

Research Article

Application of Charlson Comorbidity Index in Burn Patients

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Abstract

Predicting the mortality in burn patients is difficult but essential. Various scoring systems are existing to predict the mortality in burn patients. One of them is Charlson comorbidity index scoring system. Since no study have been reported from the country of authors, this study makes an attempt to apply retrospectively Carlson comorbidity index on burn patients who succumbed to burn injuries and look for association. The purpose is to apply Charlson comorbidity index score prospectively based on the outcome of this study. Authors found that there is an association and plans for prospective study in future.

Keywords: Charlson index; Comorbidity; Burns

Introduction

Burns are the major public health problem worldwide. Burns are the fourth most common type of trauma received in emergency department, following road traffic accidents, falls and interpersonal violence [1]. Management of burns patients has improved over past few decades and mortality is reported to be reduced to 5% to 15% in good burn care centers [2].

Prediction of mortality is important for burn patient prognostication. There are various scoring systems to predict mortality in burns patients [2]. Most of burn outcome indices are based on burn specific factors; and do not give weight age to the comorbidities associated with burns.

Charlson Comorbidity Index (CCI) (Table 1) is a valid prognostic indicator of short term mortality due to various comorbidities in intensive care unit patients [3]. CCI was developed and validated in 1984-85, taking non burn patient population [4-6]. Later on it was validated in burns patients also [4,7]. It is proposed that CCI can be combined with the burn specific scores to provide a better prediction of the mortality in burn patients with associated comorbidity [4].

This study highlights the application of CCI score on burn patients with associated comorbidities who succumbed to burn injuries. The purpose of the study is to apply CCI retrospectively to find whether comorbidity had an association with the mortality; so

that in future large prospective study can be planned to predict the mortality. Further on internet Google search authors did not find any study reported from India on application of CCI in burn patients.

Material and Methods

The study was conducted in the tertiary burn care centre of our hospital. The study was retrospective analytical study based on hospital death records. Records of burn patients died over last four years were analyzed and only those patients who were having associated comorbidity were included. Patients without comorbidity were excluded. Out of 17 dead patients four were found to have associated comorbidity.

Number of comorbidities was recorded and CCI score was calculated for these four patients. An attempt was made to correlate CCI score with mortality. As the sample size is small, statistical analysis was not done.

During hospitalization all patients were treated according to World Health Organization (WHO) and International Society for Burn Injury (ISBI) guidelines.

Table 1: Charlson comorbidity index score system.

| Comorbidity | Score |
|--|-------|
| Myocardial infarction | 1 |
| Congestive heart failure | 1 |
| Peripheral vascular disease | 1 |
| Cerebrovascular disease | 1 |
| Dementia | 1 |
| Chronic pulmonary disease | 1 |
| Rheumatologic disease | 1 |
| Peptic ulcer disease | 1 |
| Mild liver disease | 1 |
| Diabetes without chronic complications | 1 |
| Diabetes with chronic complications | 2 |
| Hemiplegia or paraplegia | 2 |
| Renal disease | 2 |
| Solid tumor | 2 |
| Leukemia | 2 |
| Lymphoma | 2 |
| Moderate or severe liver disease | 3 |
| AIDS/HIV | 6 |
| Metastatic solid tumor | 6 |
| Maximum comorbidity score | 37 |

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Results

As per the inclusion criteria details of the patients are presented in Table 2.

Table 2: Patient characteristics.

| Serial Number | Associated Comorbidity | Charlson Comorbidity Score | Risk of Mortality |
|---------------|--|----------------------------|-------------------|
| 1 | Diabetes without chronic complications | 1 | <10% |
| 2 | Diabetes without chronic complications | 1 | <10% |
| 3 | Cerebrovascular accident (Hemiplegia) | 2 | <10% |
| 4 | Ovarian carcinoma | 2 | <10% |

Discussion

Mortality after burns is a commonly used outcome measure for clinical as well as research purposes. There are various scoring systems proposed for prediction of mortality in burns patients [2]. Burn specific scoring systems are: Modified Baux score, Abbreviated Burns Severity Index (ABSI), Cape Town modified burns score, Ryan score, Burd score, and Belgian outcome in burn injury (BOBI) score. These scoring systems are based on patient age, percentage of Total Body Surface Area (TBSA) burnt, percentage of full thickness burns and presence of inhalational injury. There are some non burn-specific scoring systems also like FLAMES (fatality by longevity, APACHE II score, measured extent of burn and gender); that include patient physiology as well as chronic health status, but it is cumbersome to calculate [2].

Charlson Comorbidity Index (CCI) was developed to predict hospital mortality in ICU patients [5,6,8]. CCI can be calculated by reviewing the patient records. CCI also provides the relative risk associated with the comorbidities; thus it has been successfully used as a risk adjustment approach in claim based research [8]. CCI can be adopted with ICD 9 or 10 coding system [9]. CCI can also be used clinically to predict the chances of mortality at the time of admission; thus it helps in triage of the patients [10]. Knowlin et al. [4] has validated the use of CCI along with the other prognostic scores to predict mortality in burns patients, especially in young (<18years) patients.

The authors of the present study has plan to apply CCI scoring system prospectively so this study is planned to know the association

of CCI score on patients who succumb to burn injuries. On analyzing the results though the sample size is small (four patients only) still authors found that there was a risk of mortality up to 10% and feel that if number of comorbidities increases then the risk of mortality will also increase. Authors of this study feel that if CCI is applied prospectively the risk of mortality can be predicted as mentioned in the studies of other authors. But a large prospective multicentre randomized controlled study is suggested to validate the result of the present study. The limitation of the study is a retrospective study with small sample size and no statistical analysis done.

Conclusion

CCI has an association with mortality in burn patients. A large prospective multicentre randomized controlled study is suggested to validate the result of the present study.

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