Liver Infections

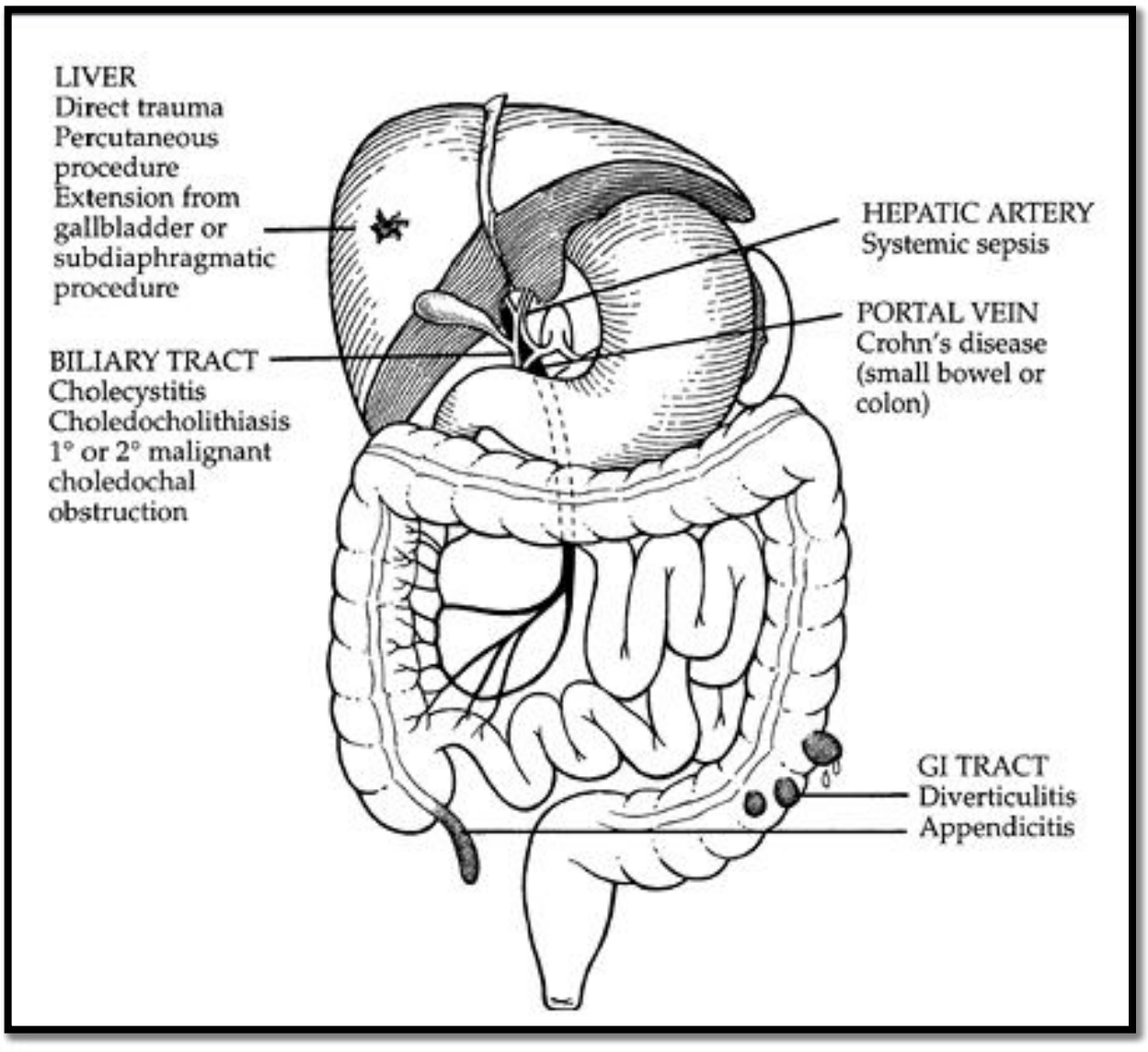
Dept Of Surgery

- Liver parenchyma is constantly exposed to a low level of enteric bacteria through the portal blood flow
- However, liver infections are rare
- Liver is the largest repository of the reticuloendothelial system and is therefore able to cope with this constant barrage.
- When the inoculum exceeds the capacity for control, infection and abscess occur
- Pyogenic hepatic abscesses constitute over 80% of liver abscesses, the rest primarily being amoebic in nature

