

Spleen

Dr. Mahmoud Al-Awaysheh

MRCSI

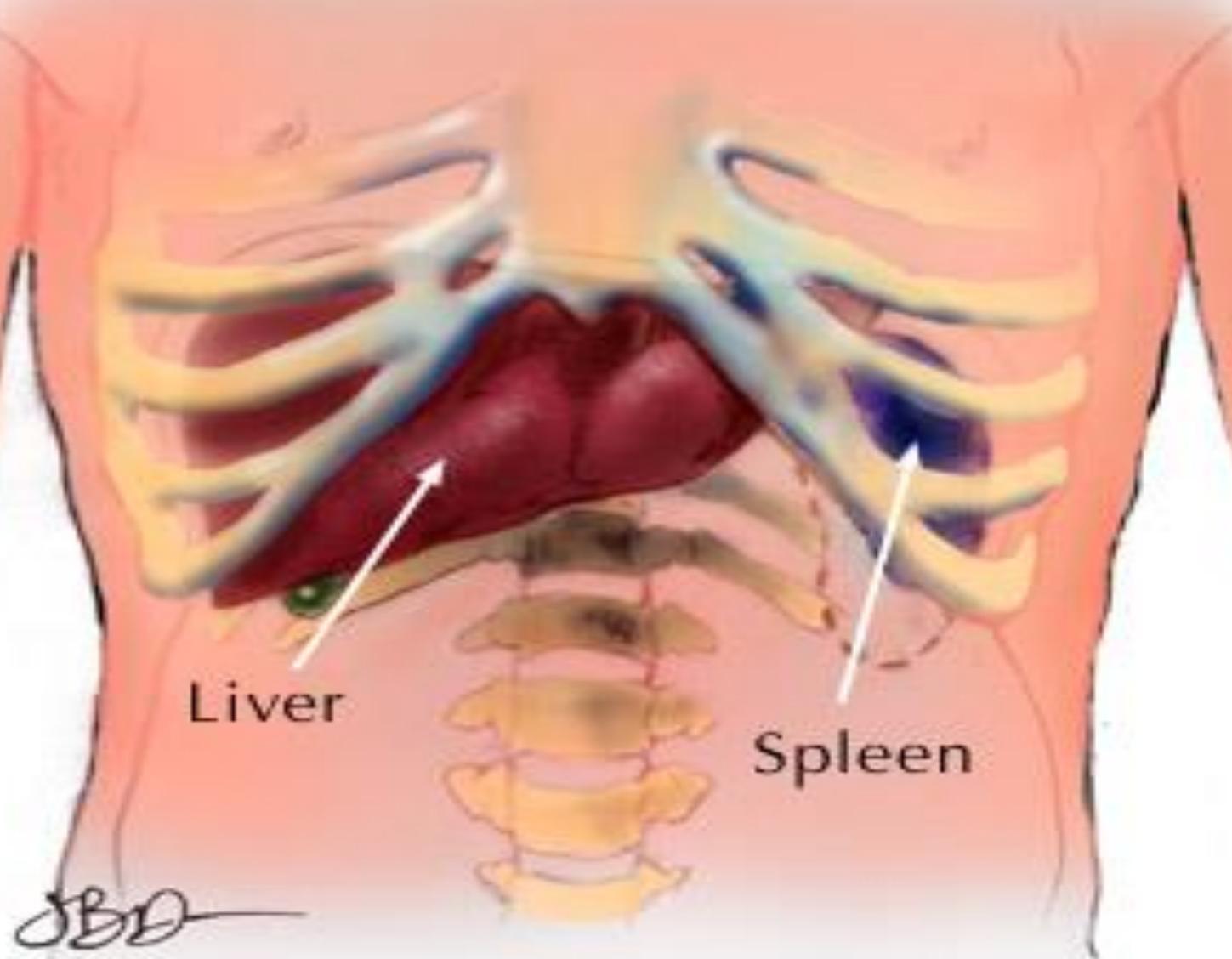
Mu'ta University

Spleen

Anatomy:

- Wt 75-250 gm, LUQ, along 10th rib, between gastric fundus & L hemidiaphragm.
- Hilum: In the angle between stomach & L kidney, in contact with tail of pancreas.
- Concave Visceral surface: impressions.
- Notch: infero lateral border, palpate in splenomegaly.

