Ascension

Hypertonic Saline Guideline for Treatment of Pediatric Traumatic Brain Injury in the Emergency Department

Purpose: To establish guidelines regarding the indication and/or contraindication of use of hypertonic saline in the pediatric trauma patient population with traumatic brain injury.

Scope: Trauma patients less than 18 years and older who have suffered traumatic brain injury.

Definitions:

A. Hypertonic saline (HTS):
   - 3% solution (concentration). HTS creates an osmotic gradient and draws water from the intracellular and extracellular spaces into the intravascular compartment, stimulates release of arterial natriuretic peptides and promotes cardiac output; may also inhibit leukocyte adhesion. Following severe traumatic brain injury (TBI) HTS is used to restore and maintain systemic and cerebral perfusion without increasing the ICP and exacerbating cerebral edema.

B. Intracranial pressure (ICP):
   - ICP is determined by the total force exerted by the brain, blood, and cerebrospinal fluid contained within the fixed volume of the skull. Elevated ICP, typically defined as > 20 mmHg, is a strong predictor of poor neurological outcome.

C. Severe traumatic brain injury:
   - Glasgow Coma Score (GCS) 3 – 8

Protocol:

A. Criteria for administration of HTS in the emergency department who have one or more of the following:
   - GCS 3 – 8
   - Witnessed lateralizing signs - Clinical signs of herniation such as dilated pupil, decerebrate or decorticate posturing, bradycardia, hypertension.

B. Administration:
   - Administration via femoral/central line is recommended but may be administered peripherally if no other access is available.
   - HTS bolus administration of 4 mL/kg over 15 minutes

C. Maintenance:
   - Initiate HTS continuous infusion at 0.5 ml/kg/hr.
   - Monitor serum sodium every 2 hours and titrate drip up to 1 ml/kg/hr to maintain between serum sodium 150-160.
     1. Pediatric Intensivist will assume control of titration when admitted to PICU. ???
     2. When transferring patient to outside facility for higher level of care, check sodium prior to transport to ensure transport team knows level to maintain appropriate drip rate.

REFERENCES

REVIEW/REVISION HISTORY

Review/Revision Date	Approved by:
Created 07/2023	Trauma Services