

Abdominal Trauma

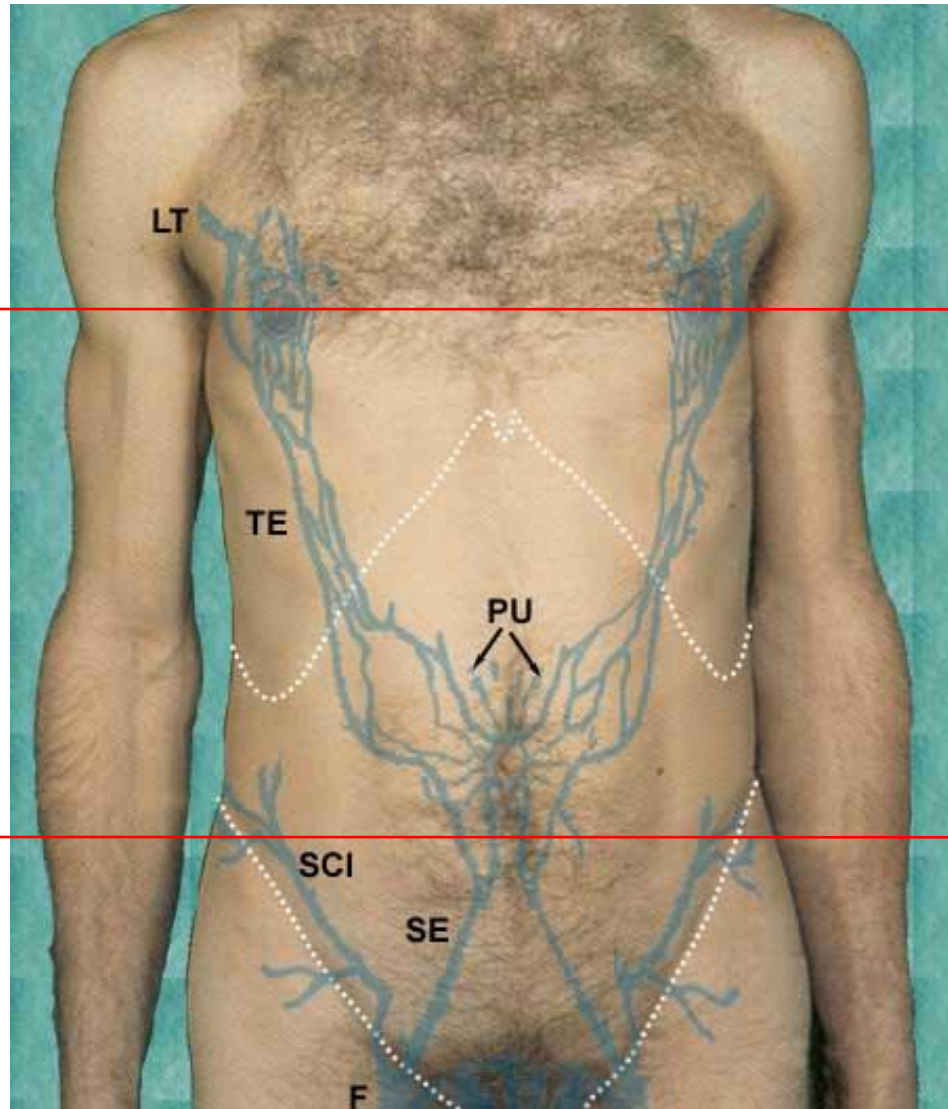


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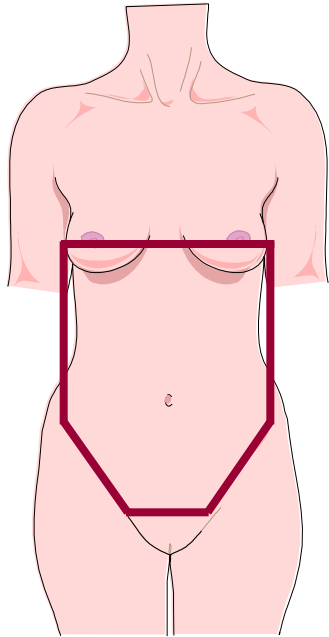
overview

