ANALYSIS OF BURN MORTALITY IN A BURNS CENTRE

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SUMMARY. We present an analysis of burn mortality in our burns centre in Nigeria. A total number of 285 patients sustained burns during the study period (1996-2000). Fifty-seven of the patients (20%) died, of whom 38 were male (66.7%) and 19 female (33.3%). Flame burn was responsible for 92.9% of the deaths, followed by 5.3% of deaths due to chemical burns and 1.8% to scalding. The highest mortality was found in the 71-80 yr age group, and survival decreased with increasing percentage burn surface areas. Mortality in males (20.8%) was higher than in females (18.6%), with flame burns causing produced more deaths than other aetiologies. The causes of deaths were acute renal failure (24 cases, 42.1%), septicaemia (18 cases, 31.6%), acute respiratory syndrome (5 cases, 8.7%), shock (4 cases, 7.0%), and upper gastrointestinal bleeding due to peptic ulcer and severe anaemia (1 case each, 1.8%). We conclude that improved facilities and better trained personnel will lead to a reduction in the current high mortality rate among burn patients in our environment.

Introduction

Burn injury is a disaster. In developing countries like Nigeria, various authors have reported burn mortality as being very high.[1-3] The reasons for this include poor facilities and a dearth of personnel to manage burn patients. Poverty and ignorance are significant contributors to this high mortality. This is because most of the people injured are from low socioeconomic levels of society. The need for patients to pay for their treatment has therefore impaired proper treatment of these patients.

A careful review of our burn mortality is presented in this paper. The aim is to make a critical analysis of mortality in our burns centre with a view to finding possible ways of improving the care given to our patients and suggesting ways of reducing mortality.

Patients and method

A retrospective review was carried out of burn patients treated in our burns centre between January 1996 and December 2000. The age and sex of patients, extent of injury, manner of occurrence, and duration of admission to hospital before death, as well as the possible cause(s) of death, were extracted from the patient folders. The data are presented in graphs, tables, and summary statistical figures, such as means and standard deviation.

Results

Two hundred and eighty-five patients with acute burn injuries were admitted during the study period. One hundred and eighty-three were males and 102 were females, with a ratio of 1.8:1. The age of the patients ranged from 22 days to 76 yr, with a mean of 20.7 yr. Two hundred and six patients (72.7%) sustained burns at home while 66 (22.4%) were burned at work; 15 (5.3%) were burned on the road following traffic accidents.

Flame constituted the largest source of burn (152 cases, 53.3%), followed by scalding (108 cases, 37.9%); chemical and electrical burns constituted respectively 20 cases (7.0%) and 5 cases (1.8%) (*Table I*).

Fifty-seven (20%) of the patients died. The age of the deceased patients ranged from 2 yr to 76 yr (mean age, 29.7 yr). Thirty-eight (66.6%) of these patients were male and 19 (33.3%) female. Most of the deaths (53, equal to 91.4%) occurred in patients who had sustained flame burns (*Table I*), followed by three deaths (5.6%) from chemical burns and one (0.9%) from scalding. Flame burn deaths also constituted 34.9% of all patients who sustained flame burns and 18.6% of all patients who sustained burns during the study period. Three of the deaths (5.6%) occurred in patients with chemical burns (average burn surface area, 45%). The last patient was a two-year-old boy who sus-

Table I - Burn aetiology and mortality

Burn aetiology	Total number of patients	Total number of deaths (%)
Flame	152	53 (34.9)
Scalds	108	1 (0.9)
Chemical	20	3 (15.0)
Electrical	5	None (0)

tained 39% scald burns and died four days later due to acute renal failure. This constitutes 0.9% of all 108 patients who sustained scald burns during the study period.

Only two patients with a burn surface area of 30% or less died - these were two of the three patients with full-thickness chemical burns with 27% and 30% burn surface areas respectively. The former of these two patients had attempted suicide by ingesting battery 'water', in addition to bathing in it. Two of the patients were known epileptics who sustained 66% and 88% flame burns that were almost entirely full thickness. Twelve of the 57 patients (21%) had associated inhalation injuries.

