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Epidemiology and referral patterns of burns admitted to the Burns Centre at Inkosi Albert Luthuli Central Hospital, Durban

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ABSTRACT

Rationale: The epidemiology, referral patterns and outcome of patients admitted to a tertiary burns unit in southern Africa were reviewed.

Materials and methods: The charts of all patients with thermal injury presenting to the Burns Centre at Inkosi Albert Luthuli Central Hospital (IALCH) between 1 January 2008 and 31 December 2010 were reviewed. Information collected included age, gender, past medical history, cause of burn, size of burn, presence of inhalation injury, time before admission, time to excision, length of hospital stay, complications and mortality.

Findings: Four hundred and sixty two patients were admitted, 296 (58%) children and 193 (42%) adults. The female–male ratio was 1:1.13. The mean total body surface area (TBSA) burned was 12% (interquartile range 8–25%) for children and 18% (interquartile range 10–35%) for adults. Common causes for the burns were in children: hot liquids (71%) and open flame (24%). Major causes in adults were: open fire (68%) and hot liquids (25%). Epilepsy was a contributing factor in 12.7%. Inhalation injury was seen in 13.6% of adults and 14.3% of children with a flame burn.

Forty-four percent of referrals from general surgical units were for burns <30% in adults, and 30% for burns <10% in children. More than one in four patients was referred between 1 and 6 weeks post-injury.

Overall mortality was 9.1% (5.7% in children and 15.1% in adults). Complications occurred in 21.6% of children and 36.7% in adults, the most common being lung complications such as ARDS and infection, severe sepsis, skin graft failure and contractures. The length of stay was 1 day/% TBSA burn for all burns in children and for burns between 10 and 49% in adults.

Conclusions: The epidemiology and outcome of severe burns referred to the Burns Centre at IALCH is similar to those in other units in Africa. The management and referral of burns patients by other hospitals are inappropriate in a significant number of patients.

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1. Introduction

Burns Centres are a sparse commodity in Middle and Low Income Countries. It has been estimated that annually in South Africa 0.32% of the population are burned to such an extent that they require hospital admission [1]. In the province of KwaZulu-Natal, with 10 819 130 inhabitants [2], this would amount to an expected 34 621 admissions. More than half of these admissions concern children, and burns is the third most common cause of death in children under the age of 18 years [3]. In KwaZulu-Natal there is only one tertiary Burn Centre and two small regional burns units. Burn Centres play a pivotal role in the management of burns. However, their resources are most optimally used if patients are referred that cannot be adequately managed in general surgical units, i.e. those that require excision and grafting of major burns (i.e. above 30%) or over sensitive areas, and those that require critical care. This study summarizes the epidemiology and referral patterns of burns admitted to the tertiary unit in KwaZulu-Natal between December 2008 and December 2010.

Inkosi Albert Luthuli Central Hospital (IALCH) is a tertiary hospital situated in Durban, South Africa and is the referral centre for the province of KwaZulu-Natal. The Burns Centre opened in March 2007, initially with 4 beds. During the study period the number of beds gradually increased from 12 in December 2008 to 20 in December 2010. These beds are located in separate adult and paediatric burn units, each with an equal number of beds.

2. Methods

A retrospective chart review was performed for all new admissions between December 2008 and December 2010. Readmissions were excluded. The hospital uses an electronic record system (Medicom, Siemed (South Africa)). Data was abstracted into a standardized proforma, which included age, gender, past medical history, cause of burn, size of the burn, presence of inhalation injury, time from injury to admission at IALCH, time from injury to excision, time of hospitalization, complications, mortality and mechanism of death.

Referral hospitals were classified as level IV (district hospital without consultant staff), level III (regional hospital with consultant specialist cover, but not necessarily continuous), level II (urban hospital with 24-h consultant specialist cover) and level I hospital (tertiary referral centre with Burns Centre). Patients were classified according to the level of hospital that referred the patient to the Burn Centre, which was not necessarily the level of hospital to which they first presented.

Data from adults and children (classified locally as those aged twelve years and younger) were analyzed separately. Statistical analysis was performed using the Statistical Package for Social Sciences software (version 19.0 for Windows, SPSS Inc., Chicago, IL, USA). To compare continuous non-normally distributed data the Mann–Whitney *U*-test was used. The Fischer exact test was used to analyze categorical variables. All *p*-values were two-tailed. Statistical significance was set at $p \leq 0.05$.

Ethical approval for use of the Trauma/Burns database was granted by the UKZN-BREC ethics committee (Class Approval BE 207/09).

3. Results

3.1. Basic demographics

During the two-year study period 462 new patients were admitted. Of these 296 (58%) were children of twelve years or younger, with 159 children (34.4% of the total) under the age of five. The mean age of admitted children was 2.3 years. There were 193 adults (42%), and these had a mean age of 30 (range 13–79) years.

Gender: the female–male ratio was 1:1.13 for the entire cohort. In children the ratio was 1:0.95, and in adults 1:1.23. Only the ratio for adults reached statistical significance ($p = 0.0097$).

Mean Total Burned Surface Area (TBSA) in children was 12% and the median TBSA 12.5%. The range was 1–80% and the interquartile range 8–25%. In adults the mean TBSA was 18% with a median of 18.5% TBSA. The range was 1–80% and the interquartile range 10–35%. Sixty-nine percent of children and 57.5% of adults were referred with burns under 20% TBSA.

3.2. Cause of the burn

Children: One hundred and forty seven burns in children (71%) were the result of hot water and other hot fluid scalds. Flame burns accounted for a further 65 burns (24%), with electrical and chemical burns representing 3% (7 burns) and 1% (4 burns) of all paediatric burns, respectively (Fig. 1). The average age of hot water scalds was 2.9 years, and of paediatric flame burns 4.9 years (Table 1). Scalds are most common in burns up to 40% TBSA, but flame burns are more common in major burns (Fig. 2).

Adults: One hundred and twenty six (68%) adult burns were the result of fires, with 48 (25%) resulting from hot fluids (Figs. 3 and 4). Twenty-one of the adult patients had epilepsy (12.7%).

Inhalation injury: Out of a total of 132 adults and 63 children with a flame burn 18 (13.6%), and 9 (14.3%), respectively had an inhalation injury. The mortality amongst children with an inhalation injury was 33.3% (3 children) and amongst adults 38.9% (7 patients).

3.3. Referral patterns

Patients were referred from 36 different hospitals, of which 23 were level IV, 6 were level III and 4 were level II.

Adults: Out of a total of 192 adults 89 (46.3%) were referred from a level IV hospital, 14 (7.2%) from a level III hospital and 88 (45.6%) from a level II hospital. Both level II and level III hospitals are staffed with at least the major specialist services. Forty-four percent of referrals from specialist hospitals were for burns <20% TBSA (Fig. 5), a category of patients that a