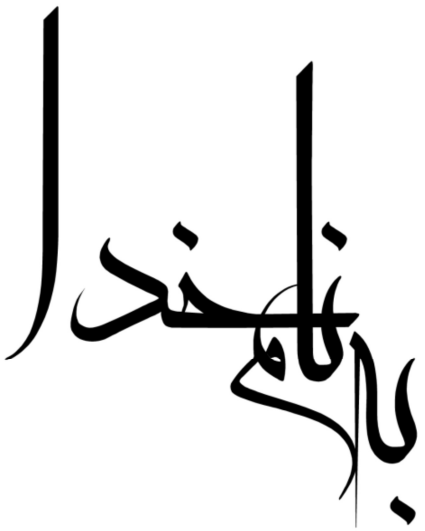

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مقدمه ناشر

سپاس و ستایش شایستهٔ پروردگاری که کرامتش نامحدود و رحمتش بی‌پایان است. اوست که بشر را دانش بیاموخت و با قلم آشنا کرد. به انسان رخصت آن داد که علم را به خدمت گیرد و با قلم خود و رسم خطوط گویا آن را به دیگران نیز بیاموزد.

خدایا از شاکران درگاهت و حقیقت‌جویان راهت قرارم ده و یاری‌ام کن تا در آموختن نلغزم و آن‌چه را آموختم، به شایستگی عرضه کنم.

رزیدنت‌یار، حامی و پیشرو در نظام کمک آموزشی پزشکی کشور به سبک نوین و مطابق با آخرین پیشرفت‌های آموزشی در حیطه پزشکی با کادری مجرب و آشنا طی ۱۸ سال گذشته از منظر متخصصین همواره بهترین محصولات را ارائه و در دسترس مخاطبین خود قرار داده است.

اثر پیش رو با توجه به محتوی بسیار غنی در مباحث ارتوپدی گردآوری شده و با استفاده از مفهومی نمودن مباحث و روان‌سازی توسط مؤلف محترم از منابع و رفرنس بوده و در روال گذر از گروه کنترل کیفیت رزیدنت‌یار با جمعی از اساتید رتبه A را به خود اختصاص داده است، امید است با مطالعه تمام مباحث پیش رو با یاری خداوند متعال پیروز و پایدار باشید.

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فهرست مطالب

فصل ۱۷
Section 17

Trauma

TRAUMA

✓ **PART I:** ***Overview & History • Trauma Systems • Injury Scoring • Prehospital Care***

I. OVERVIEW & HISTORY OF TRAUMA CARE

1. Trauma as a Surgical Discipline

- Trauma care has evolved through **war-driven innovation**, civilian system development, and structured surgical training.
- Modern trauma care integrates **resuscitation, systems design, critical care, and operative management**.

2. Historical Milestones (War-Driven Advances)

French & Indian War

- Wound contraction, granulation, epithelialization described.

American Revolutionary War

- Centralization of medical care
- First medical school established

Civil War

- Primary amputation
- Topical antiseptics
- Whole blood transfusion
- Traction splinting

World War I

- Laparotomy for penetrating abdominal trauma
- Debridement + delayed closure
- Early plasma/crystalloid
- First blood bank

World War II

- Guillotine amputation + delayed closure
- Exteriorization of colon injuries
- Mobile surgical teams
- Organ dysfunction described

Korean War

- Vascular repair for limb salvage
- Shock recognition
- MASH units

Vietnam War

- Aeromedical evacuation
- Sulfamylon for burns
- ARDS (“Da Nang lung”) recognized

Iraq/Afghanistan

- Damage control resuscitation
- Tourniquet resurgence
- Highly efficient trauma systems

II. TRAUMA SYSTEMS

1. Goal

Right patient → right place → right time.

2. Inclusive Trauma System

- Uses **all hospitals** in a region, not just Level I centers.
- Matches patient severity to facility capability.
- Reduces resource waste and improves outcomes.

