ATLS

ADVANCED TRAUMA LIFE SUPPORT

AMERICAN COLLEGE OF SURGEONS

This lesson is based on ACS ATLS Course. However it has to be considered an introduction to ATLS Course

NINTH EDITION

Chapter 5

Committee on Trauma Presents

Abdominal and Pelvic Trauma

Chapter Statement

Unrecognized abdominal and pelvic injuries continue to be a cause of preventable death.

Case Scenario

- **35-year-old male passenger in high-speed motor vehicle collision**
- **Blood pressure: 105/80; Pulse: 110; respiratory rate: 18; GCS Score = 15**
- **Complaining of pain in chest, abdomen, and pelvis**

What injuries do you suspect,
and how would you manage this patient?

Case Scenario

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:	*Best response*	15
	Comatose client	8 or less
	Totally unresponsive	3

Objectives

1. Identify the key anatomic regions of the abdomen.
2. Recognize a patient at risk for abdominal and pelvic injuries based on the mechanism of injury.
3. Apply the appropriate diagnostic procedures.
4. Identify patients who require surgical consultation.
5. Describe the acute management of abdominal and pelvic injuries.

Case Scenario

- **Airway**
- **Breathing**
- **Circulation**
- **Disability**
- **Enviroment and exposure**
- **and move on to the abdominal evaluation**

External Landmarks

From the 4th intercostal space superiorly (often the transnipple line in men) to the inguinal ligament and symphysis pubis inferiorly

The flank area extends from the 6th intercostal space superior to the iliac wing inferiorly

The back area extends from the tip of the scapula superiorly to the iliac crest inferiorly, and between the posterior axillary lines

Anterior abdomen

Flank

Back

Mechanism of Injury

When should you suspect abdominal and pelvic injury?

Blunt

- Speed
- Point of impact
- Intrusion
- Safety devices
- Position
- Ejection

Penetrating

- Weapon
- Distance
- Number, location of wounds

Explosion

- Combined mechanism

Blunt Force Mechanism

Common Injuries

- Spleen 40-55%
- Liver 35-45%
- Small bowel 5-10%
- Pelvis
- Airbag deployment does not preclude injury

- Types of blunt force that cause the injuries?

Blunt Force Mechanism

Common Injuries

- (1) compression: direct blow to liver or blowout of the bowel;
- (2) crushing: direct blow to the epigastrium with crushing of the pancreas over the spine
- (3) shearing: inappropriate location of the lap belt contributing to bowel injury

Penetrating Mechanism

Any Organ at Risk

- Stab
- Low energy, lacerations
- Gunshot
- Ballistics
- Type of weapon
- Shrapnel
- Shotgun
  - Distance from target
  - Spread of projectiles
- Explosion / blast

Explosions

- This patient was on his way to work when he was injured by an intentionally placed explosive device. He was thrown 15 feet, sustaining multiple penetrating fragments to the limbs, abdomen and chest.
- He was treated with ABC care. Evaluation showed a right pneumothorax from fragments and intraabdominal bleeding from penetrating fragments
- Combination of mechanisms

Explosions

- ABCDE
- Combination mechanism
- Blunt
- Penetrating fragments (multiple)
- Blast

Consider proximity, enclosed space, multiple fragments, and secondary impacts (thrown or fall from height).

Assessment

How do I determine if there is an abdominal or pelvic injury?

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Physical Exam

- Inspection
- Auscultation
- Percussion
- Palpation
- Examination of pelvis and perineum

Adjuncts of Primary Survey

- Pelvic x-ray
- FAST
- DPL

Assessment

Factors that Compromise the Exam

- **Alcohol and other drugs**
- **Injury to brain, spinal cord**
- **Injury to ribs, spine, pelvis**

Caution

A missed abdominal injury can cause a preventable death.