- Quick review abdominal anatomy
- Review of mechanism of injury
- Review of investigation
- management

Anatomy of abdomen

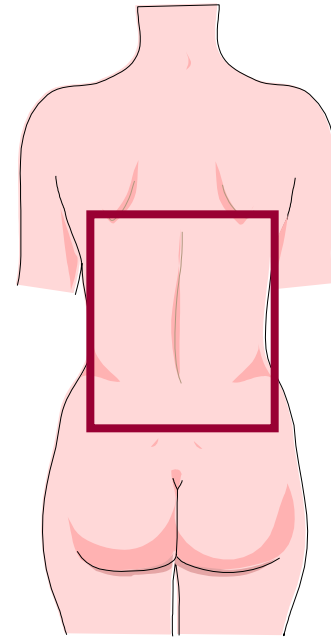
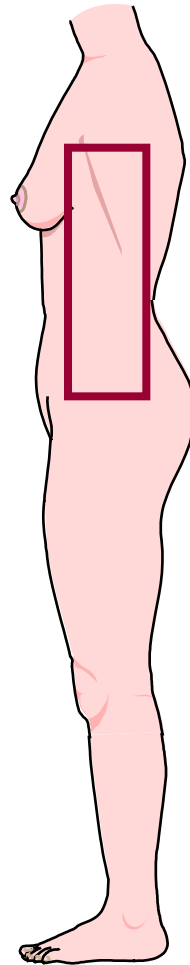