Pyogenic Liver Abscess

Causes

- Transportation of virulent organisms through portal system from the GI tract
- Trauma
- Spread of infection from the biliary tract (35% cases)
- Blood-borne infection via the hepatic artery
- Extension from a contiguous disease process



Organisms

- The most common organisms cultured from pyogenic hepatic abscesses are:
  - Gram-negative aerobic rods (most commonly Klebsiella and Escherichia coli)
  - Gram-negative anaerobes (Bacteroides fragilis)
  - Gram-positive aerobes (Enterococcus, microaerophilic Streptococcus)

Clinical presentation

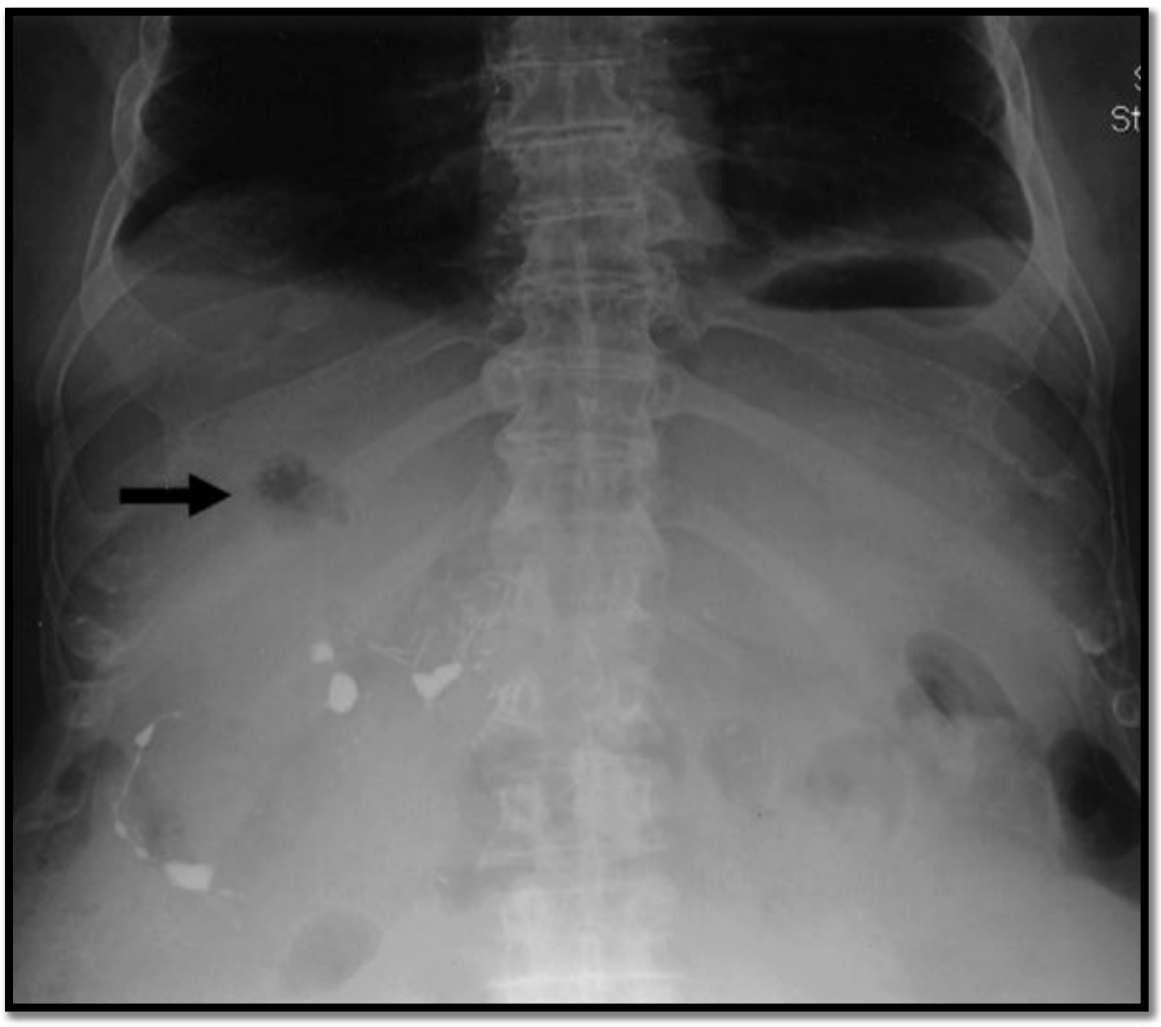
- Right upper quadrant abdominal pain
- Fever
- Jaundice
- Nausea/vomiting
- Diarrhoea
- Weight loss
- Progressive fatigue

