

## Pediatric NEUROSURGERY TBI PROTOCOL (14 years and 40kg)

All TBI patients needing ICP monitoring must have a CVP monitor, Brain Tissue Oxygen monitor

Standard approaches to care include:

**SEDATION**-Continuous infusion of **Propofol is not recommended** for sedation or control of intractable intracranial hypertension in infants and children with severe TBI. **Transient infusion of less than 6 hours may be considered with approval of Neurosurgery, Critical Care and Pediatric Attendings.**

- **Suggested:** Narcotic: Fentanyl (0.5-1.0 mcg/kg/hr) or Morphine (10-30 mcg/kg/hr) IV, titrate to need
- Vecuronium 0.05-0.1 mg/kg/hr, titrate to need for ICP control

**Fluids:** NO dextrose in the IV for 48 hours unless:

- a) Children < 2 years – Serum glucose < 80 mg/dl and spilling ketones
- b) Children  $\geq$  2 years – Serum glucose < 60 mg/dl and spilling ketones

**Blood Pressure:** -Follow **SFGH Pediatric Resuscitation Reference Manual for Weight adjusted physiologic parameters**

- Systolic BP as stated in **Pediatric Resuscitation Manual** Goal until CPP can be measured
- Children < 3 years- CPP Goal > 45-50 mmHg
- Children 3-8 years- CPP > 50-55 mmHg
- Children > 9 years- CPP > 55-60 mmHg
- *Maintain pressures with fluids.*
- *If unsuccessful, follow with pressors- Neo-Syneprine 0.1 to 0.5 mcg/kg/min*

**Temperature:** (Goal temperature 37.0°C)-Place rectal probe or use temperature-sensing Foley

- a) Tylenol for T > 37.5°C (Tylenol 10-15 mg per Kg every 4 hours)
- b) Cooling Blanket and Cultures for T > 38.5°C
- c) Warming Blanket for T < 35.0°C

**Hematocrit:** Transfuse as needed to keep **Hct** > 30 **Platelet Goal:** > 100,000 **INR Goal:** < 1.5

**Serum electrolytes/Osm:**

- a) Na: 135 – 145 (Goal 140 mEq/ml)
  - b) Osm: 280 – 300 mOsm (Goal > 280 mOsm)
- With active ICP issues these parameters will be therapeutically elevated to treat ICP

**Ventilatory Parameters: DO NOT HYPERVENTILATE PATIENT WITHOUT SIGNS OF HERNIATION**

- All patients requiring ICP monitoring must have an end-tidal CO<sub>2</sub> monitor
  - a) PaO<sub>2</sub> of 95 – 105 mmHg unless otherwise instructed. (Goal 100 mm Hg)
  - b) PaCO<sub>2</sub> of 35 – 45 mmHg unless otherwise instructed. (Goal 40 mm Hg)

**Central Line:** (CVP Goal: 6-10 mmHg, unless otherwise instructed); All patients requiring ICP monitoring must have a CVP monitor

**EVD/ICP** (normal 10-15mmHg) Intermittent drainage to 10cm H<sub>2</sub>O for ICP sustained for  $\geq$  5min. unless otherwise instructed

- Children ages 0-23 months -ICP >15 mmHg
- Children 24-59 months, -ICP > 18mmHg (2-4 yrs. 11 mo)
- Children 60 months or older, -ICP >20mmHg (5 years and older)

**Brain O<sub>2</sub>** (normal 18-30 on an FiO<sub>2</sub> of 30-40%)

- Conduct FiO<sub>2</sub> challenge each shift - increase FiO<sub>2</sub> to 100% for 20 min. and record peak
- Obtain an ABG & notify Chief Resident or Attending for the following:
  - a) PbrO<sub>2</sub> drops to 15 mmHg or below
  - b) PbrO<sub>2</sub> rises  $\geq$  100 mmHg for 30 minutes
  - c) PbrO<sub>2</sub> changes by 50% ( $\uparrow$  or  $\downarrow$ ) torr any time during your shift, even if it reads within normal range
- Additional physiologic challenges (e.g. hyper- or hypoventilation, blood pressure challenge) may be periodically performed to assess cerebral autoregulation status

**Anti-epileptic Treatment-** An anti-epileptic drug is administered with an initial loading dose on admission (i.e., Phenytoin - 15 mg/kg IV over 30 min.) and a daily maintenance dose (i.e., Phenytoin - 5mg/kg/day IV divided q 12 hours) for one week after injury. It should be discontinued in the absence of seizures during this time. (Do not use Phenobarbital)

**Nutrition**

- Begin enterally or parenterally 48-72 hours after admission.

**At the present time, we are using brain tissue oxygen and SjvO<sub>2</sub> monitoring for early detection of systemic and intracranial abnormalities. These monitors may provide “early warning” of potentially serious aberrations in standard endpoints. In order to interpret the values measured by these monitors, correct brain probe placement must be verified by:**

- CT scan, and positive response to 100% oxygen challenge.

