Primary and Secondary Survey Like a Boss

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Objectives:
- Participants will be able to name the critical assessment steps when surveying a trauma patient
- Recognize and prioritize multiple injuries
- Recommend 3 interventions needed to help stabilize a patient in a case presentation
- Perform both a primary and secondary assessment on a patient
Do a Primary and Secondary Survey like a Boss! Leader!

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Trauma and Critical Care

Intermountain Medical Center
"You miss 100% of the shots you don't take." - Wayne Gretzky

"Michael Scott"
Effective Communication

- RELAX
- Complex & High Risk Environment
- Prevents breakdown of plan
- Prevents missed injuries
- Team Leader
- Teamwork
- Closed loop
- Be clear
Advanced Trauma Life Support (ATLS)

• 1976 an Ortho surgeon crashed plane. Wife died.

• “We can provide better care...something is wrong with the system.”

• Need for uniform training-ATLS

• Changed Golden hour
Case Scenario

- 44-year-old male driver crashed head-on into a wall
- Patient found unresponsive at the scene
- Arrives at hospital via basic life support with c-collar in place and strapped to a backboard; technicians assisting ventilations with bag-mask
Case Scenario

What is the sequence of priorities in assessing this patient?

1. Do you need to identify the specific injuries before initial management of this patient?

2. If not, how do you proceed?
PEARLS of (ATLS)

- **ABCDE** approach
- Treat the greatest threat to life first!
- Repeat **ABCDE** when patient deteriorates
- Timely treatment of injuries
- Resuscitation is done simultaneously
- The lack of a definitive diagnosis should never impede treatment
- A detailed history is NOT essential to begin the evaluation
Missed Injuries

• 39 percent of trauma patients have injuries that are initially missed
• 22 percent are clinically significant
• Leads to:
  - Increased mortality
  - Additional procedures
  - Significant pain
  - Complications
  - Residual disability

FOCUS ON LIFE THREATENING PROBLEMS AND MINIMIZE THE RISK OF MISSED INJURIES
Common Missed Injuries

- Esophageal intubations
- Hemorrhagic shock
- Cardiac tamponade
- Thoracoabdominal injury
- Penetrating bowel injury
- Open book pelvic fractures
- Ocular injuries
- Injuries in the Elderly, children and in pregnancy
- Cognitive Errors—premature diagnosis, Overreliances on early negative results, attribute abnormal findings to benign causes, analgesia and sedation.
Mechanism of Injury

- Injury patterns can often be predicted by mechanism
- High Index of Suspicion
- Frequent reevaluation and monitoring

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Suspected Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontal impact automobile collision</td>
<td>Cervical spine fracture Anterior flail chest Myocardial contusion Pneumothorax Traumatic aortic injury Fractured spleen or liver Posterior fracture/dislocation of hip and/or knee</td>
</tr>
</tbody>
</table>
Preparation

**Prehospital-**
- Airway Maintenance
- Control of external bleeding and shock
- Immobilization of the patient
- Communication with hospital
- Transport to closest appropriate facility
- History (include events)

**In-hospital-**
- Advanced planning (especially mass casualty)
- Standard Precautions
- Equipment
- Personnel (Code alert)
# Trauma Activation Criteria

## Level One

<table>
<thead>
<tr>
<th>Immediate Life or Limb Threatening</th>
<th>Full Trauma Team</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Systolic BP &lt; 90 mmHg at any time in adults and age-specific hypotension in children</strong></td>
<td>• Trauma Surgeon</td>
</tr>
<tr>
<td>o Infants &lt; 1 yr. SBP &lt;60</td>
<td>• Chief Surgical Resident</td>
</tr>
<tr>
<td>o Children 1- to 10 years SBP &lt;70 + 2x age in years</td>
<td>• Emergency Physician</td>
</tr>
<tr>
<td>o Children &gt; 10 years SBP &lt; 90</td>
<td>• Trauma APC (s)</td>
</tr>
<tr>
<td><strong>Glasgow Coma Score ≤ 10 with mechanism attributed to trauma</strong></td>
<td>• EM Resident on trauma call</td>
</tr>
<tr>
<td><strong>Respiratory compromise/Obstruction/Unstable airway</strong></td>
<td>• Emergency Nurse (s)</td>
</tr>
<tr>
<td>o Intubated at scene</td>
<td>• Patient Care Technician</td>
</tr>
<tr>
<td>o Intubated transfer patient, <strong>unstable</strong></td>
<td>• Laboratory/Blood Gas</td>
</tr>
<tr>
<td><strong>Penetrating injuries involving head, neck, torso, or proximal to elbow or knee</strong></td>
<td>• Radiology</td>
</tr>
<tr>
<td><strong>Time sensitive injury:</strong></td>
<td>• Respiratory Therapist</td>
</tr>
<tr>
<td>o Amputation proximal to wrist or ankle</td>
<td>• Surgery</td>
</tr>
<tr>
<td>o Crushed, degloved, mangled, or pulseless extremity</td>
<td>• Social Worker</td>
</tr>
<tr>
<td><strong>Fractures:</strong></td>
<td>• Scribe</td>
</tr>
<tr>
<td>o Open or depressed skull fracture</td>
<td><strong>Team members are to be released when not needed</strong></td>
</tr>
<tr>
<td>o Unstable pelvic fracture</td>
<td></td>
</tr>
<tr>
<td><strong>Paralysis</strong></td>
<td></td>
</tr>
<tr>
<td><strong>All patients with cardiac arrest following traumatic event</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Emergency provider/Charge nurse discretion</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Inter-hospital trauma transfers:</strong></td>
<td></td>
</tr>
<tr>
<td>o Receiving blood products</td>
<td></td>
</tr>
<tr>
<td>o Unstable during transport</td>
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</tbody>
</table>
Trauma Activation Criteria