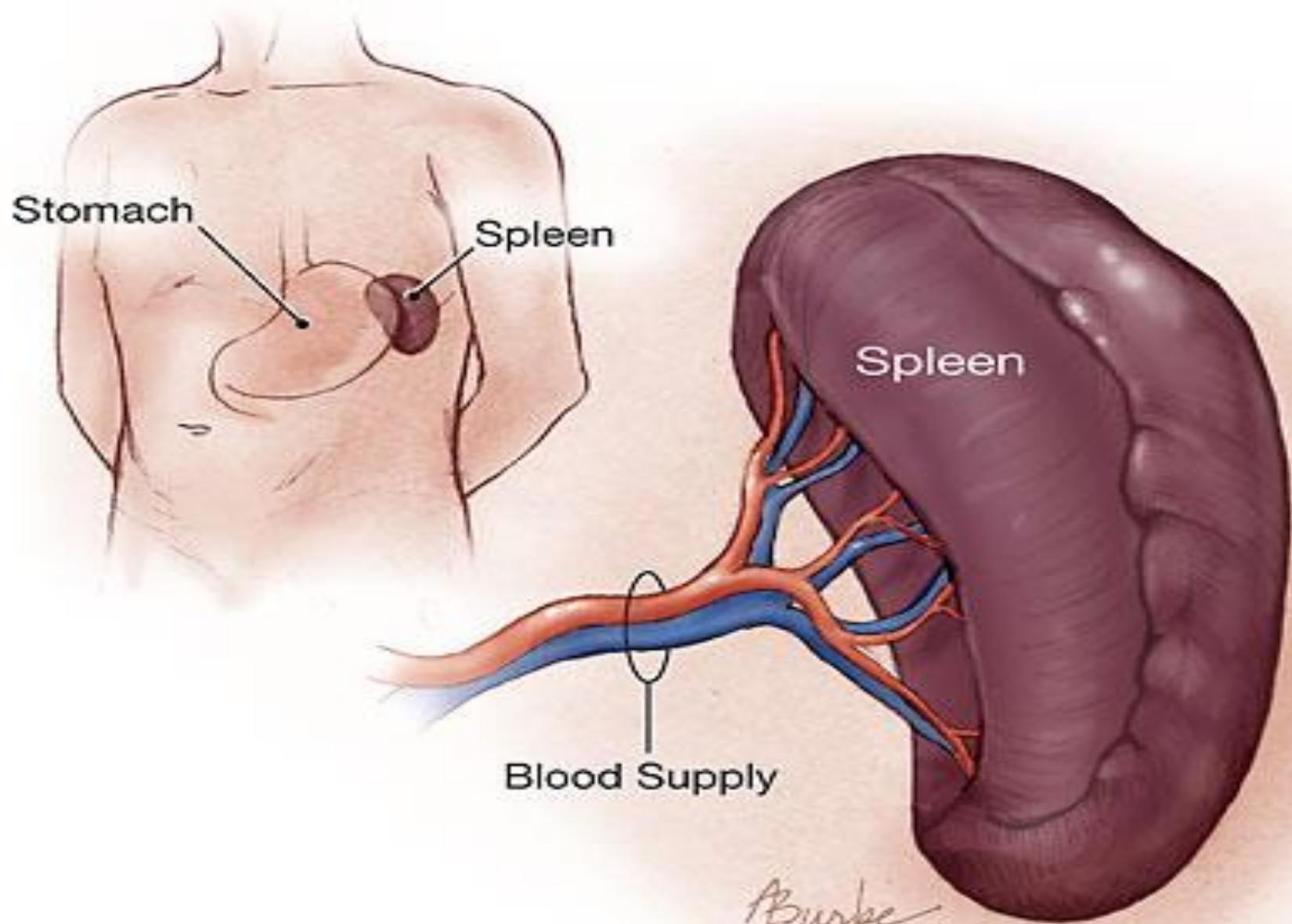
- **Arterial:** Splenic A. along upper border of tail of pancrease.
- **Vein:** Splenic V.at hilum behind pancrease.join SMV to form portal V.
- **Lymphatics:** efferent vessels from white pulp to L N in hilum to retropancreatic to coeliac nodes.