External Anatomy



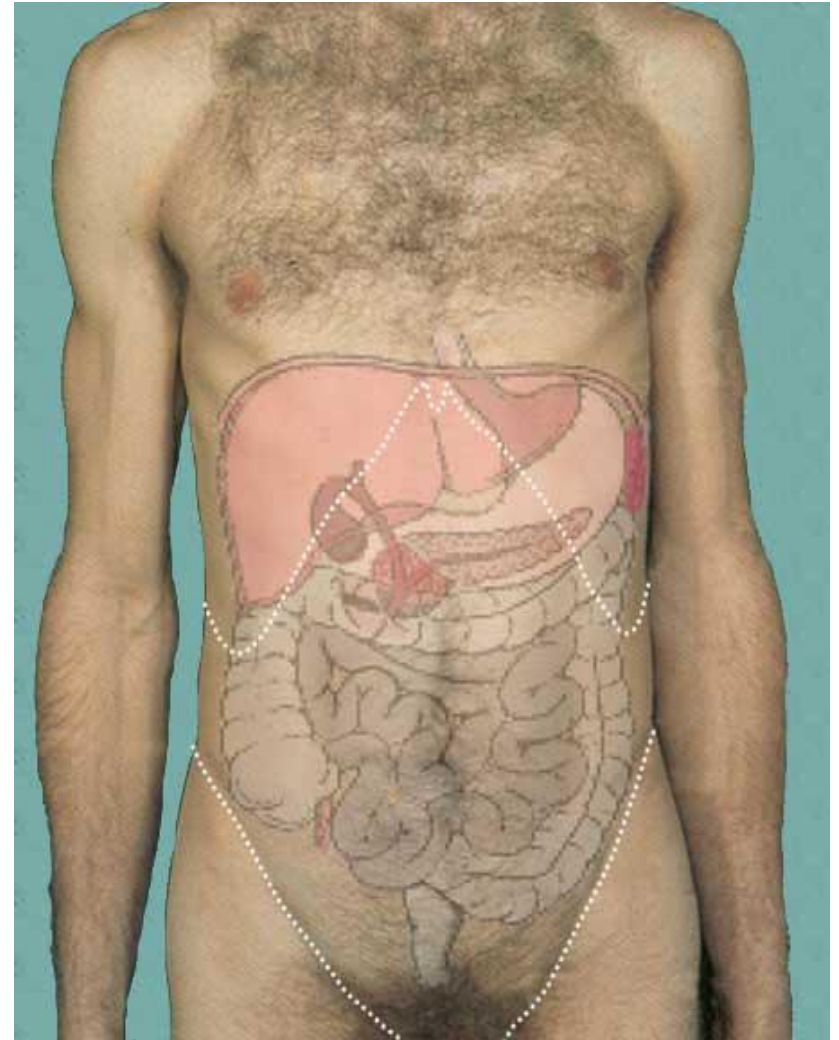
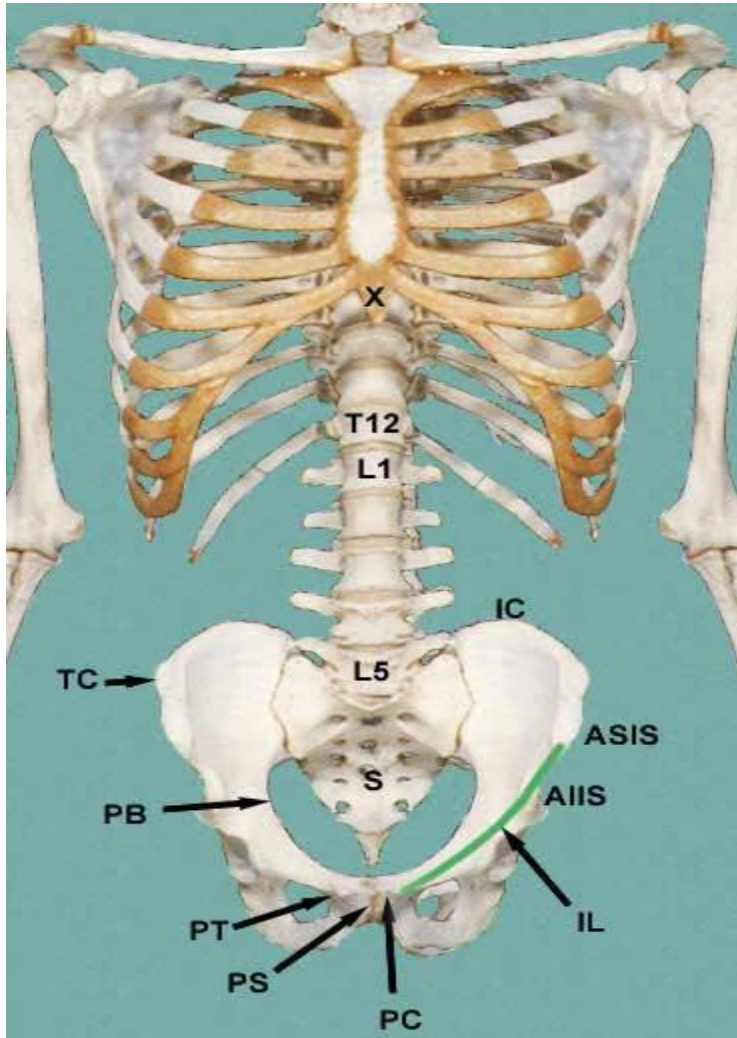
Anterior
abdomen

