جامعة المعرفة
ALMAAREFA UNIVERSITY

Diseases Of Spleen

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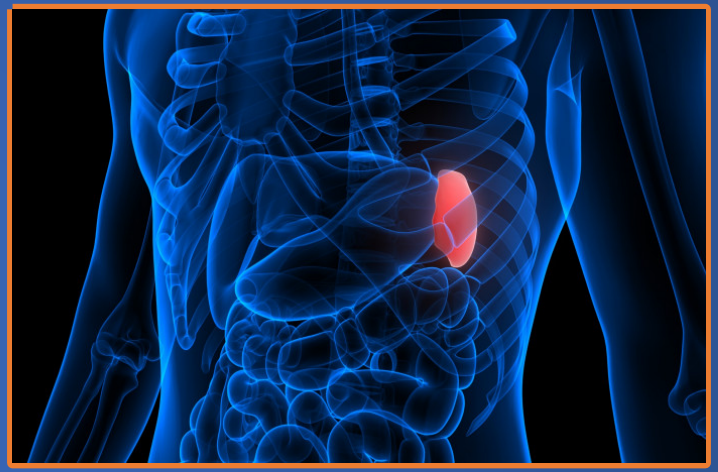
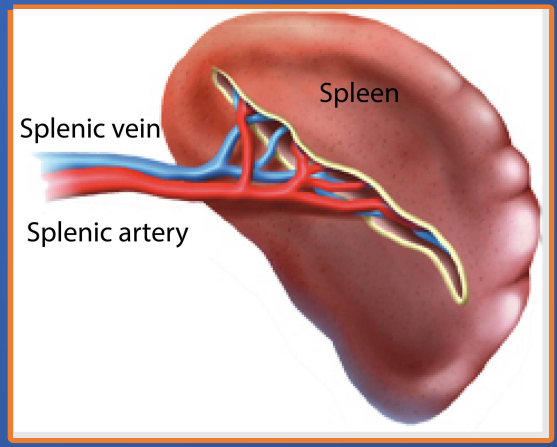


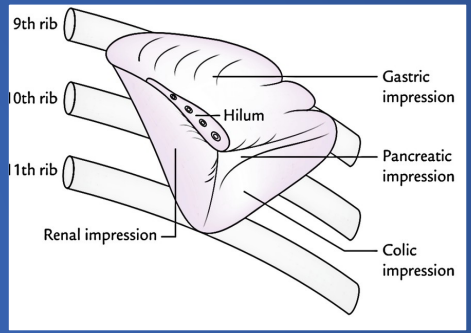


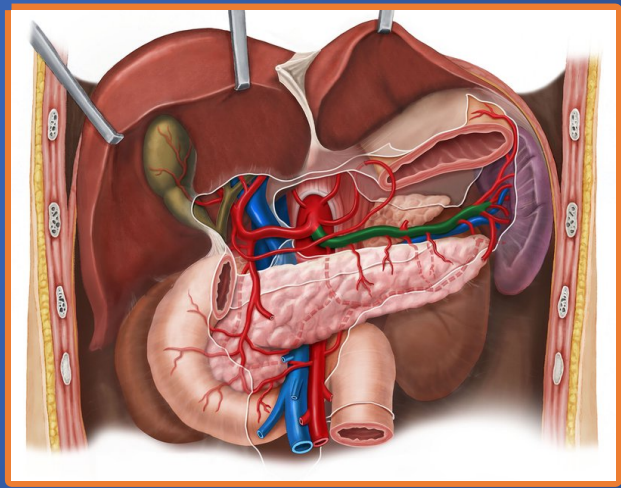
Objectives

- Anatomy & functions
- Causes of splenomegaly
- Splenic diseases of surgical interest
- Indications of splenectomy
- Hematological changes post-splenectomy
- Post-splenectomy sepsis

Surgical Anatomy

- **Convex surface & upper pole:**
  - related to diaphragm (9-11 ribs).
- **Concave surface:**
  - Fundus of stomach, tail of pancreas, & upper pole of left kidney
- **Lower pole:** rests on splenic flexure of colon





