Splenomegaly & splenic rupture

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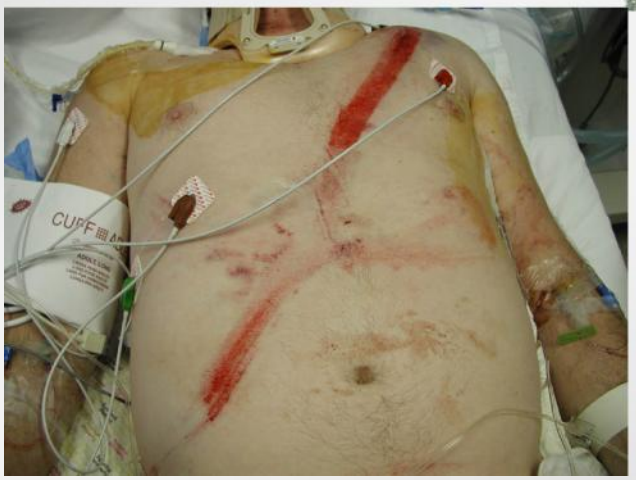
Rupture of spleen

Etiology

- Any trauma, esp. direct injury to left upper quadrant of abdomen from any angle.
- A fall without direct trauma to trunk, esp. if spleen is diseased.



Clinical features

Fatal type

- **There is rapid blood loss, due to tearing of splenic vessels & complete avulsion of spleen from its pedicle.**
- **Patient succumbs rapidly within minutes, never recovering from initial shock.**

Clinical features

Usual type

1. ***Initial shock***
2. ***Recovery from shock***
3. ***Signs of a ruptured spleen***

General signs

- **Increasing pallor**
- **Rising pulse rate**
- **Sighing (rapid & deep) respiration**
- **Restlessness**

Local signs

1. **Abdominal guarding, most in LUQ.**
2. **Local bruising & tenderness in LUQ.**
3. **Abdominal distension, commencing about 3 hours after accident.**
4. **Kehr's sign → Pain referred to left shoulder. It is demonstrated 15 min after elevation of foot of bed.**
5. **Shifting dullness in flanks.**
6. **Balance's sign → A dull note in both flanks, but on right side it can be made to shift, whereas on left it is constant.**
   - **It indicates that there is blood in peritoneal cavity, but blood in neighborhood of lacerated spleen has coagulated.**
7. **Tenderness, & sometimes a soft swelling on per rectal examination.**

