Tracheostomy in traumatic brain injury

- Predicting Factors Associated with In-hospital Mortality in Traumatic Brain Injury
- Association Between Metabolic and Inflammatory Biomarkers and Prognosis in Traumatic Brain Injury: A Focus on Short- and Medium-Term Mortality
- Cerebral Venous Thrombosis in Traumatic Brain Injury: A Population-Based Cross-Sectional Study of 640 Patients
- Early neurological wake-up test in intubated patients with traumatic brain injury
- The Field Attributes May not Accurately Predict the Need for Early Tracheostomy Tube Insertion in Severe TBI Patients: A New Insight With the Help of AI Algorithms
- Review of Ventilation in Traumatic Brain Injury
- Methamphetamine and traumatic brain injury outcomes: an analysis of 29,416 patients from the national trauma data bank
- The use of tier three therapies in acute brain injured patients: Insight from the Extubation strategies in Neuro-Intensive care unit patients and associations with Outcomes observational study

Tracheostomy is a surgical procedure that is commonly performed in patients admitted to the intensive care unit (ICU). It is frequently required in patients with moderate to severe traumatic brain injury (TBI), a subset of patients with a prolonged altered state of consciousness that may require a long period of mechanical respiratory assistance.

Timing

- Review of Ventilation in Traumatic Brain Injury
- Significant Disparities in Adolescents With Severe Traumatic Brain Injury Across Trauma Center Types: Wide Variation of Tracheostomy and Gastrostomy
- Clinical management and nursing care for patients with tracheostomy following traumatic brain injury
- Timing of tracheostomy in geriatric patients with isolated severe traumatic brain injury: A nationwide analysis
- Early Tracheostomy versus Late Tracheostomy in Patients with Moderate-to-Severe Traumatic Brain Injury
- Effect of Early Versus Delayed Tracheostomy Strategy on Functional Outcome of Patients With Severe Traumatic Brain Injury: A Target Trial Emulation
- Extracranial Complications in Monitored and Nonmonitored Patients with Traumatic Brain Injury in the BEST TRIP Trial and a Companion Observational Cohort
- The Urban-Rural Divide in Neurocritical Care in Low-Income and Middle-Income Countries

The timing of tracheostomy in traumatic brain injury (TBI) is an important consideration and should be individualized based on the patient's specific condition and needs. Tracheostomy is a surgical procedure that involves creating an opening in the trachea (windpipe) to help with breathing and managing airway secretions. In the context of traumatic brain injury, it is often considered when a patient requires prolonged mechanical ventilation or has difficulty managing their airway.

The decision to perform a tracheostomy in TBI patients is influenced by several factors, including:

Severity of TBI: The severity of the brain injury is a crucial factor in determining the need for a

tracheostomy. Patients with severe TBI who are at risk of prolonged unconsciousness or impaired consciousness may require long-term ventilatory support.

Ventilator dependence: If a TBI patient is unable to breathe effectively on their own and requires prolonged mechanical ventilation, a tracheostomy may be considered to facilitate weaning from the ventilator.

Airway protection and secretion management: TBI patients who have difficulty managing their own airway or have excessive respiratory secretions that cannot be managed with other methods may benefit from a tracheostomy.

Intensive Care Unit (ICU) course: The patient's progress and response to treatment in the ICU will influence the decision to perform a tracheostomy. The medical team will assess the patient's condition over time and consider a tracheostomy if it is deemed beneficial for the patient's overall care.

Risk of complications: Tracheostomy is not without risks, and complications can arise. The medical team will weigh the potential benefits of the procedure against the risks for each patient.

It is important to note that there is no strict timeline for performing a tracheostomy in TBI patients. The decision is often made collaboratively by a multidisciplinary team of healthcare professionals, including neurosurgeons, neurologists, intensive care specialists, and respiratory therapists. They will consider the individual patient's medical history, neurological status, respiratory function, and overall condition before recommending a tracheostomy.

