

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*

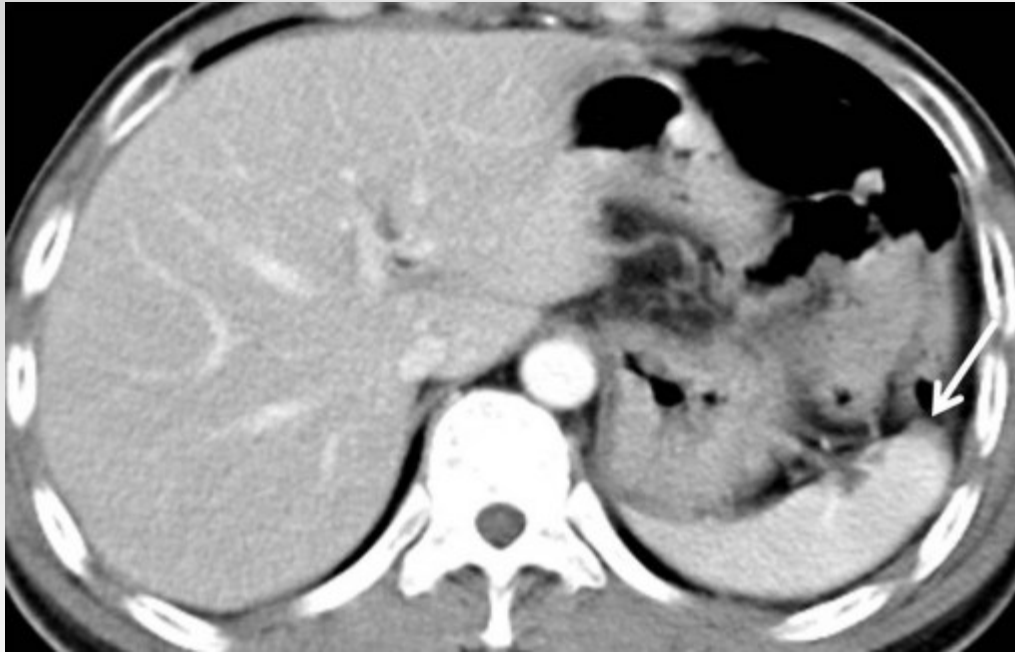
1. Obliteration of splenic outline.
2. Obliteration of psoas shadow.
3. Indentation of left side of gastric air bubble.
4. Fracture of one or more lower ribs of left side.
5. Elevation of left side of diaphragm.
6. Free fluid between gas-filled intestinal coils.

∞ *Ultrasound*

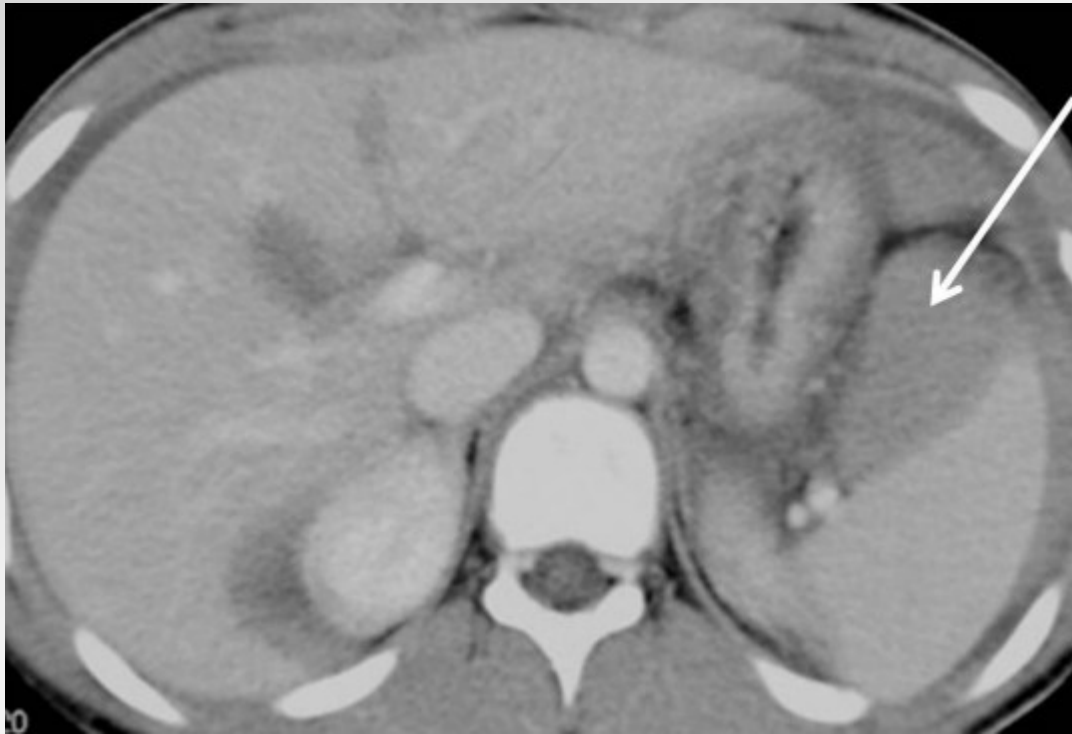
- Spleen is usually visualized, & a surrounding hematoma may suggest rupture.

