
بسم الله الرحمن الرحيم

King saud university

SPECIFIC ABDOMINAL TRAUMA

Lecturer:

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References

- Current Surgical Diagnosis and Treatment
- Surgical Practice by Peter Lawrence
- Essentials of Surgery
- Principles and Practice of Surgery by James Gardener

Abdominal Trauma

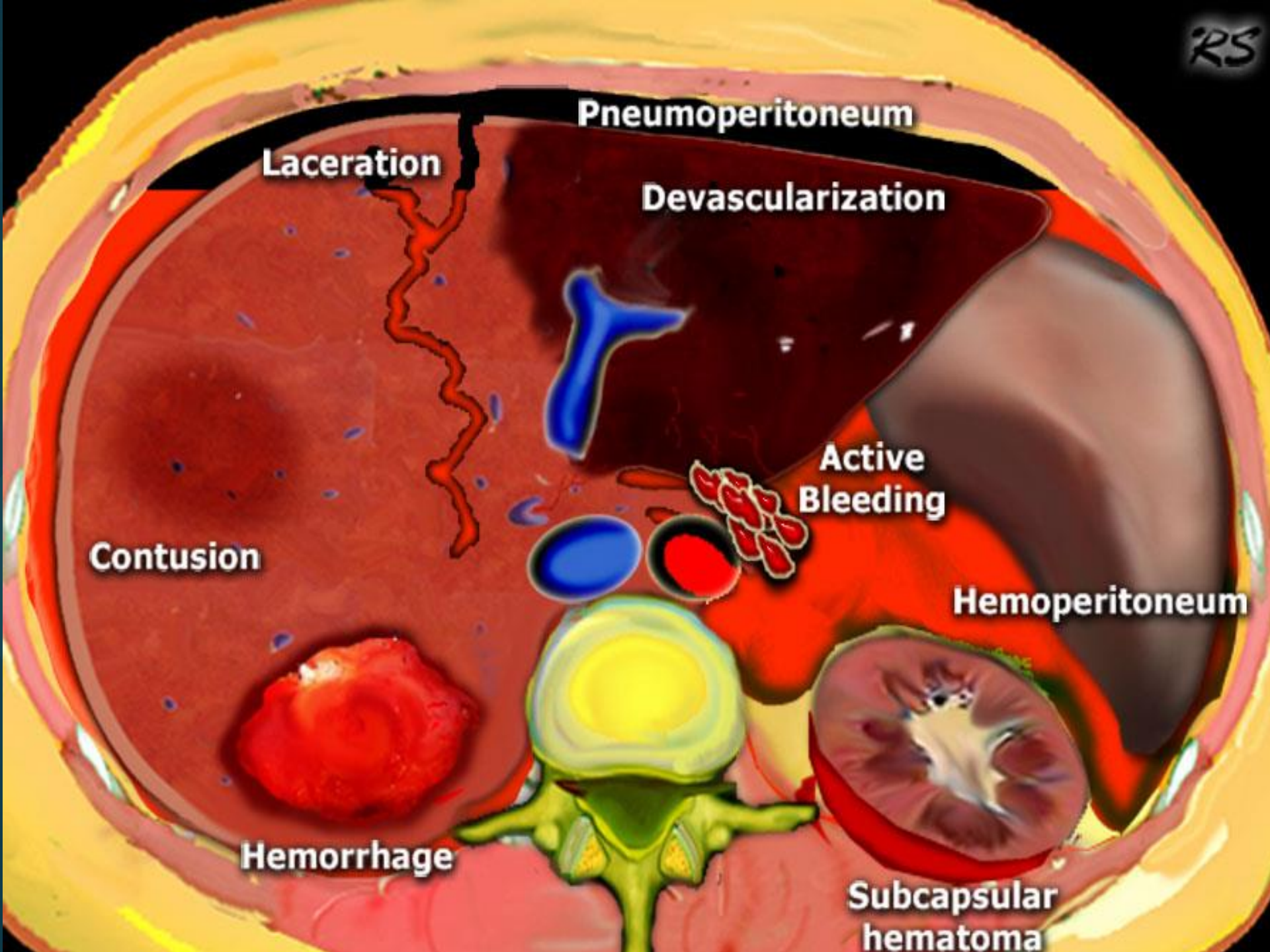
- what is the objective of the lecture?
- what are the types of the abdominal trauma?
- how would you evaluate the patient with blunt trauma?
- what are the commonly solid organs involved the blunt and penetrating trauma?

