تبييض محاضرة

Abdominal Trauma

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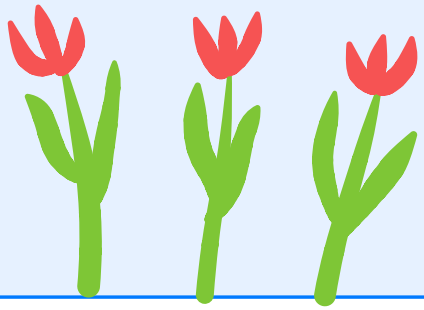
Done by :



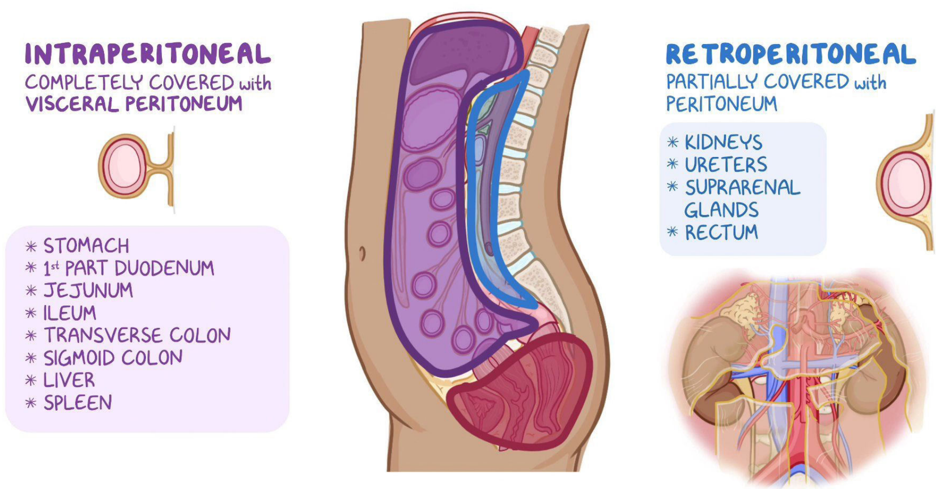
ABDOMINAL TRAUMA

* Peritoneal organs

* intra Peritoneal organs → devided into 3 (stab wounds بال نستفيد منها):
  - → intra-thoracic abdomen (above costal margin line)
  - → pelvic abdome (above 2 ASIS)
  - → abdominal Proper (in between) ⬆⬆

* retro Peritoneal organs → No clinical abdominal sign, retroabdominal hemorrhage can cause <u>shock</u> without signs of bleeding (it accommodate alot of blood) hold up to 4 liters

* injury in each division not the same *

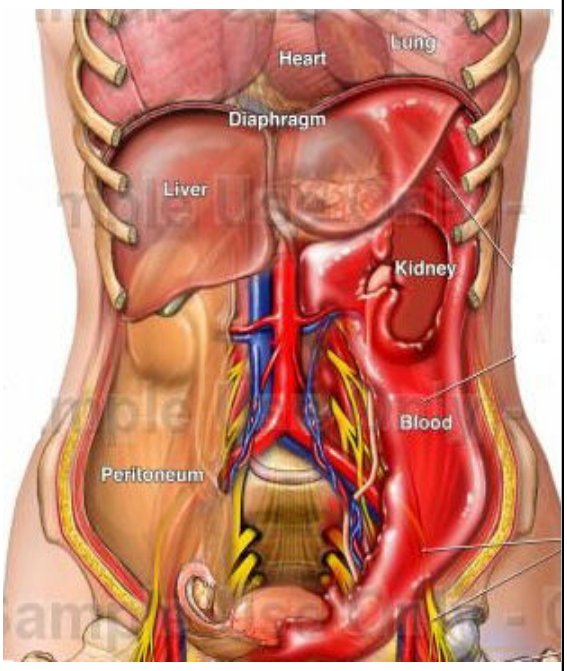


Surgical anatomy & physiology

* Injury to abdominal organs, especially those in the retroperitoneal space, when bleed the space can hold a great deal of blood, up to four liters.

*Solid organs, such as the liver and spleen bleed profusely as do the major abdominal blood vessels, the aorta and vena cava.

* Injury to hollow presents a serious risk of infection, especially if there is a delay in diagnosis