Lab Abnormalities

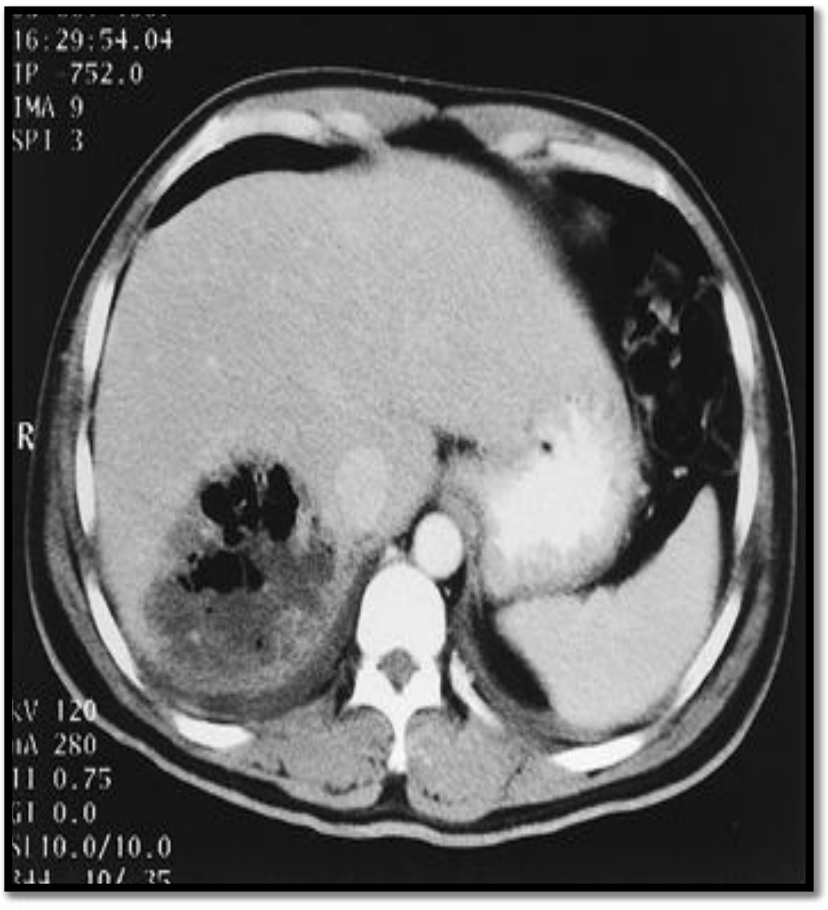
- Elevated white blood cell count
- Low haemoglobin
- High alkaline phosphatase
- Transaminase levels can be slightly elevated

Radiological Investigations

- Ultrasonography: sensitivity is 85% to 90%
- Computed tomography (CT) scan: sensitivity is approximately 95%
- Magnetic resonance imaging
- Chest X ray: may display an elevated right hemi diaphragm, pleural effusion, or extra luminal air fluid level



Plain abdominal x-ray demonstrating an abnormal collection of air in the RUQ consistent with pyogenic hepatic abscess



Treatment

- First, the abscess must be managed, most often with a drainage procedure.
- Antimicrobial therapy is essential in the treatment of pyogenic abscesses.
- Second, the initiating process must be identified and managed to ensure that recurrence is avoided.