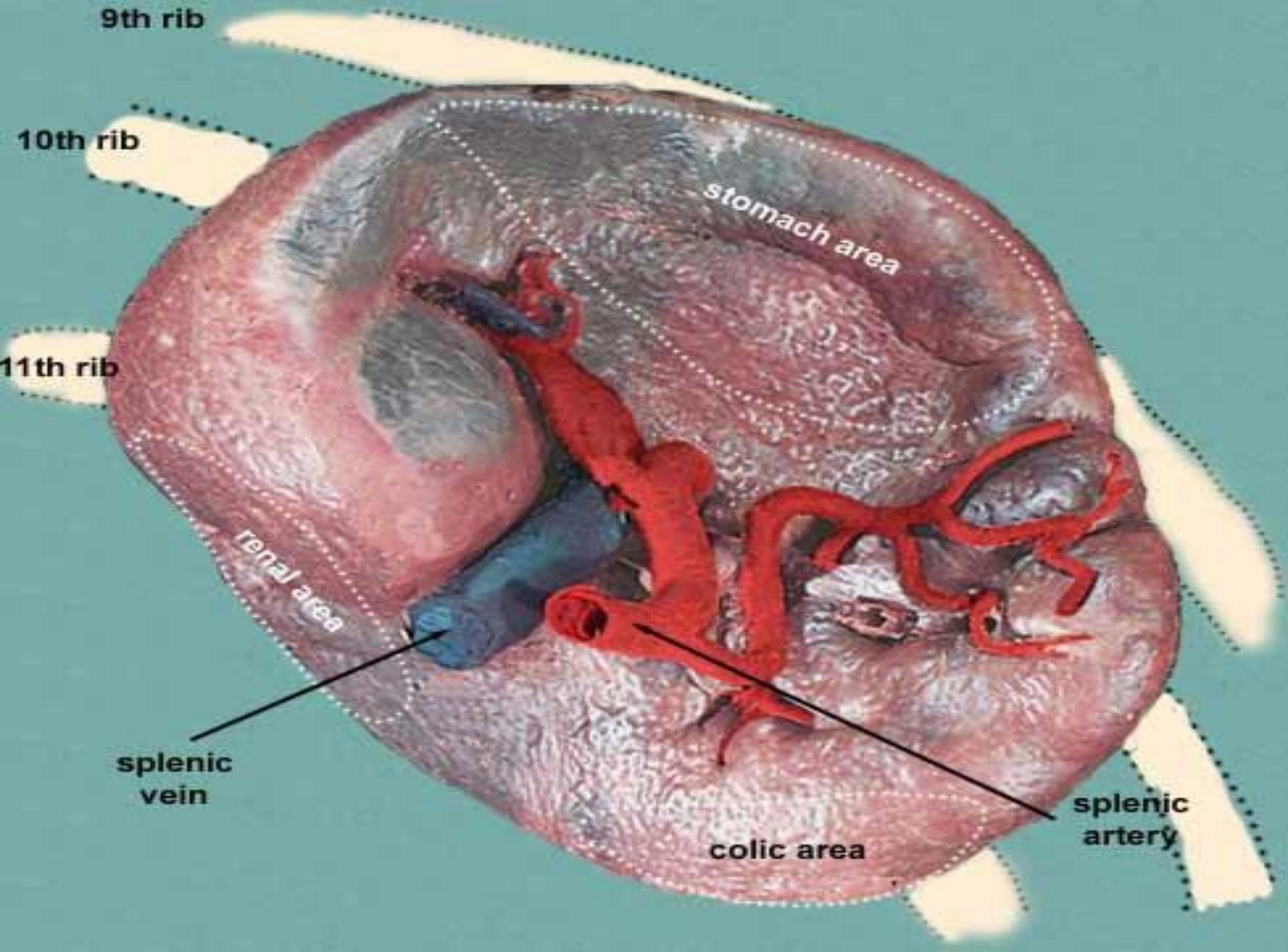


Liver

Spleen

JBD

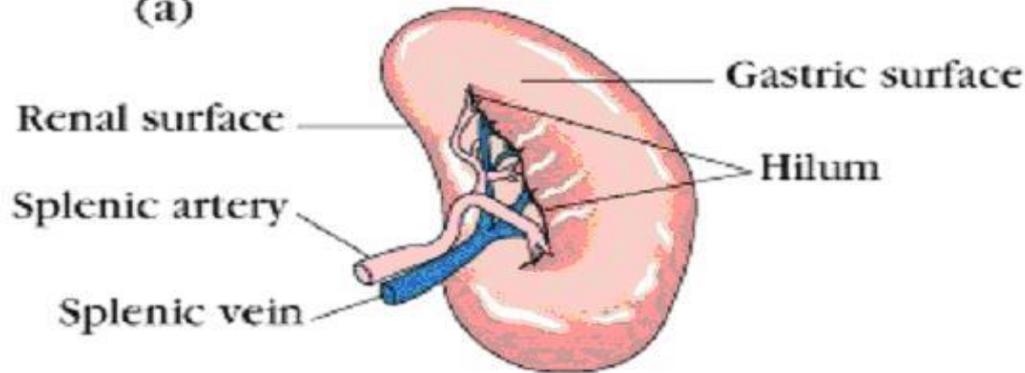




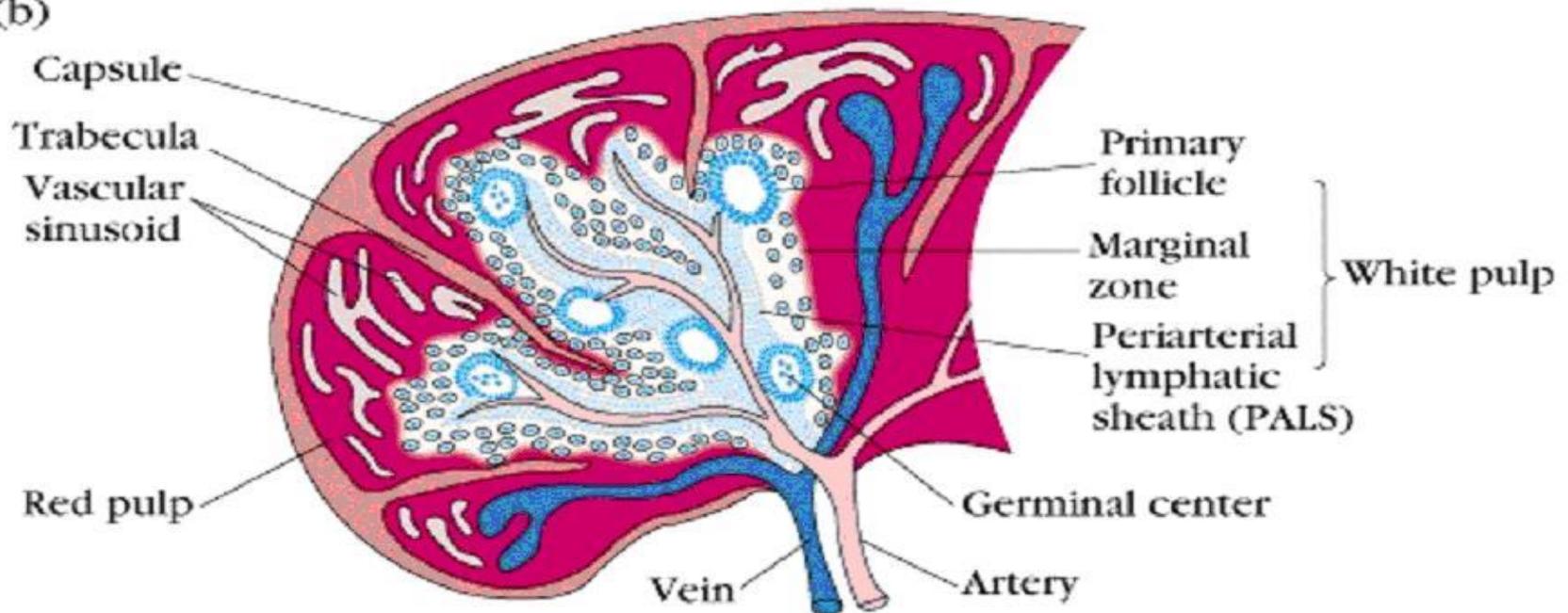
Spleen

- **Physiology:**

(a)



(b)



Spleen

Functions:

1. Response to antigenic challenge
2. Destruction of abnormally shaped or rigid red cells
3. Phagocytosis of foreign substance
4. Platelet reservoir
5. Erythrocyte production

Investigation of the Spleen.

- FBC, Reticulocytes, tests for haemolysis.
- LFT & OGD in splenomegaly+portal hypertension in liver cirrhosis.
- Investigations for causes of splenomegaly including LN biopsy.