Introduction

(1) head
(2) chest
(3) abdominal

1. Road traffic accidents is the **main cause** of abdominal trauma in the civilian population

2. Abdominal injuries **rank third** as a cause of traumatic death after head and chest injuries

3. The **primary cause** of death in abdominal trauma is hemorrhage and sepsis after 48 hours

Types of abdominal trauma

1. Blunt abdominal trauma is the most common injury pattern with RTA accounting for approximately 75%. most common

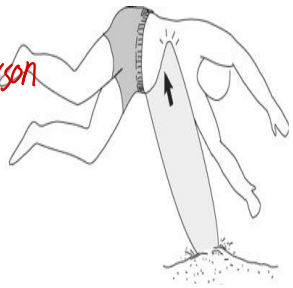
a. vehicular trauma

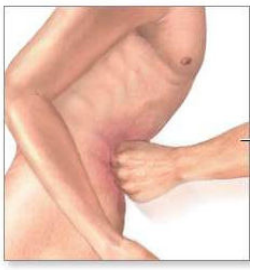
a.auto to auto car with car

b.auto to pedestrain car with Person

b. Direct blow to the abdomen

c. Fall from a height





2. Penetrating abdominal trauma

a. low & high velocity missiles

Sometimes , the trauma is asymptomatic
vitals : pulse , pressure لذلك بنقدر نكشف عنها عن طريق ال

b. stabs:

knives,ice picks,industrial implement

Mechanism of injury

In blunt abdominal trauma :

1.Decelaration : توقف فجائي أو تسريع فجائي

The differential movement among adjacent structures especially at relatively fixed points of attachment such as the ligament of Treitz, the ileocecal valve, and the phrenocolic ligament.

2.Compresion with crush :

when intra-abdominal contents are crushed between the anterior abdominal wall and the vertebral column or posterior thoracic cage

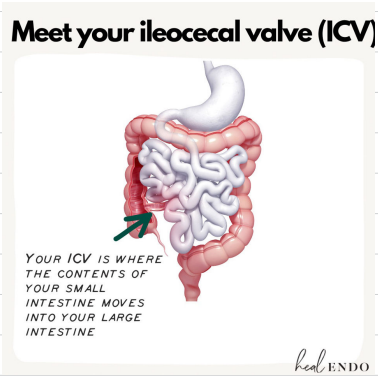
mechanism of blunt : 3 mechanisms

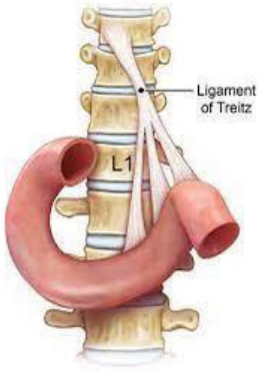
1. deceleration : injury in Partially mobile (Partially fixed) eg : Ligament of Treits, duodeno-jejunal Junction

الجزء اللي بيتحرك ، والثابت بعده ثابت
الوضع من الـ acceleration

2. compression with crush

3. compression with crush rupture : Rupture of the sphincter : ① ileocecal valve





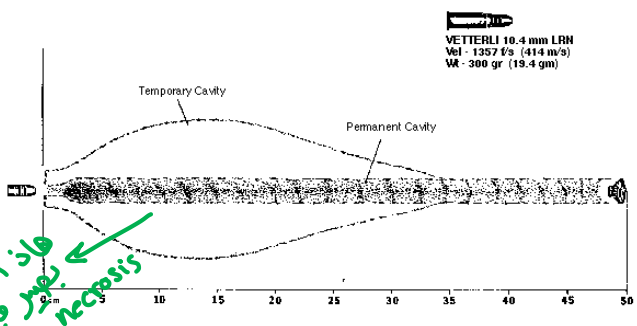
* if the sphicter closed & this crush was proximal or distal to it & there is gas in the abdomen will ↑ intraleumenal Pressure → Rupture

② Pylorus

The mechanism in pentrating abdominal trauma

1.Mechanical distruption of tissue along the path of stab or bullet pasage.

2.In high missile injuries :



1. KE =1/2 M (v1- v2

Tissue هاذ الـ بيموت فيه necrosis

2. Cavitation within solid organs result in shattering
3. The colon less tolerable to hight velocity missile than small bowel because of its fecal content.

Kinetic Energy

Kinetic energy is the energy that objects possess due to their motion.

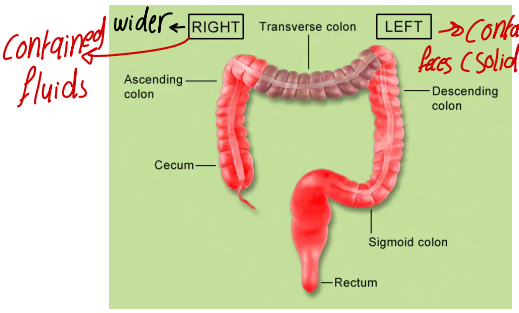
$$KE = \frac{1}{2}mv^2$$

m = mass (kg)
v = velocity (m/s)
KE = Kinetic energy (J)

* hollow viscous tolerate the KE (bone, kidney) solid organ بكسر

↑ m ↑ KE :
cavitation phenomenon
(intolerance : solid orgns)

* left or Right colon ?) imp. MCQ *
Pulse wave can be tolerated less with left colon & more with Right colon