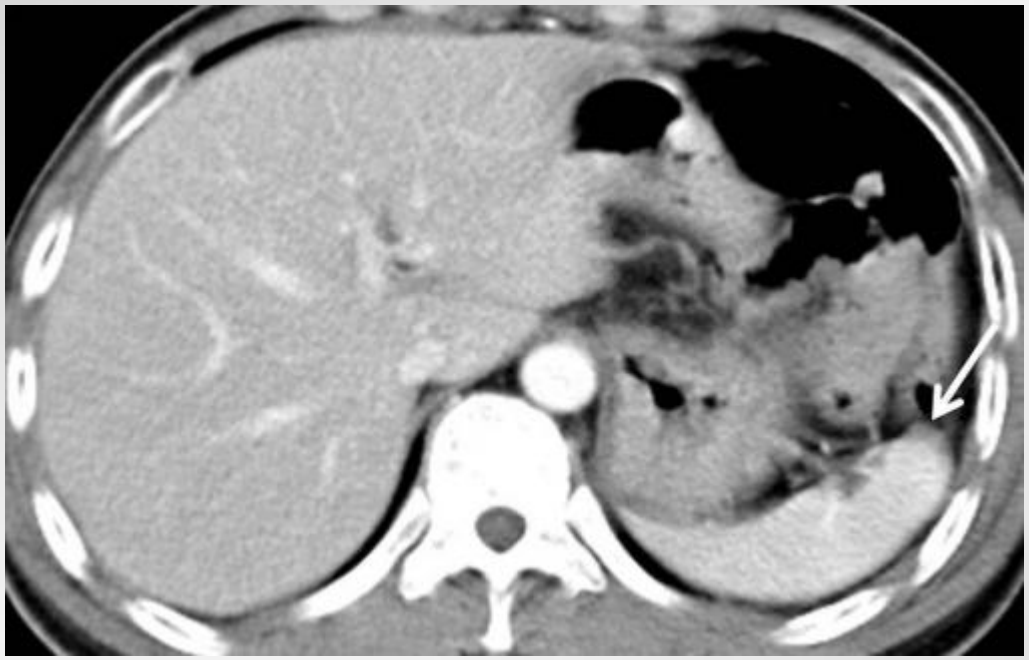
Clinical features

Delayed type

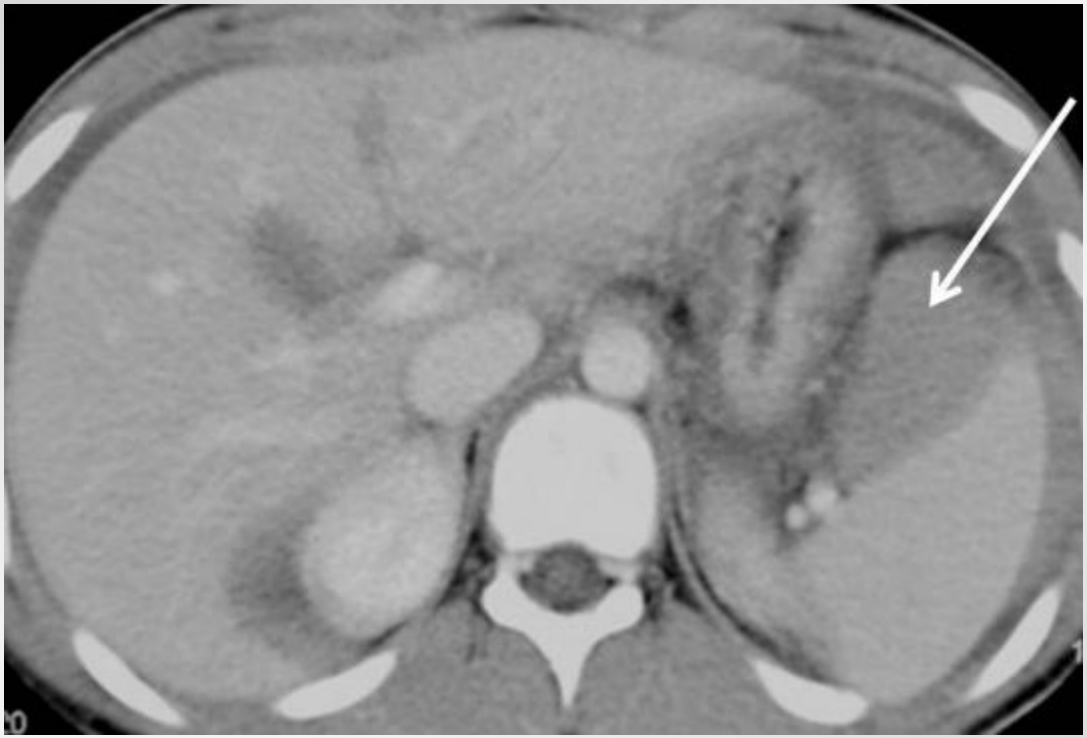
- **Initial signs of trauma & shock.**
- **Patient recovers from blow, within minutes to an hour or so.**
- **Serious intra-abdominal catastrophe are postponed for a variable period up to 15 days, or even more.**