- Radiology:
 - 1- Calcification: splenic infarct, splenic a. aneurysm, hydatid cyst, TB.
 - 2- US, CT with contrast, MRI.
 - 3- Tc99: is spleen site of RBC destruction?.

Congenital Abn of Spleen

1-Agenesis:rare.

2-Spleniculi:10-30% of population.

Hilum (50%), splenic vessels & tail of pancreas (30%), mesocolon & splenic ligaments (20%) .

**Failure to remove spleniculi during splenectomy.....persistant disease.

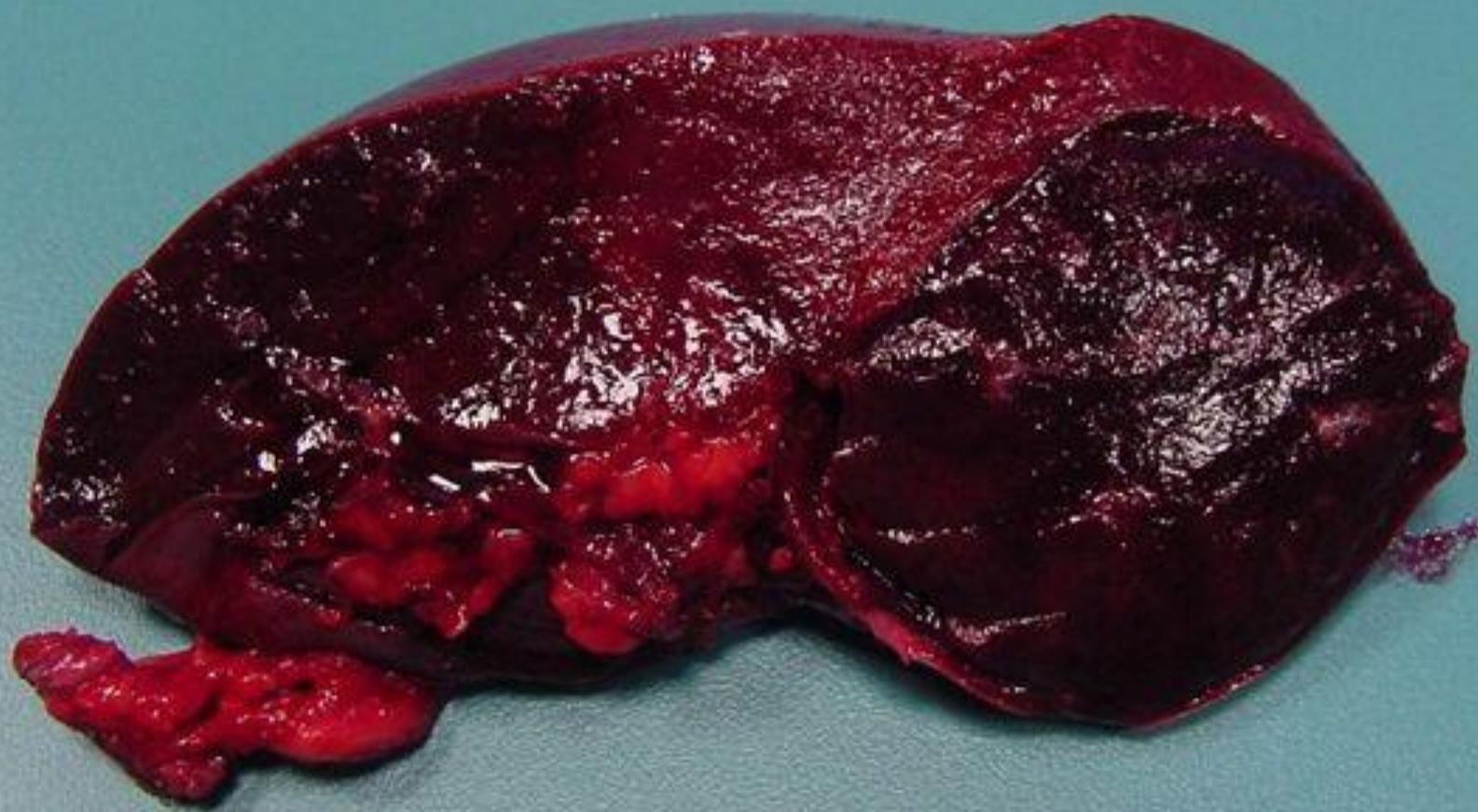
3-Hamartomas:rare

4-Non parasitic splenic cyst:

1-True,dermoid,mesenchymal.

