

Adult Trauma – ROTATION SPECIFIC OBJECTIVES
Pediatric Emergency Medicine Subspecialty Residency - University of Calgary

At the completion of training, the resident will have acquired the following competencies and will function effectively as:

Medical Expert:

Principles

- Demonstrate concepts and principles of primary and secondary patient assessment
- Initiate primary and secondary management necessary within the first hour of emergency care for acute life-threatening emergencies
- Establish management priorities in a trauma situation
- Delineate the essential elements of patient transfer to another medical facility

Resuscitation and Stabilization

- Perform a thorough primary and secondary survey
- Match the four classes of hemorrhage with their clinical manifestations
- Identify crystalloid fluids useful in shock resuscitation
- Indicate colloid fluids and blood products used in the Emergency Department (ED) during shock resuscitation and be aware of importance of early use of blood products
- Describe massive transfusion protocol and be aware of its components
- Describe the application of tranexamic acid in trauma
- List the most serious immediate complications of blood use for both single-unit and massive transfusions (transfusion reactions)
- Describe the application of universal precautions against communicable and blood-borne disease

Mechanism of Injury

- Delineate characteristics of motor vehicle accidents (MVAs) and the victims themselves that most often prove fatal
- Describe the common injuries associated with the following:
 - head on (belted versus unbelted)
 - lateral impact
 - rear impact seat belt injuries
 - airbag injuries
 - pedestrian/bumper injuries
 - fall from a height

Ballistics

- Describe how bullet characteristics (velocity, fragmentation, deformation, yaw) cause tissue damage
- Explain how body tissue type affects the extent of injury potential of the bullet

Airway

- State the indications for intubation
- Define rapid sequence intubation (RSI)
- Describe RSI (including medications and doses) for the following situations:
 - head trauma
 - hypovolemic patient
- Demonstrate the proper technique for orotracheal intubation using in-line C-spine stabilization
- Describe alternative techniques for airway maintenance
- Demonstrate the proper technique for establishing a surgical airway (cricothyroidotomy), including its indication, contraindications and complications.
- Be familiar with advanced airway devices used in the prehospital care system
- Describe the ventilator settings that must be adjusted post-intubation, and how they affect the patient's cardiorespiratory and neurological status

C-Spine Trauma

- Using a radiograph, demonstrate the normal anatomy of the C-spine
- Describe an acceptable approach to the interpretation of a C-spine radiograph
- Demonstrate an acceptable method for immobilization of the C-spine
- Describe how to clinically assess a C-spine
- Describe how to "clear" a C-spine, radiographically and clinically
- Describe the role of flexion/extension, oblique views, and CT of the neck
- Describe the following C-spine injuries:
 - Atlanto-occipital dislocation
 - Jefferson fracture
 - Hangman's fracture
 - Odontoid fracture (3 types)
 - Facet joint dislocation (unilateral, bilateral)
 - Clay Shoveler's fracture
- Describe how RSI must be modified for (potential) C-spine injured patients

Head Trauma

- Define and calculate the Glasgow Coma Scale (GCS)
- Explain the traumatic mechanisms by which acute epidural hematomas; acute, subacute, and chronic subdural hematoma; subarachnoid hemorrhages, and intraparenchymal hemorrhages are formed, and differentiate the CT findings of each
- List three herniating syndromes and explain the pathophysiology
- Institute initial management in a patient with increased intracranial pressure (ICP) secondary to an intracranial hematoma
- Describe your approach to RSI in the head injured patient
- Discuss the indications for plain skull x-rays in head injuries:
 - blunt injuries
 - penetrating injuries
- Discuss the indications for CT scan in minor head trauma
- Describe the clinical and radiographic features of linear, depressed, and basal skull fractures