Surgical Anatomy

A presence of spleen

- **Accessory spleen:**
  - (10-20%)
  - Mostly hilum, may be anywhere

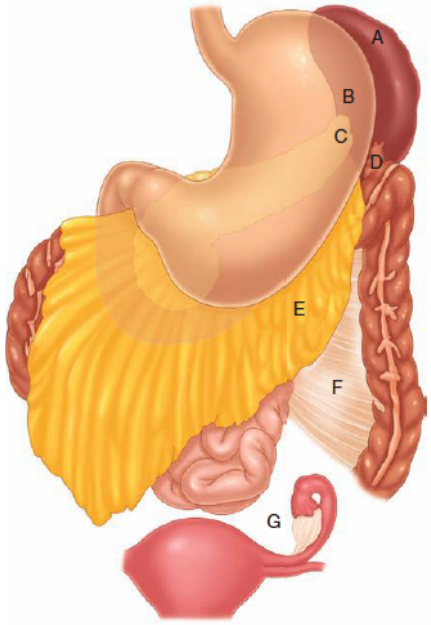
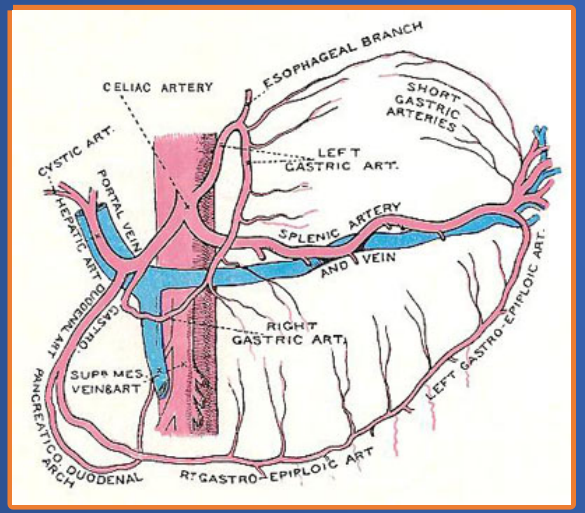
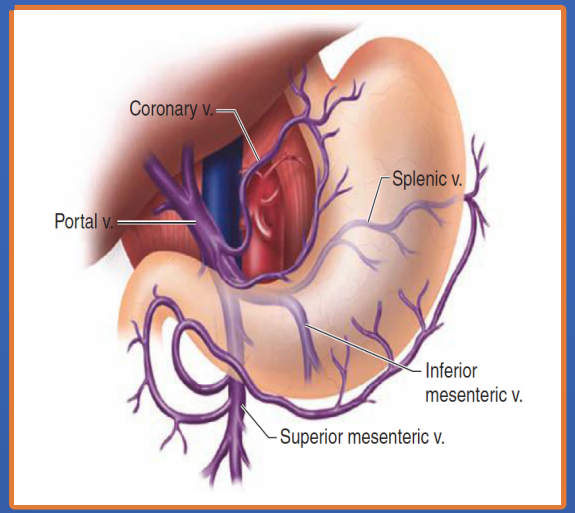


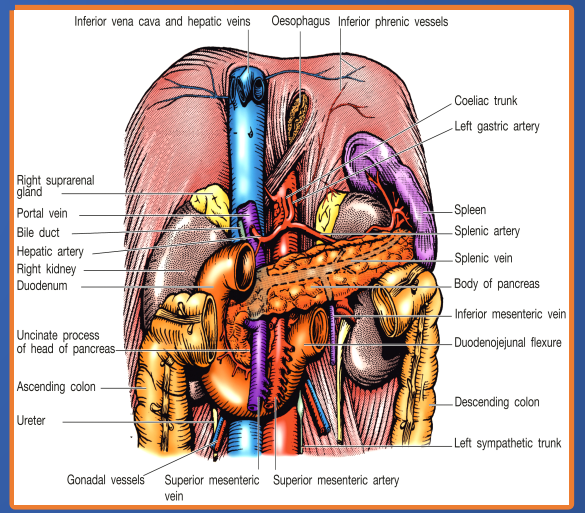
Figure 34-1. Sites where accessory spleens are found in order of importance. *A.* Hilar region, 54%; *B.* pedicle, 25%; *C.* tail of pancreas, 6%; *D.* splenocolic ligament, 2%; *E.* greater omentum, 12%; *F.* mesentery, 0.5%; *G.* left ovary, 0.5%.