Diagnostic investigations

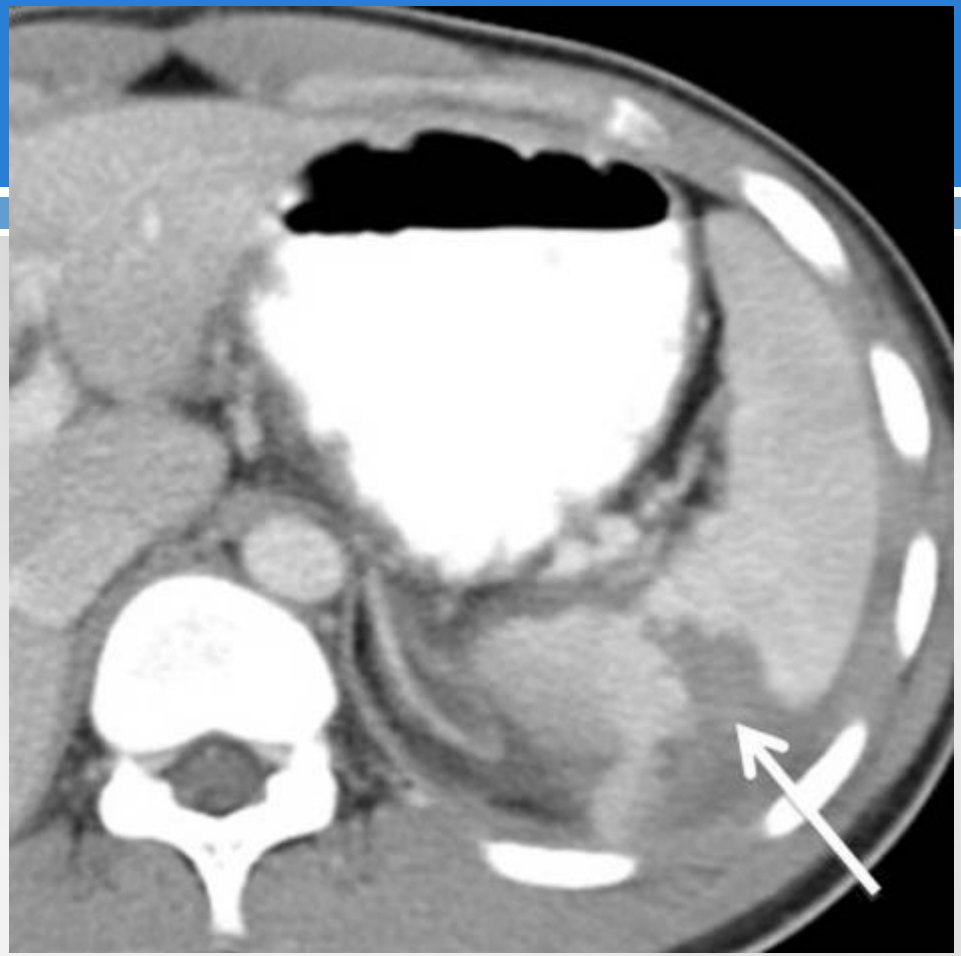
- ***X-ray abdomen***
  1. **Obliteration of splenic outline.**
  2. **Obliteration of psoas shadow.**
  3. **Indentation of left side of gastric air bubble.**
  4. **Fracture of one or more lower ribs of left side.**
  5. **Elevation of left side of diaphragm.**
  6. **Free fluid between gas-filled intestinal coils.**
- ***Ultrasound***
  - **Spleen is usually visualized, & a surrounding hematoma may suggest rupture.**
- ***CT scan***
  - **Enable an accurate diagnosis to be made.**