Facility Roles

- Minor injuries → community hospitals
- Moderate injuries → Level III/IV
- Severe injuries → Level II
- Most severe → Level I

3. Components of a Comprehensive Trauma System

- Injury prevention
- Prehospital care
- Triage protocols
- Communication
- Transport
- Acute care facilities
- Trauma center designation/verification
- Rehabilitation
- Performance improvement
- Education/outreach
- Legislation

4. Landmark Reports

- **1966: "Accidental Death and Disability"** → birth of modern trauma systems
- **1985: "Injury in America"** → national public health framing
- **1990: Trauma Care Systems Planning Act**
- **2006: Model Trauma System Planning & Evaluation**

5. Evidence for Trauma Systems

NSCOT (2006)

- Trauma center care → **%20 reduction in in-hospital mortality**, **%25 reduction in 1-year mortality**.

Nathens et al. (1979–1995)

- Trauma system implementation → **%8 mortality reduction**.

III. INJURY SCORING

1. Abbreviated Injury Scale (AIS)

- Anatomic scoring system
- Six-digit code: region + structure + injury detail
- Severity "post-dot" code:
  - 1 = minor
  - 2 = moderate
  - 3 = serious
  - 4 = severe
  - 5 = critical
  - 6 = unsurvivable

AIS Regions

1. Head
2. Face
3. Neck
4. Thorax
5. Abdomen
6. Spine
7. Upper extremity
8. Lower extremity
9. Unspecified

---

2. Injury Severity Score (ISS)

- Sum of squares of highest AIS scores in **three most injured regions**
- Range: 1–75
- Categories:
  - <9 = minor
  - 9–16 = moderate
  - 16–25 = serious
  - 25 = severe

---

3. Organ Injury Scale (OIS)

- AAST grading system
- Incorporated into AIS
- Provides detailed anatomic severity for each organ
- Validated with NTDB

---

4. Physiologic Scoring Systems

A. Glasgow Coma Scale (GCS)

- Eye (1–4)
- Verbal (1–5)
- Motor (1–6)
- Total: 3–15
- Motor score alone strongly predicts TBI outcomes.

B. Revised Trauma Score (RTS)

- GCS
- Systolic BP
- Respiratory rate
- Range: 0–12
- Used for triage and research

IV. PREHOSPITAL TRAUMA CARE

1. Goals

- Rapid assessment
- Immediate life-saving interventions
- Quick transport to appropriate facility
- Minimize scene time (<15 minutes)

2. Four Priorities

1. Scene evaluation
2. Initial assessment (ABCs)
3. Triage & transport decision
4. Critical interventions + transport

---

3. Airway Management

- RSI/DAI commonly used
- Always assume cervical spine injury
- Evidence mixed:
  - Some studies show ↑ mortality with prehospital intubation
  - Others show benefit in severe TBI
- Key principle: **don't delay transport for airway attempts**

---

4. Hemorrhage Control

- Tourniquets (military → civilian adoption)
- Direct pressure
- Hemostatic dressings
- Junctional tourniquets for groin/axilla

---

5. Field Triage Decision Scheme (CDC)

Four steps:

Step 1: Physiologic

- GCS ≤13
- SBP <90
- RR <10 or >29 (or <20 in infants)

Step 2: Anatomic

- Penetrating injuries (head/neck/torso/proximal extremities)
- Flail chest
- ≥2 long-bone fractures
- Crushed/degloved/pulseless extremity
- Amputation proximal to wrist/ankle
- Pelvic fractures
- Open/depressed skull fracture
- Paralysis

Step 3: Mechanism

- Falls
- High-risk MVC
- Ejection
- Death in same compartment
- Auto vs pedestrian/bicyclist
- Motorcycle crash >20 mph

Step 4: Special Considerations

- Age >55
- Children
- Anticoagulation
- Burns
- Pregnancy >20 weeks
- EMS judgment

V. PEARLS (PART I)

- Trauma systems save lives — up to **%25 mortality reduction**.
- Inclusive trauma systems use **all hospitals**, not just Level I centers.
- AIS is anatomic; ISS = sum of squares of top 3 AIS regions.