Flank

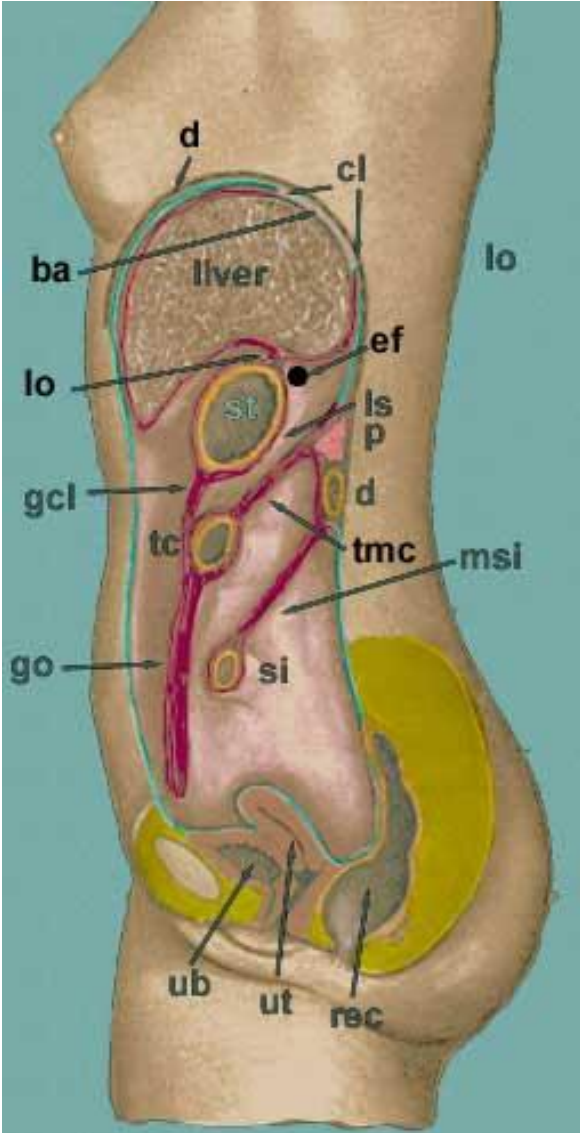
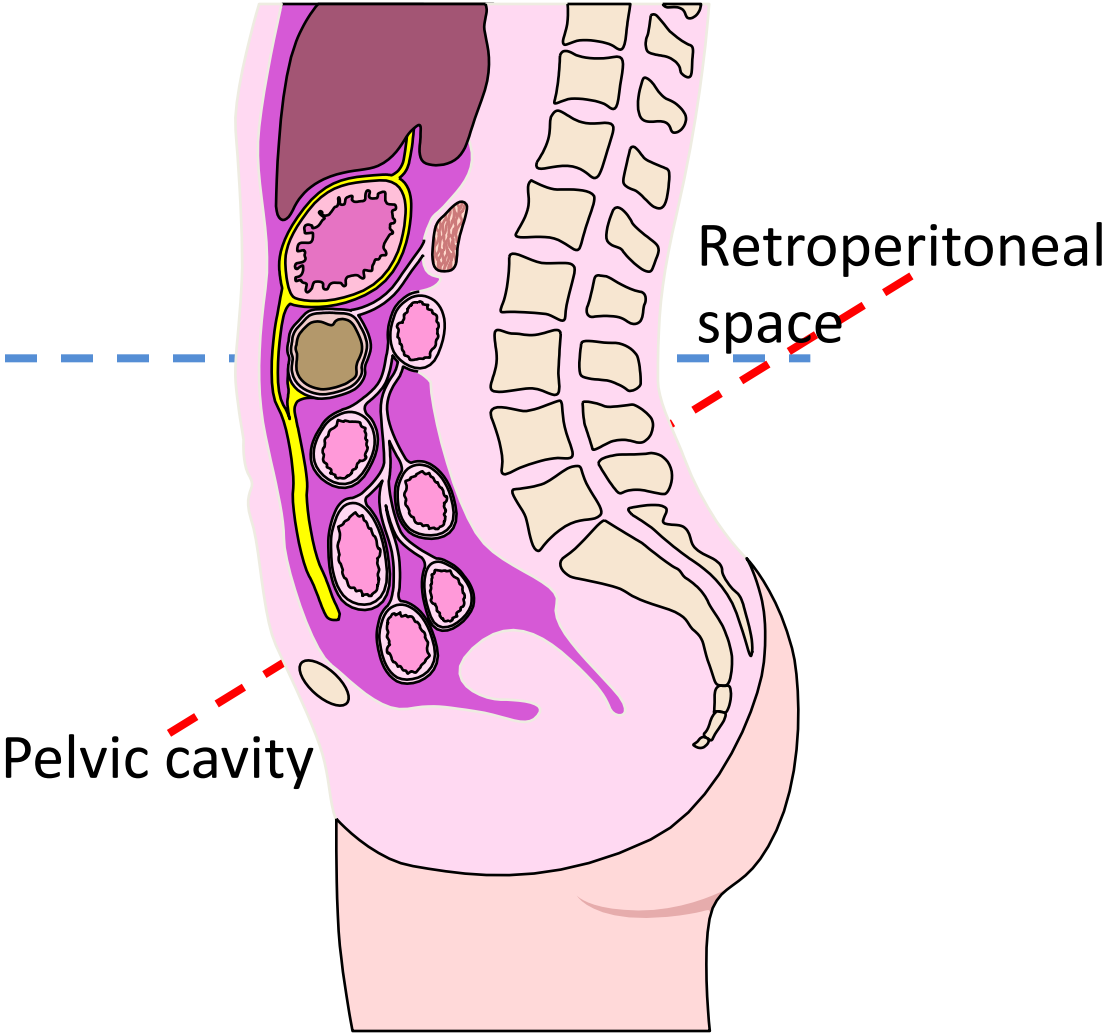