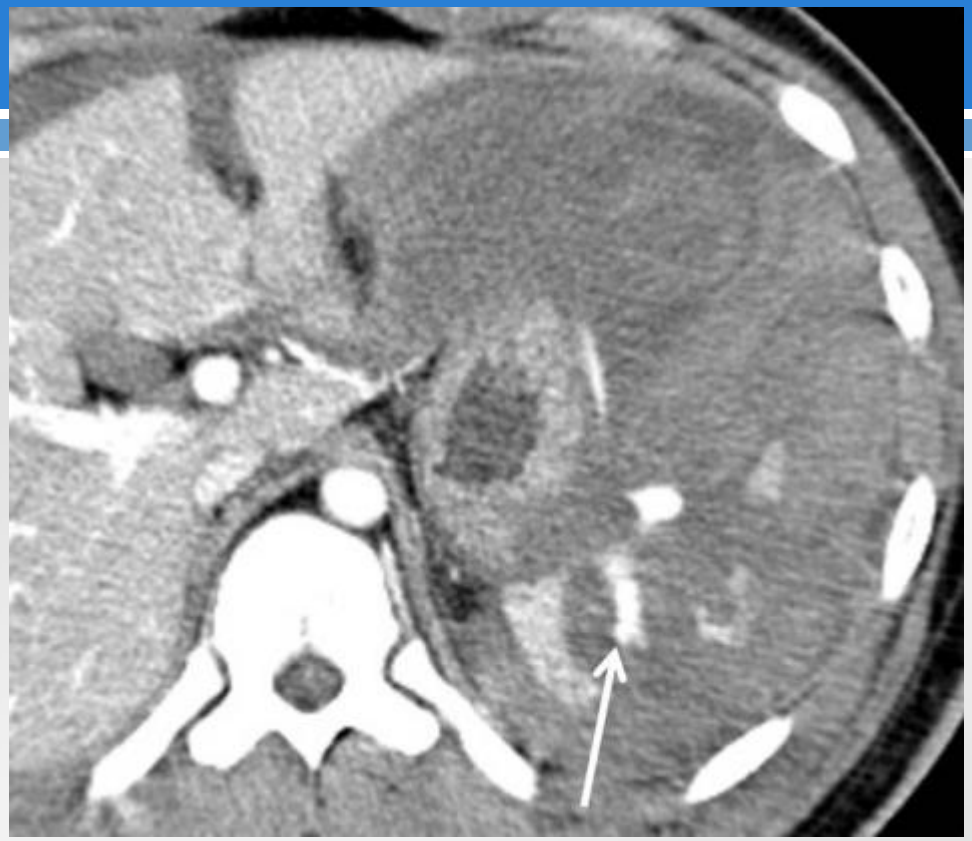
Grade I spleen injury, subcapsular hemorrhage (arrow) less than 10% of surface area.



Grade II spleen injury, subcapsular haematoma involving 30%–40% of splenic surface area (arrow).



Grade IV spleen injury, laceration at upper pole (arrow).



Grade V spleen injury, shattered spleen with large-volume haemoperitoneum.

Grading for splenic injuries

- Grade I
  - Hematoma: Subcapsular, nonexpanding, <10% surface area
  - Laceration: Capsular tear, nonbleeding, <1cm parenchymal depth
- Grade II
  - Hematoma: Subcapsular, nonexpanding, 10-50% surface area; Intraparenchymal, <2cm diameter, nonexpanding
  - Laceration: Capsular tear, active bleeding, 1-3cm parenchymal depth
- Grade III
  - Hematoma: Subcapsular, >50% surface area or expanding; Ruptured subcapsular hematoma with active bleeding; Intraparenchymal, >2cm diameter or expanding
  - Laceration: >3cm parenchymal depth
- Grade IV
  - Laceration: Involving segmental or hilar vessels producing devascularization
- Grade V
  - Laceration: Shattered spleen
  - Vascular: Hilar vascular injury that devascularizes spleen

Treatment

ATLS guidelines

- A, B, C, D, E

Conservative management

- **Careful observation in an ICU setup is undertaken, if**
  - **there is hemodynamic stability.**
  - **CT scan confirms absence of hilar involvement or massive disruption of spleen.**

Treatment

Surgery

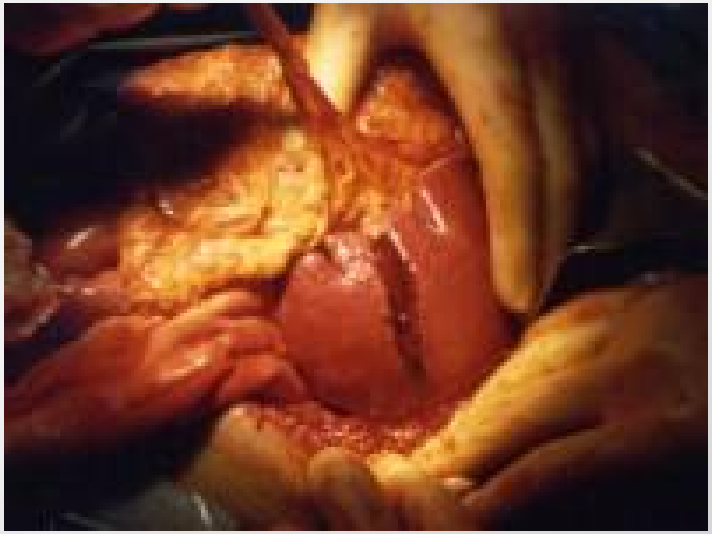
- **Immediate laparotomy is indicated, if**
  - **There is evidence of continuing blood loss despite adequate resuscitation.**
  - **There is strong suspicion of injury to other intraabdominal viscera.**
- **Because of the problems associated with splenectomy, splenic preservation should be undertaken where possible, esp. in children where auto-transplantation should be performed if spleen could not be saved.**

