Vizgirdaite V, Mazeikiene S. Electrical injuries. Medicina. 2007;43:259-66.

16. Maghsoudi H, Adyani Y, Ahmadian N. Electrical and lightning injuries. J Burn Care Res 2007;28:255-61.

17. Opara KO, Chukwuanukwu TO, Ogbonnaya IS, Nwadinigwe CU. Pattern of severe electrical injuries in a Nigerian regional burn centre. Niger J Clin Pract 2006;9:124-7.

18. Nursal TZ, Yildirim S, Tarim A, Caliskan K, Ezer A, Noyan T. Burns in southern Turkey: electrical burns remain a major problem. J Burn Care Rehabil 2003;24:309-14.

19. Rajabian MH, Aghaei S, Fouladi V. Analysis of survival and hospitalization time for 2057 burn patients in Shiraz, southwestern Iran. Med Sci Moint 2007;13:353-5.