Severe traumatic brain injury action plan | Southern Region

Rationale and evidence

There is currently no national consensus on which patients should be transferred to a neuroscience centre (NSC) after experiencing a severe traumatic brain injury (sTBI) (Glasgow Coma Scale [GCS] < 9). Approximately half of patients with sTBI are initially admitted to non-NSC. Data from the New Zealand Trauma Registry suggests that significant regional variation exists, both in access to specialist NSC care and patient outcomes after experiencing sTBI.[1]

Traditionally, the decision to transfer a patient following sTBI is determined by whether there is an absolute or potential indication for neurosurgical intervention. While neurosurgery is an essential part of sTBI management, the improved outcomes observed in NSC admission extend to non-surgical sTBI patients.[2,3] This is likely due to higher case volumes as well as the immediate availability of neuro-subspecialty teams, specialist allied health and nursing staff.

Current international consensus suggests that patients with sTBI should be admitted to an NSC independent of a need for neurosurgery. This policy has been adopted in England and linked to a significant decline in sTBI mortality.[4,5]

Goals of the sTBI action plan:

- Ensure that all sTBI patients (pre-intubation GCS < 9 and an abnormal CT) are managed within an NSC, irrespective of their need for neurosurgery.
- Provide equitable access to specialist services for patients who are most likely to benefit from admission to NSC.

Over the last six months the sTBI collaborative team has discussed this action plan with key opinion leaders in most NSC and major trauma centres throughout New Zealand, who have overwhelmingly supported it. We encourage hospitals to disseminate this action plan to all key personnel involved in the care of sTBI patients.

References

1. https://www.majortrauma.nz/assets/Publication-Resources/Annual-reports/National-Trauma-Network-Annual-report-2019-20220.pdf.
2. Harrison DA, Prabhu G, Grieve R et al. 2013. Risk Adjustment In Neurocritical care (RAIN) -: A cohort study. *Health Technology Assessment* 17: VII–XVII, 1–350.
3. Fuller G, Pallot D, Coats T, et al. 2014. The effectiveness of specialist neuroscience care in severe traumatic brain injury: a systematic review. *British Journal of Neurosurgery* 28: 452–60.
4. NICE. 2014. Head injury: triage, assessment, investigation and early Management of Head Injury in infants, children and adults. London: Clinical Guideline 176.
5. Marincowitz C, Lecky F, Allgar V, et al. 2019. Evaluation of the impact of the NICE head injury guidelines on inpatient mortality from traumatic brain injury: an interrupted time series analysis *BMJ* Open 9: e028912.

Common questions

What is the difference between a neuroscience centre and neurosurgical hospital?

- All New Zealand hospitals with 24/7 neurosurgical services are also neuroscience centres (NSC).
- The term NSC is designed reflect the broad multidisciplinary neuro-expertise readily available at these hospitals and de-emphasise neurosurgical intervention as the only admission criteria.

How many additional patients can an NSC expect to see following implementation of the sTBI action plan?

- Nationally there are approximately 200 patients per year who fulfil the recommended admission criteria and the majority (90 percent) are already managed within NSC.
- Each NSC can expect to see an additional 2-5 patients per year as a result of the action plan.

How quickly do patients need to be transferred to neuroscience hospitals?

- Prevention of secondary brain injury is a priority; physiological stability of the patient should be attained before they are transferred.
- Early transport has been defined as within 18 hours of injury, but more rapid transport will be required if time-critical neurosurgery is required.
- NSC and regional hospitals should review their current transport processes and consider alternative pathways for time-critical cases.

Are regional intensive care units (ICUs) able to look after sTBI patients who don't need neurosurgery?

- A multidisciplinary approach is needed for optimal recovery in sTBI.
- Many aspects of sTBI care can be delivered in non-NSC and regional ICUs, however, most regional hospitals are unable to provide the breadth and depth of all of the desired specialist services.

How will we measure success?

- National case review and local feedback for all patients who are not transferred despite fulfilling criteria.

Are there any other patients that should or should not be transferred?

- These are minimum criteria and regional guidelines should guide additional referrals.
- Evidence of benefit is less clear in frail or elderly patients. These patients should be reviewed on a case-by-case basis.