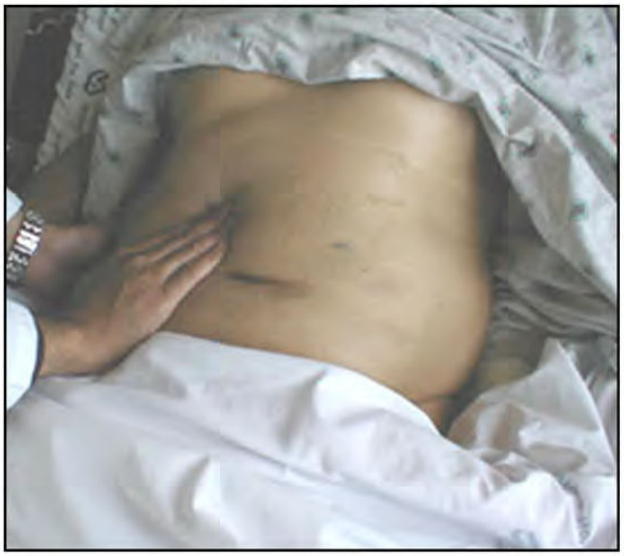


contained fluids
contained faces (solids)

Less tolerate ← solid organs لأنه يعامل معاملة left colon *

Abdominal Assessment

- Inspection
- Auscultation
- Percussion
- Palpation



Assessment in blunt trauma

Motor vehicle accident

History:

type of collision,extent of vehicular damage,

b.status of other passengers, dead person

c. patient position in vehicle,belted

d. A record of hypotension reading by prehosp. team

*Fall

- heigh
- the site

The assessment in pentrating injury:

History

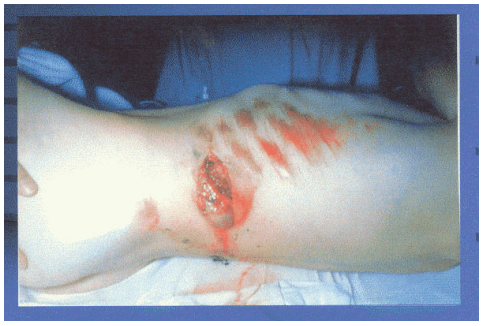
-Time

- Type of weapon, knife ,hand gun, shot gun.

-length of knife

-no. of stabs, no. of shot fired

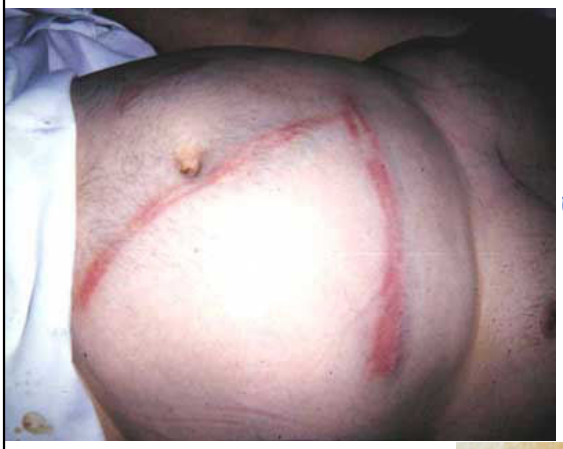
Clinical evaluation in blunt trauma



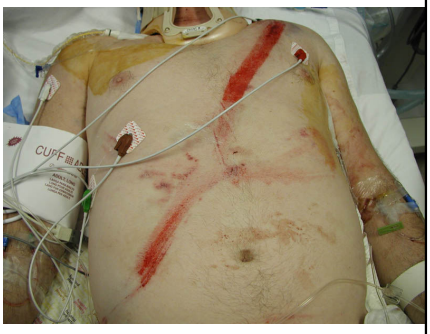
INSPECTION

- fully exposed patient
- Echymotic area ,abrasion
- steering wheel shaped contusion,
- seat belt sign : indicates intra-abdominal injury in about one third of patients.
- skin discoularation
- abdominal distension

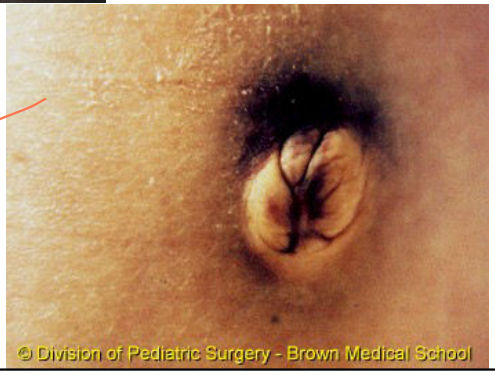
INSPECTION



seat belt sign:
intra-abdominal injury in 1/3 of patients
retroperitoneal bleeding
(very severe pressure)
from outside



retroperitoneal Trauma hemorrhage



- The person **inside the moving car** acquires the same velocity of the car :
  - ♣ If he is not wearing the seat belt , his body strike the car .
  - ♣ If he is wearing the seat belt → seat belt injuries (skin mark, fracture clavicle , thoracic or abdominal injuries).