Level Two

**GCS 11-14** (altered baseline with hx of dementia or other deficit; excludes GCS 14 due to eye opening)

**Neurologic deficit** (unilateral weakness, facial droop etc.) with recent traumatic mechanism

**Fractures**: Two or more long bone fractures

**Chest wall instability** or deformity (flail chest)

**Head trauma** or other significant injury on anticoagulants or with bleeding disorder

**Falls**:
- Children: 2 to 3 times the height of the child
- Adults: > 15 feet (1 story = 10 ft)
- Adults > 55 of age: 10 feet

**Adults > 65 years of age: GLF with significant chest or abdominal injury**

**High risk auto crash**:
- Intrusion > 12 inches occupant site including roof, > 18 inches any site
- Ejection(partial or complete) from automobile
- Death in same passenger compartment

**Auto-versus pedestrian/bicyclist thrown, run over, or with significant impact > 20 mph**

**High energy dissipation or rapid deceleration incidents**:
- Thrown from/stepped on/significant injury from livestock
- Striking fixed object with momentum (e.g. bicycle, skateboard, paragliding)
- Blast or explosion
- With chest or abdominal pain

**Motorcycle/ATV/other power sport crash**: > 20 mph or with separation of rider

**Pregnancy > 20 weeks with significant mechanism**

**High energy electrical injury**

**Significant** burns with trauma mechanism

**EMS/Emergency provider/Charge nurse discretion**

**Inter-hospital transfers**:
- Intubated, stable respiratory status **
- Stable transfer patient that meets activation criteria and doesn’t meet other transfer criteria

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B. **Modified Trauma Team**

- Emergency Physician
- Trauma APC
- EM Resident on trauma call
- ED nurse
- ED patient care technician
- Radiology
- Laboratory
- Social Worker
- Scribe
- Trauma Surgeon

Team members are to be released when not needed

**Respiratory therapy only for those inter-hospital transfer patients who are intubated with stable respiratory status**
Trauma Hall

- RT
- EP
- RN
- TT
- Scribe

- XR
- SW
- PAC
- OR
- CT
- TX
- ABG
- Phleb
- Nsg Spvsr
Concepts of Initial Assessment

Preparation
Primary Survey
  Resuscitation Adjuncts
Reevaluation

Detailed Secondary Survey
  Reevaluation Adjuncts

Reevaluation
Definitive Care
Primary Survey

**A**irway with c-spine protection

**B**reathing and ventilation

**C**irculation with hemorrhage control

**D**isability: Neuro status

**E**xposure / Environmental control
Quick Assessment

What is a quick, simple way to assess a patient in 10 seconds?

- Ask the patient his or her name
- Ask the patient what happened

A  Patent airway
B  Sufficient air reserve to permit speech
C  Sufficient perfusion
D  Clear sensorium
Airway with C-spine Protection

- *Establish patent airway and protect c-spine*
- *Assume c-spine injury in patients with multisystem trauma*
- *Verify placement*
- *Reassess*
Airway Interventions

- **Supplemental oxygen**
- **Suction**
- **Chin lift/jaw thrust**
- **Oral/nasal airways**
- **Definitive airways**
  - RSI for agitated patients with c-collar
  - ETI for comatose patients (GCS<8)
- **BE PREPARED!**
Breathing and Ventilation

- Assess adequate oxygenation and ventilation
- Inspect, palpate, and auscultate
  - Respiratory Rate
  - Deviated trachea
  - Chest movement
  - Sucking chest wound
  - Absence of sounds
  - O2 sats
Breathing Interventions