- GCS motor score is the strongest predictor of TBI outcome.
- Prehospital intubation is controversial; **don't delay transport**.
- Tourniquets are safe and life-saving; now standard in civilian EMS.
- Field triage uses **physiology → anatomy → mechanism → special factors**.
- Scene time should be **<15 minutes** ("load and go").
- Early hemorrhage control is the most important prehospital intervention.

✓ **PART II: *Initial Assessment • ABCDE • Shock • Early Resuscitation • Damage Control***

VI. INITIAL ASSESSMENT & MANAGEMENT (ATLS FRAMEWORK)

Trauma care begins with a **structured, prioritized, life-saving sequence**.
The goal is to **identify and treat immediate threats to life** before anything else.

---

1. Primary Survey — ABCDE

A. Airway with Cervical Spine Protection

- Assess patency: speech, stridor, gurgling, obstruction
- Protect C-spine in all trauma patients
- Indications for immediate airway:
  - GCS ≤8
  - Facial trauma
  - Airway burns
  - Expanding neck hematoma
  - Vomiting with altered mental status
- Preferred method: **rapid-sequence intubation (RSI)**
- Surgical airway if:
  - Failed intubation
  - Massive facial trauma
  - Laryngeal disruption

B. Breathing & Ventilation

- Inspect, palpate, percuss, auscultate
- Identify and treat:
  - Tension pneumothorax
  - Open pneumothorax
  - Massive hemothorax
  - Flail chest
  - Pulmonary contusion
- Interventions:
  - Needle decompression
  - Tube thoracostomy
  - Oxygenation/ventilation support

C. Circulation with Hemorrhage Control

- Hemorrhage is the **#1 preventable cause of death**
- Assess:
  - Pulses
  - Skin perfusion
  - Mental status
  - Blood pressure
- Control external bleeding:
  - Direct pressure
  - Tourniquets
  - Hemostatic dressings
- Establish IV/IO access
- Initiate **balanced resuscitation** (see below)

D. Disability (Neurologic Status)

- GCS
- Pupils
- Lateralizing signs
- Consider hypoxia/hypotension as causes of altered mental status

E. Exposure & Environmental Control

- Fully expose patient
- Prevent hypothermia:
  - Warm blankets
  - Warm fluids
  - Warm environment

VII. RESUSCITATION PRINCIPLES

1. Shock Recognition

Shock = inadequate tissue perfusion.

Types of Shock in Trauma

- **Hypovolemic (hemorrhagic)** — most common
- **Obstructive** — tension pneumothorax, tamponade
- **Cardiogenic** — blunt cardiac injury
- **Neurogenic** — spinal cord injury (warm, hypotensive, bradycardic)

2. Hemorrhagic Shock Classification (ATLS)

Class	Blood Loss	HR	BP	UOP	Mental Status
I	<15 %	<100	NL	Normal	Mild anxiety
II	15–%30	100–120	NL	20–30 mL/hr	Anxious
III	30–%40	120–140	↓	5–15 mL/hr	Confused
IV	>40 %	>140	↓	Negligible	Lethargic

---

3. Early Resuscitation Strategy

Modern trauma resuscitation = **Damage Control Resuscitation (DCR)**

Key Components

- **Permissive hypotension** (SBP 80–90) until hemorrhage control
- **Minimize crystalloids**
- **Early balanced blood products** (1:1:1 PRBC: FFP: platelets)
- **TXA within 3 hours** (1 g bolus → 1 g infusion)
- **Prevent hypothermia, acidosis, coagulopathy** (lethal triad)

VIII. DAMAGE CONTROL PRINCIPLES

Damage control = **stop the bleeding, stop the contamination, get out**.