2-False,trauma

3- Pseudocyst after pancreatitis.





Splenic Rupture

Consider it :

- 1-Bunt abdominal trauma LUQ (RTA, Fall,...).
- 2-High Risk: diseased or enlarged spleen(rupture of a malarial spleen in trivial injury).
- 3-Fractures of 9th,10th, 11th left ribs.
- 4-Iatrogenic.

Presentation:

- 1-Succumbs rapidly from massive haemorrhage
- 2-Initial shock,recovery,signs of late bleeding:
Blood loss+tamponade+further bleeding.Reminder are,general signs of internal haemorrhage,local LUQ peritonitis signs,Kehrs sign+FAST US & CT.
- 3-Delayed rupture:uncommon with these days scan use In ER.

Splenic rupture

Management:

1-Conservative:

1-minimal or no abdominal findings+stable haemodynamically .

2-CT,isolated injury,no hliar injury,no massive distruption of spleen.

2-Immediate Laparotomy:

1-continuing blood loss despite adequate resuscitation.

2-associated abdominal organ injuries with blunt splenic trauma is up to 25-50%.

*******Consider splenic preservation*******

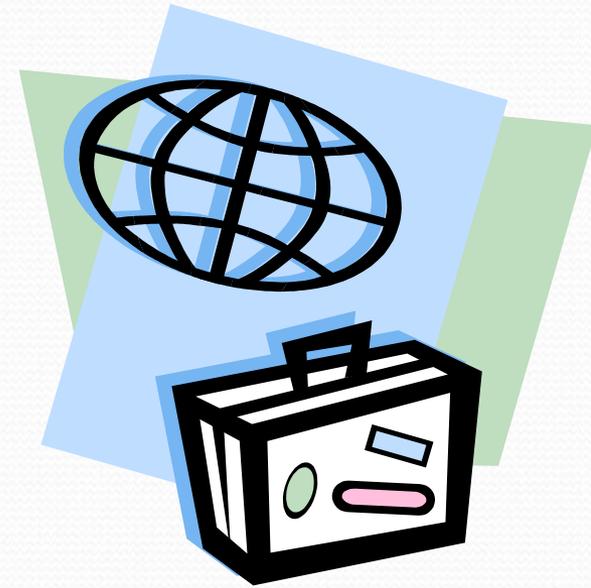
Splenic Trauma

- **Spleen**

- Is one of most vascular organs , pass through it 350 liter of blood / day , contain 1 unit of blood at any moment !
- **Types of trauma :**
 - 1- Blunt
 - 2- penetrating : Easily diagnosed , because patient almost always referred to Surgery .

Blunt Trauma of Spleen

- 25% of all blunt trauma of abdominal viscera
- More in male 3:2
- Most common cause is RTA
- Presentation :
 - Asymptomatic
 - abdominal pain (50%) , abdominal Distention , Hypotension (25%)



Diagnosis

- For stable patient :

1. *UltraSound*
2. *CT*
3. *Angiography*



4. Plain radiography / chest and abdomen

- The radiography signs of rupture are:-

- 1. Obliteration of the splenic outline**
- 2. Obliteration of the psoas shadow**
- 3. Indentation of the left side of the gastric air bubble**
- 4. Fracture of one or more lower ribs on the left side (present 27 % of cases**
- 5. Elevation of the left side of the diaphragm**
- 6. Free fluid between gas filled intestinal coils .**

5. CT

- Modality of choice
- Used with contrast .
- Findings :
 1. Lacerations : irregular hypodense area with no enhancement .
 2. Sub-capsular hematoma : regular shape , crescentic .
 3. Intraparenchymal hematoma .
 4. Fragmentation with autosplenectomy .

Diagnosis

- Unstable patient :
 - Open and See !
 - Peritoneal lavage
 - FAST



Spleen injury grading scale :

- **Stage 1 :**

- Subcapsular Hematoma < 10 % of surface area .
- Capsular tear depth < 1 cm .



Spleen injury grading scale :

- **Stage 2 :**

- Subcapsular hematoma of 10 – 50 % of surface area .
- Laceration depth :
 - 1-3 cm
 - Not involving trabecular vessels
- Intraparenchymal Hematoma < 5 cm in Diameter .

Spleen injury grading scale :

- **Stage 3 :**

- Sub-capsular Hematoma $> 50\%$, or Ruptured spleen .
- Laceration depth :
 - > 3 cm
 - Involving the trabecular Vessels .
- Intraparenchymal hematoma > 5 cm in diameter .