Surgical Anatomy

- **Splenic artery**: branch from celiac axis
- **Splenic vein**: joins SMV to form portal vein

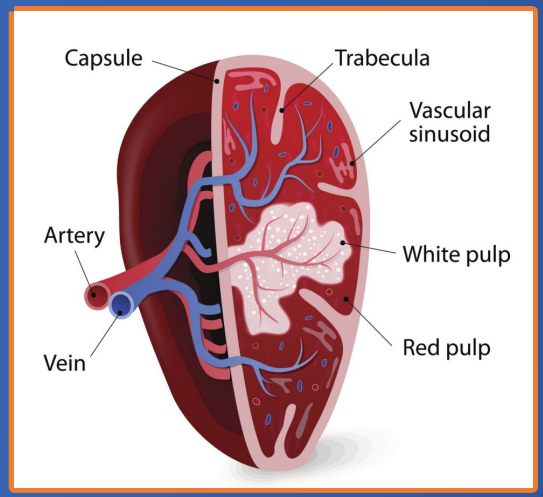


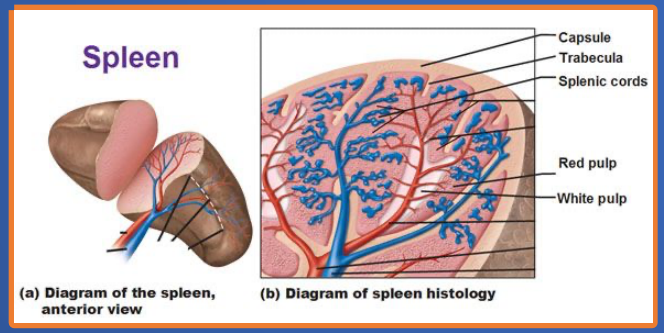




Surgical Physiology

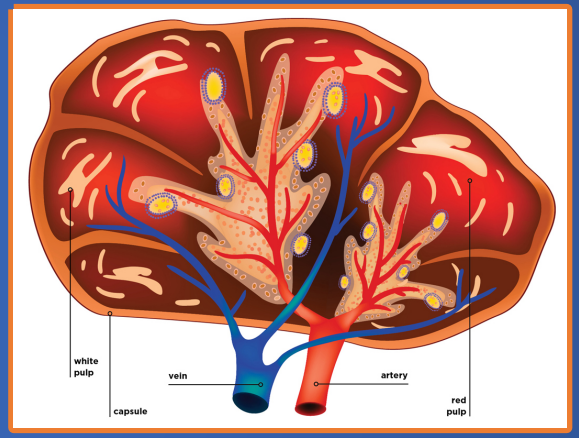
- Highly vascularized (5% CO).
- Largest **filter** of blood & a **lymphoid** organ
- Composed of **red & white** pulp.





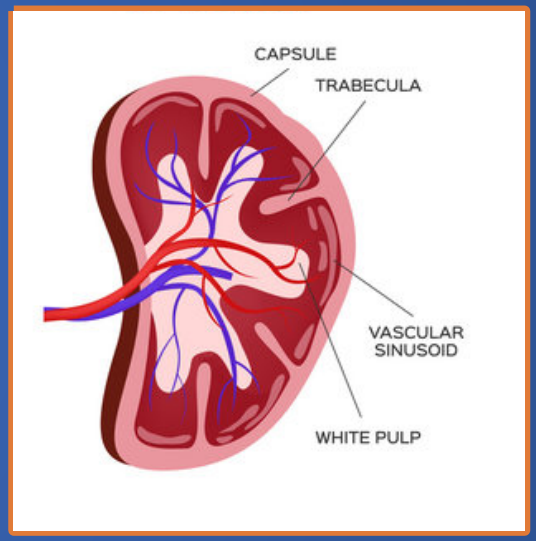
Surgical Physiology

- **Red pulp:**
  - Made up of **sinusoids**
    - Filters old RBC
    - Phagocytose
  - Iron transported back to bone marrow for new RBC
  - RBC &Platelets: 1% & 20-30% respectively are sequestrated
  - (**Howell-Jolly bodies**): Post-splenectomy- mis-shapen RBC with nuclear remnants seen in circulation