Guiding principle for surgical management prevail: Diagnosis, drug(s), and drainage.

- Once the diagnosis of a single or multiple liver abscess is made, broad-spectrum parenteral antibiotics should be started.

- Antibiotics alone is given in:
  - multiple small abscesses
  - low risk of abscess rupture
  - lack of toxemia

Clinical response is gauged by defervescence , fall in leukocytosis , and resolution of symptoms

- Imaging with ultrasonography or CT can be used to assess resolution of abscess(es).

- Lack of improvement after a reasonable course (10 to 14 days) indicates failure of treatment.

- Oral antibiotics should be continued for at least 4 weeks after discontinuance of parenteral antibiotics.

- Worsening of fever, leukocytosis, and symptoms at any time also indicates failure of treatment and immediately qualifies the patient for a more aggressive treatment regimen involving a drainage procedure

- Percutaneous aspiration

Aspirated fluid should be sent for aerobic and anaerobic cultures

- Percutaneous catheter drainage :
  - In whom aspiration fails
  - Coagulopathy
  - Lack of a safe or appropriate access route
  - Multiple macroscopic abscesses

In 10% to 15% of cases, percutaneous drainage fails and intraoperative drainage is required.

- Operative drainage

Indications:

  - patients who require laparotomy for the underlying problem
  - those in whom percutaneous catheter drainage fails
  - patients with contraindications to percutaneous drainage

- Management of Underlying disease

  - Sphincterotomy , biliary-enteric bypass, or resection of liver for ductal obstruction

