Management of Traumatic Intracranial Hemorrhage

1. Initial Stabilization

A: Airway
- Intubate if patient not protecting airway, GCS ≤ 8

B: Breathing
- Maintain physiologic levels of O2 and CO2 to avoid 2* Brain Injury
- High oxygen potentially leads to free radical damage
- Elevated CO2 → vasodilation of carotid arteries and ↑ cerebral blood flow → ↑ ICP

C: Circulation
- Hypotensive:
  - Target a MAP > 80 to maintain cerebral perfusion pressure
    \[ MAP = (SBP + 2 \times DBP)/3 \]
  - Fluids, vasopressors as needed
  - Most ICH pts are hypertensive, find source if hypotension
- Hypertensive:
  - Increases perfusion pressure, can worsen ICH
  - Nicardipine gtt and arterial line to keep SBP < 180

2. Subsequent Management

Reverse Anticoagulation
- Warfarin: Vitamin K, FFP, Prothrombin Complex Concentrate (PCC)
- Aspirin/Antiplatelets: consider desmopressin; platelets controversial
- Other potential options: PCC, idarucizumab (dabigatran), dialysis (dabigatran)

Increased ICP

Signs/Symptoms:
- Cushing’s Triad (irregular respirations, HTN, bradycardia), “blown” dilated pupil, AMS
- CT showing midline shift, blood, loss of sulci, signs of herniation

Treatment Options:
- The most important intervention is RAPID early surgical evacuation of space occupying lesions

Avoid delays, plan early
- Elevate head of bed to 30°, control pain/sedation
- Hyperventilation to PCO2 30-35 is only an anecdotal temporizing measure, do not use routinely
- Hypertonic Saline
  - 250 mL 3% over 10 minutes, re-dose as needed
  - 30 mL 23% “bullet” IV push
- Mannitol: 1 g/kg, potent diuretic, avoid if patient hypotensive

Seizures
- Treat all clinical seizures emergently with benzodiazepines
- Consider EEG monitoring
- Discuss anticonvulsants with Neurosurgery
- Levetiracetam (Keppra) or phenytoin (Dilantin)