Back

Visceral organ



visceral organ



Abdominal injuries

- No.1 Preventable cause of death
- Unrecognized
- Closed spaces
- Multisystem / multiple organs
- Need investigations

ATLS protocol

Primary survey

Maintain circulation
Stop / seek for bleeding

Adjunct to primary survey

Monitoring
investigations

Investigations for abdominal trauma

- FAST
- DPA (DPL)
- CT scan



FAST: Focused Abdominal Sonography for Trauma

Advantage

- Good sensitivity
- Easy to use
- Repeatable
- No radiologic exposure

- Really excellent test?

Disadvantage

- Operator dependent
- Poor evaluation for hollow viscus and retroperitoneal injury

- Negative FAST?

DPL: Diagnostic Peritoneal Lavage

Advantage

- High sensitivity and specificity
- Hollow viscus injury detection

Disadvantage

- Invasive
- Poor evaluation for retroperitoneal injury

DPL: Diagnostic Peritoneal Lavage

Indications

- Equivocal abdominal sign
- Unexplained shock
- Unevaluable abdominal status
 - Alcohol / drug
 - Head / spinal injury
 - unconscious

Interpretation

- DPL positive in
- Receive 10 ml of gross blood
- Cell count:
 - RBC > 100000
 - WBC > 500
- Biochemistry:
 - amylase > 175 iU/ml
- Microscopic:
 - food particle, bile, bacteria

DPL

- False positive rate in RBC count 11%, esp. in low RBC cell count
- False positive rate in WBC count: late DPL

Computer Tomography

- Great sensitivity and specificity
- Detect hollow viscus, retroperitoneal injury
- Grading organ injury → non-operative management plan
- Blunt VS penetrating