IN PENTRATING ABD.INJURY

Any wound in The boundries of the abdomen considered as apotential abdominal injury

* Where there is a Possibility of intraabdominal injury ?
  → from 5th ICS to the groin crease anteriorly
  → from 5th ICS to inferior gluteal crease Posteriorly

PALPATION

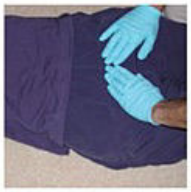
Pelvic compression (instability) : if pain + movement (fracture)

1. Haemodynamic instability.
2. Signs of peritoneal irritation:gaurdining,rigidity tenderness,rebound.
3. Crepitus at lower thoracic cage
4. Pelvic instability if painful there is a fracture
5. Abdominal distension
6. Evisceration
7. Per digital rectal exam.

- Check stability of pelvis (DON'T REPEAT)
  1) Apply gentle medial pressure with palms by pressing inward on iliac crests
  2) With patient supine, apply gentle posterior pressure by pressing downward on iliac crests
  3) Apply gentle downward pressure on pubis to check pelvic ring stability

Medial pressure (1

Posterior iliac pressure (2



Posterior pubis pressure (3

Signs of pelvic instability :

- **Deformity** of lower limb .
- Yielding pelvis by **manual stress examination** .
- Palpable **displacement** in the posterior ring (always exam. the back).

Diagnostic aids for evaluation

1. repeated "serial"physical exam.
2. local wound exploration
3. Ultra sound "FAST"
4. CT. abdomen

CT of the abdomen is the preferred diagnostic examination for the evaluation of blunt abdominal trauma in the hemodynamically stable patient .

5. Diagnostic peritoneal lavage

Focused assessment with sonography for trauma (FAST)

looks for fluid in the perihepatic and hepatorenal space, the perisplenic area, the pelvis and the pericardium. It has a role in children but it does not detect solid organ injuries nor replace CT

Nowadays , this included in the primary survey to identify pneumothorax , haemothorax , pericardial tamponade, and free fluid in the abdomen

Diagnostic peritoneal lavage

To find out if there is blood in the peritoneal cavity to suspect a bleeding and to find if there is any injury to the intestine

The procedure is still performed when alternative diagnostic methods such as computerized tomography (CT) or ultrasound imaging are unavailable

INDICATIONS FOR DPL

1. Equivocal clinical examination
2. Difficulty in assessing patient.
3. Persistent hypotension despite adequate ressuscitation
4. Multiple injuries

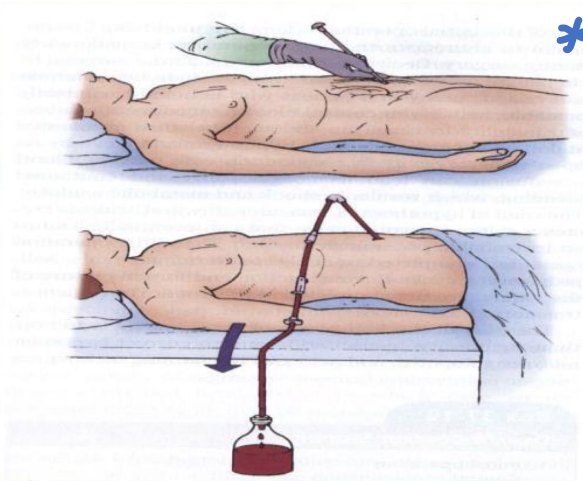


Fig. 37-14 Diagnostic peritoneal lavage (DPL) can exclude or confirm the presence of intraabdominal injury with a high accuracy rate.

* if we don't have computer or CT → we use Lavage

test used to assess the presence of blood in the abdomen. A gastric tube is placed to empty the stomach

A cannula is inserted in Linda alba below the umbilicus, directed caudally and posteriorly (near to the umbilicus)to be away from urinary bladder. The cannula is aspirated for blood

DPL is especially useful if FAST is not available or unreliable and in the hypotensive, alcoholic patient or take drugs , unstable patient with multiple injuries as a means of excluding intra- abdominal bleeding .

* blood > 5-10 cc

* if we didn't find blood in abdomen, but we still doubt presense of blood ; we do (irrigation) ?

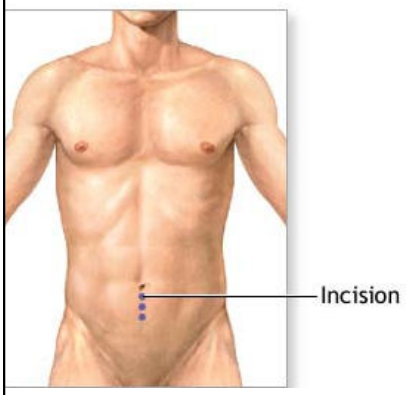
→ by irrigate it , by filling abdomen with normal saline ≈ 500 cc

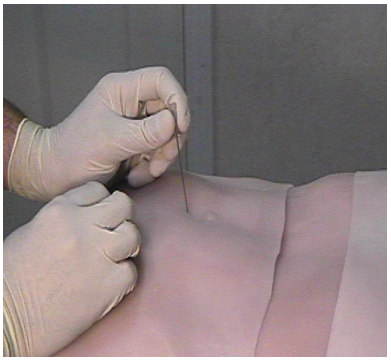
→ Then we see if there is blood in fluid , & we verify this by ?

