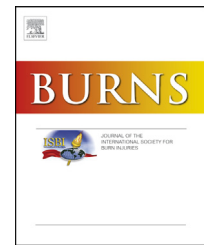


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Epidemiology of burn patients presenting to a tertiary hospital emergency department in Lebanon

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ARTICLE INFO

Article history:

Accepted 24 June 2017

Available online xxx

Keywords:

Emergency department

Burn

ED disposition

Levant

ABSTRACT

Background: The epidemiology of burns is well described in the United States, Europe and Asia. However, few studies address this topic in the Levant region. This study aims to describe characteristics of burn victims treated at the emergency department of a tertiary care center in Beirut, Lebanon and to report on factors that affect ED disposition.

Methods: A retrospective cohort study was conducted in the ED of a tertiary care hospital, in Beirut, Lebanon, between 2009 and 2013. Patients were recruited if their final ED diagnosis was burn. A descriptive analysis of patients' characteristics including burns was done, followed by a bivariate analysis to compare two groups (admitted vs discharged). Statistical analysis included the use of Student t-test and Pearson chi-square where appropriate. A multivariate analysis was then conducted to determine the predictors of hospital admission. **Results:** A total of 366 patients had their charts queried. Age category distributions of the patients were 73 (19.9%) <5 years, 39 (10.7%) 5-14 years, 236 (64.5%) 15-65 years and 18 (4.9%) >65 years of age. Around half of the patients (47.3%) were males, with scalding being the most common mechanism of burn (53.9%), followed by contact with hot object (16.8%) and flame (11.9%). In terms of disposition from the ED, 58 (15.8%) patients were admitted to the hospital with 42 (72.4%) going to GPU, 12 (20.6%) to ICU and 4(6.9%) transferred to either another hospital or to an acute burn facility. Admitted patients tended to be at the extremes of ages (<5 years or ≥65 years), male dominant, more likely to be brought in by family, with higher proportions of more severe mechanisms of injury (flame, electric, chemical). Admitted patients also sustained higher degrees of burns with more TBSA injured. Predictors of hospital admission included the aforementioned factors with the strongest predictors of admission being full-thickness degree burn (OR 18.56 (4.67-73.72 CI95% p≤0.001)) and mechanism of injury such as electrical (OR 23.01 (3.23-163.89 CI95% p=0.002)) and chemical (OR 17.43 (2.33-130.14 CI95% p=0.003)).

Abbreviations: ABA, American Burn Association; ED, emergency department; EHR, electronic health record; EMS, emergency medical services; GPU, general practitioner unit; ICD, International Statistical Classification of Diseases and Related Health Problems; ICU, intensive care unit; TBSA, total body surface area; WHO, World Health Organization.

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<http://dx.doi.org/10.1016/j.burns.2017.06.015>

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Conclusion: Characteristics of burn patients treated in an urban ED in Lebanon mirror those of burn victims in other international studies. Future larger epidemiologic studies are needed to better quantify the impact of burns in Lebanon.

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1. Introduction

The World Health Organization (WHO) global burden of disease data, updated in 2008, reports that approximately 11 million people per year sustain burns requiring medical attention. The report places burn as the fourth most common substantial injury after road traffic accidents, falls and interpersonal violence [1]. In the US, approximately 450,000 individuals require medical treatment for burns per year, with most of these patients treated in the emergency department (ED), and discharged with outpatient follow-up [2,3]. On a global scale, 90% of all burns occur in low and middle income countries [1].

There is a growing international literature regarding the epidemiology of burns in the US, Europe and Asia [2,4-6]. Pakistan, Turkey and Iran have contributed to the database of burn patients in the Levant region [7-9] with studies reporting on burn patients that present to emergency departments and not just to dedicated burn centers.

Studies pertaining to burns are lacking in Lebanon. This study was conducted in a tertiary care center in Lebanon to contribute to the international and local literature, by describing characteristics of burn victims treated at the emergency department and by reporting on factors that affect ED disposition.

2. Methods

2.1. Study design and setting

This is an IRB approved (ER.GA.06), single center, retrospective cohort study conducted in the ED of the American University of Beirut Medical Center (AUBMC). AUBMC is the largest tertiary care center in Lebanon with over 56,000 ED visits per year. All patients presenting from July 2009 to December 2013 had their medical records queried via the hospital's Electronic Health Record (EHR).

2.2. Patient selection

Patients' ED encounters were filtered by an experienced data user using the hospital's EHR via structured keyword searches and ICD-9 coding (*International Statistical Classification of Diseases and Related Health Problems*). Patients were included in the study if their charts included the final ED diagnosis of "Burn" regardless of severity. No age restriction was implemented; and no exclusion criteria were used.

2.3. Sample size calculation

This study serves as a foundation for future epidemiologic studies of burn patients in Lebanon. No formal sample size

calculation was performed. However, given that multiple studies for burn patients presenting to emergency departments recruited between 300 and 400 patients, we aimed to recruit a similar number of patients [6-9].

2.4. Variables

Trained research fellows extracted available clinical information from scanned charts and electronic laboratory reports: Patients' demographic information, past medical history and burn characteristics (etiology, injury site, circumstance, suspected motive, time from injury, degree, percentage surface area affected and degree of burn) were extracted.

Disposition from the ED, length of stay in the ED, general practitioner unit (GPU), and intensive care unit (ICU) were noted. If the patient was transferred to another hospital or the country's specialized burn center, the patient was considered "admitted" though physically discharged from our hospital. This is due to the similar clinical profile shared by those admitted to our hospital and those requiring hospital treatment elsewhere. The reason In-hospital mortality was collected as well. Finally, the American Burn Association (ABA) severity score was calculated for all burns as per the definition set by the ABA [10].

2.5. Statistical analysis

Statistical analyses were performed using SPSS version 24.0 (Armonk, NY: IBM Corp). The distributions of the continuous and categorical variables were presented as mean \pm standard deviation and frequency/percentages respectively. Selected characteristics were then stratified by admission status (Discharged or Admitted) and variable differences between the two groups were calculated by Pearson's chi square/Fischer test and Student's t-test where appropriate. Tests were interpreted at a significance level $\alpha=0.05$.

A multivariate logistic regression analysis was performed to ascertain the predictive factors of hospital admission in the population. A backward selection procedure, with significance level for variable removal from the model set at 0.1, was conducted. The independent variables chosen for modelling were those found to be significant at the bivariate analysis level in addition to those considered clinically meaningful. The variables included in the model were: Age, gender, method of transportation, degree of burn, location of burn, mechanism of injury, Total Body Surface Area (TBSA), and ABA score. The results were described as odds ratios (OR) and their corresponding 95% confidence intervals (CI).

A sub-analysis was performed to describe the association between gender and injury site. All patients were stratified by gender and a Pearson's chi square/Fischer test was performed where appropriate (Supplement 1). A second sub-analysis was done to evaluate the association between the degree of burns

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