1. Indications for Damage Control Surgery

- Profound acidosis (pH <7.2)
- Hypothermia (<35°C)
- Coagulopathy
- Massive transfusion
- Inability to achieve hemostasis quickly
- Time-sensitive multisystem injuries

---

2. Damage Control Stages

Stage 1: Damage Control Surgery

- Rapid control of hemorrhage
- Control contamination
- Temporary abdominal closure
- Avoid definitive repairs

Stage 2: ICU Resuscitation

- Correct acidosis
- Warm patient
- Normalize coagulation
- Optimize hemodynamics

Stage 3: Definitive Surgery

- Return to OR once physiology restored
- Definitive repair of injuries
- Formal abdominal closure

IX. SECONDARY SURVEY

Performed **after** primary survey and resuscitation.

Components

- Full head-to-toe exam
- Complete history (AMPLE):
  - Allergies
  - Medications
    - Past medical history
    - Last meal
    - Events of injury
- Imaging:
    - FAST exam
    - Chest/pelvis X-ray
    - CT scan (if stable)

X. PEARLS (PART II)

- Airway + C-spine protection is always first.
- GCS ≤8 → intubate.
- Tension pneumothorax = clinical diagnosis → treat immediately.
- Hemorrhage is the most preventable cause of trauma death.
- Balanced resuscitation (1:1:1) improves survival.
- Permissive hypotension until hemorrhage control (except TBI).
- TXA must be given within 3 hours.
- Hypothermia, acidosis, coagulopathy = lethal triad.
- Damage control surgery is about **physiology, not anatomy**.
- Secondary survey only after ABCs and resuscitation are complete.

✓ **PART III:** ***Airway • Breathing • Chest Trauma • Circulation • Hemorrhage Control • Shock Physiology***

XIII. AIRWAY MANAGEMENT

Airway is the first priority because **hypoxia kills faster than hemorrhage**.

1. Indications for Immediate Airway Control

- GCS ≤8
- Facial trauma obstructing airway
- Expanding neck hematoma
- Airway burns / inhalation injury
- Vomiting with altered mental status
- Severe maxillofacial fractures
- Impending airway compromise

2. Rapid-Sequence Intubation (RSI)

- Preoxygenation
- Induction agent (etomidate, ketamine)
- Paralytic (succinylcholine or rocuronium)
- Cricoid pressure no longer routinely recommended
- Always maintain C-spine protection

3. Difficult Airway Indicators

- Massive facial trauma
- Blood/vomit in airway
- Limited mouth opening
- Neck hematoma
- Laryngeal trauma

4. Surgical Airway

- Indications:
  - Failed intubation
  - Massive facial trauma
  - Laryngeal disruption
- Cricothyrotomy preferred in emergency

XIV. BREATHING & CHEST TRAUMA

Breathing problems kill quickly; many are **clinical diagnoses** requiring **immediate treatment**.

---

1. Tension Pneumothorax
Diagnosis (clinical)

- Hypotension
- Distended neck veins
- Absent breath sounds
- Tracheal deviation (late)
- Respiratory distress

Treatment

- Immediate needle decompression
- Follow with chest tube

---

2. Open Pneumothorax ("Sucking Chest Wound")
Treatment

- Three-sided occlusive dressing
- Chest tube away from wound
- Definitive closure in OR

---

3. Massive Hemothorax
Definition

- 1500 mL immediate output
- or >200 mL/hr for 3 hours

Treatment

- Chest tube
- Volume resuscitation
- Thoracotomy if ongoing bleeding

---

4. Flail Chest
Definition

- ≥3 consecutive ribs fractured in ≥2 places

Management

- Pain control (epidural, blocks)
- Pulmonary hygiene
- Positive pressure ventilation if needed
- Surgical rib fixation in select cases

---

5. Pulmonary Contusion
Management

- Avoid fluid overload
- Oxygenation
- Pain control
- Ventilatory support if needed

XV. CIRCULATION & HEMORRHAGE CONTROL

Hemorrhage is the **leading preventable cause of trauma death**.