Spleen injury grading scale :

- **Stage 4 :**
 - Laceration involving hilar or segmental vessels with devascularization of $> 25\%$ of spleen



Spleen injury grading scale :

- **Stage 5 :**
 - Shattered spleen



Treatment

1. Conservative:

- Admit patient to ICU
- Repeated ultrasound
- For those with stage 1 or 2 .



2- splenectomy

3- conservative splenoraphy .

suturing of spleen to prevent further bleeding .

4- splenic artery Embolization .

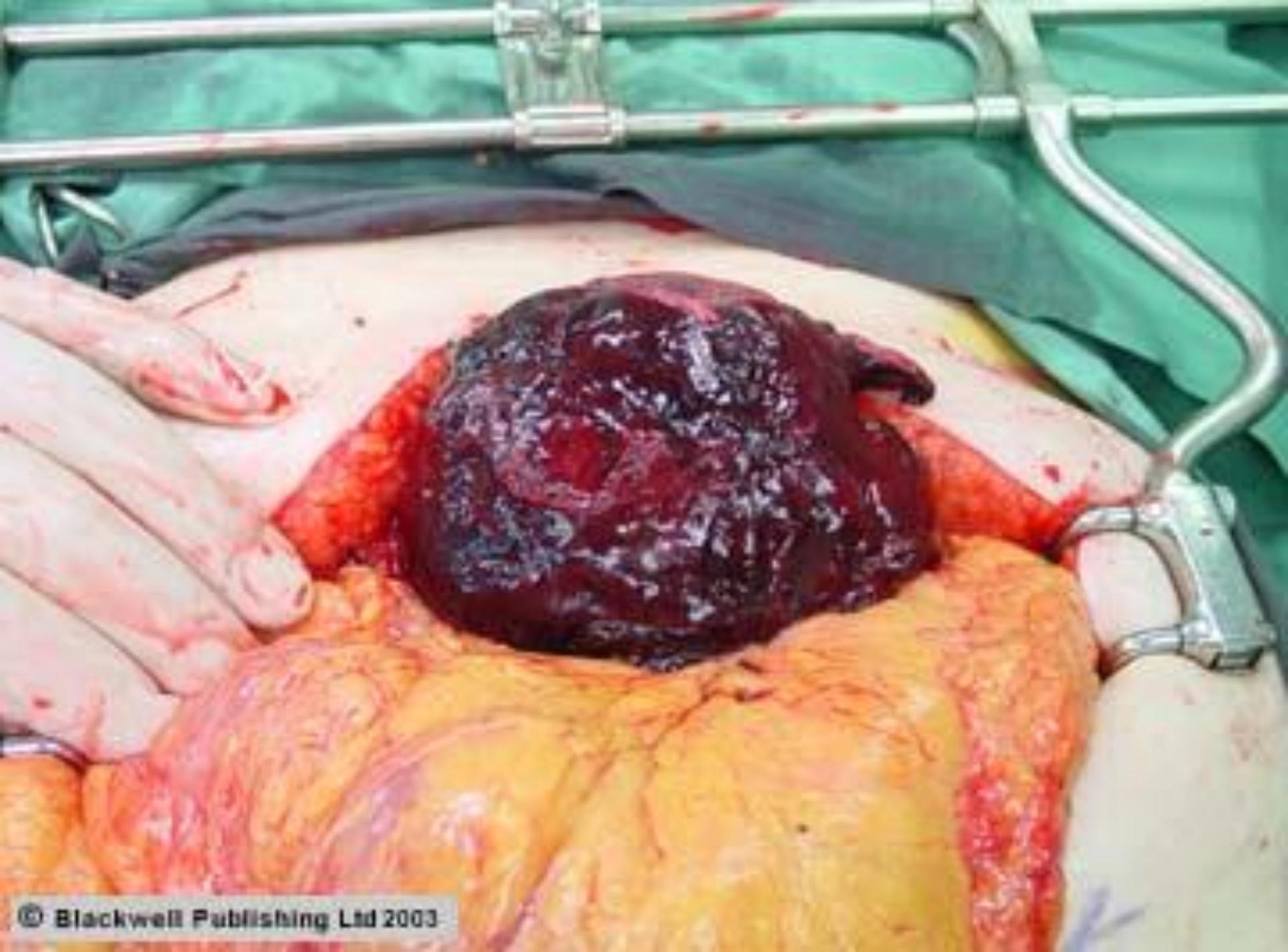
- less mortality and morbidity than splenectomy

- mortality is related to % of splenic tissue Embolized .

- Complications :

1. Pancreatitis
2. Splenic Abscess
3. Pleural Effusion (most common)







Causes of splenomegaly

Infection

- Acute (viral)
- Subacute
- Chronic (malaria)

Immunological inflammatory disorders

- Felty syndrome (with rheumatoid arthritis and granulocytopenia)
- Systemic lupus erythematosus
- Sarcoidosis
- Amyloidosis
- Thyroiditis

Haemolytic anaemia

Immune thrombocytopenia

Portal hypertension

- Thrombosis of the portal vein
- Liver cirrhosis

Primary metastatic neoplasms

- Leukaemia (in particular, chronic lymphocytic leukaemia)
- Lymphoma/Hodgkin's disease
- Myeloproliferative syndromes
- Sarcoma

Storage diseases

- Gaucher's disease
- Niemann–Pick disease

Splenomegaly & Hypersplenism

Hypersplenism: *Clinical syndrome*

- 1-Splenic enlargement.
- 2-Any combination of anaemie,leucopenia or thrombocytopenia.
- 3-Compensatory bone marrow hyperplasia.
- 4-Improvement after splenectomy.