∞ *CT scan*

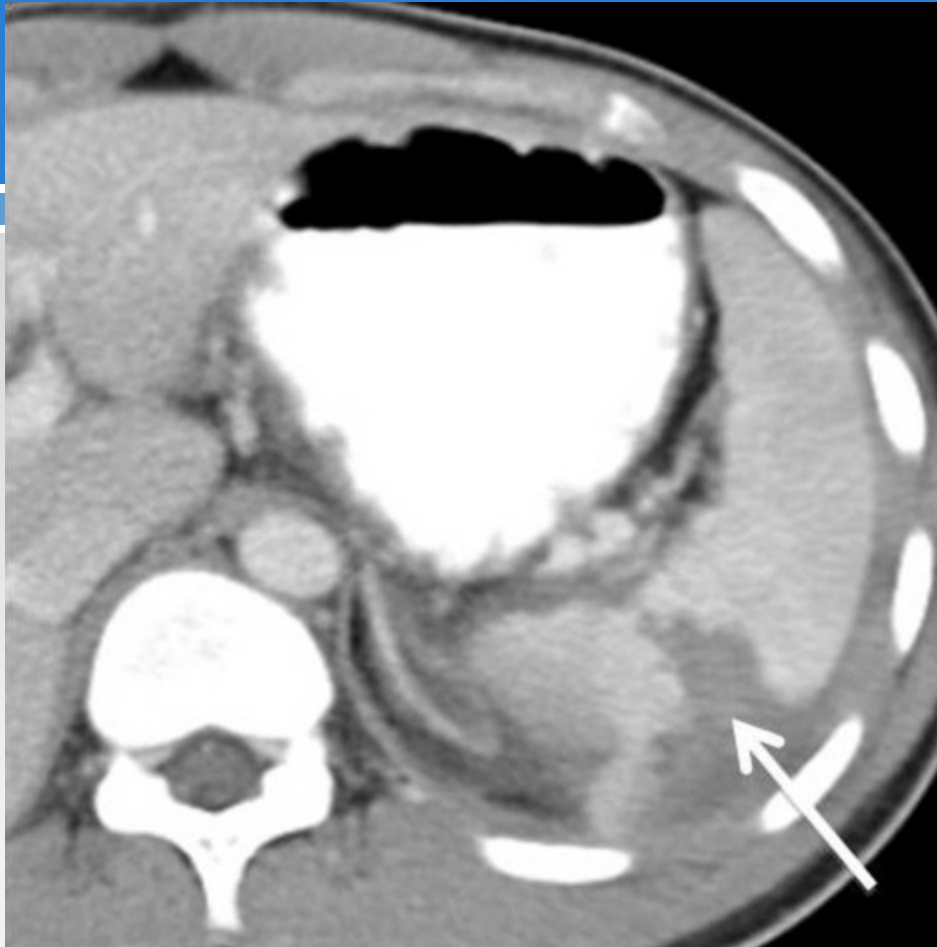
- Enable an accurate diagnosis to be made.



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.

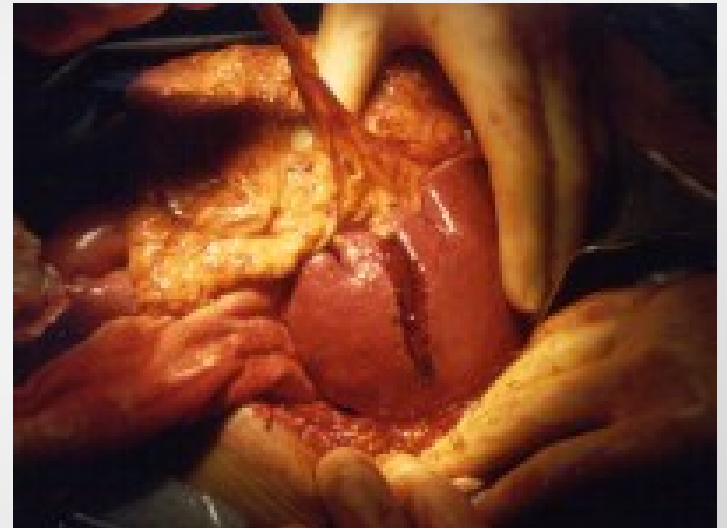
∞ Because of the problems associated with splenectomy, **splenic preservation** should be undertaken where possible, esp. in children where auto-transplantation should be performed if spleen could not be saved.

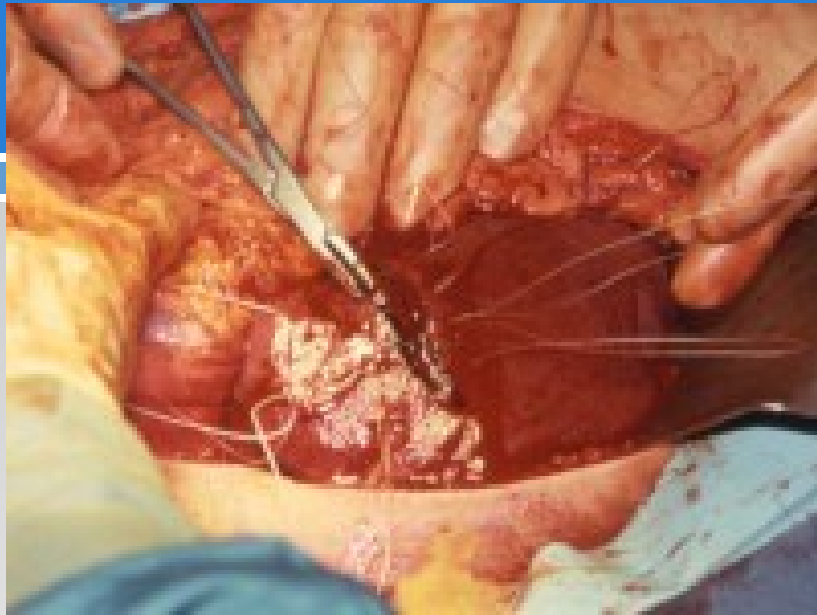
Treatment

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 $250-400 \times 10^9/\text{litre}$).



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 $< 60 \times 10^9/\text{litre}$).
- ∞ **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 4.5×10^6 to 1.5×10^6 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 ^{51}Cr , 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!