SPECIFIC ORGAN ABDOMINAL TRAUMA

Done by 429 surgery team: Ismail raslan, Reham Alhenaki

SOURCES: RECORDING, SLIDES AND 427.

OBJECTIVES:

- Overview of Multiple Trauma
- Types of abdominal Trauma
- Anatomical regions of the abdomen
- Hospital Care and diagnosis
- (Evaluation of patient with blunt / Penetrating Trauma)
- Specific organs trauma**: liver, spleen, and kidney.**
- Identify the signs suggesting retroperitoneal, intraperitoneal or pelvic injuries.
- Outline the diagnostic & therapeutic procedures specific to abdominal trauma.

OVERVIEW :

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

ABDOMINAL TRAUMA:

- There is no specific organ trauma, so abdominal trauma comes with multiple trauma.
  And we apply the same management primary survey and secondary survey

> *How do we initiate to reduce RTA: 1- check the tires, and Water of the car 2- check the breaks 3- seat belt 4- Quality of the road 5- follow the sign 6- no high speed 7- Be careful if there is dust. 8- ER very well equipment | machine, qualified doctors .staff in ER.*

TYPES OF TRAUMA:

- Blunt
  - **Road traffic accident is the major cause of blunt trauma.**
  - **RTA: 3rd leading cause of death after IHD and cancer.**
- Penetrating
- Burns
- Blast

- The majority of abdominal injuries are due to blunt abdominal trauma(90%) secondary to high speed automobile accidents
- The failure to manage the abdominal injuries accounts for majority of preventable death following multiple injuries
- Some patients came to ER walking, you think he is OK but he is bleeding very slowly and after 1 hour he will collapse. We should examine patient from head to toe depending on what case you have:

- The primary management of abdominal trauma is determination that an intra abdominal injury EXISTS and operative intervention is required. " a reduction in oxygen for more than 15 minutes will cause disability"
- The recognition of the mechanism of the injury weather is penetrating or non-penetrating trauma is a greatest importance for treatment and diagnosis and workup therapy
- The liver, spleen and kidneys commonly involved in the blunt and penetrating abdominal injuries

TYPES OF PATIENTS:

- go to theater(operating room) direct
- investigate and then theatre
- admitted for conservative treatment

TYPES OF ABDOMINAL TRAUMA

- Blunt abdominal trauma.
  - "Sometimes missed by doctors "some Doctors take superficial hx and Physical examination then the patient collapse in the ER or waiting area"
  - (take about 90 % of trauma)
- Penetrating abdominal trauma: Easy to diagnose and mange

ANATOMICAL REGIONS OF THE ABDOMEN:

- Peritoneum
  - Intra thoracic abdomen: under the rib cage, (liver ,spleen , and stomach, pancreas)
  - True abdomen, The accessible part during P/E :between rib cage and pelvis "
- Retroperitoneal: not accessible during P/E so we do it with investigation
  - Pancreas & Duodenum
  - Bowel
  - Vascular(IVC , aorta)
  - Kidneys, ureter
- Pelvic abdomen: bladder, female genital system

MANAGEMENT OF TRAUMA PATIENTS:

PRIMARY SURVEY

- The resuscitation & Management priorities of patient with major abdominal trauma are:
  - ABCDE of emergencies for all patients
  - **Airway** (if the airway is damaged> intubation), **Breathing** "if there is absent of breath sound >then insert chest tube ... do not wait for x- ray , **Circulation** with haemorrhage control should be initiated (control the bleeding not just I V fluid) , **Disabilities and Exposure**
  - Also nasogastric tube and urinary catheter: NGT : is contraindicated if there is blood coming from the nose or mouth
  - Urinary catheter: for monitoring output, input. |Contraindicated if there is blood coming from urethra.
  - Exposure (cut the clothes)

SECONDARY SURVEY: "SOMETIMES THERE IS NO TIME FOR SECONDARY SURVEY"

- History:
  - if the patient is Conscious take hx from the patient if not from one who attended or Ambulance man
  - Blunt trauma
  - Penetrating trauma > immediately to surgery
- Physical examination: General and abdominal examination
- **Abdominal Examination:** Inspection ,Palpation ,Percussion ,Auscultation, Rectal Examination, Vaginal Examination
- Investigations:
  - Blood Tests
  - Radiological Studies (Plain abdominal X-ray , CXR)
  - Diagnostic Peritoneal Lavage (DPL)
    - when the patients in shock or abdominal distention
    - extremely reliable 98% in determining the presence of blood in the peritoneal cavity
    - When positive take the patient to the OR
    - If 50/50 insert 1 litre of saline and if fresh blood appears it is positive
    - supraumbilical if there is pelvic injury if not infraumbilical
  - USG abdomen
  - CT abdomen
  - Peritoneoscopy (Diagnostic laparoscopy)