Ventilate with 100% oxygen

Needle decompression if tension pneumothorax suspected

Chest tubes for pneumothorax / hemothorax

Occlusive dressing to sucking chest wound

If intubated, evaluate ETT position
Tension Pneumothorax
Circulation with Hemorrhage Control

Hemorrhagic shock should be assumed in any hypotensive trauma patient

Rapid assessment of hemodynamic status

- Level of consciousness
- Skin color
- Pulses in four extremities
- Blood pressure and pulse pressure
Circulation Interventions

**CONTROL HEMORRHAGE, RESTORE VOLUME and REASSESS**

*Cardiac monitor*

*Apply pressure to sites of external hemorrhage*

*Establish IV access*
  - 2 large bore IVs
  - Central lines if indicated

*Cardiac tamponade decompression if indicated*

*Volume resuscitation*
  - Have blood ready if needed
  - Level One infusers available
  - Foley catheter to monitor resuscitation
Disability: Neuro status

**Abbreviated neurological exam**

- Level of consciousness
- Pupil size and reactivity
- Motor function
- GCS
  - Utilized to determine severity of injury
  - Guide for urgency of head CT and ICP monitoring
  - Lowest score 3, High score 15 (11T)
Disability Interventions

Spinal cord injury - baseline exam and neurosurgical consultation, steroids

ICP monitor - Neurosurgical consultation

Elevated ICP

- Head of bed elevated
- Mannitol or 3% NaCl
- Hyperventilation
- Emergent decompression
Exposure / Environmental Control

- Complete disrobing of patient
- Logroll-inspect back
- Warm blankets
- Warm trauma bay
- External warming device
- Prevent Hypothermia
Resuscitation Done Simultaneously

- Protect and secure airway
- Ventilate and oxygenate
- Stop the bleeding!
- Crystalloid/blood resuscitation
- Protect from hypothermia
Adjuncts to Primary Survey

- ECG
- Vital signs
- ABGs
- Urinary output
- Urinary / gastric catheters unless contraindicated
- Pulse oximeter and CO₂
Adjuncts to Primary Survey

Diagnostic Tools
Transfer to Definitive Care

Which patients do I transfer to a higher level of care?

- Injuries exceed institutional capabilities
- Multisystem or complex injuries
- Patients with comorbidity or age extremes

Prior to transfer think:

- EMTALA
- Do not delay transfer for imaging
- Stabilize prior to transfer
- Decompensation should be anticipated
Secondary Survey

- The **complete** H&P
- Head to toe exam-including rectal
- ABCDE reassessed
- Vital functions returning to normal
- Diagnostic studies simultaneously
Secondary Survey-History

AMPLE

Allergies
Medications
Past illnesses / Pregnancy
Last meal
Events / Environment / Mechanism
Additional Imaging and Labs

- Plain radiographs
- CT-Computed tomography
- MRI
- Standard Labs
  - CBC, K, Cr, PTT, Utox, EtOH, ABG
- Must be monitored in radiology
- Go to radiology IF stable
Secondary Survey

**Head**
- External exam
- Palpate the scalp
- Eye and Ear exam
- Visual Acuity

**Maxillofacial**
- Bony Crepitus
- Malocclusion
- Deformity
Secondary Survey

**Neck (Soft Tissues)**

**Mechanism:** Blunt versus penetrating

**Symptoms:** Airway obstruction, hoarseness

**Findings:** Crepitus, hematoma, stridor,
Secondary Survey

**Chest**

- Inspect
- Palpate
- Percuss
- Auscultate
- X-rays
Secondary Survey

**Pelvis**
- Pain on palpation
- Leg length unequal
- Instability
- X-rays as needed

**Perineum**
- Contusions
- Hematoma
- Lacerations,
- Urethral blood

**Rectum**
- Sphincter tone,
- High-riding prostate,
- Pelvic fracture,
- Rectal wall integrity,
- Blood

**Vagina**
- Blood
- Lacerations
Secondary Survey

**Extremities**
- Contusion
- Pain
- Perfusion
- NV status
- X-rays as needed
Secondary Survey

**Spine**
- Palpate full spine
- Tenderness/swelling
- Complete motor/sensory exams
- Reflexes
- Imaging Studies
Secondary Survey

**Brain**

- GCS
- Pupil size/reaction
- Lateralizing signs
- Frequent reeval
- Prevent Secondary Brain Injury
Summary

• Lead
• Communicate
• Prevent missed injuries - reassess
• **ABCDE** approach
• Treat greatest threat to life first!
• Repeat **ABCDE** when patient deteriorates
• Interventions should not be delayed
• Don’t delay transfers
References


Approach to Trauma. UNC Emergency Medicine, Lecture Series.


Trauma Bay Do-si-do. Brad Morris (2013). Intermountain Medical Center, Murray, UT.