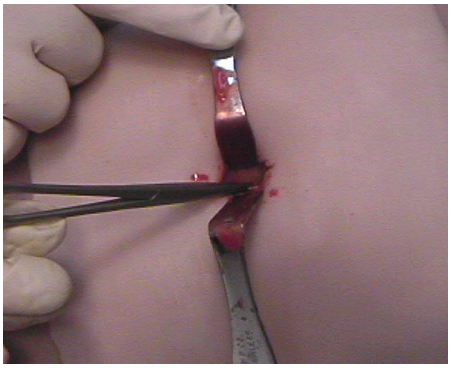
Positive diagnostic Peritoneal Lavage:

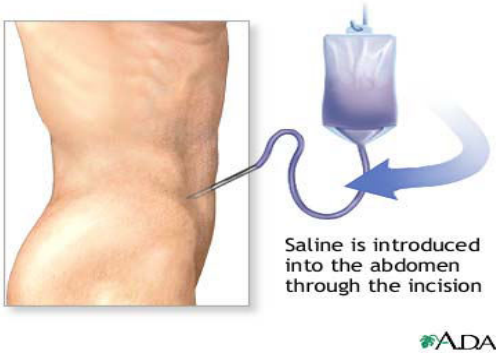
1. RBCs > 100,000 cells / ml
2. WBCs > 500 cells / ml
3. Amylase & Alkaline phosphatase

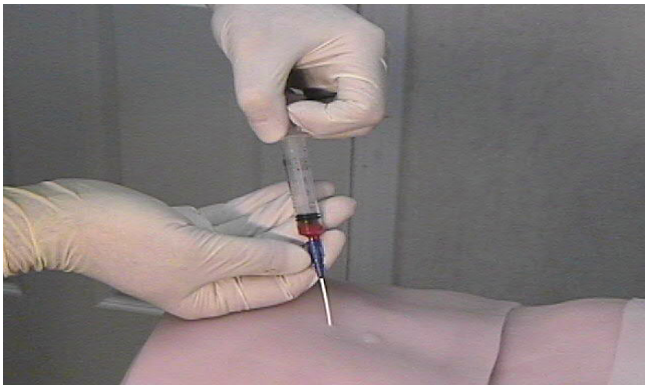
DPL Technique











Positive signs in DPL

1. > 5mls of blood aspirated before fluid is infused.
2. Bloody irrigated fluid
3. the presence of bile,
4. enteric contents.
5. Hematological & biochemical tests for the aspirated fluid:
   a. RBC > 100,000/cmm
   b. WBC > 500 /cmm
   c. Amylase > 175 units

Organs injury

The Spleen

CLINICAL ASPECTS OF SPLENIC RUPTURE

Symptoms:

- **May be painless, or LUQ/diffuse abd pain.**
- **referred L shoulder pain in splenic laceration: Kehr's sign**
- **Syncopy due tohypotension.**

Signs

- **Physical examination is insensitive and non specific.**
- **Pt may have signs of lt upper quadrant tenderness or signs of generalized peritoneal irritation.**
- **May present with tachycardia ,tachypnea, hypotension or shock**

Plain radiographic findings in splenic injury:

1. left lower rib fracture
2. left hemidiaphragm elevation
3. left lower lobe atelectasis,
4. Left pleural effusion
5. medial displacement of the gastric bubble
6. inferior displacement of the splenic flexure gas pattern.

SPLENIC ORGAN INJURY SCALING

grading

* يحتفد عليها في الTreatment

I – subcapsular hematoma <10% of surface. Laceration < 1cm deep.

II – subcapsular hematoma 10-50% of surface. Laceration 1-3 cm deep.

III – subcapsular hematoma >50% of surface or expanding. > 3 cm parenchymal depth.

IV –Laceration > 25 % of spleen or laceration involving the hilum..

V – completely shattered spleen or hilar vessel injury with devascularization.

- grade 1,2,3 → don't operate but still depends on evaluation
  (can be treated conservatively)

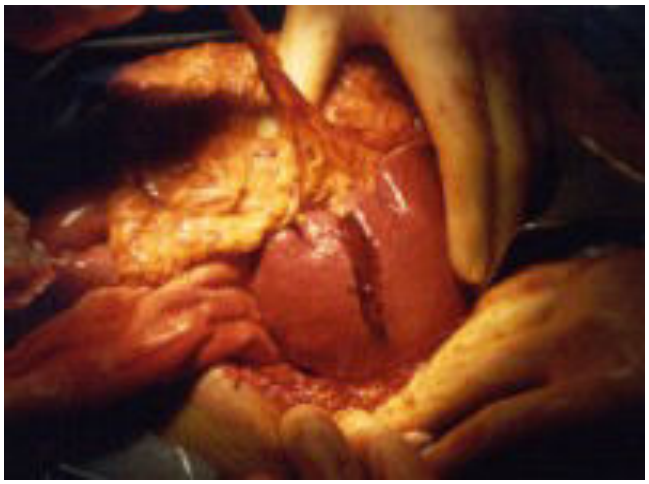
- grade 4,5 → can be treated operatively (usually surgery)

  a. splenic preservation → splenorrhaphy
  (conservative) → Partial splenectomy

  * conservative surgery → open the abdomen without remove the spleen ?
  → Try to keep fuction of spleen

  b. splenectomy → should be vaccinated
  " overwhelming abscess "

