SIBICC SEVERE TBI ALGORITHM
FOR PATIENTS WITH ICP MONITORING

A comprehensive protocol designed to assist clinicians managing P TBI patients undergoing ICP monitoring. These recommendations are based on combined expert opinion and reflect neither a standard-of-care nor a substitute for thoughtful individualized management.

PRINCIPLES FOR USING TIERS:
- When possible, use lowest tier treatment
- There is no rank order within a tier
- If considered advantageous, tier can be skipped when advancing treatment

Expected Interventions:
- Admission to ICU
- Endotracheal intubation and mechanical ventilation
- Serial evaluations of neurological status and pupillary reactivity
- Elevate HOB 30–45°
- Analgesia to manage signs of pain (not EP directed)
- Sedation to prevent agitation, ventilator asynchrony etc. (not EP directed)
- Temperature management to prevent fever
- Measure core temperature
- Treat core temperature above 38°C

TIER 0
Basic Severe TBI Care
Not ICP Dependent

- Maintain CPP 60–70 mmHg
- Increase analgesia to lower ICP
- Maintain P–CO₂ at low end of normal (20–50 mmHg)
- Mannitol by inst in emergsit
(D2.5–10 g/kg)
- Consider anti-seizure medications for 48 hrs only (in the absence of an indication to continue)
- Maintain ICP < 50 mmHg
- Maintain Ht. 70g/dl
- Avoid hypovolemia
- Optimize venous return from head (e.g. head elevation, ensure cervical collars are not too tight)
- Arterial line for continuous blood pressure monitoring
- Maintain SpO₂ > 94%

Recommended Interventions:
- Insertion of a central line
- End-tidal CO₂ monitoring

TIER 1
Tier 1 Treatment for > 72 hrs with
Marshall Classification of Most
- Mild hypovolemia range 32–35 mmHg/4.3–4.6 kPa
- Neuromuscular paralysis in adequately sedated patients if efficacious
- Perform MAP challenge to assess cerebral autoregulation and guide MAP and CPP goals in individual patients
- Should be performed under direct supervision of a physician who can assess response and ensure safety
- No other therapeutic adjustments (i.e. sedation) should be performed during the MAP challenge
- Initiate or titrate a vasopressor or inotrope to increase MAP by 10 mmHg for not more than 20 minutes
- Monitor and record key parameters (MAP, CPP, ICP, P–CO₂) before, during and after the challenge
- Adjust vasopressor/inotrope dose based on study findings
- Relax CPP with fluid boluses, vasopressors and/or intravenous to lower CPP when autoregulation is intact

TIER 2
- Venous or arterial pressure monitoring
- Consider high-dose propofol to attempt burst suppression
- Consider repeat CT to re-evaluate intracranial pathology

TIER 3
- Consider consultation with higher level of care if applicable for your health care system

CRITICAL NEUROWORSENING
A serious deterioration in clinical neurological status such as:
- Spontaneous decrease in the GCS motor score of ≥1 points (compared with the previous examination)
- New decrease in pupillary reactivity
- New pupillary asymmetry or bilateral mydriasis
- New focal motor deficit
- Hematoma syndrome or Cushing’s triad which requires an immediate physician response

RESPONSE TO CRITICAL NEUROWORSENING
- Immediate evaluation to identify possible cause of neuroworsening
- If fever is suspected
  - Empic treatment
  - Hyperventilation
  - Thrombolysis
- Seizure or post-ictal state
- Impaired Autoregulation
- Hyponatremia
- Hypovolemia
- Hypothermia

POSSIBLE CAUSES OF NEUROWORSENING
- Substance withdrawal
- Hyperkalemia
- Hyper or hypothermia
- Subdural hematoma
- Cerebral edema
- Elevated ICP
- Seizure
- Electrolyte or other metabolic disturbance
- Medical comorbidity

HEATMAPS INFORMING THE SAFETY OF A SEDATION HOLIDAY AND ICP MONITOR REMOVAL

TREATMENT NOT RECOMMENDED
- High-dose propofol to attempt burst suppression
- Routine decreasing NPO, Intermittent 30 mmHg/4.0 kPa
- Routinely raising CPP above 90 mmHg

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