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The Western Australia Population-based Burn Injury Project: Using record linkage to examine long-term effects of burn injury

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Objectives

While the most obvious impact of a burn is a visible scar, there are hidden impacts. The main contributors to adverse health outcomes after burns are the metabolic, inflammatory, immune and endocrine changes that occur in response to the initial injury. These responses have been shown to persist for at least three years after paediatric severe burns, with adverse effects to the circulatory and musculoskeletal systems. Recent evidence demonstrates that minor burns and severe burns can trigger these systemic responses. Currently, minimal data on the long-term effects of burns are available, and the data that do exist are primarily related to paediatric severe burns. We have used population-based record linkage to support a research program to shed light on the spectrum of long-term morbidity, expressed in terms of hospital admissions, experienced by burn patients to guide burn clinicians in the management of their patients. We report here our current findings of post-burn mortality and morbidity.

Approach

A population-based longitudinal study using linked hospital morbidity and death data from Western Australia was undertaken of all persons hospitalised for a first burn injury ($n=30,997$) in 1980-2012 and a frequency matched non-injury comparison cohort, randomly selected from Western Australia's birth registrations and electoral roll ($n = 127,000$). Crude admission rates and cumulative length of stay for disease-specific admissions were calculated. Negative binomial and Cox proportional hazards regression modelling were used to generate incidence rate ratios (IRR) and hazard ratios (HR), respectively, adjusting for sociodemographic and health factors.

Results

For both paediatric and adult burn patients we identified increased long-term all-cause mortality (IRR, 95%CI: <15 years: 1.6, 1.3-2.0; 15-44 years: 1.8, 1.7-2.0; ≥ 45 years: 1.4, 1.3-1.5). Increased post-burn discharge health service use for cardiovascular diseases (IRR, 95%CI: <15 years: 1.3, 1.1-1.6; 15-44 years: 1.6, 1.4-1.7; ≥ 45 years: 1.5, 1.4-1.6) and musculoskeletal conditions (IRR, 95%CI: <20 years: 1.9, 1.7-2.1; ≥ 20 years: 2.0, 1.9-2.1) were also found. Analyses found significantly elevated admission rates for minor and severe burns. Adjusted HRs identified time periods after discharge where burn patients experienced significantly elevated disease-specific incident admissions (results not provided).

Conclusion

Both minor and severe burns were associated with increased long-term cardiovascular and musculoskeletal morbidity and mortality. These results identify treatment needs for burn patients for a prolonged time after discharge. Further research that links primary care and pharmaceutical data is required to facilitate identification of at-risk patients and appropriate treatment pathways to reduce post-burn morbidity.

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