Objectives

1. ***Describe the anatomical regions of the abdomen.***
2. ***Discuss the difference in injury pattern between blunt and penetrating trauma.***
3. ***Identify the signs suggesting retroperitoneal, intraperitoneal or pelvic injuries.***
4. ***Outline the diagnostic & therapeutic procedures specific to abdominal trauma***

Overview of Multiple Trauma

- Good example of trauma is RTA. Trauma remains major cause of death after IHD and malignancy
- Trauma is the leading cause of death in people aged 1-35 years
- Trauma given a larger group of people per minute disability
- Trauma care account up to 7% of all hospital care


Pneumoperitoneum
Laceration
Devascularization
Active
Bleeding
Contusion
Hemoperitoneum
Hemorrhage
Subcapsular
hematoma

How do we initiate to reduce RTA?

Classification of Trauma according to Mechanism

- Blunt
- Penetrating
- Burns
- Blast

- The majority of abdominal injuries are due to blunt abdominal trauma secondary to high speed automobile accidents.

- *The failure to manage the abdominal injuries accounts for majority of preventable death following multiple injuries.*

The primary management of abdominal trauma is determination that an intra abdominal injury EXISTS and operative intervention is required.

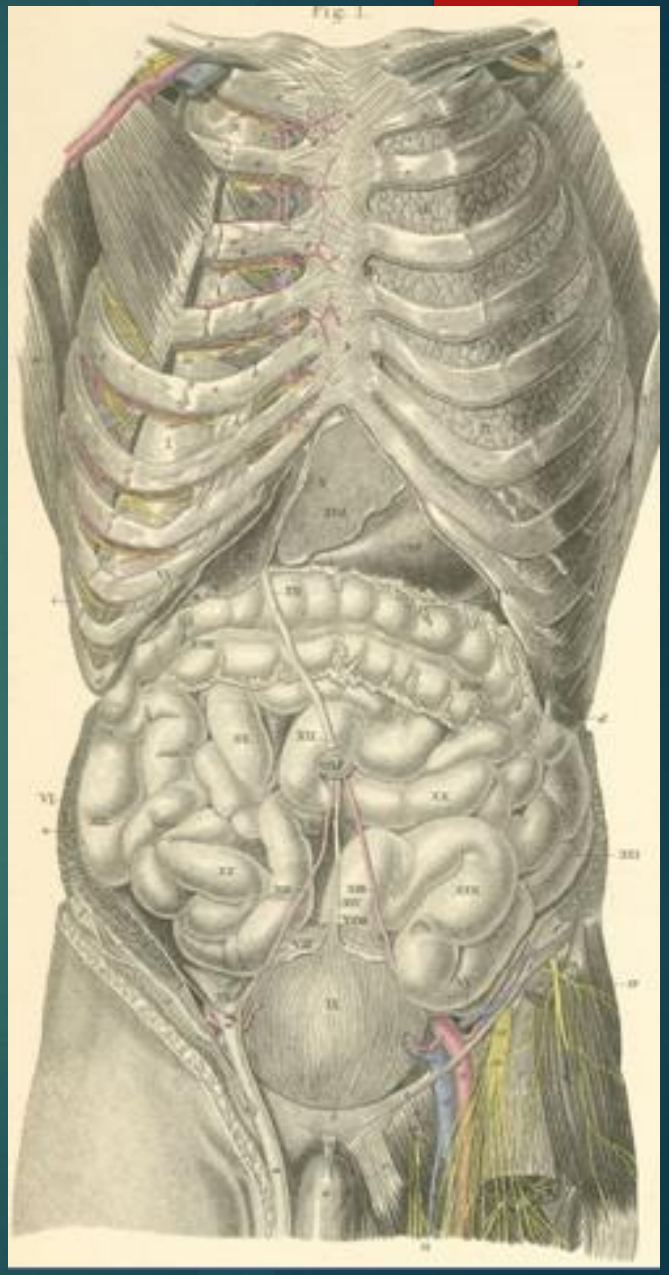
Types of the abdominal trauma

- Blunt abdominal trauma.
- Penetrating abdominal trauma.

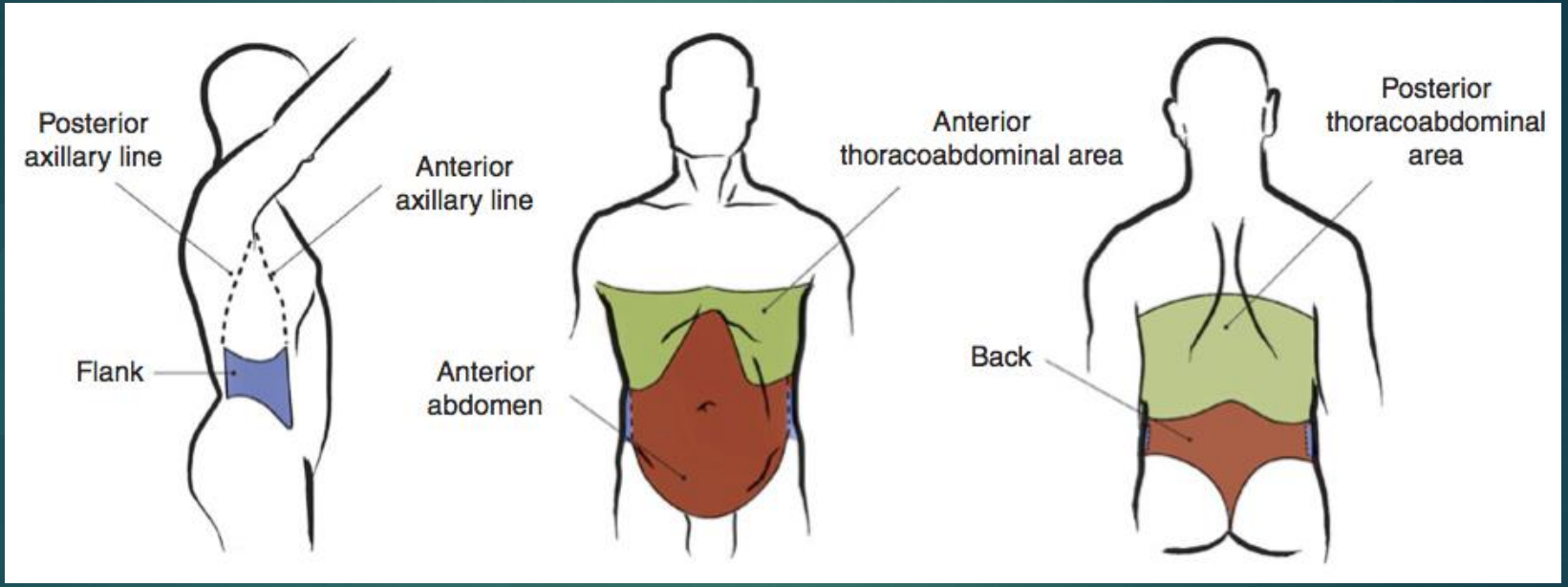
- The recognition of the mechanism of the injury whether is penetrating or non-penetrating trauma is a greatest importance for treatment and diagnosis and workup therapy.

Anatomical regions of the abdomen:

- (a) Peritoneum
- ⇨ Intrathoracic abdomen
- (liver ,spleen , and stomach, pancreas).
- ⇨ True abdomen
- # The accessable part during PEx.
- (b) Retroperitoneum abd. :
- (kidney, pancreas, part of colon)
- (c) Pelvic abdomen
- (bladder, genital system of female).