Surgical Physiology

- **White pulp:**
  - largest aggregation of lymphoid tissue
  - Composed of **lymphoid follicles** (Malpighian bodies), lymphocytes (T & B), macrophages, & plasma cells
  - Site of antigen presentation & antibody production

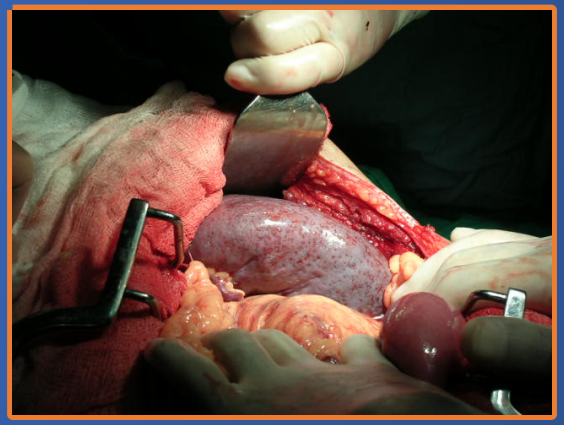


Immunological function

- Largest aggregation of lymphoid tissues
- Promotion of **cell mediated & humoral immunity**
- Antigens engulfed by macrophages for antibody production- immunoglobulin **(IgM)**
- Production of **opsonins, properdin** from lymphocytes
  - Binds to macrophage & leukocyte
  - Promote phagocytosis and bacteriocidal activity
- **Splenectomy** impairs immunological responses

Causes of splenomegaly

- **Clinically palpable spleen enlarged 3 times**
  - **Infective:** TB, abscess, HIV, malaria, schistosomiasis, hydatid cyst
  - **Blood disease**: **ITP, Hereditary spherocytosis**, autoimmune haemolytic anemia, thalassaemia, **sickle cell disease**, polycythemia, **leukaemia**
  - **Metabolic**: Gaucher's disease , amyloidosis
  - **Circulatory**: Portal hypertension, infarction
  - **Nonparasitic Cysts**: Congenital/ acquired
  - **Neoplasms**: Hodgkin's, other lymphoma, myelofibrosis, angioma

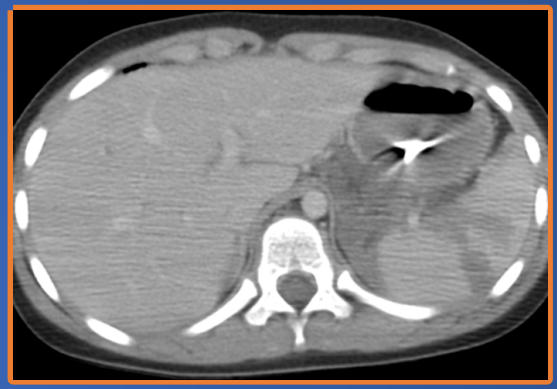


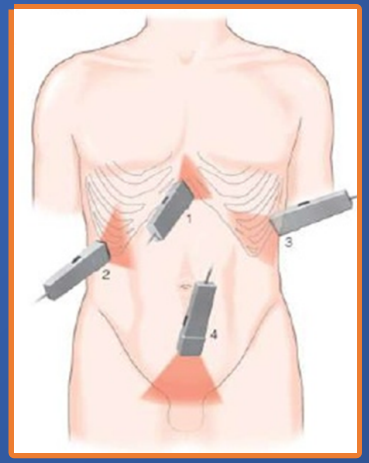
Indications of splenectomy

- **Splenic trauma-** most common indication, hemodynamic instability
- **Purpuras**: Idiopathic thrombocytopenic purpura **(ITP)**
- **Haemolytic anaemias**: **Hereditary spherocytosis**, Acq. haemolytic anaemia.
- **Hypersplenism**
- **Left sided portal hypertension**
- **Myelofibrosis**
- **Tumours**: Lymphomas, haemangioma
- **Cyst of spleen**
- **Splenic infarct**
- **Abscess**
- **Splenic artery aneurysm**