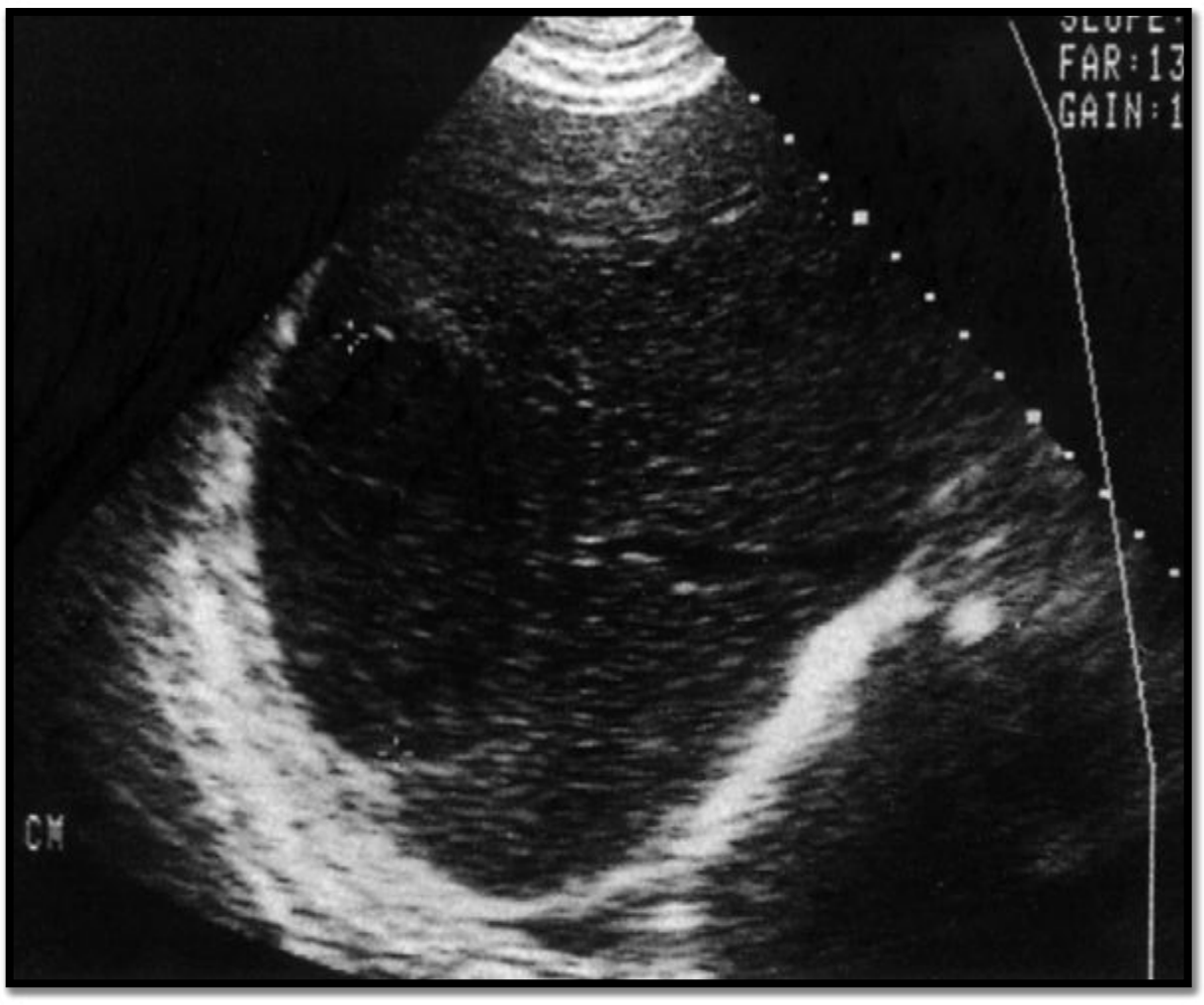
  - Cholecystectomy

  - Evacuation of the hematoma (hepatic trauma)