Anatomical regions of the abdomen



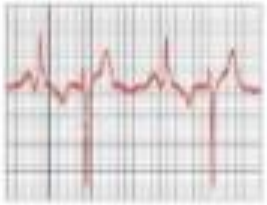
Hospital Care and Diagnosis

- **Primary survey:**
- The resuscitation & Management priorities of patient with major abdominal trauma are:
- The (ABCDE) of EMERGENCY resuscitations airway, breathing and circulation with hemorrhage control should be initiated.

ATLS – Primary Survey

- Airway (& C-spine Immobilization)
- Breathing
- Circulation
- Disability Neurological
- Exposure/Environmental Control
- Full Vital Signs

Adjuncts to Primary Survey



ECG

Vital signs

ABGs

PRIMARY SURVEY

Urinary output

Pulse oximeter and CO_2

Urinary / gastric catheters unless contraindicated

Secondary Survey

- **HISTORY:**
  - **Blunt abdominal trauma**
  - **Penetrating abdominal trauma**
- **PHYSICAL EXAMINATION:**
  - **General physical Examination**
  - **Examination of the abdomen.**

Abdominal Examination

1. **Inspection**
2. **Palpation**
3. **Percussion**
4. **Auscultation**
   - **And .. Rectal Examination**
   - **Vaginal Examination**

DIAGNOSTIC PROCEDURES

- (A) Blood Tests
- (B) Radiological Studies (Plain abdominal X-ray , CXR)
- (C) Peritoneal lavage (DPL)
- (D) USG abdomen
- (E) CT abdomen
- (F) Peritoneoscopy (Diagnostic laparoscopy)

ESTABLISHING PRIORITIES AND INDICATIONS FOR SURGERY:

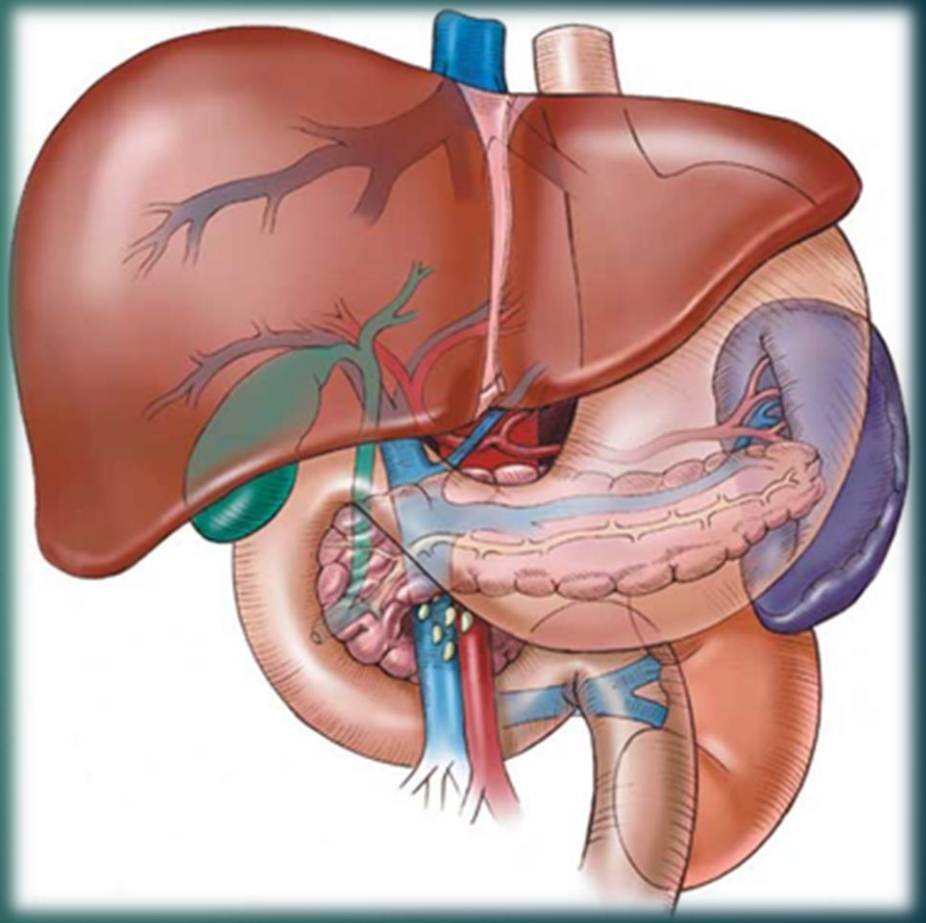
- Q : when should we do laparotomy ?
- A : if there are :

