

## Post-crash transport decisions for patients with traumatic spinal cord injury: does it differ between states and does it matter?

Lisa N Sharwood<sup>a,b</sup>, Bharat Vaikuntam<sup>a</sup>, James W Middleton<sup>a,c</sup>

<sup>a</sup>University of Sydney, <sup>b</sup>Monash University, <sup>c</sup>NSW Agency for Clinical Innovation

### Abstract

Traumatic spinal cord injury (TSCI) is a devastating injury resulting predominantly from motor vehicle crashes and falls, with significant costs to the healthcare system. Precise post injury management is critical for lessening mortality or complication risk and improving possible functional recovery. Post-crash care including transport decisions can vitally impact patient outcomes. Clinical pathway mapping undertaken on TSCI cases across NSW and Victoria showed 1/3 in NSW were admitted directly to a specialist spinal unit (SCIU); rarely occurring in Victoria. Direct transport to SCIU saw TSCI patients more likely to receive appropriate blood pressure management and timely surgery ( $\leq 12$  hours).

### Background

Traumatic spinal cord injury (TSCI) is a devastating, costly condition impacting adversely health and quality of life. From 2008-2013 over 1200 people aged  $\geq 15$  years sustained TSCI in Australia, admitted to a SCIU; 43% as a result of a motor vehicle crash. Age at injury averaged 41 years, 80% males and 96% were discharged with persisting neurological deficit (AIHW & Harrison, 2018).

It has been previously demonstrated that not all patients with acute TSCI achieve timely admission to a SCIU (Sharwood, Boufous, Muecke, & Middleton, 2016). Expert consensus recommends expeditious transfer ( $<24$  hours of injury) to a SCIU (Consortium for Spinal Cord Medicine, 2008), equipped to provide the comprehensive care necessary for TSCI. Delayed transfer to SCIU has been shown to increase the risk of secondary complications by at least 2.5 times (Middleton et al., 2012). This study aimed to examine clinical pathways for patients with acute TSCI across NSW and Victoria, associations with patient outcomes and costs.

### Method

Prospective observational study of 267 cases with an acute TSCI were recruited in NSW and Victoria between June 2013 and January 2016. Early care pathways from the scene of injury to definitive treatment in a SCIU were examined, including transfer decisions, care protocols, timely access to surgery and health outcomes at follow up to two years post injury.

### Results

We undertook clinical pathway mapping for 267 TSCI cases across NSW and Victoria revealed significant differences between states; one-third of NSW TSCI cases were admitted directly to SCIU however this rarely occurred in Victoria. Admissions to SCIU as a secondary inter-hospital transfer from a Major Trauma Service (MTS), Rural Trauma Service or other hospital occurred in over 90% in NSW, compared to less than 60% in Victoria. Transport mode (air vs road) had no effect on getting to a SCIU. Long delays in time to SCIU admission occurred in Victoria (median time 52 hours versus 3 hours in NSW) associated with increased number of inter-hospital transfers. Seventy-two percent of patients in NSW were admitted to SCIU within 24 hours of injury, compared to 21% in Victoria, reflecting some differences in injury severity, however predominantly due to the configuration of trauma services and SCIU hospitals. In NSW, the acute SCIU is collocated with a MTS; this is not the case in Victoria. Patients were 2-4 times more likely to receive appropriate treatment to maintain blood pressure (for cord perfusion) if taken directly to a SCIU than elsewhere. Early surgical decompression ( $\leq 12$  post injury) was strongly associated with direct admission to SCIU.

## Conclusions

Injuries resulting in permanent disability demand our best efforts to mitigate the extent of their severity. Importantly, victims of TSCI are often young at the time of injury and as such impose substantial and lengthy cost burdens on the health system and their families. Timely access to best practice medical and surgical care depends on an effective, coordinated health care system. Post-crash care policy and clinician action plays a key role in the long term disability of this critical injury.

## References

- AIHW, & Harrison, J. (2018). *Spinal cord injury, Australia: summary 2008–09 to 2012–13*. (100). Canberra: Australian Institute of Health and Welfare.
- Consortium for Spinal Cord Medicine. (2008). Early acute management in adults with spinal cord injury: a clinical practice guideline for healthcare professionals. *Journal of Spinal Cord Medicine*, *31*(4), 403-479.
- Middleton, P., Davies, S., Anand, S., Marial, O., Reinten-Reynolds, T., & Middleton, J. (2012). The prehospital epidemiology and management of spinal cord injuries in NSW: 2004-2008. *Injury*, *43*, 480-485.
- Sharwood, L., Boufous, S., Muecke, S., & Middleton, J. I. (2016). Health service pathways analysis as evidence base for trauma policy change: a retrospective study of patients with traumatic spinal cord injury. *Emergency Medicine: Open Access*, *7*(3). doi:10.4172/2165-7548.1000353