Splenectomy for Blood ds

1-ITP:

- 15-50 y female.
- CP: Ecchymoses purpuric patches of skin & MM.
Post traumatic skin petechial haemorrhage.
Epistaxis, Menorrhgia.
10% palpable spleen.
- Investigations: B.T increased. C.T & P.T normal.
Thrombocytopenia.

Treatment

1-75% regress after 1st attack in paediatrics.

2-Steroid for short course in adult & children...recovery

3- Surgery: Refractory (more than 9 months+low platelet+ 2 relapses).Two thirds cure.

Splenectomy for Blood ds

2-Haemolytic Anaemias:

1-Hereditary Spherocytosis.

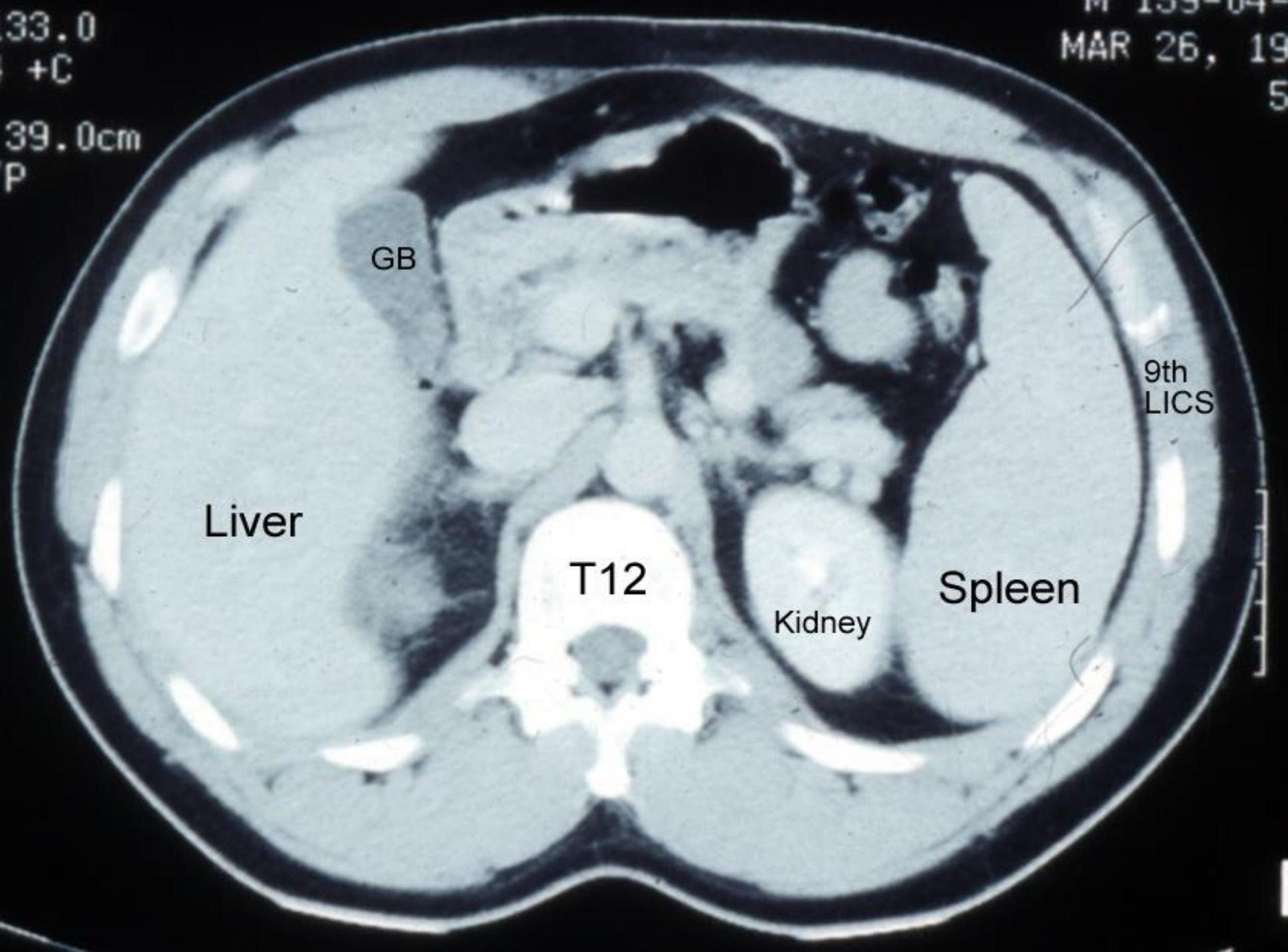
2-Sickel cell anaemia.

3-Thalassaemia.

4-Acquired autoimmune haemolytic anaemia

33.0
+C
39.0cm
P

M 155-04
MAR 26, 19
5



Liver

GB

T12

Kidney

Spleen

9th
LICS



Hereditary spherocytosis

- Autosomal dominant.spherocytic RBC.
- Present in childhood.haemolytic
jaundice+splenomegaly+pigment gall stones.
- Fragility test RBC haemolyse in stronger saline
solution 0.6%(normally in 0.47% saline solution).
- Reticulocytes increase.
- Radioactive Cr 51 labelling RBC..RBC destruction.