- (A) Signs of peritoneal injury
  (B) Unexplained shock
  (C) Evisceration of viscous
  (D) Positive diagnostic (DPL)
  (E) Determination of finding during routine follow up

Exploratory Laparotomy

Specific Organs Trauma

- Liver
- Spleen
- Kidneys
- Bowel



Retroperitoneal

- Pancreas & Duodenum
- Bowel
- Vascular(IVC , aorta)
- Kidneys, ureter

Genito-urinary system

- Urinary bladder, urethera
- Female reproductive system

Liver Trauma

- The liver is the largest organ in the abdominal cavity
- Continues to be the most commonly injured organs in all patients with abdominal Trauma
- The commonest organ injured in case of penetrating trauma

Mechanism of injury

- Hepatic injuries result from direct blows, compression between the lower ribs on right side and the spine or shearing at fixed points secondary to deceleration.
- Any penetrating gunshot, stab or shotgun wound below the right nipple on right upper quadrant of the abdomen is also likely to cause a hepatic injury.

Penetrating Trauma

Diagnosis of liver trauma

- CLINICAL MANIFESTATIONS
- Diagnosis of hepatic injury is often made at laparotomy in patients presenting with penetrating injuries requiring immediate Surgery
- Or those sustaining blunt Trauma who remain in shock or present with abdominal rigidity.

Diagnosis of liver trauma

- **Investigation :**

- Adjuvant diagnostic tests are necessary in the decision making process to determine whether or not laparotomy is necessary:

- **Diagnostic peritoneal lavage (DPL**) has been extremely reliable 98% in determining the presence of blood in the peritoneal cavity once (positive) patient should be taken to the Operating Room without delay.
- N.B : DPL used in In patient with shock or abdominal distention

DPL

Diagnosis of liver trauma

- **Investigation :**
- CT Scan abdomen used for diagnosing intra peritoneal injuries in stable patients after blunt trauma.
- N.B : CT used in stable patient .

LIVER TRAUMA

TREATMENT

- When patient arrived to ER the initial management of the patient should be uniform regardless of organs system injuries. Resuscitation is performed (ABCDE) in the standard fashion.

Non operative approach:

The hepatic injury diagnosed by CT in stable patient is now non operative approach practiced in many centers.

C T Criteria for non operative management

- Simple hepatic laceration Or intra hepatic hematoma
- No evidence of active bleeding
- Intra peritoneal blood loss less than 250 ml
- Absence of other Intra peritoneal injuries required surgery

OPERATIVE APPROACH

- Persistent hypotension, despite adequate volume replacement, suggests ongoing blood loss and mandates immediate operative intervention.

Injury Classification

- Grade I: Simple injuries – non bleeding
- Grade II: Simple injuries managed by superficial suture alone if you open the patient.
- Grade III: Major intraparenchymal injury with active bleeding but not requiring inflow occlusion (Pringle maneuver) to control haemorrhage
- Grade IV: Extensive intraparenchymal injury with major active bleeding requiring inflow occlusion for hemostatic control
- Grade V: Juxtahepatic venous injury (injuries to retrohepatic cava or main hepatic veins) portal vein injury.