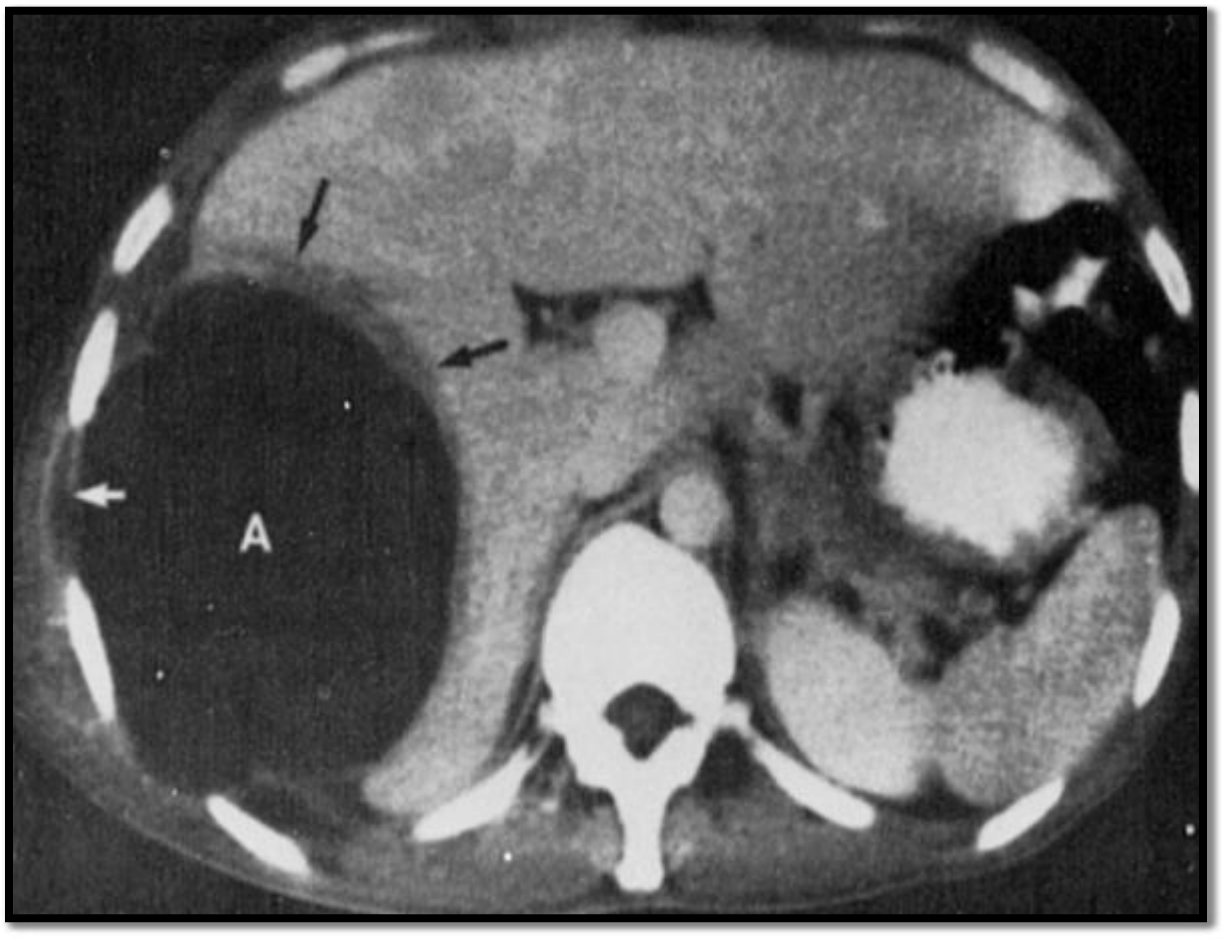
Amoebic Liver Abscess

Pathogenesis

- Cysts containing the parasite are transmitted via the fecal and oral route.
- Trophozoites are released in the intestinal tract after ingestion of cysts and then reside primarily in the large bowel.
- Amoebic abscesses in the liver form when the amoebic trophozoites invade through the colonic mucosa and spread via venules or lymphatics from the colon to the liver.
- E. histolytica may live within the lumen of the colon and may or may not be invasive.
- liver is the most common extra intestinal site of amoebic invasion



USG showing: peripheral location, rounded shape with poor rim and internal echoes



CT scan of amebic abscess,peripherally located,round, rim is nonenhancing but shows peripheral edema (black arrows) with extension into the intercostal space (white arrow)

Treatment

- Metronidazole remains the drug of choice
- Effective for intestinal as well as extraintestinal amebiasis
- Dose regimen is 750 mg three times daily for 10 days.
- Chloroquine may be added if defervescence does not occur in 72 hours or if the patient is acutely ill

Percutaneous aspiration of amoebic abscesses

- bacterial suprainfection is suspected
- pyogenic liver abscess is suspected
- abscess is large and left sided (segments 2 and 3) so that the risk of rupture into the pericardium is significant.

Laparotomy is indicated for ruptured amebic abscesses into the pericardium

Rupture into the pleura or pericardium may be treated with amoebicides and pleuracentesis or pericardiocentesis as necessary

If laparotomy is performed, a midline incision should be used

Amoebic versus Pyogenic Liver Abscess

- No reliable clinical features exist that are specific for amoebic versus pyogenic hepatic abscesses
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- Younger age, recent travel to areas of endemic amebiasis, diarrhoea, and marked abdominal pain raise the clinical suspicion of amoebic abscess