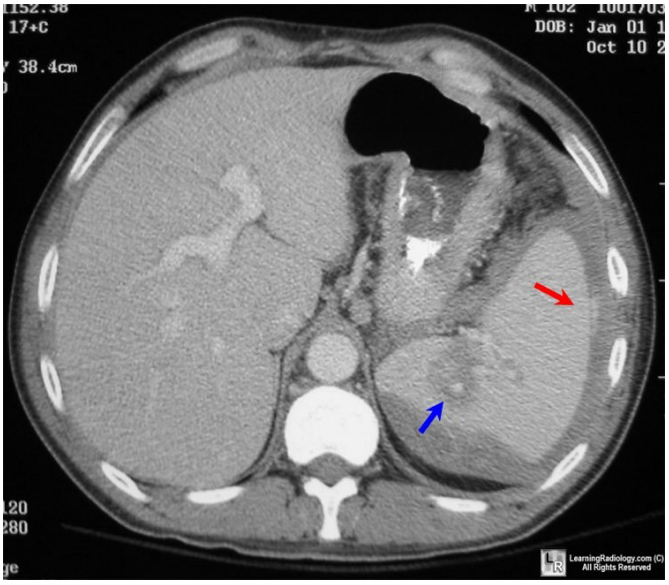
Splenic injury



Grade II

Splenic injury

Grade IV



Management options in splenic injury

1. Conservative –Observation

- may followed by a selective splenic artrey embolization

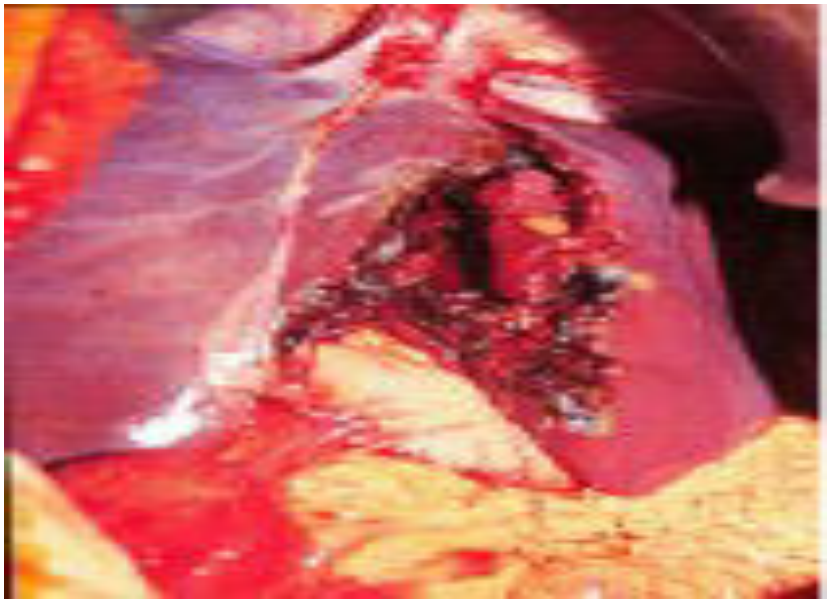
2.Surgery ← أي مريض بشيلها جراحي لازم يوخذ vaccine

a. Splenic preservation

- splenorraphy
- partial splenectomy

b. splenectomy

Liver injury



Symptoms of a liver injury

right upper quadrant pain, increase with deep breathing.

nausea or vomiting, tachycardia and fainting,

Physical examination :

tenderness to palpation in the right upper quadrant of the abdomen. Abnormalities of blood pressure and pulse will be noted (low blood pressure and pulse over 100).

Liver injury scale

Grade I :Sub capsular hematoma < 10%of surface area,non expanding.

Laceration < 1cm parenchymal depth,non bleeding.

Grade II :Sub capsular hematoma 10-50%

parenchymal Laceration 1-3 in depth ,<10 cm in length.

Grade III :Sub capsular hematoma >50 %

3 cm parenchymal depth.