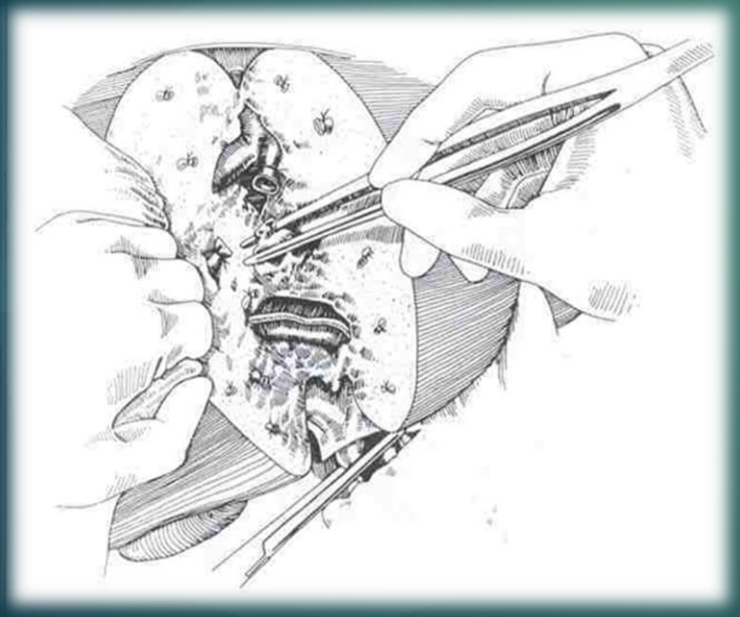
OPERATIVE MANAGEMENT

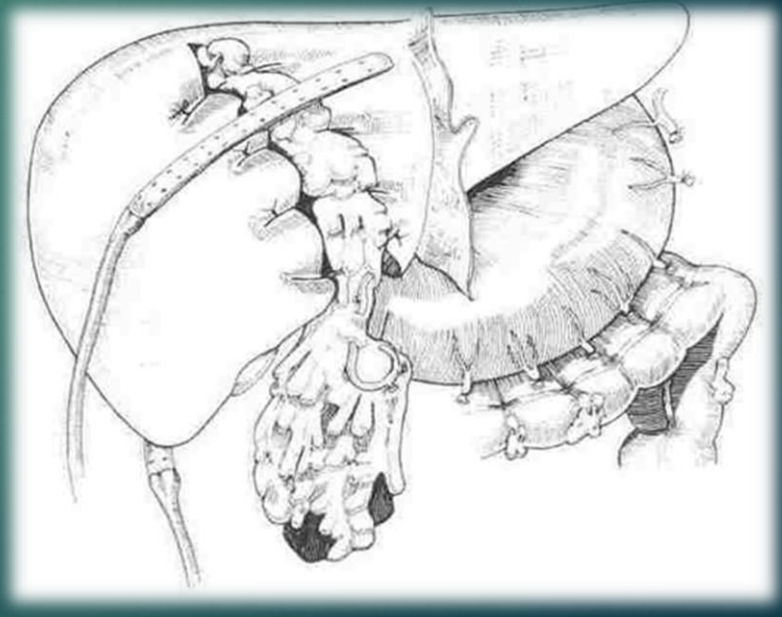
- All patients undergoing laparotomy for trauma should be explored through midline incision because you do not know where is the lesion.

MANAGEMENT OF SPECIFIC LIVER INJURIES

- Grade-I&II: Simple injuries can be management by any one of variety of methods (simple suture, electrocautery or Tropical Hemostatic Agents) This type of injury like Liver Bx. does not require drainage.
- Grade III: Major intraparenchymal injuries with active bleeding can best be managed by Finger Fracturing the hepatic parenchyma and ligating or repairing lacerated blood vessels & bile ducts under direct vision.

- Grade IV: Extensive intra parenchynal injuries with major rapid blood loss require occlusion of portal trial to control hemorrhage.





