GUIDELINES FOR
EMERGENCY DEPARTMENT CARE OF THE PEDIATRIC PATIENT WITH MODERATE TO SEVERE TRAUMATIC BRAIN INJURY 0-14 years old

EARLY NOTIFICATION OF THE FOLLOWING SERVICES BY PEDIATRIC EMERGENCY MEDICINE (PEM) STAFF:
Pediatric Trauma Surgery, Pediatric Neurological Surgery, Pediatric Critical Care

EVALUATION OF THE PATIENT CONSISTENT WITH ATLS GUIDELINES MINDFUL OF THE FOLLOWING:

AIRWAY:

- Oxygen administered to all patients
- For suspected or confirmed severe TBI (GCS≤8): Neurological Surgery resident or attending available at bedside for baseline neurologic examination
- No delay in establishing definitive airway awaiting neurologic examination
- Intubation for Glasgow Coma Scale (GCS) ≤ 8 **OR** unstable airway regardless of GCS

RAPID SEQUENCE INTUBATION (RSI) MEDICATIONS PER ED GUIDELINES:
Etomidate 0.3-0.6 mg/kg
Rocuronium 1 mg/kg

- Endotracheal tube (ETT) placement confirmed by chest radiograph (CXR)

BREATHING:

- With advanced airway, titrate minute ventilation to maintain end-tidal capnography values (ETCO2) of 34-36
- Arterial blood gas (PaCO2, PaO2) correlate established in PICU (**venous blood gas (VBG) not recommended**)

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Reviewed 2/2019

CIRCULATION:

- Consider early lab evaluation (e.g. CBC, coagulation profile (PT, aPTT), fibrinogen) to guide need for blood products before and after transfusion
- Consider early activation of Massive Transfusion Protocol and alerting Blood Bank
- Maintain age-appropriate blood pressure
  - Bolus with blood products or 0.9% NS for hypotension or evidence of hypovolemia
  - Consider norepinephrine if vasopressor desired for blood pressure support
- No role for antihypertensives in the emergency department (ED) setting

NEUROLOGIC:

- Preferred hyperosmolar agent: 3% hypertonic saline (bolus 5 mL/kg then begin infusion at 0.5-1 mL/kg/hr); mannitol 0.5-1g/kg (given over 3-5 minutes) if 3% not readily available and there is no hypertension present or at discretion of Neurological Surgery
- Seizure prophylaxis: Fosphenytoin 20mg/kg IV/IO or Keppra 50 mg/kg IV/IO to be given in the ED
- If clinical (observed) seizure, Ativan 0.1 mg/kg x 3 doses followed by fosphenytoin load 20 mg/kg; if persisting, seek advice of Neurological Surgery or Critical Care
- Acetaminophen 15 mg/kg IV x 1 if Temperature ≥ 37.5 C

FLUIDS/ELECTROLYTES/NUTRITION:

- NPO
- Initiate isotonic fluid (0.9% NS) at maintenance rate by Holliday-Segar method (4-2-1 method)- **NO DEXTROSE**
- May initiate 3% hypertonic saline infusion at starting rate of 0.5-1 mL/kg/hr
- Total fluid infusion rate should not exceed Holliday-Segar maintenance infusion rate - consult with Critical Care as needed

INTRAVASCULAR ACCESS:

- Obtain peripheral intravenous access; utilize early intraosseus (IO) access if necessary
- Arterial line and central venous line placement may be deferred to OR or PICU

LABS:

- Obtain Level I labs; additional labs at discretion of PEM, Trauma, or Neurological Surgery service

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PATIENT POSITIONING:

- Head of bed elevated to 30 degrees (i.e. in Trauma Bay, during transport between ED and scanner and to PICU); reverse Trendelenburg to 30 degrees if thoracolumbar spinal (TLS) precautions indicated

IMAGING:

- CT head and cervical spine (consider CT neck w/ contrast if penetrating neck injury or concern for dissection)
- Indication and timing of MR imaging should be discussed among the PEM, Neurological Surgery, Trauma, and Critical Care services

DISPOSITION:

- Early decision regarding operative vs. nonoperative management and disposition (OR versus PICU)
- Alert Pediatric Critical Care attending early in patient course for PICU admission
- Initiate nurse to nurse communication between ED nurse and OR or PICU nurse

STRONG CONSIDERATION FOR ADMISSION TO PEDIATRIC INTENSIVE CARE UNIT (PICU):

- Child ≤ 1 yo with any intracranial hemorrhage
- GCS ≤12 with any non-isolated symptoms of head injury (e.g. headache AND vomiting, headache AND altered mental status, vomiting AND focal neurologic exam)
- GCS ≤ 10

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