If the patient is stable

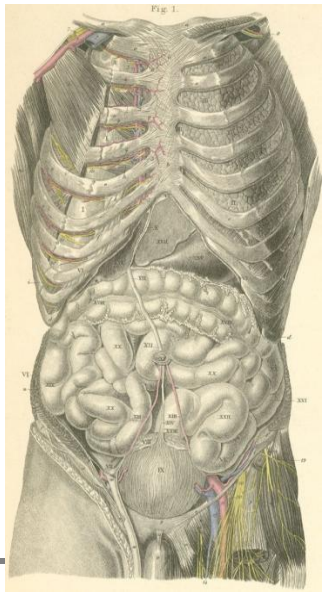
INDICATIONS FOR SURGERY (LAPROTOMY)

- Signs of peritoneal injury **(distention)**
- Unexplained shock **(we give the patient I.v fluide but still bleeding)**
- Evisceration of viscus **: viscus is outside the body**
- Positive diagnostic (DPL)
- Determination of finding during routine follow up on investigations: admitted patient and he is Conscious with injury for conservative therapy then after 4-6 hours in shock

SPECIFIC ORGAN TRAUMA:

PERITONEAL

- Liver :protected by ribs
- Spleen: mobile from its original place
- Kidneys: retroprotineal not easy to injure so when there is injury that is severe trauma.
- Bowel



RETROPERITONEAL:

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

GENETO-URINARY SYSTEM

- Urinary bladder, urethera : easy to diagnose if there is fracture to pelvis
- Female reproductive system

LIVER TRAUMA:

GENERAL CONSIDERATIONS:

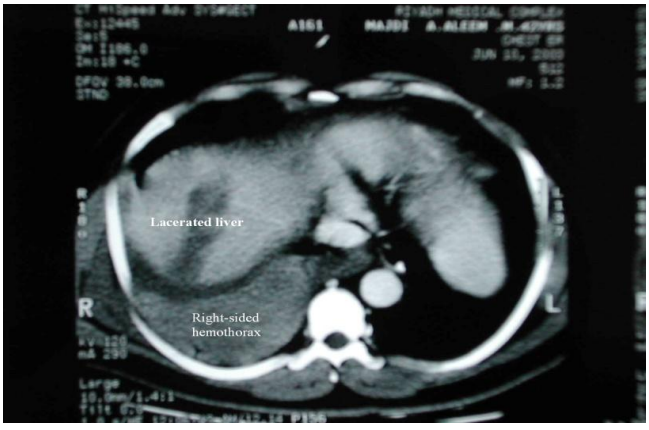
- largest organ in the abdominal cavity
- 5th intercostal space any trauma under the nipple we Expect liver is injured
- most commonly injured organs in all patients with abdominal Trauma
- commonest organ injured in case of penetrating trauma

MECHANISM OF INJURY:

- direct blows
- compression between the lower ribs on right side and the spine
- shearing at fixed points secondary to deceleration
- 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

DIAGNOSIS:

- clinical manifestations:
  - Often made at laparotomy in patients presenting with penetrating injuries requiring immediate Surgery or in shock
  - blunt Trauma who remain in shock or present with abdominal rigidity "no further investigations"
- investigations:
  - 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.
    - if (+) immediately to OR
    - used in patient with shock or abdominal distention
  - CT Scan abdomen
    - for diagnosing intra peritoneal injuries in stable patients after blunt trauma
    - in stable patients



- **Pic: gunshot below the nipple, RT side hemothorax, grade 3. The patient is stable no blood in the peritoneal cavity, this one go with conservative management if he bleed take him to OR ,if there is other injuries take him to OR and deal with all injury .**