- Indirect haem agglutination is the most sensitive and specific laboratory test

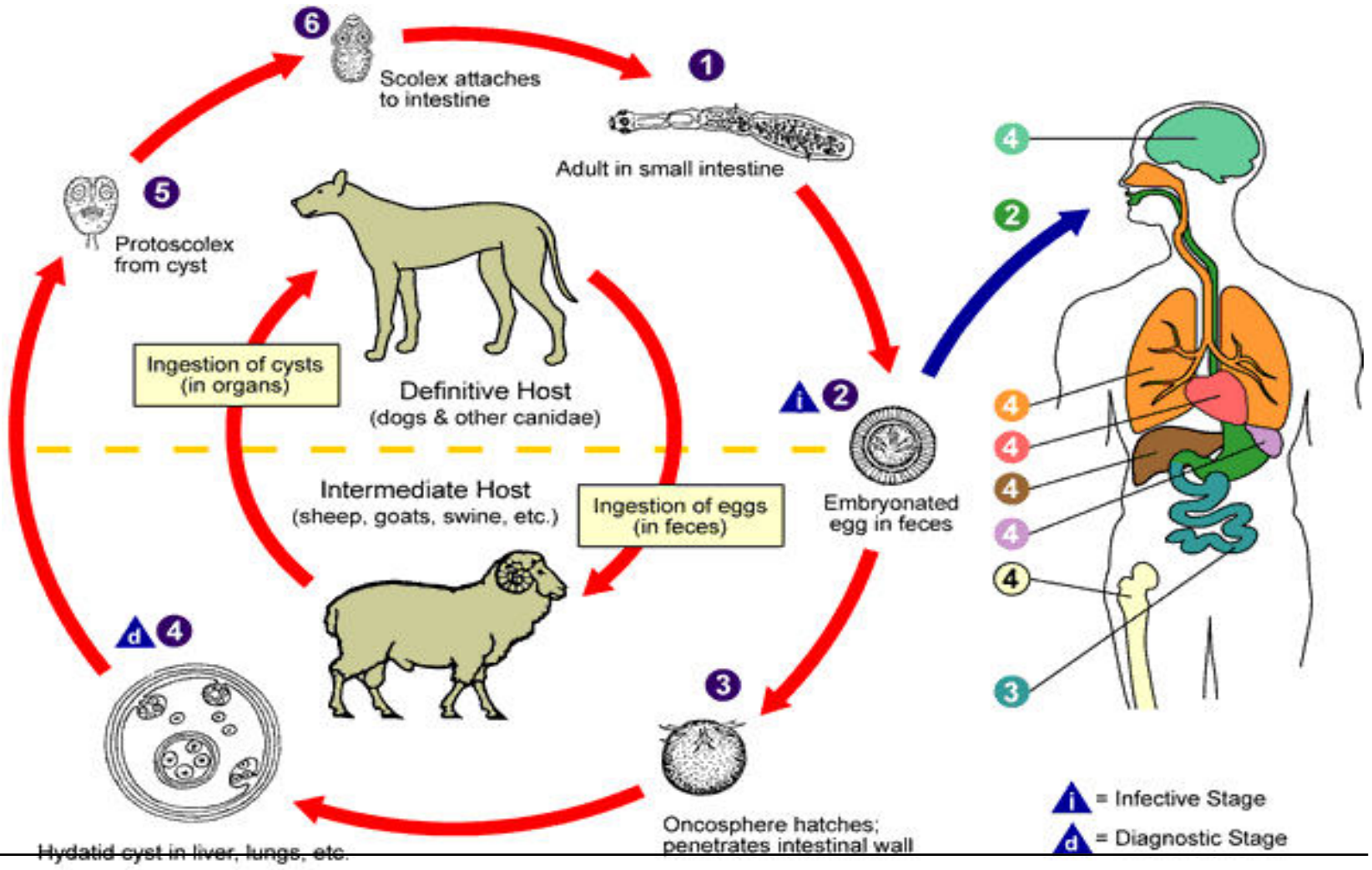
Hydatid Cyst

- Echinococcal species cause hydatid cyst in liver.
- 4 species which can infect humans –
  1. *E. granulosus*
  2. *E. multilocularis*
  3. *E. oligrathus*
  4. *E. vogeli*

Hydatid cyst

- *E. granulosus* - most common type infesting humans. Forms single cyts. Can also infest lung, peritoneum etc.
- *E. multilocularis* – most dangerous. Cause multiple cysts like locally advanced malignancy.
- *E. oligrathus* and *vogeli* are rare. They are found in south america.