SUMMARY

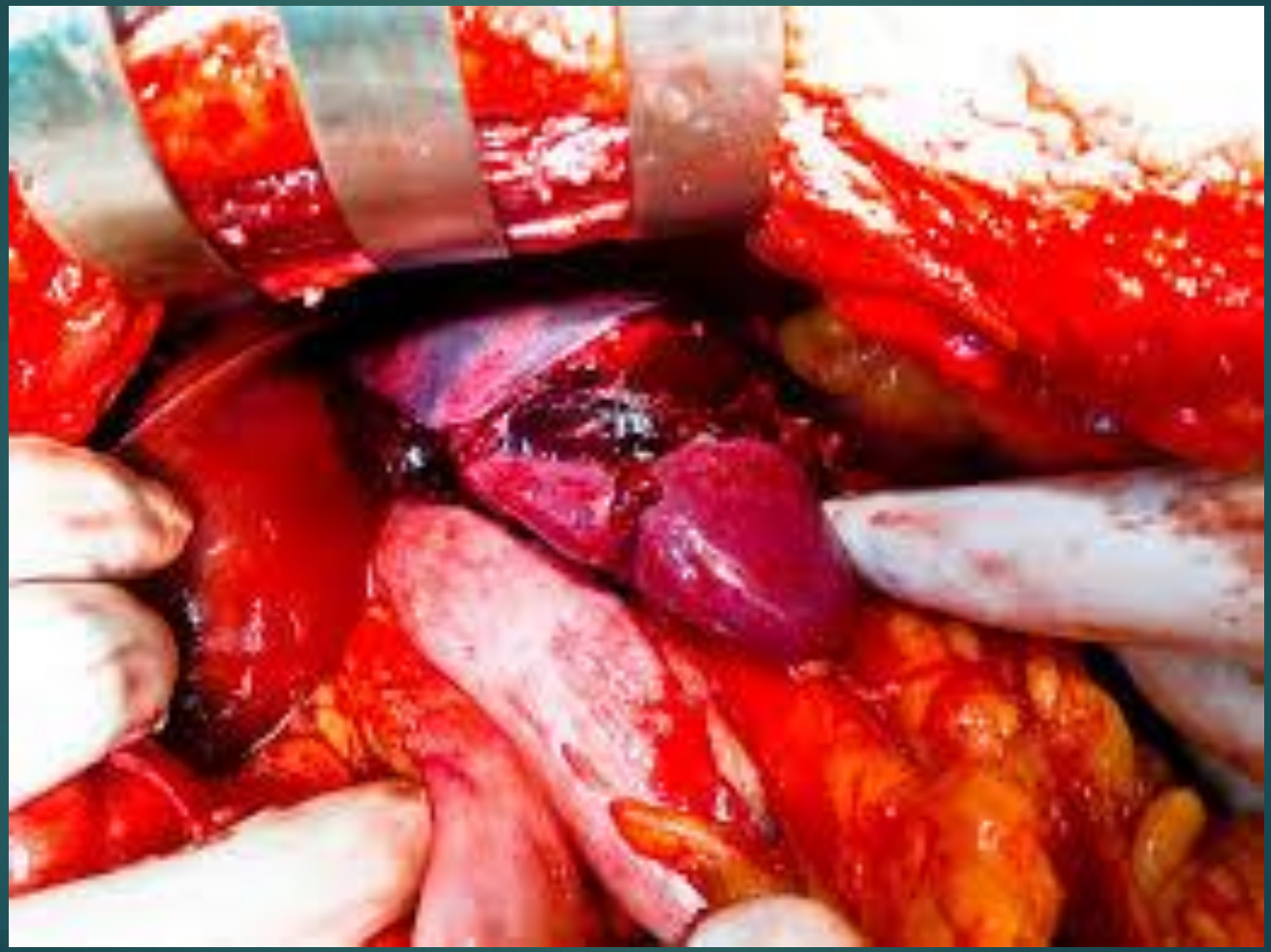
- Simple techniques includes drainage only of non-bleeding injuries, application of fibrin glue, and sutures hepatorrhaphy and , Application of Surgical (I & II).
- Advanced Techniques of Repair (III & IV) all performed with Pringle Maneuver in place.

