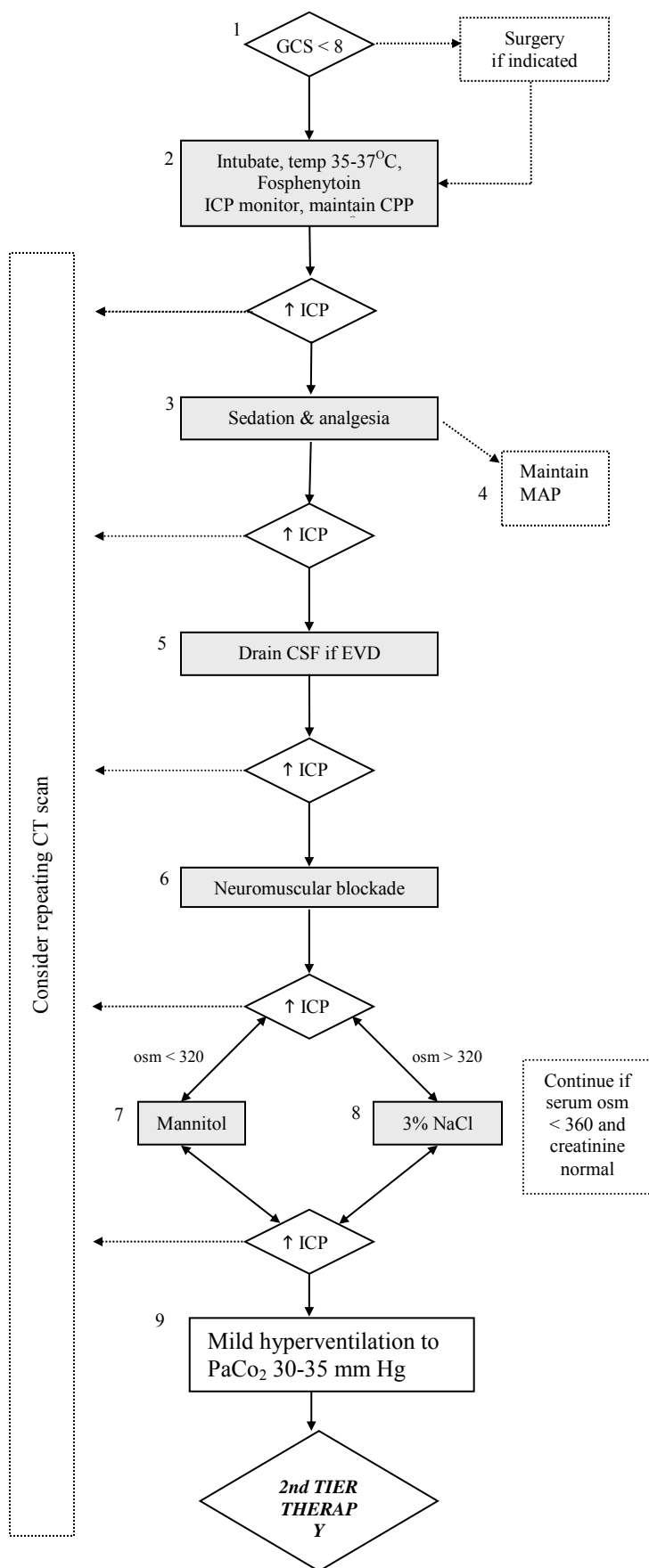


## TRAUMATIC BRAIN INJURY MANAGEMENT ALGORITHM



## COMMENTS

1. GCS 3-8 with cardiopulmonary resuscitation defines severe traumatic brain injury and is an indication for ICP monitoring. Exceptions: initial brain CT with global cerebral edema consistent with hypoxic ischemic encephalopathy (HIE) or cardiopulmonary resuscitation > 2 min with initial pH < 7.0.

2. Use cooling blanket to keep temp 35-37° C from admission. Avoid aggressive cooling that may cause shivering.

Cerebral perfusion pressure (CPP) = MAP – ICP. Minimum limits are age-dependent.

CPP > 40 for < 12 months, > 50 for ages 1-10 years, and > 65 for ages > 10 years.