Splenectomy for neoplasms

- 1-**Haemangioma** :Most common benign tumour of spleen
Haemangiosarcoma (rare).
- 2-**Lymphoma**:most common cause of neoplastic enlargement.
---Splenectomy is for..
 - 1-management.
 - 2-diagnosis& staging.(CT is alternative for staging).
- 3-**Myelofibrosis**: Abnormal proliferation of mesenchymal elements in BM,spleen,liver & LN.
 - Over 50,gross splenomegaly with LUQ pain.
 - Splenectomy reduces the need transfusion & may relieve the pain.



Indications for splenectomy

Traumatic

- Rupture after blunt injury to the abdomen
- Iatrogenic injury during another procedure (particularly mobilization of the splenic flexure of the colon)

Haematological

- Immune thrombocytopenia
- Hereditary spherocytosis
- Autoimmune haemolytic anaemias
- Malaria
- Schistosomiasis
- Leishmaniasis
- Staging of haematological malignancies (e.g. Hodgkin's disease)

With other viscera

- Radical gastrectomy
- Pancreatectomy

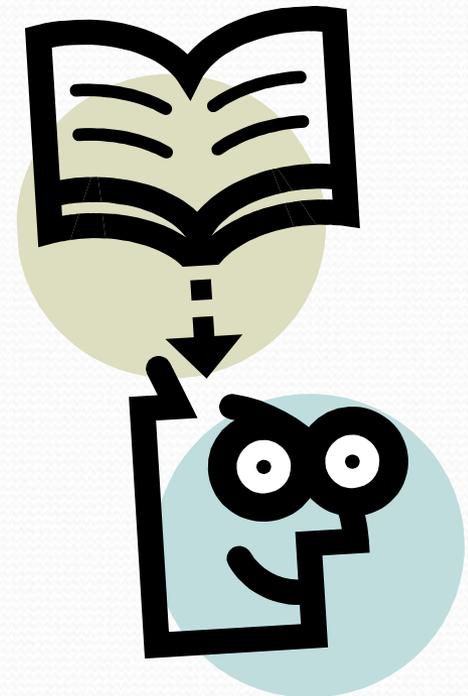
Miscellaneous

- Treatment for gastric varices
- Treatment of splenic artery aneurysms
- Treatment of splenic cysts/tumours

Splenectomy

Preop. Investigations:

- 1-Blood, FFP, Cryoprecipitate, platelets.
- 2-Coagulation profile.
- 3-Antibiotic prophylaxis



Splenectomy

Post operative complications:

- 1-Slipped ligature from splenic a...Haemorrhage.
- 2-Haematemesis(gastric mucosal damage)
- 3-Gastric dilatation.
- 4-Left basal atelectasis & Pleural effusion.
- 5-Injury to tail of pancreas.pancreatitis,abscess,fistula.
- 6-injury to greater curvature of stomach during ligation short gastric vessels...fistula.

Splenectomy

7-Venous Thrombosis.

Prophylactic aspirin if platelets more than 1 million

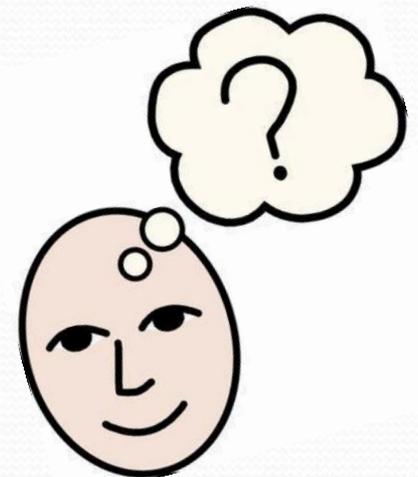
8-Post splenectomy septicaemia:

1-Strep pneumonia.

2-N meningitides.

3-H influenzae

4-E.coli.



Higher Risk Groups:

- 1-Young.
- 2-Chemoradiotherapy.
- 3-Splenectomy for blood dss.



9- OPSI (*overwhelming post splenectomy infection*) is a real clinical danger.

Splenectomy

OPSI:

1-Prophylactic daily penicillin if under 5 y until they are 10.

2-prophylaxis for 2-3 years if older than 5y.

Oral Penicillin, Erythromycin, Amoxicillin, Co-Amoxiclav.

I.V same A.B above or Cefotaxime, Ceftriaxone or chloramphenicol if allergic to Penicillin or Cephalosporine

Splenectomy

Immunization and antibiotic prophylaxis

Vaccinations

- Pneumococcal vaccination before surgery and repeated at intervals of five years
- *Haemophilus influenzae* and meningococcal vaccination before surgery if not previously received
- Influenza vaccinations given every year
- Giving vaccines minimum of two weeks before surgery or as soon as possible after emergency surgery

Antibiotics

- Lifelong penicillin should be offered (250–500 mg b.d.)
- Urgent admission to hospital and antibiotic administration on development of infective symptoms
- Written patient information and a health alert card

*** Post operative vaccination give less than 50% antibody levels of those with preoperative vaccination.**

Thank You ☺



**Dr. Mahmoud Al-
Awaysheh
Mu'ta University**