

Severe TBI Treatment

- While reviewing cases at the state and regional level, **we have seen an increase in TBI treatment methods that are not evidence-based and not included in consensus consortiums** such as the Brain Trauma Foundation (<https://braintrauma.org>) and the Seattle TBI Consensus.
- In 2019, 42 physician experts in TBI management authored the Seattle Severe Traumatic Brain Injury Consensus Conference (SIBICC) algorithm. The highlights for initial care appear on the subsequent two slides.
 - *Special note: **Furosemide (Lasix) and nicardipine (Cardene) are contraindicated because of their potential to cause hypotension**, which should be avoided (along with hypoxia & hypoglycemia) in TBI patients*
 - *Please see the entire document for more details:*
<https://link.springer.com/article/10.1007/s00134-019-05805-9>

Basic Severe TBI Care

Expected Interventions

- Admission to ICU
- Endotracheal intubation & mechanical ventilation
- Serial evaluation of neurologic status and pupillary reactivity
- Elevate head of bed 30-45°
 - reverse Trendelenburg if spine not cleared radiographically
- Analgesia to manage signs of pain (not ICP directed)
- Sedation to prevent agitation, asynchrony, etc. (not ICP directed)
- Temperature management to prevent fever
 - measure core temperature
 - treat core temperature above 38°C

Recommended Interventions

- Insertion of central line
- End tidal CO2 monitoring
- Consider anti-seizure medications (1 week only)
- Maintain CPP initially = 60 mmHg
- Maintain Hgb > 7 g/dL
- Avoid hyponatremia
- Optimize venous return from head (keeping head midline, ensure c-collars are not too tight)
- A-line for continuous blood pressure monitoring
- Maintain SpO2 >= 94%

*ICP = intracranial pressure as monitored by a subarachnoid bolt monitor or external ventricular drain (EVD)

*CPP = cerebral perfusion pressure = mean arterial pressure (MAP) – ICP

*SpO2 = oxygen saturation (measured by pulse oximeter)

NOT for use in TBI Patients

Treatments **NOT** recommended for use in the management of severe traumatic brain injury

- **Furosemide (Lasix)**
- **Steroids**
- Mannitol by non-bolus continuous intravenous infusion
- Scheduled infusion of hyperosmolar therapy (e.g., every 4-6 h)
- Lumbar CSF drainage
- Hypothermia (below 35 °C)
- High-dose propofol to attempt burst suppression
- Decreasing PaCO₂ below 30 mmHg/4.0 kPa
- Routinely raising CPP above 90 mmHg
- Barbiturates

Care for Severe TBI with EVD/ICP monitor

Tier one treatments for elevated ICP (≥ 22 mmHg):

- Maintain CPP 60-70 mmHg
- Increase analgesia & sedation to lower ICP
- Maintain Pa CO₂ between 30-35 mmHg
- Hypertonic saline by intermittent bolus
- Mannitol by intermittent bolus 0.25-1g/kg
- Consider placement of EVD to drain CSF
 - CSF drainage if EVD *in situ*
- Seizure prophylaxis (one week only)
- Consider EEG monitoring