- Extensive hepatorrhaply
- Hepatotomy with selective vascular ligation
- Omertal Pack
- Resectional debridement with selective vascular ligation
- Resection
- Selective Hepatic Artery Ligation
- Perihepatic packing

COMPLICATIONS & MORTALITY

- Recurrent bleeding
- Hematobilia
- Perihepatic abscess
- Billiary Fistula
- Intrahepatic Haematoma
- Pulmonary Complications
- Coagulopathy
- Hypoglycemia

Splenic Trauma



INCIDENCE

- The spleen remains the most commonly injured organ in patients who have suffered blunt abdominal trauma and is involved frequently in penetrating wounds of the left lower chest and upper abdomen. Management of the injured spleen has changed radically over the pastdecade.

- Now recognized as an important immunologic factory as well as reticuloenlothelial filter. Although the risk of over whelming postsplenctomy sepsis (OPSS) is greatest in child less than 2 yrs recognition of OPSS has stimulated efforts to (Conserve spleen) by splenorrhaphy.

MECHANISM OF INJURY

- The spleen is commonly injured in patients with blunt abdominal trauma because of its mobility.
- Most civilian stab wounds and gunshot wounds cause simple lacerations or through and through injuries.
- It is of interest 2% of patient who are undergoing surgery LUQ of the abdomen can injured the spleen

PATHOPHYSIOLOGY & CLASSIFICATION

- The Magnitude of splenic disruption depend on patient age, injury mechanism and presence of underlying disease spleanic injury have been classified according to their pathologic anatomy as such:

Grading

- Grade I: Subcapsular hematoma
  Grade II: Sub segmental parenchgmal injury
  Grade III: Segmental devitalization
  Grade IV: Polar disruption
  Grade V: Shattered or devascularized organ

DIAGNOSIS (EVALUATION)

- Patient History

  Physical Examination
- Symptoms and signs :
  - 1- LUQ bruising or abrasion
  - 2- Left lower ribs fracture
  - 3- Kehr's sign : shoulder tip pain
  - 4- Balance's sign : LUQ mass

DIAGNOSIS (EVALUATION)

- Radiological Evaluation
- CXR
- Plain abdominal X-Ray
- CT Scan
- Angiography

TREATMENT

- *Initial Management (Resuscitation) ABCDE*
- Non operative approach:
- Widely practiced in pediatric trauma the criteria for nonoperative approach
- Haemodynamically stable children / adult
- Those patient without peritoneal finding at anytime
- Those who did not require greater than two unit of blood

Contra indication for splenic salvage:

- The patient has protracted hypotension
- Undue delay is anticipated in attempting repair the spleen
- The patient has other severe injury

Operative approach

- Decision to perform splenctomy or splenorraphy is usually made after assessment & grading the splenic injury

Post splenectomy and splenorraphy complications

Early Complications

- Bleeding
- Acute gastric distention
- Gastric necrosis
- Recurrent splenic bed bleeding
- Pancreatits
- Subpherinic abscess

Late Complications

- Thrombocytosis
- OPSS (1 – 6 Week)
- DVT

Renal Trauma

- The commonest organ prone to injury in urinary system
-
- If contusion occur , can be treated by conservative therapy
-
- If hematuria presence , means poor indicator of severe renal injury

Mechanism of Blunt Renal Injury

Renal Trauma

Diagnosis

- **Symptoms and signs (3 Fs) :**

- 1- Flank abrasion
- 2- Fracture of the ribs
- 3- Fracture vertebral transverse process
-
- **Investigation :**
- Intravenous urography (IVU) + CT scan

Managment

- Minor injuries >> US scan , percutanous drainage , antibiotic usage
- Severe injuries >> partial nephroctomy or total nephroctomy

Shattered Kidney

ضحايا الحوادث المرورية في 2016

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Thank
You