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OUTLINE

- Trauma Statistics
- Head Trauma Case
- Trauma ABC
- GCS
- Airway and Intubation
- Pre-Hospital
- Remote Hospital Management

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STATISTICS

- Traumatic head Injury is a leading cause of death and disability in the US
- Approximately 2.5 million ED visits each year
 - 282,000 hospitalizations
 - 56,000 deaths
- Approximate socioeconomic impact is \$76.5 billion each year

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RECENT TRAUMA CASE

- 56 YO Male presents via EMS for unknown downtime status post presumably fall down flight of stairs.
- Call over radio stated altered, confused, and laceration to right face. No obvious deformities. Unknown anticoagulation.
- GCS 14 in field (M6, V4, E4). Vital signs stable.

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PREPARATION IN THE ED

- Assign roles (arguably one of the most important)
 - 2 nurses, 1 ED attending \pm resident, 2 technicians, 1 respiratory therapist, 1 runner
- Equipment:
 - Airway
 - Ultrasound
 - Wound supplies

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ARRIVAL OF PATIENT

- EMS Story:
 - 56 YO Male with no known history fell 1 flight of stairs. Sustained laceration to right face, bleeding profusely with pressure dressing applied. GCS 14 for confusion. Placed in C-collar. Mention of patient smells of alcohol.
- Transfer patient with **C-spine stabilization**
- Trauma is as easy as **ABCDE**:
 - Airway - intact
 - Breathing – bilateral breath sounds
 - Circulation – laceration to right face with large amount of bleeding, no other signs of injury, equal pulses throughout
 - Disability – GCS 14 for confusion, smells of alcohol, AOx2 to name and place
 - Exposure – log roll, no other injuries noted

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TRAUMA ABCDE

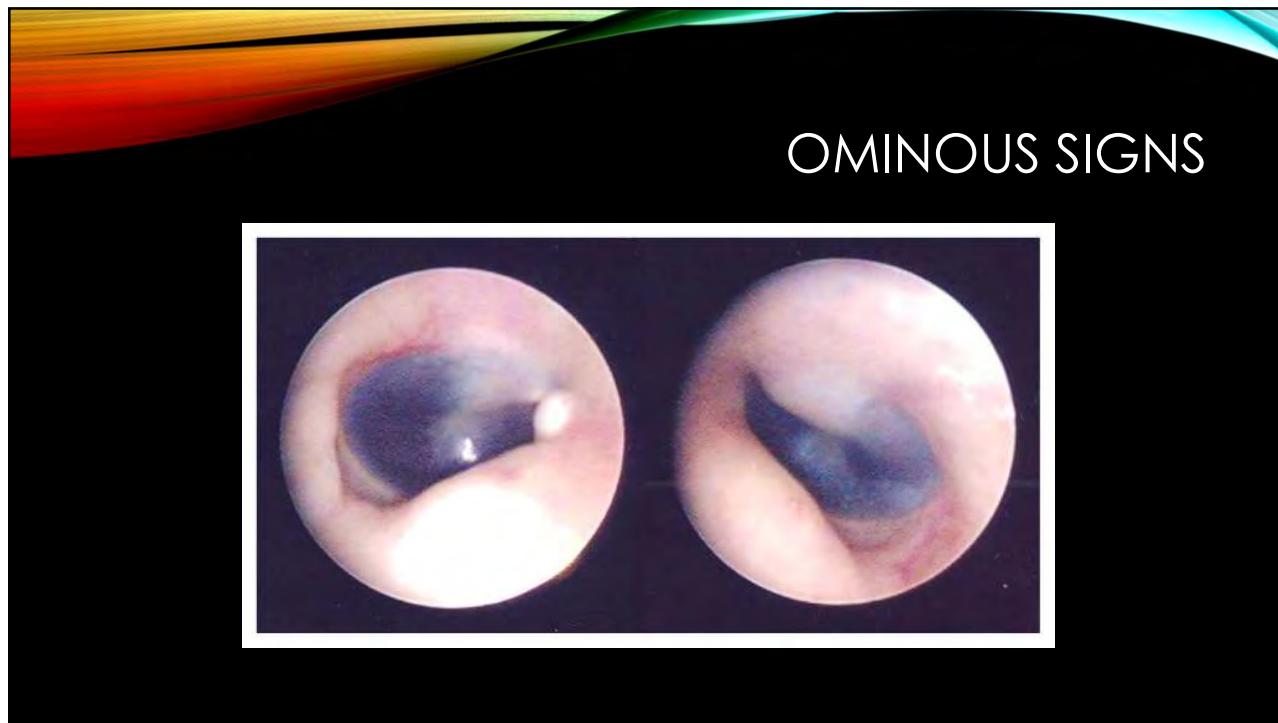


- **Airway**
 - Blockage
 - Consider C-spine injury
- **Breathing**
 - Tension pneumothorax
 - Pulmonary edema
- **Circulation**
 - Shock
 - Hemorrhage
- **Disability**
 - Seizure
 - Intoxication
 - Intracranial Catastrophe
- **Exposure**