---

1. External Hemorrhage

- Direct pressure
- Tourniquets (limbs)
- Hemostatic dressings
- Junctional tourniquets (groin/axilla)

2. Internal Hemorrhage; Sources (5 Cavities)

- Chest
- Abdomen
- Pelvis
- Retroperitoneum
- Long bones

---

3. FAST Exam

- Pericardial view
- RUQ (Morrison's pouch)
- LUQ
- Pelvis (pouch of Douglas)

Positive FAST + hypotension → **immediate OR**.

---

4. Pelvic Fracture Hemorrhage
Management

- Pelvic binder (over greater trochanters)
- Massive transfusion protocol
- Angioembolization

- Preperitoneal packing

---

5. Massive Transfusion Protocol (MTP)

Balanced Resuscitation

- 1:1:1 PRBC: FFP: Platelets
- Early TXA (within 3 hours)
- Minimize crystalloids
- Warm all fluids

XVI. SHOCK PHYSIOLOGY

Shock = **oxygen delivery < oxygen demand**.

---

1. Hemorrhagic Shock

- Most common in trauma
- Tachycardia is earliest sign
- Hypotension is late

Lethal Triad

- Hypothermia
- Acidosis
- Coagulopathy

Management

- Stop bleeding
- Balanced transfusion
- Permissive hypotension (SBP 80–90)
- Avoid in TBI (maintain SBP >100–110)

---

2. Obstructive Shock

Causes

- Tension pneumothorax
- Cardiac tamponade
- Massive PE (rare in early trauma)

Management

- Decompress chest
- Pericardiocentesis or thoracotomy

---

3. Cardiogenic Shock

Causes

- Blunt cardiac injury
- MI (rare in trauma)
- Cardiac contusion

Management

- Inotropes
- Avoid fluid overload
- Treat arrhythmias

---

4. Neurogenic Shock

Cause

- Spinal cord injury above T6

Clinical

- Hypotension
- **Bradycardia**
- Warm, flushed skin

Management

- Fluids
- Vasopressors (norepinephrine)
- Maintain MAP 85–90 for spinal perfusion

XVII. EARLY INTERVENTIONS & PRIORITIES

1. Control Catastrophic Hemorrhage First (MARCH Protocol)

- Massive hemorrhage
- Airway
- Respiration
- Circulation
- Hypothermia/Head injury

2. Early Imaging

- FAST
- Chest/pelvis X-ray
- CT scan if stable

3. Early Antibiotics

- Open fractures
- Penetrating abdominal trauma
- Open chest wounds

4. Early Tetanus Prophylaxis

XVIII. PEARLS (PART III)

- GCS ≤8 → intubate.

- Tension pneumothorax is a **clinical diagnosis** — treat immediately.
- Massive hemothorax = >1500 mL immediate or >200 mL/hr × 3 hours.
- Pelvic binder goes over **greater trochanters**, not iliac crests.
- FAST positive + hypotension = OR.
- Permissive hypotension except in TBI.
- TXA must be given within 3 hours.
- Neurogenic shock = hypotension + **bradycardia**.
- Flail chest requires aggressive pain control and pulmonary hygiene.
- Pulmonary contusion worsens over 24–48 hours.

✓ **PART IV: *Head Trauma • Spinal Cord Injury • Maxillofacial Trauma • Neck Trauma***

XIX. HEAD TRAUMA (TBI)

Traumatic brain injury is one of the most time-sensitive and outcome-defining injuries in trauma care.