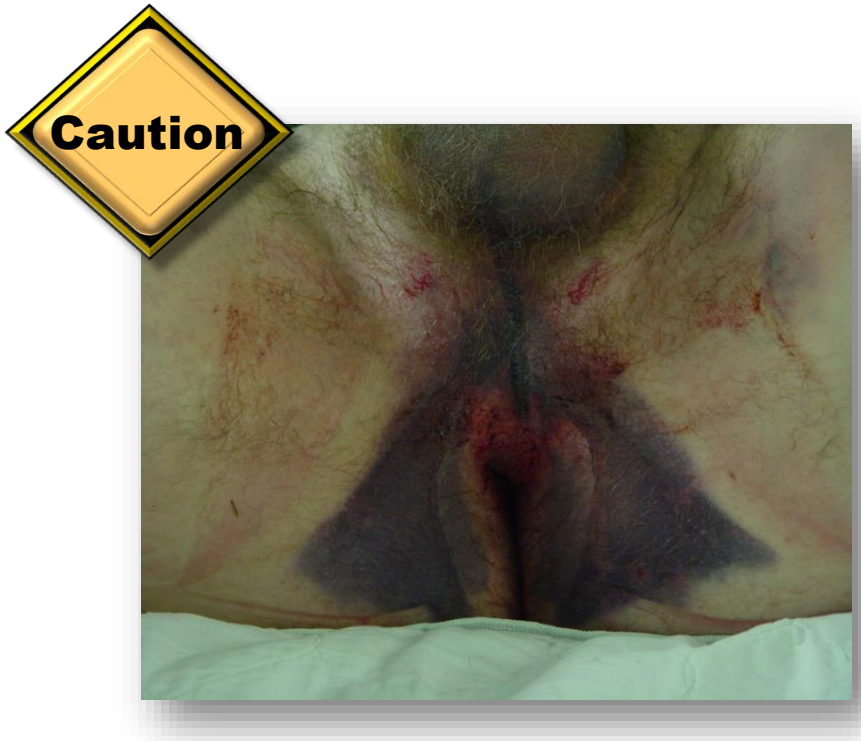
Pitfalls

Excessive or repeated testing of pelvic stability can be detrimental.

Adjuncts

Urinary Catheter

- Monitors urinary output
- Diagnostic
- Decompresses bladder before DPL
- Pelvic fracture patients are at high risk of bladder and urethral injury.
- Hematuria is diagnostic of injury.



Urethral Injury

A posterior urethral injury usually occurs in patients with multisystem injuries and pelvic fractures.

In contrast, an anterior urethral injury results from a straddle impact and can be an isolated injury.

Adjuncts

Gastric Tube

- **Relieves distention**
- **Decompresses stomach before DPL**

Basilar skull / facial fractures can induce vomiting / aspiration

Adjuncts

Blood and Urine Tests

- No mandatory blood tests before urgent laparotomy
- Hemodynamically abnormal
- Type and crossmatch
- Coagulation studies
- Pregnancy testing
- Alcohol or other drug testing
- Hematuria (gross versus microscopic)

Adjuncts

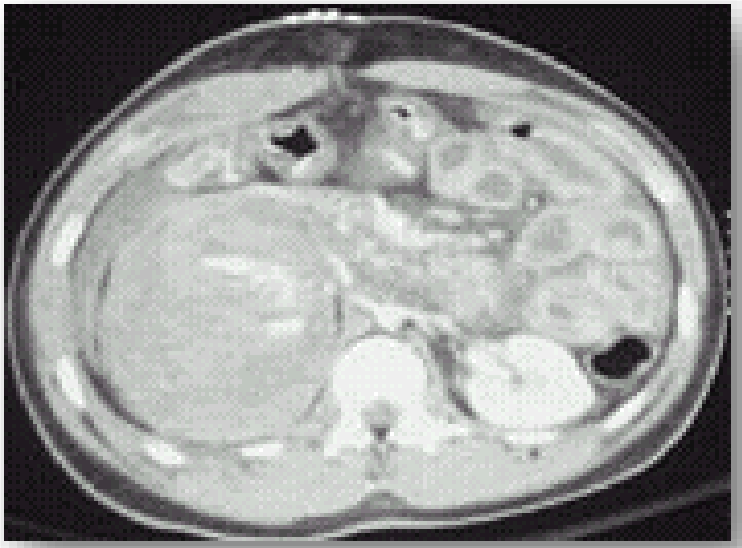
X-ray Studies

- **Blunt Trauma: AP chest and AP pelvis**
- **Penetrating Trauma: AP chest and abdomen with markers (if hemodynamically normal)**

Adjuncts

Contrast Studies

- Abdominal CT
- Urethrogram
- Cystogram
- IVP
- GI studies



Caution

Don't delay definitive care!

Diagnostic Studies – Blunt Trauma

TABLE 5-2 Comparison of DPL, Fast, and CT in Blunt Abdominal Trauma

	DPL	FAST	CT SCAN
Advantages	• Early diagnosis • Performed rapidly • 98% sensitive • Detects bowel injury • Transport: No	• Early diagnosis • Noninvasive • Performed rapidly • Repeatable • 86%–97% accurate • Transport: No	• Most specific for injury • Sensitive: 92%–98% accurate
Disadvantages	• Invasive • Specificity: Low • Misses injuries to diaphragm and retroperitoneum	• Operator-dependent • Bowel gas and subcutaneous air distortion • Misses diaphragm, bowel, and pancreatic injuries	• Cost and time • Misses diaphragm, bowel, and some pancreatic injuries • Transport: Required
Indications	• Unstable blunt trauma • Penetrating trauma	• Unstable blunt trauma	• Stable blunt trauma • Penetrating back/flank trauma

Diagnostic Studies – Blunt Trauma

FAST Exam- Primary Views or Windows

1. Subxiphoid
2. Right upper quadrant (RUQ)
3. Left upper quadrant (LUQ)
4. Suprapubic

Diagnostic Studies – Penetrating Trauma

Hemodynamically Normal Patients

Lower chest wounds

- Serial exams, thoracoscopy, laparoscopy, or CT scan

Anterior abdominal stab wounds

- Wound exploration, DPL, or serial exams

Back and flank stab wounds

- DPL, serial exams, or double- or triple-contrast CT scan

Laparotomy

Which patients warrant a laparotomy?