Splenic Injury

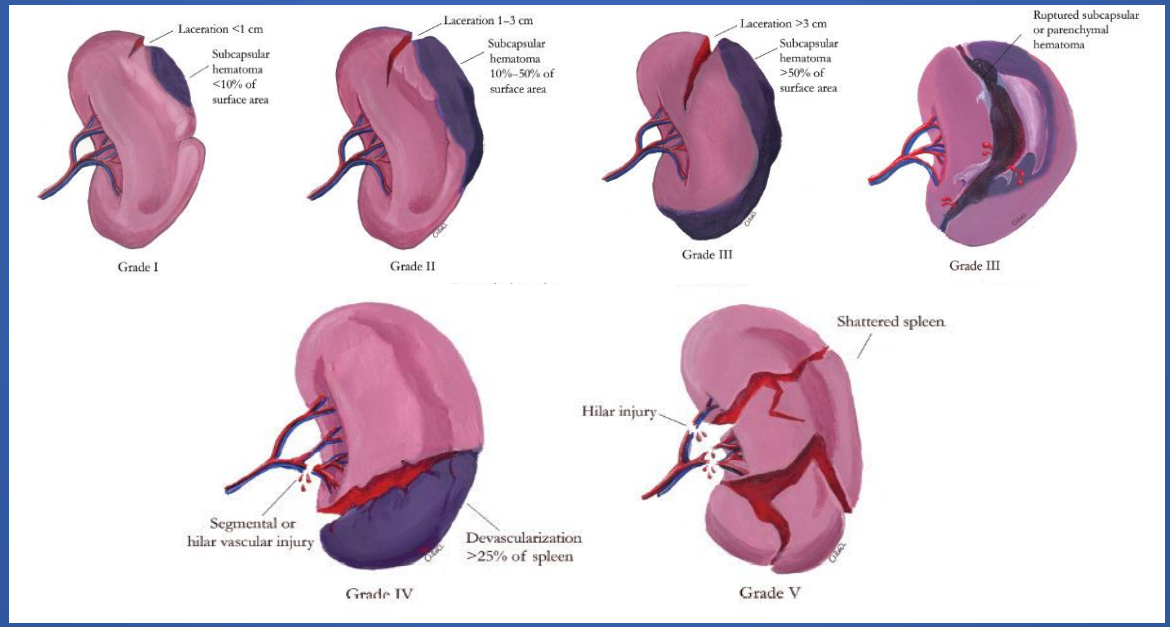
- **Aetiology**: **Blunt/ Penetrating** injury
- Blunt trauma: most frequently injured organ
- **Injury to left side-** chest, flank, or abdomen
- **Left** lower chest & upper abdomen:
  - **Pain, Bruising, Tenderness**
- **Diagnosis**:
  - **FAST- unstable patients**
  - **FAST+ CT-stable patients**