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GLASGOW COMA SCALE

TABLE 38-2
Glasgow Coma Scale

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	<i>Best response</i>	15
	<i>Comatose client</i>	8 or less
	<i>Totally unresponsive</i>	3

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EXPLORE WOUNDS

- Detailed exploration of wounds is necessary to reveal extent of injury
- This patient was bleeding profusely anytime dressing was removed and patient became increasingly confused and combative
- Exam revealed 8 cm laceration extending from right cheek to zone 2 of the neck
- 2 small branch arterial bleeds were noted
- Zones of the Neck:
 - Zone III: Between the angle of the mandible and base of skull
 - Zone II: Between cricoid cartilage and angle of mandible
 - Zone I: Between cricoid cartilage and clavicles

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CONFUSED/COMBATIVE PATIENT

- What do you do when there is a combative trauma patient?
 - Attempt to de-escalate verbally
 - Is it hindering your management?
- When to intubate?
 - GCS < 9
 - Combative and unable to de-escalate
 - Confusion/combativeness affects your ability to manage the care of the patient or puts unnecessary risk to the patient

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INTUBATION

- **SOAP ME Mnemonic**
 - Suction
 - Oxygen
 - Airway (prediction of difficult airway)
 - Position
 - Medications
 - Equipment
- Paralytics improve first pass rate
 - Succinyl choline vs. rocuronium
- Induction agents
 - Etomidate vs. Ketamine
- Sedation
 - Propofol vs. fentanyl & versed
- Pre-oxygenation
- Have your go to, 2nd line, and 3rd line equipment available
 - Expect the difficult airway

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INTRACEREBRAL HEMORRHAGE

- Position
 - Head elevated
- Blood pressure management (next slide)
- Good neurologic examination
- Rocuronium will affect your ability to have a good neurologic examination
- Midline shift and predicting herniation/decompensation
- Hypertonic saline vs. Mannitol
- Burr holes?
 - Essential to have neurosurgery guidance if never performed

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BLOOD PRESSURE MANAGEMENT

- Recommendations are **SBP < 140 mmHg** or **MAP < 110 mmHg**
- **Recommended 1st line medication:**
 - Nicardipine 5 mg/hr initial, with max of 15 mg/hr
- Several studies have been cited over the years regarding blood pressure management to include:
 - **INTERACT-2** (Intensive Blood Pressure Reduction in Acute Cerebral Hemorrhage II)
 - **ATACH-2** (Antihypertensive Treatment of Acute Cerebral Hemorrhage II)
- Most recently, a meta-analysis of 6 RCTs came out in 2017:
 - **Intensive BP management in patients with ICH is safe**
 - **Intensive BP lowering could reduce hematoma growth in patients ≤ 62 YO**

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ANTICOAGULANT REVERSAL

- Reverse all intracranial hemorrhages on anticoagulation
 - **Warfarin**
 - 4 Factor PCC **and** Vitamin K
 - If no 4 factor PCC, use 3 Factor PCC or FFP **and** Vitamin K
 - **Factor Xa Inhibitors (Apixaban, Edoxaban, Rivaroxaban)**
 - Andexanet Alfa or 4-Factor PCC
 - **Dabigatran**
 - Idarucizumab (Praxbind)
 - **Heparin Products**
 - Protamine Sulfate

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PRE-HOSPITAL MANAGEMENT

- Position
 - Head elevated
 - If C-spine and backboard, Reverse Trendelenburg
 - Left lateral (difficulties with backboards)
- Intubation pre-hospital with poor GCS and deteriorating
 - Good evidence to support this to prevent secondary injuries such as aspiration pneumonias
 - Improved morbidity and mortality when intubated for combination of low GCS and severe mechanism

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RURAL HOSPITAL

- Control the bleed
- Recognizing/diagnosing the head bleed
- Good initial neurologic exam to include GCS and deterioration
- Airway management if indicated
- Control the blood pressure and pain
- Reach out early for phone consult with trauma center for guidance

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