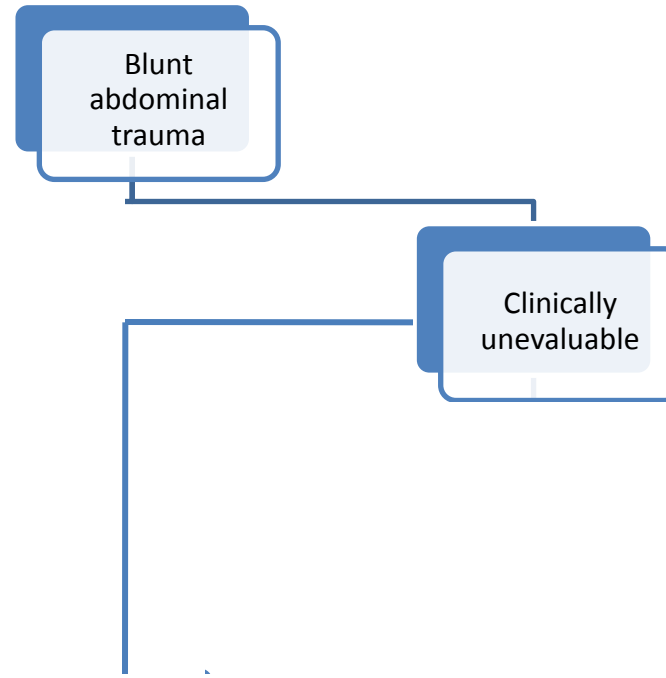
Limitation of CT scan

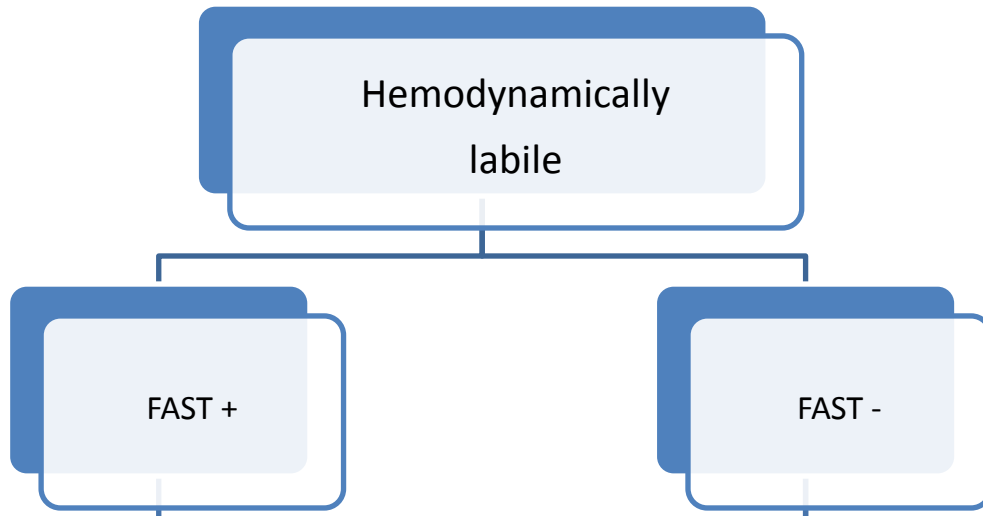
- Some hollow viscus and mesenteric injury
- Patient's hemodynamic status