Chest Trauma

- Tension Pneumothorax
 - Describe the physical findings of a tension pneumothorax
 - Demonstrate the technique for the immediate treatment of a tension pneumothorax
- Flail chest:
 - Define and describe its presentation and management
- Open pneumothorax:
 - Describe its presentation and management
- Chest tube insertion:
 - Demonstrate the proper technique for insertion
- Cardiac Tamponade:
 - Describe the physical findings, including Beck's triad, pulsus paradoxus, and electrical alternans
 - Demonstrate the proper technique in performing a pericardiocentesis, its indications, contraindications, and complications
- Aortic transection:
 - List radiographic features associated with a tear of the thoracic aorta
 - Discuss the diagnostic modalities (angiography, CT, transesophageal (TE) echography); define the gold standard and current trends
- Myocardial contusion:
 - Outline a rational approach to diagnosis and management of suspected myocardial contusion
- Pulmonary contusion:
 - Define pulmonary contusion, compare clinical and radiographic findings in pulmonary contusion and adult respiratory distress syndrome (ARDS), and discuss management
- Penetrating Chest Trauma
 - Develop a management strategy depending on site (central vs. peripheral, upper versus lower)
 - Outline the approach to asymptomatic penetrating trauma of the chest with a negative chest radiograph (CXR)
- Demonstrate the use of ultrasound to diagnose pneumothorax, pericardial effusion
- Discuss the indications for emergency thoracotomy in the Emergency Department

Abdominal Trauma

- List the most commonly injured organs, blunt vs. penetrating, adult vs. pediatric
- Delineate the injuries and the mechanisms associated with the use of seat-belts (lap and lap-shoulder)
- State the diagnostic utility of each of the following tests following blunt and penetrating trauma:
 - Physical examination
 - FAST
 - CT
 - Abdominal ultrasound
- Penetrating abdominal trauma:
 - Classify the abdomen, including flank and back, into anatomic regions and list the potential injuries associated with each region
 - Select the indications for exploratory laparotomy following stab and gunshot wounds of the abdomen

Pelvic Fractures

- Define an unstable pelvis
- Describe how to assess the pelvis for stability
- Demonstrate how to apply a pelvic binder
- Delineate the indications and contraindications of the following therapeutic interventions for hemorrhage secondary to pelvic fracture:
 - Angiographic embolization
 - External skeletal fixation/C-clamp
- Describe the complications of pelvic fractures and the mechanism of shock associated with these fractures

Spinal Cord Injuries

- Define a complete cord injury
- Match the clinical and pathological findings of each of the following incomplete cord injuries:
 - Brown-Séquard syndrome
 - Central cord syndrome
 - Anterior cord syndrome
- Identify dermatomes to determine the level of cord injury
- Outline the diagnosis and management of spinal shock versus neurogenic shock
- Delineate the indications and contraindications for spine immobilization and an acceptable method to do so

Procedures

- Demonstrate proficiency and describe the indications for the following:
 - Finger thoracostomy for emergent pneumothorax decompression
 - Tube thoracostomy
 - Vascular access
 - Trauma-specific ultrasonography
- Describe the technique for the following procedures:
 - ED thoracotomy
 - Cricothyroidotomy/tracheotomy

Communicator:

- The fellow should be able to establish therapeutic relationships with trauma patients/families
- The fellow should be able to obtain and synthesize relevant history from patients/families/pre-hospital care providers
- The fellow should understand the importance of listening effectively
- The fellow should discuss appropriate information with patients/families and the health care team

Collaborator:

- Consult effectively with other physicians and health care professionals
- Contribute effectively to other interdisciplinary team activities

Leader:

- Recognize when to make the decision to terminate resuscitative efforts
- Effectively and efficiently plan the disposition of trauma patients beyond care in the ED
- Utilize resources effectively to balance patient care, learning needs, and outside activities
- Utilize information technology to optimize patient care, life-long learning and other activities
- Understand the roles of the trauma team members

Health Advocate:

- Identify the important determinants of health affecting trauma patients
- Contribute effectively to improved health of patients and communities, for example
- Understand various approaches to health care advocacy and policy change
- Recognize and respond to those issues where advocacy is appropriate

Scholar:

- Develop, implement and monitor a personal continuing education strategy
- Critically appraise sources of medical information
- Facilitate learning of patients, medical trainees/students and other health professionals
- Contribute to development of new knowledge

Professional:

- Deliver highest quality care with integrity, honesty and compassion
- Exhibit appropriate personal and interpersonal professional behaviors
- Practice medicine ethically consistent with obligations of a physician