3. Fentanyl and midazolam minimize agitation, which can elevate ICP. Lidocaine 0.5mg/K IV or ET prior to suctioning.

4. Maintain systolic BP at 70+ 2(age). Volume or pressor support may be necessary to maintain CPP. Norepinephrine or phenylephrine is recommended if perfusion is adequate.

5. The amount of CSF drained is dependent upon ICP. Drainage of small volumes will have an effect on pressure, if there is not loss of autoregulation.

6. Neuromuscular blockade is thought to minimize thoracic and abdominal pressures transmitted trans-durally to ICP. Vecuronium doses q 1h or continuous infusion can be used.

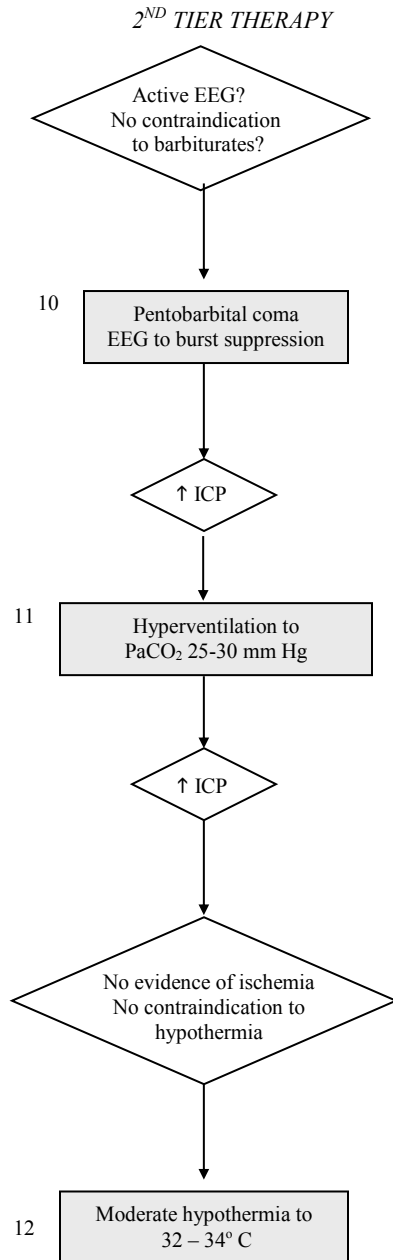
7. Mannitol: Dose is 0.25 – 1 g/kg/dose IV. Fluid loss resulting from osmotic diuresis can be replaced ½ mL: mL with NS in the first hour after the dose of mannitol.

8. 3% NaCl: Initial bolus dose is 3 ml/kg over 1 hour. May repeat the bolus if ICP is still high. Use continuous infusion 0.1-1ml/kg/hr to maintain serum Na of 145-150. The choice of step 7 or 8 as a first-line agent is left for physician's discretion.

9. Use this intervention only when there is no evidence of ischemia on CT perfusion scan.

When the above measures do not control increased ICP, then progress to 2nd tier therapy. Keep in mind that the progression to this level may occur in a very short period of time.

**TRAUMATIC BRAIN INJURY  
MANAGEMENT ALGORITHM**



10. Pentobarbital reduces neuronal activity and metabolism, thereby reducing oxygen demand and cerebral perfusion. Pentobarbital coma is induced by loading with 2-4 mg/kg followed by a drip at 1-2 mg/kg/h, which is titrated upward until burst suppression is achieved. Since pentobarbital has myocardial depressant effects, pressors and volume may be needed.

11. Hyperventilation to this degree reserved for refractory increased ICP due to risk of ischemia. Measurement of cerebral blood flow, jugular saturation, or tissue oxygen tension should be considered.

12. Definitive evidence for the benefits of moderate hypothermia in the setting of pediatric TBI is still lacking.

**ICP Spikes:**

Check pupils notify NSG if new asymmetry

Consider bolus: sedatives, paralytics, osmotic agents

Hyperventilate via hand bagging for non-responsive severe spikes > 40

Notify neurosurgery resident

Consider stat head CT

Consider 2<sup>nd</sup> tier therapies