---

1. Primary vs Secondary Brain Injury

- **Primary injury**: occurs at moment of impact
- **Secondary injury**: hypotension, hypoxia, edema, ICP elevation
- Prevention of secondary injury is the main goal of early management

---

2. Initial Assessment

- GCS
- Pupils
- Lateralizing signs
- Airway protection (GCS ≤8)
- Avoid hypotension (SBP >100–110)
- Avoid hypoxia(SpO> %95)

3. Imaging

- **Non-contrast CT head** is the gold standard
- Repeat CT if:
  - Neurologic decline
  - Anticoagulated patient
  - Large initial bleed

---

4. Types of Intracranial Hemorrhage

A. Epidural Hematoma

- Middle meningeal artery injury
- Classic: lucid interval → rapid decline
- Biconvex (lenticular) on CT
- Requires emergent craniotomy

B. Subdural Hematoma

- Bridging veins
- Crescent-shaped on CT
- More common in elderly
- Surgical evacuation if:
  - Thickness >10 mm
  - Midline shift >5 mm
  - Neurologic decline

C. Subarachnoid Hemorrhage

- Trauma or aneurysm
- Risk of vasospasm
- Manage ICP, BP control

D. Intraparenchymal Hemorrhage

- Contusions common in frontal/temporal lobes
- Risk of expansion in first 24 hours

---

5. ICP Management

- Elevate head of bed
- Sedation
- Hyperosmolar therapy (mannitol or hypertonic saline)
- Maintain normocapnia
- Avoid hypotension
- Neurosurgical consultation

6. Seizure Prophylaxis

- Indicated for severe TBI
- Levetiracetam or phenytoin for 7 days

XX. SPINAL CORD INJURY (SCI)

1. Initial Priorities

- Airway with C-spine protection
- Immobilization
- Avoid hypotension (MAP 85–90 for 7 days)

---

2. Neurogenic Shock

- Hypotension + **bradycardia**
- Warm, flushed skin
- Caused by loss of sympathetic tone

Management

- Fluids
- Vasopressors (norepinephrine preferred)
- Atropine for bradycardia

---

3. Spinal Shock

- Temporary loss of reflexes
- Return of bulbocavernosus reflex marks end of spinal shock

---

4. Imaging

- CT spine for all suspected injuries
- MRI for:
  - Neurologic deficits
  - Ligamentous injury
  - Cord compression

---

5. Complete vs Incomplete SCI

- **Complete**: no motor/sensory function below injury
- **Incomplete**: some preserved function
- Prognosis significantly better in incomplete injuries

6. Key Spinal Cord Syndromes

- **Central cord**: upper > lower extremity weakness
- **Anterior cord**: motor + pain/temp loss; preserved proprioception
- **Brown-Sequard**: ipsilateral motor loss + contralateral pain/temp loss
- **Posterior cord**: loss of proprioception

XXI. MAXILLOFACIAL TRAUMA

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1. Airway Risk

- Midface fractures
- Mandibular fractures
- Bleeding
- Swelling
- Vomiting

Airway Principles

- Early intubation if airway threatened
- Avoid nasotracheal intubation in:
  - Cribriform plate fractures
  - Midface fractures

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2. Le Fort Fractures

Le Fort I

- Horizontal maxillary fracture
- Mobile upper alveolar ridge

Le Fort II

- Pyramidal fracture
- Nasal bridge + maxilla

Le Fort III

- Craniofacial dissociation
- Entire midface mobile

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3. Mandibular Fractures

- Malocclusion
- Trismus
- Step-off deformity
- Airway risk if bilateral

4. Orbital Blowout Fractures

- Diplopia
- Infraorbital nerve injury
- Enophthalmos
- CT orbit for evaluation

XXII. NECK TRAUMA

Neck trauma is divided into **blunt** and **penetrating** injuries.