Laparotomy

Which patients warrant a laparotomy?

Indications for Laparotomy – Blunt Trauma

- **Hemodynamically abnormal with suspected abdominal injury**
- **Free air**
- **Diaphragmatic rupture**
- **Peritonitis**
- **Positive FAST, DPL, or CT**

Laparotomy

Which patients warrant a laparotomy?

Indications for Laparotomy – Penetrating Trauma

- Hemodynamically abnormal
- Free air
- Peritonitis
- Positive DPL, FAST, or CT
- Evisceration

Early operation is usually the best strategy for GSW

Pelvic Fractures

- A 45-year-old male was involved in a motorcycle crash at high speed. He had a pelvic fracture with disrupted bladder neck (urethrography) and multiple intraabdominal injuries
- A pelvic x-ray with extravasated urethral contrast is shown
- Association of pelvic fracture with significant abdominal injury
- Importance of the pelvis as a source of blood loss in hemorrhagic shock
- Sheet/wrap/pneumatic compression

Pelvic Fractures

Assessment of Pelvic Fractures

- **Inspection**
- **Limb-length discrepancy, external rotation**
- **Open or closed**
- **Palpation or pelvic ring, stability (that manual manipulation of the pelvis – only once - dislodge clots)**
- **Rectal / GU / vaginal exam**
- **Open or closed? Palpate prostate**

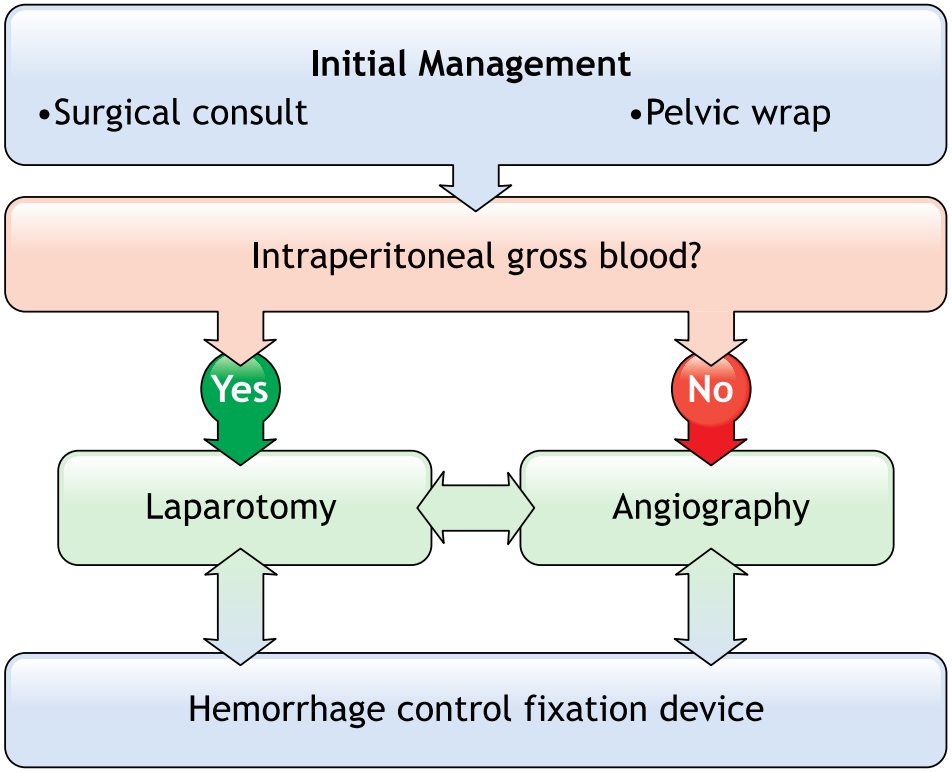
Pelvic Fractures

Management of Pelvic Fractures

- AB, as usual
- C: Control hemorrhage
  - Wrap / Binder
  - Rule out abdominal hemorrhage
  - Angiography, fixation
  - Pelvic packing

Pelvic Fractures

Hemodynamically Abnormal Patients



Pitfalls

Pitfalls

- Delayed intervention for abdominal or pelvic hemorrhage
- Occult intraabdominal / retroperitoneal injuries
- Back and flank wounds
- Repeated manipulation of a fractured pelvis
- Spinal cord injury / altered sensorium
- Improperly applied pelvic wrap
- Skin necrosis from pelvic wrap

Case Scenario

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Questions?

Summary

- Three distinct regions of the abdomen are the peritoneal cavity, the retroperitoneal space, and the pelvic cavity.
- Mechanism of injury determines the management of abdominal and pelvic injuries. Early surgical consultation is warranted with possible intraabdominal injuries.
- Appropriate diagnostic procedures are based on assessment and patient presentation.