Type of injury

- Blunt injury
- Penetrating injury
- Blast injury

Algorithm for the management of blunt abdominal trauma

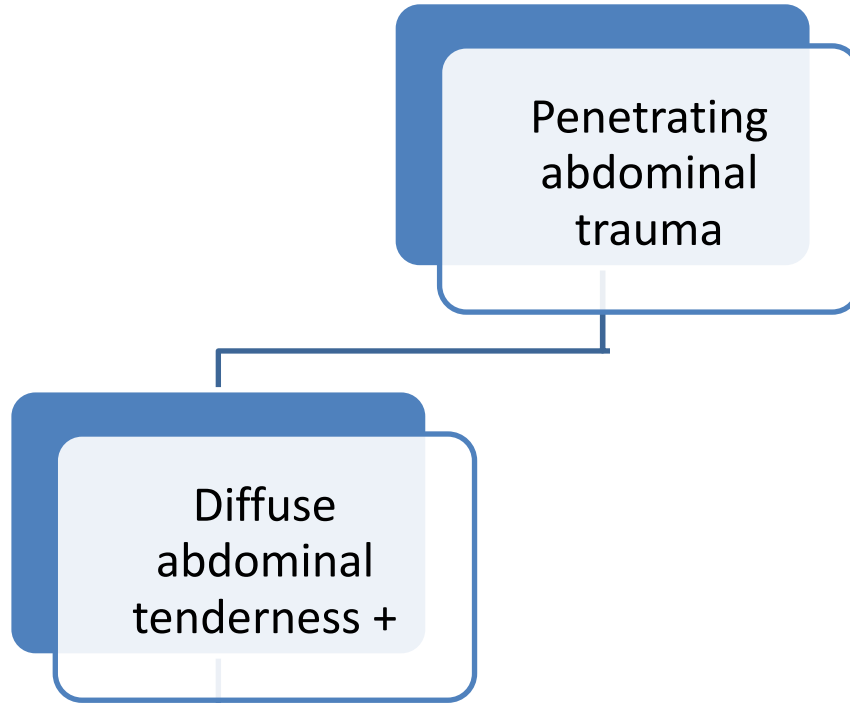


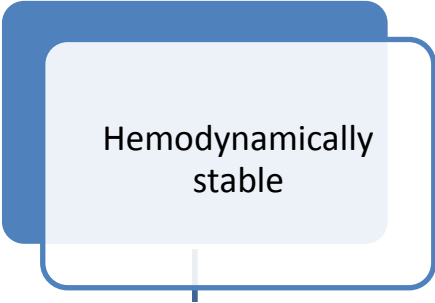


Hemodynamically
stable

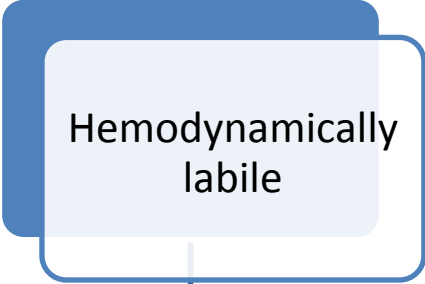
FAST +

Algorithm for the management of penetrating abdominal trauma





Hemodynamically
stable



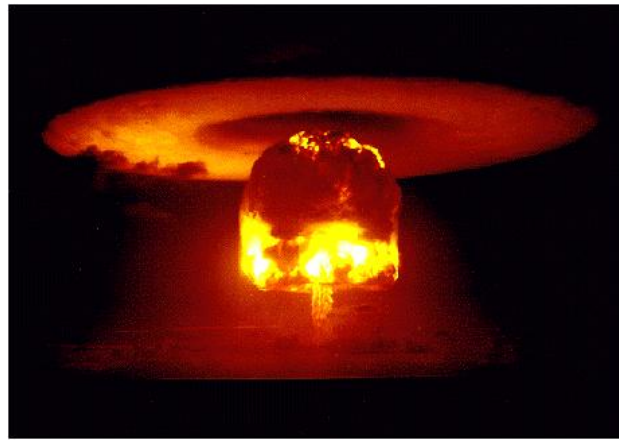
Hemodynamically
labile

Investigation for penetrating injury with hemodynamic stable

| Location | investigation |
|-------------------------|--|
| Thoracoabdomen | CT scan thoracoscopy laparoscopy |
| Anterior abdominal wall | LWE FAST, DPL CT |
| Back and flank | CT |

Options of evaluation in penetrating injury

| Investigation | % Sensitivity | % Specificity |
|----------------------------|---------------|---------------|
| Physical Examination | 95-97 | 100 |
| Local Wound Exploration | 71 | 77 |
| DPL | 87-100 | 52-89 |
| FAST | 46-85 | 48-95 |
| CT scan | 97 | 98 |



Blast Injury

Primary

Secondary

Tertiary

Quaternary

Blast wave

Shrapnel

Blast wind

**Other
consequences**

Indication for surgery

- Hemodynamic instability
- Peritonitis
- Inability to
• examine patient



Non-operative treatment

- Solid organ injury only
- Hemodynamically stable
- No peritonitis
- Capable for serial examination immediate investigation and celiotomy if needed
- Multiple / combined injury

Missed abdominal trauma

- Intraabdominal organs
 - Diaphragmatic injury
 - Hollow viscus injury
 - Retroperitoneal injury
 - Mesenteric injury
- Other combined injury

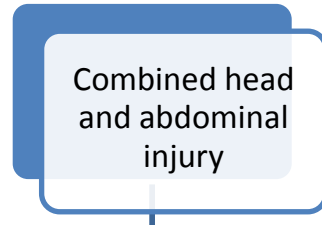
Combined injuries

Head and abdominal injuries 5.7%

Challenges:

- Reliability for abdominal evaluation
- Timing of CT evaluation of the head
- Severe head trauma in non-operative Mx of abdominal solid organ injury
- Major intraabdominal injury with severe blood loss leads secondary brain injury

Algorithm for the management of combined head / abdominal trauma



Pelvic fracture

Pelvic Fractures

Mechanism

- AP compression
- Lateral compression
- Vertical shear



Pelvic Fractures

Assessment

- Inspection: Leg-length discrepancy, external rotation
- Pelvic ring: Pain on palpation of bony pelvic ring
- Palpate prostate
- Associated injuries
- Pelvic bleeding

Pelvic Fractures

Emergency Management

- Fluid resuscitation
- Determine if open or closed fracture
- Determine associated perineal /GU injuries
- Determine need for transfer
- Splint pelvic fracture

Splinting fractured pelvis

- Pelvic wrapping
- Pelvic C-clamp
- External fixator
- ORIF





Special considerations

Case I: 32 year-old female

- GA 37 weeks
- G2P1001
- Patient model for medical student
- On the way home: MCA
- Pain on movement both hip joints



