

# **Epidemiology and Predictors of Mortality in Burn-related Major Trauma: An 18-year Retrospective Cohort Study**

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## **Introduction**

The epidemiology of burn trauma in Nova Scotia is poorly understood. Our objectives were to describe the epidemiology, trends, and predictors of mortality among patients with burn-related trauma in Nova Scotia.

## **Methods**

We conducted a retrospective observational cohort study of all major trauma patients with burn injuries between April 1, 2001, and March 31, 2019. Characteristics and outcomes for patient subgroups were compared using t-tests, chi-square analysis and Fisher's exact tests. Trend analysis for mortality was performed using linear regression. A multivariate regression model was created to assess for predictors of mortality.

## **Results**

A total of 436 patients were included. Overall, 65.6% of patients died with nearly half of all deaths occurring at the scene. We observed a decreasing trend in mortality over the study period ( $p=0.042$ ). Patients predominantly had isolated burns (87.2%), major burns (69.7%), and inhalation injuries (60.3%). The mean total body surface area (TBSA) of burn was  $53.2\pm 35.4\%$ . Survivors tended to be younger ( $35.9\pm 20.6$  yrs vs  $50.8\pm 23.3$  yrs,  $p<0.001$ ), male (79.3% vs 65.4%,  $p=0.002$ ), had lower mean %TBSA involved ( $29.5\pm 19.9\%$  vs  $67.9\pm 34.9\%$ ,  $p<0.001$ ) and had combined trauma (18.7% vs 9.8%,  $p=0.008$ ). A greater proportion of non-survivors sustained inhalational injuries (75.2% vs 32.0%,  $p<0.001$ ). Patients with isolated burns had higher overall mortality (67.9% vs 50%,  $p=0.008$ ) and in-hospital mortality (39.0% vs 3.4%,  $p<0.001$ ). Mortality was associated with major burns (OR 8.82, 95% CI 2.43-31.95), inhalation injury (OR 3.28, 95% CI, 1.39-7.73), initial carboxyhemoglobin (OR 1.09, 95% CI 1.05-1.13) and increasing age (OR 1.05, 95% CI 1.02-1.07). Intubation at the scene or in the ED was associated with survival (OR 0.17, 95% CI 0.07-0.41).

## **Conclusion**

In this population-based study of burn injuries, mortality was associated with older age, major burns, inhalational burns, and initial carboxyhemoglobin level. These results provide a foundation of evidence to guide future research, resource planning, and injury prevention efforts.