Prediction of Mortality in Severe Burn Patients

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INTRODUCTION

Accurate mortality prediction in severe burn injuries can support clinical decision-making and help counsel families. The major determinants of burn mortality prediction models are age, inhalation injury and % total body surface area (%TBSA) of the burn (Heng et al, 2015).

AIM

The aim of this study was to test the validity of existing burns mortality prediction scores on a cohort of burn patients admitted to Royal North Shore Hospital (RNSH).

METHOD

A systematic review performed on MEDLINE, EMBASE and the Cochrane reviews identified the modified Baux, Abbreviated Burn Severity Index (ABSI) and the Belgian Outcome in Burn Injury (BOBI) scores as validated burn mortality prediction models.

These models were applied to a retrospective cohort of patients admitted to RNSH from 2006-2017 with TBSA ≥50% burns. There were no additional exclusion criteria. Demographic and clinical parameters were statistically compared between "survivor" and "mortality" cohorts. A logistical regression model was adopted to test the accuracy of each burn mortality prediction model.

RESULTS

From 2006-2017, 3002 patients were admitted to RNSH with burn injuries. 2% (n=55) had burns ≥50% TBSA burns. The mean age was 39 years, mean %TBSA burn was 71% and inhalation injury was present in 62% (n=34) of cases. The mortality rate was 53% (n=29).

Patients who died were older (p <0.018) and had greater %TBSA burn (p <0.001). They had higher modified Baux scores (p <0.001), ABSIs (p <0.001) and BOBI scores (p = 0.002) (Table 1).

Table 1: Differences in demographics and mortality prediction scores in survivors and mortality cases

	Survivors	Mortality Cases	P-value
N	26	29	-
Mean Age (years)	35	44	0.018
Mean TBSA burn (%)	63	78	<0.001
Mean modified Baux Score	107	133	<0.001
Mean ABSI	11	13	<0.001
Mean BOBI	5	6	0.002

Logistic regression analysis demonstrated significant associations between the modified Baux score, ABSI and BOBI scores and mortality (Table 2).

Table 2: Logistic regression analysis for mortality prediction models

	P-value	R^2
Modified Baux score	<0.001	0.40
ABSI	<0.001	0.38
BOBI score	0.002	0.22

DISCUSSION

The modified Baux score, ABSI and BOBI score independently predicted mortality in this cohort of burns patients with TBSA ≥50%. Of the indices, the modified Baux score most accurately modelled the variability of mortality outcomes (R^2 = 0.40). All three models support age, the presence of inhalation injury and %TBSA burn as the major prognostic determinants of mortality (Douglas et al, 2015).

These prognostic scores aim to predict mortality at the time of injury. Correspondingly, existing scores fail to quantify the impact of patient comorbidities, surgical technique and complications on overall mortality prediction (Thombs et al, 2007; Douglas et al, 2015). Arguably, given the advances in holistic burns care, modelling the impact of these variables is necessary.

This study is limited by its retrospect nature, small sample size and is biased to a single tertiary burns centre.

CONCLUSION

The modified Baux score, ABSI and BOBI score may be used as clinical adjuncts to support the management of severe burn patients and assist in counselling families.

REFERENCES

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