OHSU – Trauma ICU  
Catastrophic Brain Injury Guidelines

I. PURPOSE: To provide standard, critical care to patients with catastrophic brain injuries in order to optimize the perfusion and function of all organ systems, such that the possibility for survival as well as the option for organ donation can be simultaneously preserved.

II. DEFINITION: A Catastrophic Brain Injury is one that is determined by neurosurgery/neurology to not have a reasonable chance for survival and, as such, will not receive treatments or procedures to treat intracranial hypertension.

III. GOALS:
A. Normalize hemodynamic status (Note: patients with pre-existing hypertension may require a higher MAP to maintain organ perfusion/function.)
   1. Maintenance IV: D5 ½ NS with 20mEq KCl at 1.25 cc/kg/hour (may need to adjust saline concentration for serum Na+ > 155)
   2. For MAP < 65: Lactated Ringers 500cc bolus (evaluate for the need to support with vasopressors)
   3. For hematocrit < 21%, transfuse one unit packed cells. Repeat as necessary.
   4. For MAP < 65 with unsustained response to fluid resuscitation: Utilize infusions of norepineprine and/or vasopressin (preferred if Diabetes Insipidus also present)
   5. If present, a CVP of 4-12 mmHg is the target range
   6. Normalize serum lactate

B. Normalize Oxygenation/ventilation
   1. Adjust FiO₂ to maintain O₂ saturation > 92%
   2. Adjust tidal volume to 6-8cc/kg of ideal body weight
   3. Adjust respiratory rate to maintain a normal PaCO₂
   4. Use physiologic PEEP (5cm) – Consider higher levels to treat atelectasis or if FiO2 > 60%
   5. Pulmonary toilet/suction q 1-2 hrs
   6. Follow daily chest x-rays and treat as indicated
   7. Avoid fluid overload

C. Normalize Coagulation System
   1. Maintain normothermia with warming blanket to achieve core temperature of 36-37 C
   2. Maintain normal acid/base balance with:
      a. Volume replacement
      b. Ventilator setting adjustments
      c. Administration of buffers
   3. For symptomatic coagulopathy, administer coagulation products according to standard practice

D. Treat Neuro-Endocrine disturbances
   1. Diabetes Insipidus
      a. For urine output > 300cc x 2hrs and urine specific gravity is < 1.005 and Na >145, give either: i. DDAVP .5-1 mcg IV. May repeat PRN Q2 hours for inadequate response.
         ii. Vasopressin continuous IV gtt @ 0.04 units/min (2.4 units/hour)
      b. Monitor/treat related electrolyte disturbances (especially Na+, K+, Mg++, and Ca++)
   2. Impaired Glucose Tolerance – For glucose >180 mg/dL, institute hospital Insulin Therapy Protocol
   3. Hormone insufficiency – If brainstem herniation is imminent/suspected and there is a persistent requirement for high-dose vasopressors (equivalent to > 0.15 mcg/kg/min of norepineprine), despite volume resuscitation, consider:
      a. Levothyroxine 20 mcg IV bolus (only if serum K+ > 3.5) followed by…
      b. Levothyroxine infusion (250 mcg in 500 ml 0.9% NS) – begin at 10 mcg/hr and titrate to goal MAP
      c. Hydrocortisone 50mg IV q6 hours or 100mg IV q 8 hours

E. Normalize blood chemistry/components – Monitor and treat q6 hours: electrolytes, BUN/Cr, glucose, CBC, INR, ABG, lactate, and any labs noted to be deranged.

F. Support GI Integrity/Nutritional status – Consider enteral tube feeding if hospitalized > 24-48 hrs.

G. Treat infection