

Initial Assessment & Management

Advanced Trauma Life Support (ATLS) — Chapter 1
Updated 11th Edition Clinical Presentation

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Core Chapter Objectives & Guidelines

“The primary survey should be repeated frequently to identify any deterioration in the patient's status that indicates the need for additional intervention.”

Learning Outcomes:

- Identify the correct sequence of priorities for assessing the multiply injured patient.
- Apply structured principles of primary and secondary surveys simultaneously using a team-based approach.
- Explain how mechanism of injury and medical history contribute to identifying life-threatening injuries.
- Recognize pitfalls associated with initial care and implement immediate strategies to mitigate them.
- Identify patient groups who require early transfer to a higher level of definitive care.

The Head-On Collision — Initial Presentation

Patient Presentation

Demographics: 44-year-old male driver.

Mechanism: High-velocity head-on crash into a concrete wall.

On Scene: Patient found unresponsive.

Arrival: Arrives via basic life support (BLS) with collar and backboard in place.

Airway support: Emergency technicians currently assisting ventilations with bag-mask device.

Core Clinical Prompts

Sequence of Priorities: What is the mandatory order of assessment for this multiply injured patient?

Identify Injuries First?: Do you need to identify specific diagnostic injuries before initiating life-saving management?

If Not, How Do You Proceed?: Describe the systematic physiological resuscitation approach.

Standard Precautions for Trauma Resuscitation

Standard precautions must be utilized for all patients to prevent exposure to infectious or bloodborne pathogens. Full personal protective equipment (PPE) is mandatory in the trauma bay prior to patient arrival:

1. **Cap:** Protective surgical head covering.
2. **Gown:** Fluid-resistant sterile gown.
3. **Gloves:** Double-gloving is highly recommended in high-acuity scenarios.
4. **Mask:** High-efficiency respiratory protection.
5. **Shoe Covers:** Fluid-resistant footwear protectors.
6. **Protective Eyewear / Face Shield:** Essential for eye splash and aerosol protection during airway management and procedures.

The Structured Progression of Trauma Care

Phase 1: Stabilization

- Preparation & Triage
- xABCDE Primary Survey
- Resuscitation Adjuncts
- Rapid Continuous Reevaluation

Phase 2: Detailed Exam

- Secondary Survey (Head-to-Toe)
- Detailed Patient History (AMPLE)
- Secondary Reevaluation Adjuncts
- Continuous Reassessment

Phase 3: Definitive Plan

- Advanced Reevaluation
- Definitive Specialty Care
- Early Transfer Process
- S-xABCDE-BAR handoff

The 10-Second Assessment Tool

How do you quickly assess a severely injured patient in just 10 seconds?

Ask the patient their name, and ask them what happened.

An appropriate, coherent verbal response immediately confirms:

A Patent Airway: Airway is intact, permitting air flow and phonation.

B Sufficient Reserve: Lungs are ventilating well enough to support complete spoken words.

C Sufficient Perfusion: Clear sensorium and coherent voice indicate brain perfusion.

D Clear Sensorium: GCS motor and verbal scores are intact.

The Modern xABCDE Sequence (11th Edition)

x eXtremity Hemorrhage: Control of catastrophic external bleeding using tourniquets, pressure dressings, or binders FIRST.

A Airway: Maintenance with Selective Spinal Motion Restriction (C-collar/manual inline stabilization).

B Breathing: Ventilation and oxygenation assessment, decompression of tension pneumothorax.

C Circulation: Identification of internal hemorrhage, administration of balanced blood component therapies.

D Disability: Quick Neurological Evaluation (Glasgow Coma Scale and pupillary response).

E Exposure & Environment: Fully undress the patient to find hidden injuries while maintaining absolute normothermia.

x & A — Catastrophic Hemorrhage & Airway Management

Core Priorities

Catastrophic Hemorrhage (x): Must be controlled before airway management if bleeding is immediately life-threatening.

Airway Protection (A): Clear airway of debris, optimize suctioning, implement jaw-thrust.

Spinal Care: Selective Spinal Motion Restriction. Rigid collars are contraindicated in penetrating neck injury.

RSI Pre-oxygenation: Always resuscitate hemodynamics and restore volume BEFORE rapid sequence intubation (RSI).

Pitfalls & Complications

Occult Airway Injury: Progressive swelling or tracheal tear might seal temporarily, then close suddenly.

Progressive Loss of Airway: Constant monitoring required; visual parameters can deteriorate in seconds.

Equipment Failure: Ensure functioning backups for suction, laryngoscopes, and ventilators.

Inability to Intubate: Have a pre-planned rescue airway strategy (e.g., surgical cricothyroidotomy).

B — Breathing and Ventilation

Objective Assessment

Respiratory Rate: Evaluate for tachypnea or shallow effort.

Chest Movement: Inspect for symmetry and paradoxical flail chest segment.