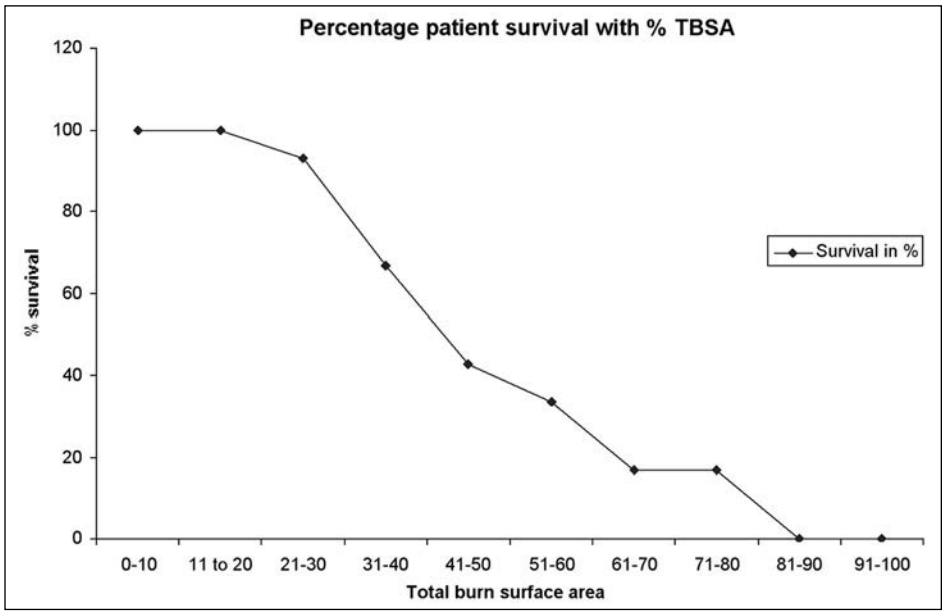

Fig. 1 - Percentage patient survival with percentage total burn surface.

Mortality was 6.1% in the age group 0-10 yr, the group with the highest number of patients (114, equal to 40%). The mean burn surface area in this group was 13.1%. The highest mortality was observed in the age group 71-80 yr, with two out of three dying (66.7%) - this group also had the highest average burn surface area (48.2%). The 31-40 yr age group came next, with an average total burn surface area of 27.1% and mortality of 41%.

Survival was seen to decrease as percentage burn surface areas increased, as shown in *Fig. 1***,** with no survival among patients with 80% burn surface area or more. Patient survival also decreased with increasing age, as shown in *Fig. 2*, with highest survival in the age group 0-10 yr and lowest in the age group 71-80 yr. Most of the deaths (38, or 66.7%) occurred within the first week of admission, with nine (15.8%) occurring within the second week; the average day of death was day 14.9, with a range of 1-172 days.

The causes of death were acute renal failure in 24 cases (42.1%), septicaemia in 18 (31.6%), acute respiratory distress syndrome in five (8.7%), shock in four (7.0%), peptic ulceration in one (1.8%), and severe anaemia in one patient (1.8%) who refused transfusion on religious grounds; four patients (7.0%) did not have the cause of death indicated in the folders.

Discussion and conclusion

Burns are one of the most important causes of disability and mortality throughout the world. In developed countries, the mortality rate is 2.1% per 100,000 person years.[1] Mortality has decreased throughout the years owing to prevention campaigns and advances in therapy.[2]

The mortality rate in this study is 20%, which is quite high compared to mortality from developed countries[3-6] but lower than in other reports from Nigeria[7-9] and Kuwait (28.4%).[10]

Three risk factors for death have been identified: age over 60 yr, more than 40% body surface area burned, and inhalation injury.[2]

Mortality in our patients aged 60 yr and above was 50%, although the number of patients in this age group was quite small. This compares to the study of Herd et al.,[11] who reported mortality of 45% among 123 burned patients aged 65 yr and above. High mortality among the elderly has also been reported by other researchers.[2,4]

We also noticed in the current study a decrease in survival with increasing burn surface areas, as also with increasing age (*Figs. 1, 2*). This is consistent with a study from Brazil which shows increased mortality with age and burn surface areas.[12]

Mortality in males was higher than in females: 38 males (66.6%) and 19 females (33.3%). Mortality among all men burned was 20.8% and among all females burned 18.6%. This finding is similar to other reported cases of male predominance in burn mortality.[13] Female preponderance in burn mortality has been reported from India[14] and Iran.[15]

Flame burns appear to be a predisposing factor to higher mortality as most of the deaths in this study (91.4%) occurred in patients with flame burn compared to only