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1. Zones of the Neck

- **Zone I**: clavicles → cricoid
- **Zone II**: cricoid → angle of mandible
- **Zone III**: angle of mandible → skull base

2. Hard Signs of Vascular/Aerodigestive Injury

These mandate **immediate operative exploration**:

- Expanding hematoma
- Pulsatile bleeding
- Shock unresponsive to fluids
- Air bubbling from wound
- Massive hemoptysis
- Cerebral ischemia
- Thrill/bruit
- Airway compromise

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3. Soft Signs

- Dysphagia
- Dysphonia
- Subcutaneous emphysema
- Minor bleeding
- Stable hematoma

Soft signs → CT angiography.

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4. Blunt Cerebrovascular Injury (BCVI)

Risk Factors

- C-spine fractures
- Le Fort II/III fractures
- Basilar skull fractures
- Neck hyperextension/rotation

Diagnosis

- CT angiography

Management

- Antithrombotic therapy (heparin or antiplatelet)

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5. Penetrating Neck Trauma

Stable Patient

- CT angiography
- Endoscopy/esophagram if aerodigestive injury suspected

Unstable Patient

- Immediate OR

XXIII. PEARLS (PART IV)

- GCS ≤8 → intubate.
- Epidural hematoma = lucid interval → OR.
- Subdural hematoma = crescent-shaped; surgical if >10 mm or >5 mm shift.
- Avoid hypotension in TBI (SBP >100–110).
- Neurogenic shock = hypotension + **bradycardia**.
- MAP 85–90 for spinal cord perfusion.
- Le Fort fractures: I (maxilla), II (pyramidal), III (craniofacial dissociation).
- Nasotracheal intubation contraindicated in midface fractures.
- Hard signs of neck trauma → immediate OR.
- BCVI requires CT angiography and antithrombotic therapy.

✓ **PART V: Chest Trauma (Detailed), Abdominal Trauma, Pelvic Trauma, and Extremity Trauma.**

XXIV. CHEST TRAUMA

Chest trauma accounts for a major portion of preventable trauma deaths. Many injuries are **clinical diagnoses** requiring **immediate intervention**.

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1. Life-Threatening Chest Injuries (ATLS Big Six)

A. Tension Pneumothorax

- Clinical diagnosis
- Hypotension, distended neck veins, absent breath sounds
- Needle decompression → chest tube

B. Open Pneumothorax

- "Sucking chest wound"
- Three-sided occlusive dressing
- Chest tube away from wound

C. Massive Hemothorax

- 1500 mL immediate output
- OR >200 mL/hr × 3 hours
- Chest tube + resuscitation → thoracotomy if ongoing

D. Flail Chest

- ≥3 ribs fractured in ≥2 places
- Paradoxical motion
- Pain control, pulmonary hygiene, possible fixation

E. Cardiac Tamponade

- Beck's triad: hypotension, JVD, muffled heart sounds
- FAST pericardial view
- Pericardiocentesis → thoracotomy

F. Airway Obstruction

- Facial trauma, blood, vomit
- Immediate airway control

2. Other Important Chest Injuries

Pulmonary Contusion

- Worsens over 24–48 hours
- Avoid fluid overload
- Oxygenation, ventilation support

Rib Fractures

- Pain control
- Incentive spirometry
- Elderly patients at high risk for pneumonia

Blunt Cardiac Injury

- Arrhythmias, troponin elevation
- Continuous ECG monitoring
- Echo if unstable

Aortic Injury

- High-speed deceleration
- Widened mediastinum
- CT angiography
- TEVAR preferred

XXV. ABDOMINAL TRAUMA

Abdominal trauma is divided into **blunt** and **penetrating** mechanisms.

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1. Blunt Abdominal Trauma

FAST Exam

- RUQ, LUQ, pelvis, pericardium
- Positive FAST + hypotension → OR

CT scan

- Gold standard in stable patients
- Identifies solid organ injuries

Solid Organ Injuries (Liver, Spleen, Kidney)

- Nonoperative management preferred if:
  - Hemodynamically stable
  - No peritonitis
  - No other operative indications

Indications for Laparotomy

- Hemodynamic instability
- Peritonitis