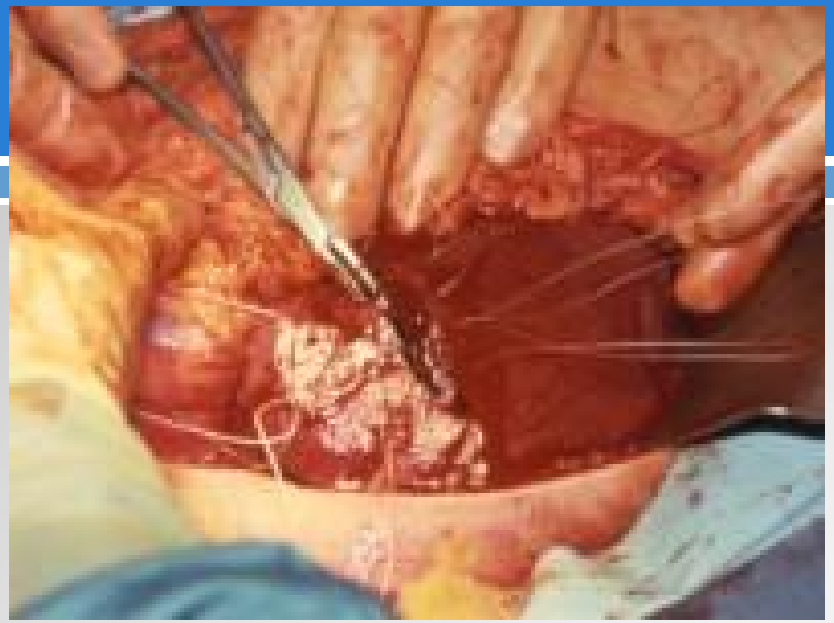
Treatment

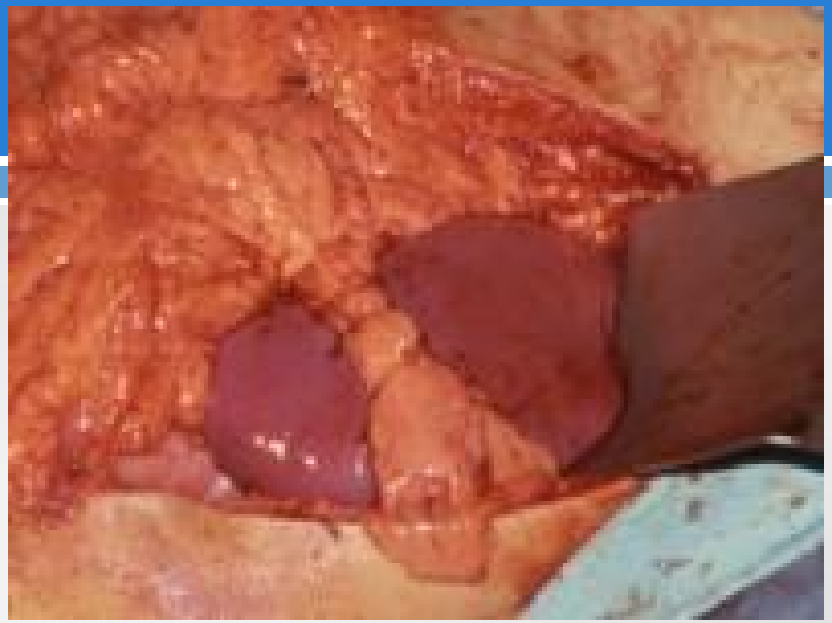
Surgery

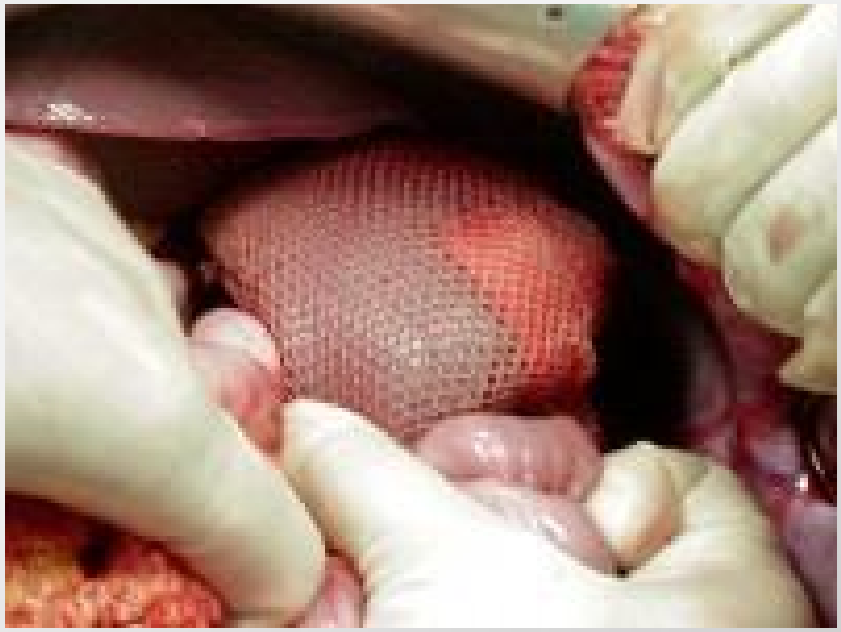
Options available are;

1. **Suturing of the injury, with or without application of hemostatic agents.**
2. **Partial segmental resection (upper & lower pole injuries).**
3. **Splenectomy, with or without auto-transplantation.**









Treatment

1. **Blood transfusion should be given, as required.**
2. **Long-term antibiotic protection & pneumococcal vaccine should be given, in cases of splenectomy.**

Splenomegaly

Etiology of splenomegaly

A. **Reactive hyperplasia**

1. **Bacterial infections**
   1. Tuberculosis
   2. Infective endocarditis
   3. Typhoid & paratyphoid
   4. Typhus (rickettsia)
   5. Anthrax
   6. Septicemia
   7. Splenic abscess
   8. Syphilis
   9. Weil's disease (leptospirosis)
   10. Psittacosis
   11. Brucellosis

2. **Viral infections**
   1. Infectious mononucleosis (EBV)
   2. Cytomegalo virus infection

3. **Parasitic infections**
   1. Malaria & tropical splenomegaly
   2. Toxoplasmosis
   3. Schistosomiasis
   4. Trypanosomiasis
   5. Kala-azar (leishmaniasis)
   6. Hydatid cyst

4. ***Hemolytic diseases***
    1. Hereditary spherocytosis
    2. Sickle-cell disease
    3. Thalassemia
    4. Autoimmune hemolytic anemia
    5. Erythroblastosis fetalis
5. ***Connective tissue diseases***
    1. Systemic lupus erythematosus (SLE)
    2. Rheumatoid arthritis
    3. Felty's syndrome (rheumatoid arthritis, leukopenia)
    4. Still's disease (systemic-onset juvenile idiopathic arthritis)