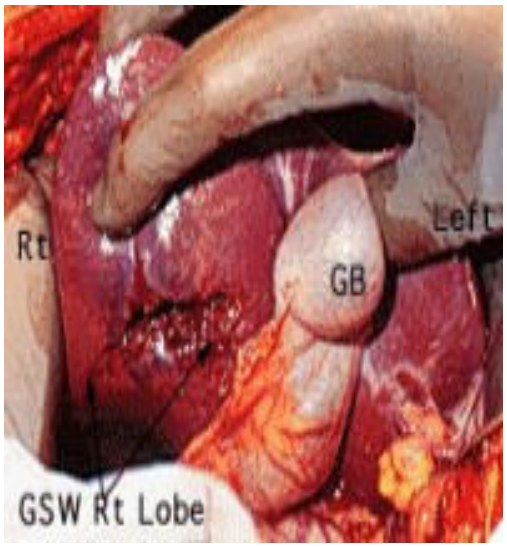
Grade IV : Ruptured intra parechymal hematoma with active bleeding.

Parechymal distruption involving 25-50%of hepatic lobe.

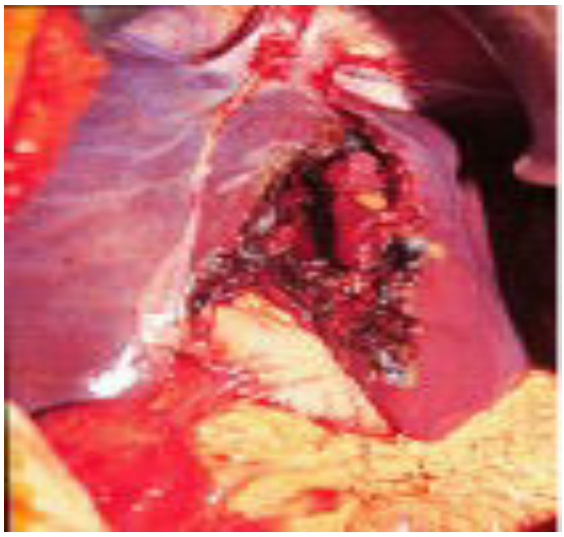
Grade V : Parenchymal distruption >50%of hepatic lobe

Vascular injuries :hepatic veins,inf. Vena cava.

Liver injury



Grade II



Grade IV

Treatment of liver injury

Nonoperative management: is safe, effective, and clearly

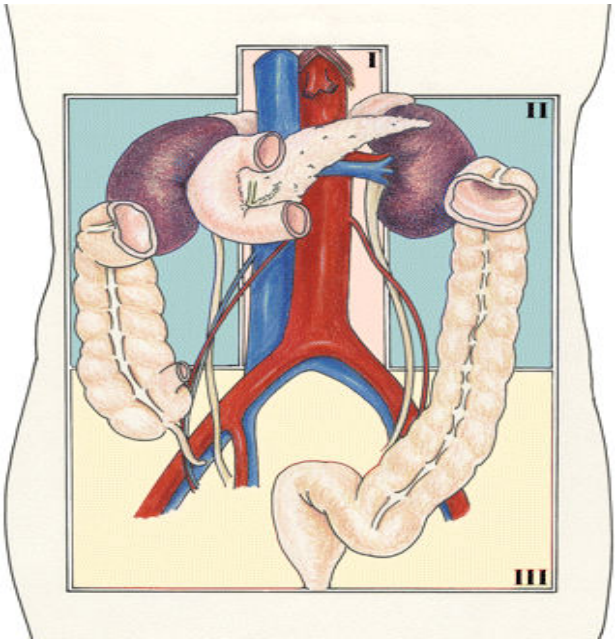
the treatment modality of choice in hemodynamically stable patients.

The weakness in this treatment is the possibility of missing an associated intra abdominal injury

Operative management :

- simple suture techniques
- resectional debridement to control hemorrhage.
- Anatomic resection,
- hepatic artery ligation
- Mesh wrapping or perihepatic packing,
- fibrin glue application

Retroperitoneal organs injury



Retroperitoneal injuries
&
retro peritoneal hematoma

1. **Frequently over looked and carry significant morbidity.**

2. **Diagnosis require a high index of suspicion and an organized diagnostic approach**

any patient who has sustained a direct high-energy blow to the epigastrium ,ie from a crushed steering wheel in an adult.

3. **the findings of retro peritoneal hematoma on CT or at operation.**

Zones of retroperitoneal hematoma

Zone I :

.Occupy the centro medial portion of the retro peritoneum,

.Include : dodenum &pancrease and major bloosd vessels.