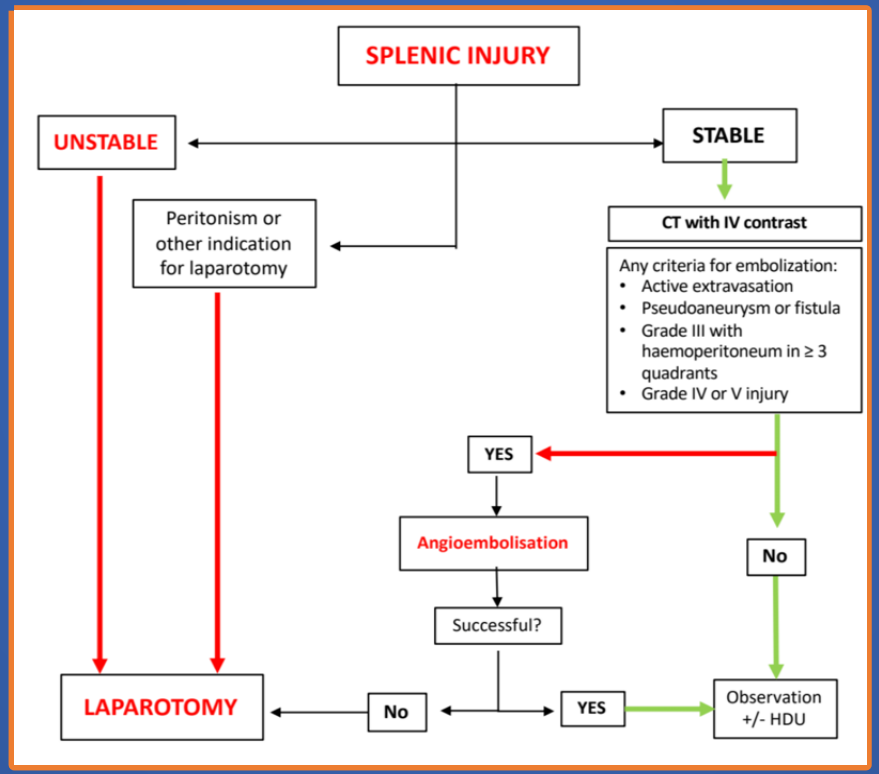


Splenic Injury

- American Association for the Surgery of Trauma (AAST) splenic injury scale



Splenic Injury



Idiopathic Thrombocytopenic Purpura
ITP

- ITP in children:
  - 2-4 years age
  - Acute
  - Usually post viral,
  - Most recover without treatment.

Idiopathic Thrombocytopenic Purpura
ITP

- ITP in adults:
  - Chronic
  - Antibody (IgG) against platelets
  - Low platelets <50,000 (epistaxis, GI bleeding, ecchymosis)
  - Mild splenomegaly.
  - Initial therapy (if bleeding)- prednisolone, platelet concentrate, & immunoglobulin.
  - Splenectomy: (Commonest elective indication)
    - Persistent < 30,000 platelet after 4-6 weeks of medical therapy .
    - Severe thrombocytopaenia- platelet concentrate given after splenic artery ligation. Long time remission in 65%
  - 2nd line therapy- Rituximab (anti-CD20 monoclonal antibody)

Hereditary Spherocytosis

- **Autosomal dominant** disorder
- Increased **permeability of cell** membrane to Na, cell **swelling** & **fragility**
- **RBC- spherical**, fragile, trapped in spleen & destroyed.
- **Excessive haemolysis-** jaundice, anaemia, splenomegaly,
- **Pigment gallstone** formation in **30-60%.**

Hereditary Spherocytosis

- Spontaneous **remission & relapse**.
- Haemolytic crisis needs blood transfusion
- Mild cases managed without splenectomy.
- **Mild / severe : Splenectomy** after age **6 years** (risk of **OPSI**)
- Simultaneous **Cholecystectomy** if gallstone present

Acquired Haemolytic Anaemia

- **Aetiology:** Haemolysis due to exposure to **drugs**, or immune reaction as in **SLE**, chronic lymphatic **leukaemia** or mycoplasma pneumoniae **infection.**
- **Initial treatment:** Steroid therapy.
- **Splenectomy**:
  - No response to steroid
  - Relapse on cessation of steroids

Hypersplenism

- **Splenomegaly, pancytopenia**, **normal bone marrow** & **no autoimmune disorder**
  .
- Causes: Malaria, portal hypertension, rheumatoid arthritis, myeloproliferative disorder.
- **Sequestration & destruction** - predominantly **WBC & platelets**
- Anaemia, leukopenia & thrombocytopenia.
- Splenectomy- sometime after benefit & risk assessment.