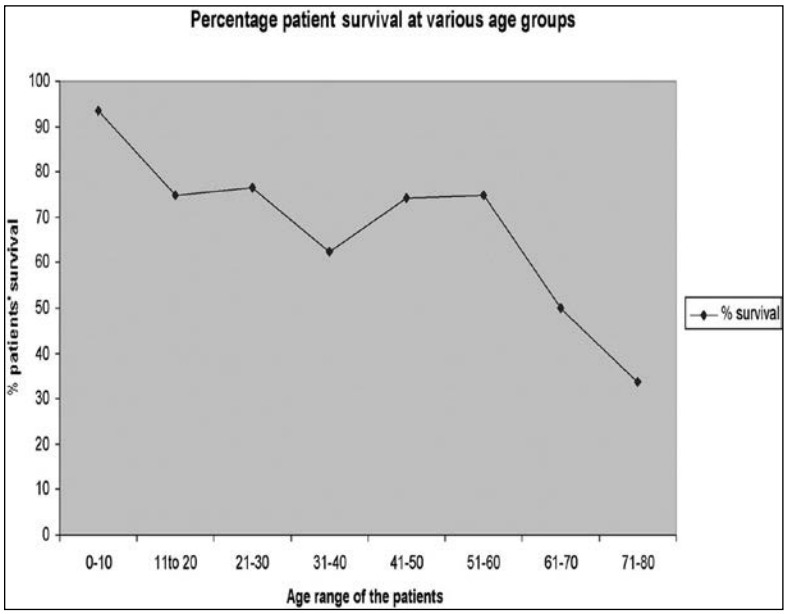

Fig. 2 - Percentage patient survival in various age groups.

0.9% of all patients with scald burns. This may however be related to the extent of the burn injuries, which is generally less in scalds than in flame burns; scalds also generally occur in younger age groups. The mean ages of patients who sustained scald and flame burns in this study were 8.0 and 28.1 yr respectively, while the average burn surface area in patients with flame burn was 36.9% and that of patients with scald injuries 8.9%.

A study from India[16] shows that patients with burns in more than 60% total body surface area had 100% mortality, while our current study shows 100% mortality and no survival in patients with 80% burn surface areas (*Fig. 1*)**.**

Bull et al.[17] suggested that the principal determinant whether a patient lived or died was the size of the burn and the age of the patient. Our current study is consistent with this observation, with decreased survival with increasing age and total surface areas burned (*Figs. 1, 2*).

Shock, infection, and septicaemia have been reported as the main causes of death in burn patients.[10,18] As already said, in the current study, the causes of death were acute renal failure in 24 cases (42.1%), septicaemia in 18 (31.6%), acute respiratory distress syndrome in five (8.7%), shock in four (7.0%), peptic ulceration in one (1.8), and severe anaemia in one (1.8%); in four cases (7.0%) no specific cause of death was indicated in the case notes.

In conclusion, burn mortality is still very high in our environment. Improvement of our facilities and of the economic status of the people will go a long way to reduce the current high mortality that we see. Education of the people has been suggested as a way of reducing morbidity and mortality in our environment.[19]

Burn patient treatment is expensive. A health insurance programme that removes the immediate burden of care from the patient will also go a long way to reduce the effect that the cash-and-carry system, currently in operation in our country, has on our patients.

RÉSUMÉ. Les Auteurs présentent une analyse de la mortalité due aux brûlures dans leur centre de brûlés en Nigeria. Au total, 285 patients ont subi des brûlures pendant la période de l'étude (1996-2000). Cinquante-sept des patients (20%) sont morts, dont 38 étaient du sexe masculin (66,7%) et 19 du sexe féminin (33,3%). Les brûlures par flamme ont causé 92,9% des décès, tandis que 5,3% des décès ont été causés par les brûlures chimiques et 1,8% par l'ébouillantement. La mortalité la plus élevée a été observée dans le groupe des patients âgés de 71-80 ans, et le numéro de patients survécus diminuait avec l'incrément du pourcentage de la surface corporelle brûlée. La mortalité des patients du sexe masculin (20,8%) était supérieure à celle des patients du sexe féminin (18,6%). Les brûlures dues aux flammes ont causé un numéro de décès majeur par rapport à toutes les autres étiologies. Les causes des décès étaient l'insuffisance rénale aiguë (24 cas, 42,1%), la septicémie (18 cas, 31,6%), le syndrome respiratoire aigu (5 cas, 8,7%), le choc (4 cas, 7,0 %) et l'hémorragie gastrointestinale supérieure due à un ulcère peptique et une anémie grave (1 cas chacun, 1,8%). Les Auteurs concluent que l'amélioration des services médicaux et de la formation du personnel pourra réduire le taux actuellement élevé des patients brûlés dans leur environnement.

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