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Characteristics of burn patients at a major burn center in Shanghai☆

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Abstract

In China, burns are becoming a major cause of morbidity and mortality with large societal and economic implications. To date, there is little epidemiological data on burns in China to direct prevention efforts. This study describes the characteristics of burn patients admitted to a major burn center in Shanghai using a burn registry developed in Toronto, Canada. A retrospective review of burn patients discharged from the Shanghai's Rui Jin Hospital Burn Unit, between March 1st 2002 and April 30th 2003, was conducted. Of 527 patients discharged, 307 were acute burn patients and 302 (98.4%) had complete data to be included in the study. There were 214 (71%) males and 88 (29%) females with a male to female ratio of 2.4:1. The median age was 30 years, and the median total body surface area burned was 10%. The majority of burns occurred at work (58%), and the most frequent etiology was flames (39%) followed by scalds (31%) and contact with hot objects (15%). Sixteen (5%) patients had inhalation injury and six (2%) patients died. There were 70 (23%) children (0–14 years), 221 (73%) adults (15–59 years) and 11 (4%) seniors (60 years and above). Children had more scald burns (83%) and the majority (83%) occurred at home. Adults had more flame burns (46%) and the majority (79%) were work-related injuries. Seniors had more flame burns (73%) and the majority (55%) occurred in domestic incidents. Seniors had deeper burns (13%, $p = 0.005$), required more escharotomies (55%, $p = 0.002$), required more operations (2, $p = 0.051$) and had higher mortality (36%, $p < 0.001$) than other age groups. These results provide compelling evidence for performing population-based studies to identify risk factors that are susceptible to modification in each age group.

Keywords: Patient characteristics; Burns; Shanghai; China

1. Introduction

In recent decades, the spectrum of disease in China has shifted from being dominated by infectious diseases and malnutrition in the 1950s to a growing proportion related to injuries. An epidemiological study in 2003 showed that injury was the fifth leading cause of death in China, accounting for 11% of total deaths [1]. Injuries from burns and scalds were within the top eight main causes of death. In a country with an estimated population of 1.3 billion, there are at least 800,000 deaths from injury annually, and at least 50 million non-fatal injuries according to the latest WHO statistics [2]. The impact on society in this developing nation is profound. In a report by Wang and Chi, the direct health cost of injury was at least 44 billion RMB (equivalent to US$ 5.4 billion) each year [3,4]. This exerts a constant burden on a society where economic improvement is among its main objectives.

The rising incidence of burns and the economic impact of these injuries for both patients and society would suggest that prevention programs might be beneficial in China. Accordingly, the country is already taking some steps towards this goal. A public campaign on fire prevention was started in Beijing after official statistics in 1999 showed that

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22,000 fires broke out in homes which led to 673 deaths, 945 injuries and a total property loss of 110 million RMB (US$ 13 million) [5]. Epidemiological studies looking at the characteristics of burns are already guiding present and future prevention programs. A number of published studies, such as one looking at ways to prevent burns from farm motor tricycle accidents in rural China, have made practical suggestions to reduce similar accidents [6]. A larger epidemiological study was performed in Hong Kong from 1993 to 1999 with 1063 acute burn patients, and results have led to numerous publications discussing risk factors in the pediatric, adult and senior populations [7]. However, similar studies in other major Chinese cities are lacking. The objective of this study was to discuss the characteristics of burn patients admitted to a major burn center in Shanghai to help guide future injury prevention practices in this city.

2. Methods

2.1. Sample population

In 2002, the Ross Tilley Burn Centre (RTBC) at Toronto's Sunnybrook and Women's College Health Sciences Center (SWCHSC), the Office of International Surgery (OIS) at the University of Toronto and Shanghai's Rui Jin Hospital Burn Unit (RJBU) collaborated to build a computerized burn registry at RJBU. The burn registry, which has been useful in identifying risk factors for burn injuries in Toronto [8], is a standardized computer database designed to collect specific information regarding patient's demographics, burn history, burn etiology, activities that caused the burn and patient outcomes. The sharing of this burn registry system is part of a continued collaboration between the two burn centers.

RJBU is the largest burn center in Shanghai, serving a catchment's area of 18 million people (13 million registered residents and 5 million migrant workers from rural areas) representing 96.3% of the total population in Shanghai. The center admits an estimated 600 burn patients per year, and treats approximately 100–200 burn outpatients per day in the clinic. While the burn center admits patients from other provinces in China the vast majority of patients are from Shanghai city.

2.2. Data collection

Patients' burn data was entered into the burn registry at discharge using a standard template that was translated into Mandarin by an English-speaking surgeon at RJBU. The chief resident at RJBU (LJ) was trained in using this registry system and entered data from patients discharged between March 1st 2002 and April 30th 2003 into the computerized database (Filemaker Pro^{TM}). Because of the way data was collected, only inpatients discharged during that period were included in the study, and all outpatients were excluded from the study.

The computerized burn registry contains a series of categories designed to facilitate analysis of burn etiologies and causes. Demographic information collected included gender, race and occupation. Burn history included whether the injury was work-related, method of transfer to hospital, etiology of injury and specific cause. Etiology of injury included: flame, electrical (contact or flash), chemical, contact, radiation, scald, tar, lightning and friction. Specific cause included a wide range of scenarios based on previous observations on common causes of burns. Burn extension (%TBSA), severity (full thickness) and anatomic sites involved were also documented. Presence or absence of inhalation injury was recorded and any associated non-burn injuries and co-morbidities were noted.

2.3. Data analysis

Retrospective data review was performed in 2004 by investigators from both centers. Records were screened for duplication and for completeness of information. Statistical analyses were performed using the SPSS^{TM} 11.0 software.

Patients were compared by gender groups (males versus females), survival groups (survived versus. deceased) and classified into three age groups: children (0–14 years), adults (15–59 years) and seniors (60 years and above). Within each group, burn etiologies and specific causes were compared with χ^2 analysis. Significance was determined at $p < 0.05$. This study was approved by the Research Ethics Board of the Rui Jin Hospital in Shanghai.

3. Results

Between March 1st 2002 and April 30th 2003, a total of 527 patients were discharged from the RJBU. This included 307 acute burn patients, 7 reconstructive surgery patients, 74 plastic surgery patients and 139 patients for other treatments. Of the 307 acute burn patients, 5 (1.8%) had incomplete data, leaving 302 (98.4%) for the analysis. Patients' median ± S.D. age was 30.0 ± 17.2 years, and their age distribution revealed that 56% of them were in the working ages (20–49 years) and 18% were small children (0–4 years, Fig. 1). The median ± S.D. total body surface area (TBSA) burned was 10.0 ± 18.9%, and the majority (77.2%) had

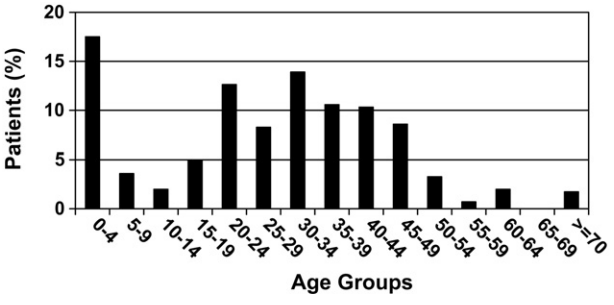

Fig. 1. Age distribution.