TREATMENT

- **when the patient comes to the ER the initiate management should be uniform**
- ABCDE
  - regardless what injury you have
  - then divide your patient chest injury with chest surgeons,
  - NOW there is trauma surgeon deal with all
- Non-operative approach: Is determined by CT scan, criteria for non-operative approach and conservative therapy:
  - 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 " spleen , bladder,.." that requires surgery
- Operative approach:" OR"
  - Persistent hypotension, despite adequate volume replacement, suggests ongoing blood loss and mandates immediate operative intervention
  - Classification:
    - Grade 1:Simple injuries – non bleeding
    - Grade 2: Simple injuries managed by superficial suture alone if you opened the patient.
    - Grade 3: Major intraparenchymal with active bleeding but not requiring inflow occlusion (Pringle maneuver) to control haemorrhage
    - Grade 4: Extensive intraparenchymal injury with major active bleeding requiring inflow occlusion for haemostatic control
    - Grade 5: Juxtahepatic venous injury (injuries to retrohepatic cava or main hepatic veins) portal vein injury
    - 1-2 →conservative if no bleed or other injury**.**
    - 3 →some patients go for conservative other for OR but when we open patient deal with that injury also.
    - 4-5 →you have to operate and we do Pringle maneuver **, Grade 5 less likely patient survive**

The Pringle manoeuvre is a surgical manoeuvre used in some abdominal operations. A large haemostat is used to clamp the hepatoduodenal ligament interrupting the flow of blood through the hepatic artery and the portal vein and thus helping to control bleeding from the liver

  - All patients undergoing laparotomy for trauma should be explored through midline incision: **from xiphisternum to pubis - around the umbilicus go up or down.** Because you do not know where is the lesion
  - Management according to classification:
    - Grade-I&II: Simple injuries can be management by any one of variety of methods: if we open it
      - simple suture
      - electrocautery
      - Tropical Hemostatic Agents
      - does not require drainage
    - grade 3: Finger Fracturing the hepatic parenchyma and ligating or repairing lacerated blood vessels & bile ducts under direct vision
    - grade 4: occlusion of portal trial to control haemorrhage
    - summary:
      - Simple techniques: Simple techniques include drainage only of non-bleeding injuries, application of fibrin glue, and sutures hepatorrhaphy and, Application of Surgical (I & II).

- Advanced techniques: Advanced Techniques of Repair (III & IV) all performed with Pringle Maneuver in place

- Types of repair:
  - Extensive hepatorrhaply
  - Hepatotomy with selective vascular ligation
  - Omertal Pack
  - Resectional debridement with selective vascular ligation
  - Resection
  - Selective Hepatic Artery Ligation : remember that the liver can regenerate
  - Perihepatic packing: **if you cannot deal with patient (as in small town) just pack the liver with gauze him and send him to another hospital**
  - Pic : finger fraction : the injury in the liver is small , you will open the liver according to the injury, start ligating the blood vessels , ligating the ducts
  - omental packing : put omentum in between the wound and Sutured it – best for homeostasis

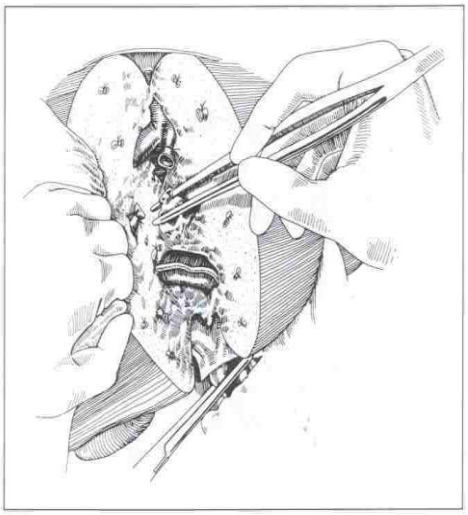


Figure 30–4.
Nonviable portions of the liver are debrided. Debridement ceases only when bleeding viable hepatic parenchyma is encountered.

COMPLICATIONS AND MORTALITY:

- Recurrent bleeding
- Hematobilia: blood go to the bile duct and the patient bleeding per rectum
- Perihepatic abscess ⟶ then Biliary Fistula later on.
- Billiary Fistula
- Intrahepatic Haematoma
- Pulmonary Complications
- Coagulopathy " because of a lot blood transfusion"
- Hypoglycemia

SPLENIC TRAUMA:

GENERAL CONSIDERATIONS:

- The spleen remains the most commonly injured organ in patients who have suffered blunt abdominal trauma
- involved frequently in penetrating wounds of the left lower chest and upper abdomen
- the spleen Now recognized as an important immunologic factory as well as reticuloenlothelial filter
- The problem is when the spleen has disease; splenomegaly;- malaria, portal hypertension make it more susceptible to be damaged from simple trauma and you find the patient collapsed
- 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 either by repair or conservative management

MECHANISM OF INJURY:

- commonly injured in patients with blunt abdominal trauma because of its mobility
- stab wounds and gunshot wounds in the left upper quadrant cause simple lacerations or through and through injuries

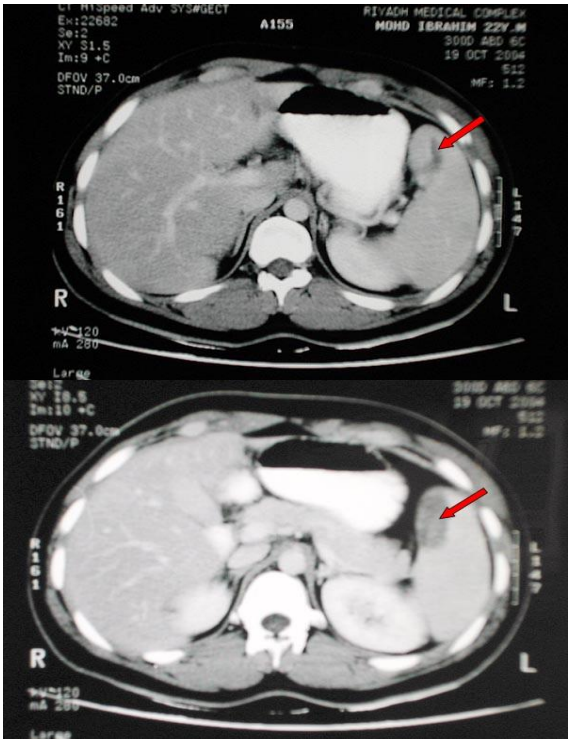
- iatrogenic injuries account for 2 % of cases : by surgeon when working on the pancreas, stomach ,… – sometime cause injury to the spleen and if they cannot deal with it they remove it “

CLASSIFICATION OF INJURY

- The Magnitude of splenic disruption depend on patient age, injury mechanism and presence of underlying disease splenic injury have been classified according to their pathologic anatomy as such:
- classification of injury:
  - Grade I:Subcapsular hematoma
  - Grade II: Sub segmental parenchymal injury
  - Grade III: Segmental devitalization “ part of it “
  - Grade IV: Polar disruption “ complete pole “
  - Grade V: Shattered or devascularized organ “ completely “ – in shock but the patient can survive b\c the blood supply is not the same as the liver.

DIAGNOSIS:

- History
- Physical examination:
- Signs and symptoms
  - LUQ bruising or abrasion
  - Left lower ribs fracture on CXR
  - Kehri's sign : left shoulder tip pain
  - Balance's sign : LUQ mass which is a hematoma
- Radiological
  - CXR - v.imp in case of spleen
  - Plain abdominal X-Ray
  - CT Scan -CT and Angiography if the patient is stable”
  - Angiography “use as diagnostic and therapeutic”
  - Pic 1 : grade 1 hematoma – stable go with conservative therapy
  - Pic2: grade2 – laceration but the wall not disrupted - with conservative therapy



TREATMENT:

- ABCDE
- Non-operative approach
  - Widely practiced in pediatric trauma
  - criteria for non-operative approach :
    - Haemodynamically stable children / adult
    - Those patient without peritoneal finding at anytime “ no rigidity no tenderness “ just bruising”
    - Those who did not require greater than two units of blood – more than two →OR
- Operative approach:
  - Decision to perform splenectomy or splenorraphy is usually made after assessment & grading the splenic injury
  - Contra indication for splenic salvage: **splenectomy must be done here**
    - The patient has protracted hypotension “ do everything and there is no response and the patient is still bleeding “

- Undue delay is anticipated in attempting repair the spleen
- The patient has other severe injury " liver , bowel , bladder injury "

COMPLICATIONS OF SURGERY:

- Early:
  - Bleeding
  - Acute gastric distention
  - Gastric necrosis - short gastric vessels they are close to each other so when you ligate the spleen it might lead to necrosis
  - Recurrent splenic bed bleeding
  - Pancreatitis - remember the tail of pancreas and the hilum of the spleen > so when you pass you might take the tail of pancreas and cause Pancreatitis
  - Subpherinic abscess
- Late:
  - Thrombocytosis
  - OPSS (1 – 6 Week)
  - DVT

RENAL TRAUMA:

GENERAL CONSIDERATIONS:

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

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

MANAGEMENT:

- **# Minor injuries >> US scan , percutanous drainage , antibiotic usage " as hematoma"**
- **# Severe injuries >> partial nephroctomy or total nephroctomy**