Air Entry: Auscultate bilaterally to ensure equal ventilation.

Oxygen Saturation: Monitor pulse oximeter continuously.

Immediate Interventions: High-flow oxygen, needle/finger thoracostomy for tension pneumothorax.

Clinical Pitfalls

Airway vs. Ventilation: Mistaking a mechanical ventilatory issue for a primary airway obstruction.

Iatrogenic Complications: Inducing tension pneumothorax during positive pressure ventilation.

Incomplete Decompression: Relying on needle decompression without following up with finger/tube thoracostomy.

C — Circulation and Hemorrhage Control

Perfusion Assessment

Level of Consciousness: Reduced sensorium is often the first indicator of hypovolemic shock.

Skin Parameters: Assess for cold, pale, clammy, and mottled extremities.

Pulse: Tachycardia and thready radial character indicate poor stroke volume.

Treatment Strategy: Stop bleeding! Restore volume with balanced 1:1:1 blood component ratios or whole blood.

Pitfalls & Special Populations

Elderly Patients: Blunted tachycardic response due to cardiac pacemakers or beta-blocker medications.

Pediatric Patients: Maintain normal BP via intense vasoconstriction until up to 30% blood loss, followed by sudden crash.

Athletes: Physiological bradycardia masks initial volume loss.

Crystalloid Hazards: Giving large volumes (>1L) of saline/Ringer's triggers dilution coagulopathy.

D & E — Disability & Exposure

D — Disability Evaluation

GCS Score: Establish initial baseline parameters.

Pupils: Assess size, symmetry, and reaction to light.

Observe Deterioration: Actively watch for lateralizing neurological signs.

Caution: Hypoxia and hypotension must be corrected before assigning neurological deficits directly to brain injury.

E — Exposure & Environment

Exposure: Fully strip the patient's clothing to inspect every surface for occult wounds.

Prevent Hypothermia: Apply warm blankets, heat the room, and use warmed IV fluids.

Hypothermia Pitfall: Promotes trauma triad of death (hypothermia, coagulopathy, acidosis).

Log-Roll Caution: Maintain spinal protection at all times during back examinations.

Essential Clinical & Diagnostic Tools

Clinical Monitors

ABGs & Lactate: Assess base deficit and perfusion trends.

Catheters: Urinary/gastric catheters (unless contraindicated).

Urinary Output: Accurate marker of end-organ renal perfusion.

ECG: Identify dysrhythmias, PEA, or ischemia.

Vital Signs: Trended temperature, HR, and BP.

Pulse Oximetry & CO2: Continuous SpO2 and capnography monitoring.

Diagnostic Imaging

FAST (Focused Assessment with Sonography):

- Evaluates for free fluid in Morrison's pouch, splenorenal space, pelvic area, and pericardium.

DPL (Diagnostic Peritoneal Lavage):

- Useful in hemodynamically unstable patients if ultrasound is unavailable.

X-rays:

- Standard AP Chest and AP Pelvis radiographs in the resuscitation bay.

The Principle of Early Trauma Transfer

Key Rule: Do NOT delay transfer to obtain non-essential diagnostic tests (such as CT scans).

Transfer Parameters:

- Identify Needs Early: Recognize immediately when a patient's injury severity exceeds your hospital's resource capabilities.
- Resuscitate on Standby: Utilize any time spent waiting for the transport team to optimize physiology.
- Direct Communication: Ensure doctor-to-doctor transfer details are finalized via structured handover.

Definition and Initiation Criteria

What is the Secondary Survey?:

The secondary survey is a comprehensive, detailed head-to-toe clinical evaluation including a full medical history and repeat of all vital parameters.

When do I start the Secondary Survey?:

Only AFTER the primary survey is entirely completed.

Only AFTER the initial resuscitation of vital functions is successfully initiated.

Only AFTER the patient's xABCDE parameters have been fully reevaluated and stabilized.

Crucial Action: If the patient's physiology deteriorates at ANY point during the secondary survey, immediately halt the exam and return to the primary survey (xABCDE).

AMPLE History & Mechanisms of Injury

The AMPLE History

A Allergies: Document environmental or drug allergies.

M Medications: Focus on anticoagulants, antiplatelets, beta-blockers.

P Past Illnesses / Pregnancy: Underlying comorbidities, gestation.

L Last Meal: Solid or liquid intake timing.

E Events / Environment: Detailed scene mechanism.

Injury Mechanisms

Blunt Trauma: Crash velocity, seatbelt signs, airbag deployment, steering wheel deformation.

Penetrating Trauma: Weapon type, caliber, bullet trajectory, velocity.

Thermal/Chemical: Explosion, smoke inhalation, toxic exposure, closed space duration.

Detailed Head & Maxillofacial Examination

Clinical Evaluation

Scalp & Cranium: Palpate for lacerations, hematomas, or step-offs.