Early tracheostomy has been suggested by some studies to be associated with improved outcomes in certain TBI patients, but it remains a subject of ongoing research and clinical debate. Ultimately, the timing of a tracheostomy in TBI patients should be based on a thorough assessment of the patient's needs and the expertise of the medical team caring for them.

Villemure-Poliquin et al. evaluated the potential clinical benefits of tracheostomy versus prolonged endotracheal intubation, as well as whether the timing of the procedure may influence outcomes in patients with moderate to severe TBI.

They conducted a retrospective multicentre cohort study based on data from the provincial integrated trauma system of Quebec (Québec Trauma Registry). The study population was selected from adult trauma patients hospitalized between 2013 and 2019. They included patients 16 yr and older with moderate to severe TBI (Glasgow Coma Scale score < 13) who required mechanical ventilation for 96 hr or longer. The primary outcome was 30-day mortality. Secondary outcomes included hospital and ICU mortality, six-month mortality, duration of mechanical ventilation, ventilator-associated pneumonia, ICU and hospital length of stay as well as the orientation of patients upon discharge from the hospital. They used propensity score covariate adjustment. To overcome the effect of immortal time bias, an extended Cox shared frailty model was used to compare mortality between groups.

From 2013 to 2019, 26,923 patients with TBI were registered in the Québec Trauma Registry. A total of 983 patients who required prolonged endotracheal intubation for 96 hr or more were included in the study, 374 of whom underwent a tracheostomy and 609 of whom remained intubated. They observed a reduction in 30-day mortality (adjusted hazard ratio, 0.33; 95% confidence interval, 0.21

to 0.53) associated with tracheostomy compared with prolonged endotracheal intubation. This effect was also seen in the ICU as well as at six months. Tracheostomy, when compared with prolonged endotracheal intubation, was associated with an increase in the duration of mechanical respiratory assistance without any increase in the length of stay. No effect on mortality was observed when comparing early vs late tracheostomy procedures. An early procedure was associated with a reduction in the duration of mechanical respiratory support as well as hospital and ICU length of stay.

In this multicentre cohort study, tracheostomy was associated with decreased mortality when compared with prolonged endotracheal intubation in patients with moderate to severe TBI. This effect does not appear to be modified by the timing of the procedure. Nevertheless, the generalization and application of these results remain limited by potential residual time-dependent indication bias [1].

Future high-quality prospective studies should be performed to investigate and shed more light on the ideal timing of tracheostomy in patients with TBI [2].

In pediatrics, the timing of the intervention may significantly impact the trajectory of the patient's recovery. Early intervention may reduce the incidence of serious complications as well as the length of stay and dependence on a ventilator and facilitate a timelier recovery [3]

1)
Villemure-Poliquin N, Costerousse O, Lessard Bonaventure P, Audet N, Lauzier F, Moore L, Zarychanski R, Turgeon AF. Tracheostomy versus prolonged intubation in moderate to severe traumatic brain injury: a multicentre retrospective cohort study. Can J Anaesth. 2023 Jul 28. English. doi: 10.1007/s12630-023-02539-7. Epub ahead of print. PMID: 37505417.
2)
Azari Jafari A, Mirmoeeni S, Momtaz D, Kotzur T, Murtha G, Garcia C, Moran M, Martinez P, Chen K, Krishnakumar H, Seifi A. Early Versus Late Tracheostomy in Patients with Traumatic Brain Injury: A US Nationwide Analysis. Neurocrit Care. 2023 Jul 6. doi: 10.1007/s12028-023-01778-2. Epub ahead of print. PMID: 37415023.
3)
Salik I, Das A, Naftchi AF, Vazquez S, Spirollari E, Dominguez JF, Sukul V, Stewart D, Moscatello A. Effect of tracheostomy timing in pediatric patients with traumatic brain injury. Int J Pediatr Otorhinolaryngol. 2023 Jan;164:111414. doi: 10.1016/j.ijporl.2022.111414. Epub 2022 Dec 12. PMID: 36527981.