B. Congestion

1. Portal hypertension
2. Congestive heart failure

C. Nonparasitic cysts

1. Congenital
2. Acquired

D. Infiltrative diseases

1. Non - neoplastic

1. Gaucher's dis (glucocerebroside)
2. Amyloidosis
3. Sarcoidosis

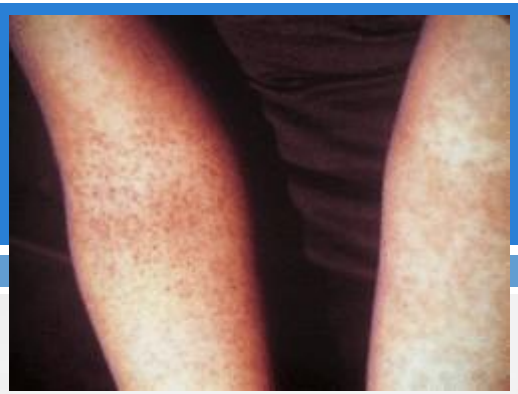
2. Neoplastic

1. Acute lymphocytic leukemia
2. Chronic lymphocytic leukemia
3. Chronic granulocytic leukemia
4. Hodgkin's lymphoma
5. Non-Hodgkin lymphoma
6. Polycythemia vera
7. Myelofibrosis
8. Angioma
9. Primary fibrosarcoma

Idiopathic thrombocytopenic purpura (ITP)

Etiology

- Formation of antibodies against patient's own platelets, resulting in low platelet count.
  - (Normal platelet count is 250-400 x 10^9/litre).



Clinical Features

- It normally affect females between 15-50 years of age.
- Purpuric patches (ecchymoses) in skin & mucosa.
- Tendency to spontaneous bleeding from mucosa (eg epistaxis), & menorrhagia.
- Prolonged bleeding of minor wounds.
- Urinary & gastrointestinal hemorrhage & hemarthrosis (rare).
- Intracranial hemorrhage (rare but fatal).
- Tourniquet test → Positive.
- Splenomegaly → Present in only 25% of cases, & gross splenomegaly suggests that the diagnosis is not ITP

Investigations

- **Bleeding time → Increased.**
- **Clotting & prothrombin times → Normal.**
- **Platelet count → Decreased (usually < 60 x 10^9/litre).**
- **Bone marrow biopsy → Plentiful megakaryocytes.**

Treatment

- In children, the disease regresses spontaneously in 75 % cases after one attack.
- Short courses of corticosteroids are usually followed by recovery, in both adult & child.
- Splenectomy is indicated, if
  - A patient has 2 relapses on steroid therapy.
  - Platelet count remains low for more than 6-9 months.
- In acute cases, with severe bleeding → Transfusion of fresh blood or platelet concentrates.

Hemolytic anemias

Hemolytic anemias amenable to splenectomy are:

- **Hereditary spherocytosis**
- **Acquired autoimmune hemolytic anaemia**
- **Thalassaemia (Cooley′ s anemia)**
- **Sickle cell disease**

Hereditary spherocytosis

- This is an autosomal dominant hereditary disorder,
- characterized by the presence of spherocytic red cells,
- due to increase in permeability of the red cell membrane to sodium.

Clinical Features

- It usually presents in childhood, but may be delayed until later life.
- Paler (anemia).
- Lassitude & undue fatigue.
- Biliary colics & pigment gallstones.
  - Jaundice (mild, intermittent).
- Splenomegaly.
- Chronic leg ulcers.
- In certain families, there is severe crises of RBCs destruction;
  - Erythrocyte count may fall from 4.5 x 10^6 to 1.5 x 10^6 in less than a week.
  - There will be pyrexia, abdominal pain, nausea, vomiting & extreme pallor, followed by increased jaundice.
  - These crises may be precipitated by acute infection.

Investigations

- **Fragility test → Increased fragility of RBCs (0.6% saline).**
- **Reticulocyte count → Increased.**
- **Fecal urobilinogen → Increased.**
- **Radioactive chromium scan →**
  - **Patient's own red cells labeled with 51Cr, followed by daily scanning over the spleen.**
  - **show the degree of red cell sequestration by the spleen.**
- **Ultrasonography → To determine the presence or absence of gallstones.**

Treatment

- **Splenectomy**
- **In juvenile cases, the optimum time is about 7 years of age, before gallstones formed & subsequent vulnerability to infection is reduced.**

The End!