



# Foundations Frameworks

## Management of Traumatic Intracranial Hemorrhage

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### 1. Initial Stabilization

#### A: Airway

Intubate if patient not protecting airway, GCS  $\leq 8$



#### B: Breathing

Maintain physiologic levels of O<sub>2</sub> and CO<sub>2</sub> to avoid 2° Brain Injury

- high oxygen potentially leads to free radical damage
- elevated CO<sub>2</sub> → 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 PCO<sub>2</sub> 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)