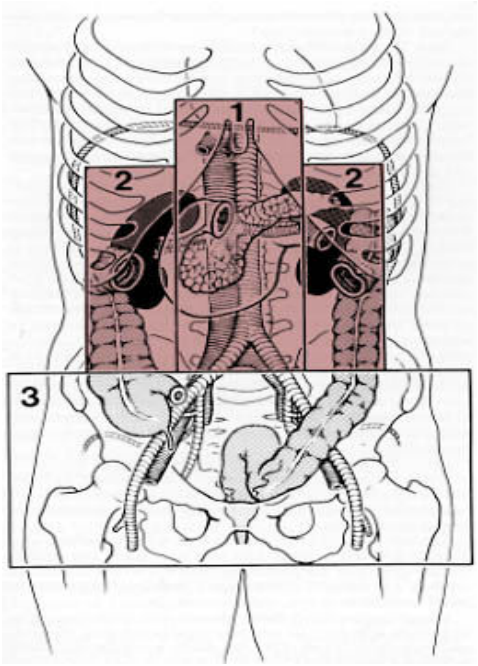
Zone II :

Is lateral to zone I,

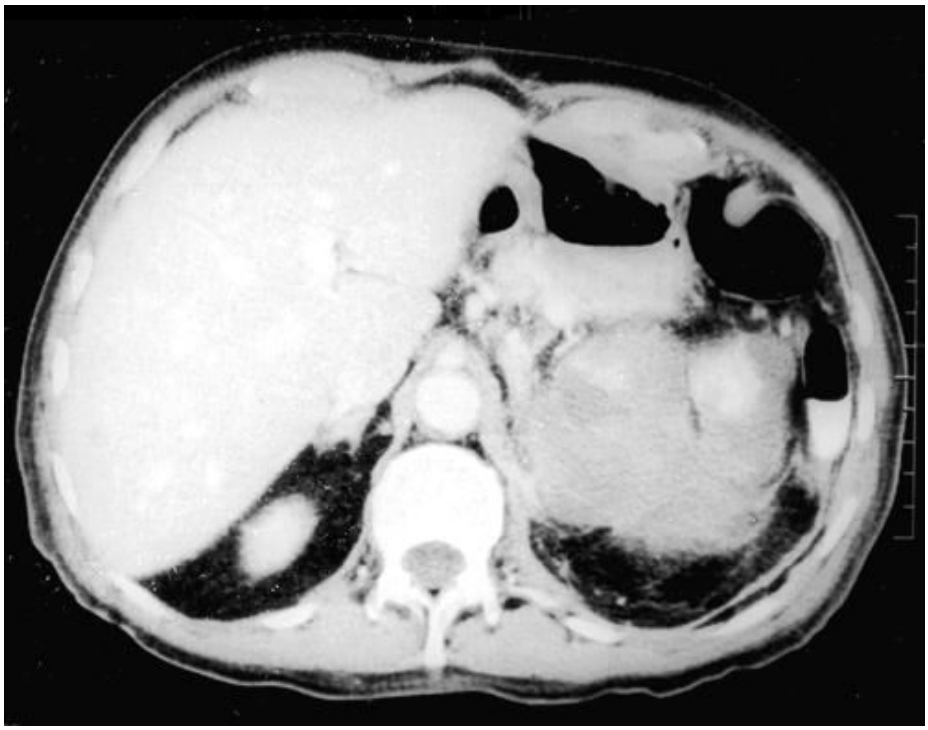
.Include : kidney & retro peritoneal portion of colon.

Zone III :

Include entire pelvis



Retroperitoneal hematoma , CT



Retroperitoneal hematoma

location	Blunt	Pentrating
Zone I	Explore	Explore
Zone II	Observe	Explore
Z0ne III	Observe	Explore

Abreviated laprotomy

Multiple trauma patients are more likely ***to die*** *from their* ***intra-operative metabolic failure*** *that from a failure to complete operative repairs.*

The patients die from , a triad of :

a. ***coagulopathy,***

b. ***hypothermia and***

c. ***metabolic acidosis***.

The principles of the first 'damage control' procedure are control of haemorrhage, prevention of contamination and protection from further injury.

Archive

*** Seat belt injury in children are at greatest risk of**

A-Colonic perforation

B-Small bowel injury

C-Thoracolumber vertebral injury

D-Bladder rupture

E-IVC injury

*** 29.Which of the following is the treatment of choice for a perforated duodenal ulcer in a 56-year-old man with a strong history of ulcer disease and signs of peritonitis after 12 hours?**

a. conservativemanagementwithnasogastricsuctionandintravenousfluids

b. vagotomyandpyloroplasty

c. omental patch repair and peritoneal lavage

d. highlyselectivevagotomy

e. partialgastrectomy

*** Diagnoatic peritonial lavage EXCEPT :**

RBC < 500

*** All of the following data are considered positive peritoneal lavage after blunt abdominal trauma, EXCEPT:**

A. Amylase positive in the lavage fluid B. Bile positive in the lavage fluid

C. Red blood cell count 100 000/ml

D. Albumin of 5 g/l

E. Gram stain positive for bacteria in the lavage fluid

*** Which of the followings is the least used in the diagnosis of intra abdominal bleeding following blunt trauma**

a. repeated clinical exam.

b. DPL diagnostic peritoneal lavage

c. FAST d. CT

e. MRI

Clinical features of abdominal compartment syndrome following multiple trauma patient include the followings except

a. tachycardia

b. low urine output

c. elevated CVP

d. The elevated abdominal pressure can be measured by folys catheter

e. Intra abdominal pressure above 10 cm H2O is diagnostic. ?