Pelvic wrapping



Roll on her left side

External fixator

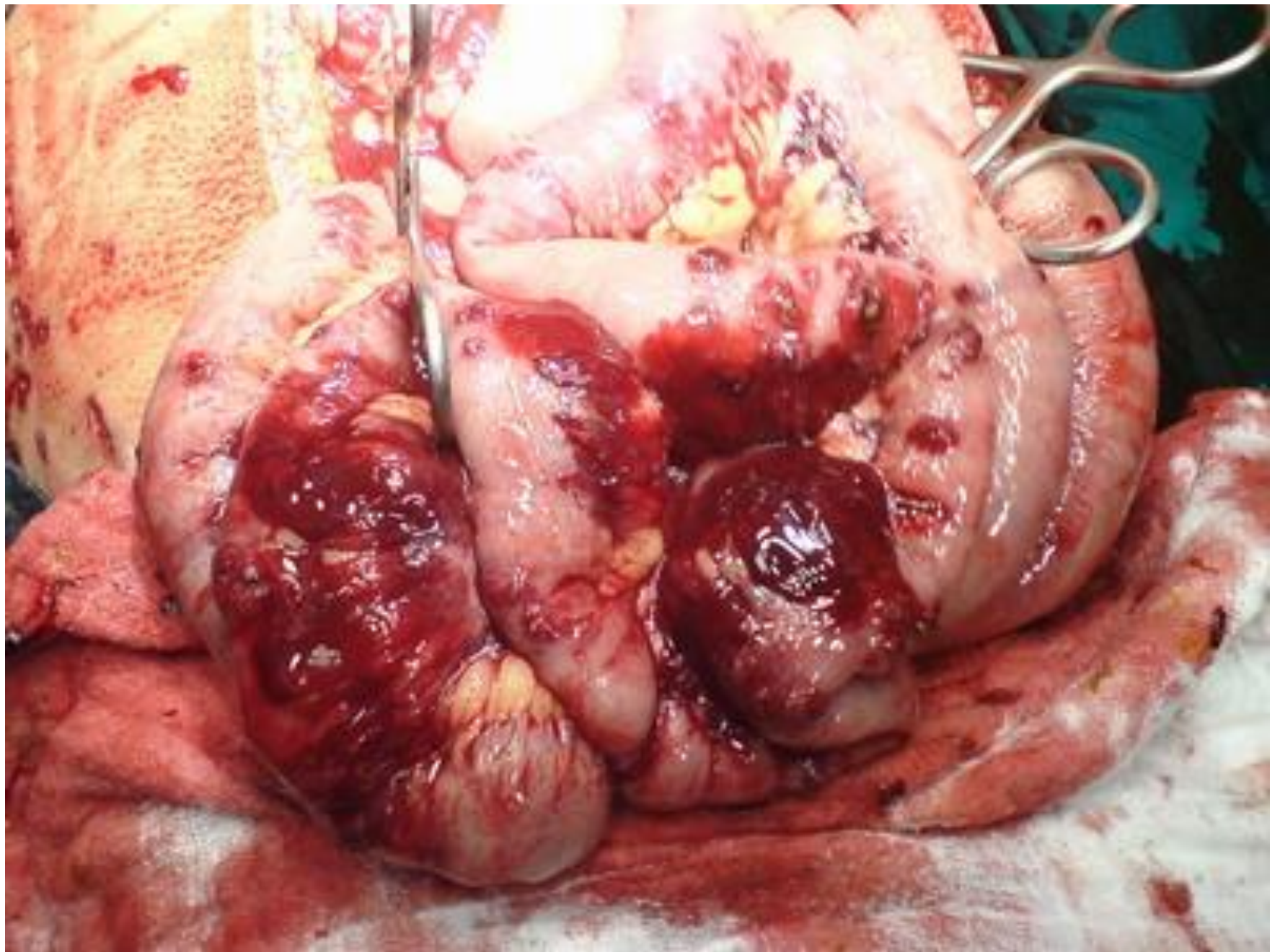


Case II: 37 year-old male

- Short gun wound abdomen
- Unstable vital signs on arrival







Case III: 48 year-old male

- gunshot wound ? At posterior right thigh
- Unstable vital signs on arrival
- No abdominal sign on arrival









Conclusion

ATLS initial assessment

- Primary survey
- Adjunct to primary survey

Select appropriate investigation(s) for the injury