Segmental Portal Hypertension

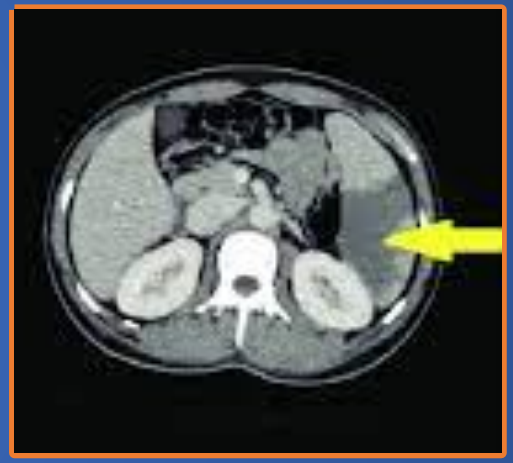
- **(Left sided PH)**
- **Aetiology**:
  - **Thrombosis of splenic vein**
    - Acute/ chronic pancreatitis,
    - Carcinoma pancreas.
- UGI bleed from **gastric varices**, hypersplenism.
- Endoscopic control of varices unsuccessful
- **Splenectomy+ ligation** of vessel on greater curvature of stomach very effective.

Proliferative disorders

- **Myelofibrosis**: Proliferation of mesenchymal elements (connective tissues) bone marrow fibrosis, spleen, liver, lymph nodes & extramedullary haemopoieses.
- Seen in over 50 age group.
- Huge splenomegaly & infarct causes discomfort.
- Splenectomy relieves symptoms.
- **Tumours**: Large haemangioma, Non-Hodgkin's lymphoma confined to spleen-splenectomy

Uncommon indications of Splenectomy

- **Cysts**:
  - Congenital, degenerative, hydatid disease.
  - **Infarction spleen:** arterial embolism,
  - Asymptomatic/ pain LUQ.
  - CT: hypo-perfused area
- Splenic **abscess**
- Splenic artery **aneurysm:**
  - Typically incidental finding, female, rupture during pregnancy.
  - **Treatment:** proximal location – proximal & distal ligation. Distal location- proximal ligation with splenectomy
- **Part of other surgery** : Distal pancreatectomy, radical gastrectomy for ca.



Complications of Splenectomy

- **Early:**
  - Haemorrhage (2-5%)
  - Organ injury- pancreas (0-6%-open, up to 16%- laparoscopic), splenic flexure , stomach

Complications of Splenectomy

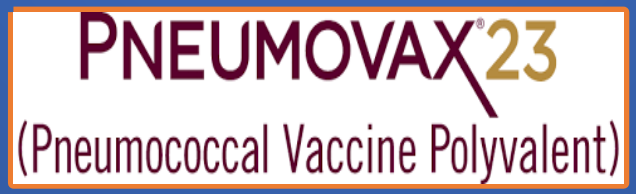
- **Delayed**:
  - Fistula- stomach, pancreas
  - Sub-diaphragmatic collection
  - Left basal atelectasis & pleural effusion
  - Thrombocytosis- thrombotic complications
  - OPSI- H influenzae, Meningococcus
  - Splenosis- splenic rupture, bag rupture in laparoscopic surg.

Effects of Splenectomy

- **RBC**: Howell Jolly bodies, erythroblasts
- **WBC**: Leucocytosis
- **Platelet**: Thrombocytosis, increased adhesiveness.
- **Immunological defects**:
  - ↓ serum IgM level
  - ↓ level of phagocyte promoting peptide
  - ↓ response to particulate antigens

Immunization

- **Prone to infection** (encapsulated bacteria- Strep pneumoniae, Neisseria meningitides, Haemophilus influenzae)
- **Elective splenectomy:** vaccination **2-3 weeks before surgery**
- **Emergency splenectomy-** vaccination **postoperatively**
- Polyvalent pneumococcal vaccine (pneumovax)



Immunization

- Not previous immunized persons:
  - Strep pneumoniae (booster dose in 8 weeks)
  - Haemophilus influenza type b (Hib)
  - Meningococcal type c
- Life long antibiotic prophylaxis:
  - Oral phenoxymethyl penicillin or erythromycin

References

- Principles and Practice of Surgery
  - Pg 229-232

Thanks