Eyes: Check visual acuity, pupillary size, and conjunctival hemorrhage.

Ears & Nose: Inspect for hemotympanum, rhinorrhea, or otorrhea (CSF leak).

Maxillofacial: Palpate bony landmarks for deformity or malocclusion.

Pitfalls & Complications

Cribiform Plate Fractures: Blind nasogastric tube insertion can lead to intracranial tube passage. Always use orogastric routes.

Occluded Auditory Canal: Debris/blood can mask basilar skull fractures.

Periorbital Edema: Severe swelling can prevent timely ophthalmological exams.

Neck, Chest & Abdomen Assessment

Neck (Soft Tissues): Inspect for jugular distension, tracheal deviation, and seatbelt marks.

- Clinical findings: Crepitus, hematoma, stridor, hoarseness, or arterial bruits.
- **Pitfall: Delayed signs of progressive airway swelling or carotid dissection.**

Chest Wall: Inspect, palpate, percuss, and auscultate the entire thoracic cage.

- Evaluate for: Rib fractures, flail segments, subcutaneous emphysema.

Abdominal Organs: Inspect for distension, ecchymosis, or penetrating wounds.

- Palpation: Evaluate for guarding, rebound tenderness, or rigidity.
- **Pitfall: Missed hollow viscus or retroperitoneal injuries on early exams.**

Pelvis, Perineum, Rectum & Vagina

Clinical Findings

Pelvic Instability: Unequal leg lengths, pain, rotation deformity.

Perineum: Check for scrotal hematomas, lacerations, or blood at meatus.

Rectum: Sphincter tone, pelvic fractures, high-riding prostate, or blood.

Vagina: Complex lacerations, active hemorrhage, or bone fragments.

Pelvic Pitfalls

Underestimating Pelvic Bleeding: Fractures can sequester massive, life-threatening blood volumes in the retroperitoneal space.

Excessive Manipulation: Repeatedly rocking or compressing an unstable pelvis can disrupt clots.

Catheter Contraindications: Do not insert a Foley if blood is present at the meatus.

Extremities & Neurological Evaluations

Musculoskeletal Extremities: Inspect for deformities, open wounds, and contusions.

- Perfusion: Palpate all peripheral pulses and evaluate capillary refill.
- **Pitfalls: Missed fractures in obtunded patients, development of compartment syndrome.**

Neurological - Brain: Frequently reevaluate GCS score, pupil size, and reaction.

- **Core Action: Prevent secondary brain injury by avoiding hypoxia and hypotension.**

Neurological - Spinal Assessment: Complete motor, sensory, and reflex exams.

- Log-Roll: Carefully palpate the entire vertebral spine for focal tenderness or step-offs.
- **Pitfall: Patient is unable to cooperate with exam due to altered sensorium.**

Analgesia & Pain Management Principles

Pain Management in Trauma:

Relief of severe pain and anxiety is a key component of trauma care, but must be balanced carefully against hemodynamic stability.

1. Appropriate Administration: Administer analgesics intravenously for reliable absorption.
2. Careful Titration: Give small, repeated doses of short-acting agents (e.g., Fentanyl) to avoid sudden cardiovascular or respiratory depression.
- 3. Avoid Intramuscular Routes: Intramuscular injections have erratic, delayed absorption in patients with hypovolemia or shock.**
- 4. Mandatory Monitoring: Active physiological monitoring (continuous ECG, pulse oximetry, blood pressure) is essential during analgesia.**

Definitive Transfer & S-xABCDE-BAR handoff

Criteria for Widespread Transfer

Multisystem Trauma: Complex regional or multi-cavitary injuries.

Age Extremes / Comorbidities: Frail elderly, infants, severe cardiac disease.

Resource Discrepancies: Injuries that exceed local institutional capabilities.

Operational Action: Initiate early contact with the receiving facility.

S-xABCDE-BAR Communication

S Situation: Patient ID, age, and mechanism.

xABCDE: Present current physiologic status.

B Background: AMPLE history details.

A Assessment: Identified injuries and procedures.

R Recommendation: Specific tasks/needs during transport.

Case Resolution & Initial Assessment Summary

Case Resolution

- 1. Immediate xABCDE Evaluation:** Control any external bleeding. Support the airway while restricting spinal motion.
- 2. RSI Preparedness:** Optimize hemodynamics with balanced blood components BEFORE intubating.
- 3. Primary Survey Adjuncts:** Run chest/pelvis x-rays and bedside FAST scan.
- 4. Early Transfer:** Mobilize transfer teams early.

Summary of Chapter 1

Prioritize Physiology: Do not delay resuscitation to find anatomical injuries.

Follow xABCDE: Keep catastrophic external bleeding control as your absolute first step.

Continuous Reevaluation: Constantly repeat the primary survey to catch early deterioration.