Life cycle



Hydatid cyst

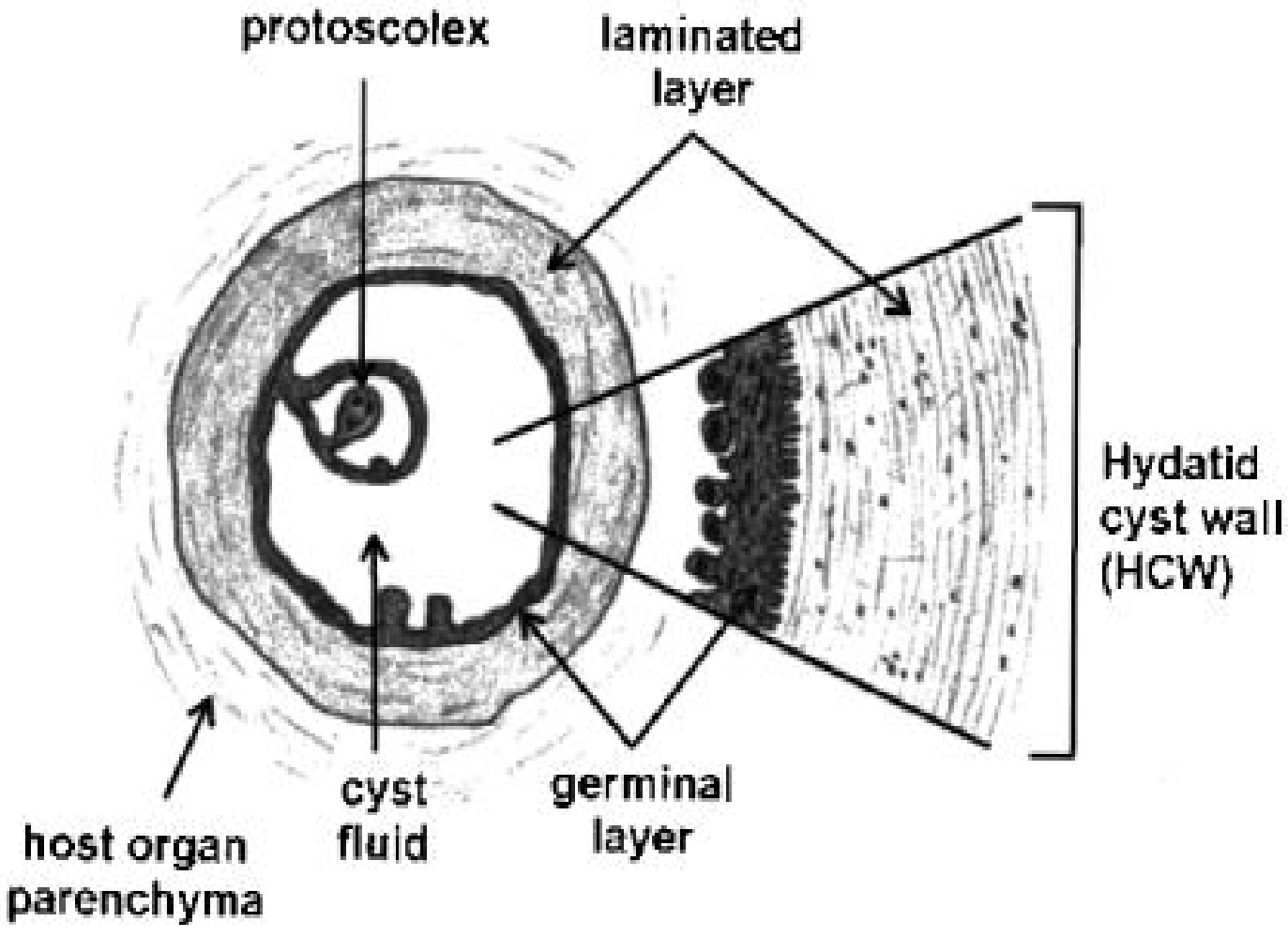
- Humans are accidental hosts.
- Carnivorous or flesh eating animals are definitive hosts like dogs, wolves.
- Herbivorous animals are intermediate hosts.
- Humans who keep pets are more prone.
- Oro-fecal route or direct inoculation while pets lick mouth.

Hydatid cyst

- Echinococcus reach liver through entero-hepatic circulation.
- In liver, oncosphere forms hydatid cyst.
- Three layers –

1. Outermost or ectocyst- parenchymal reaction.
2. Laminated – fibrous layer for protection.
3. Germinal layer – forms daughter cysts.

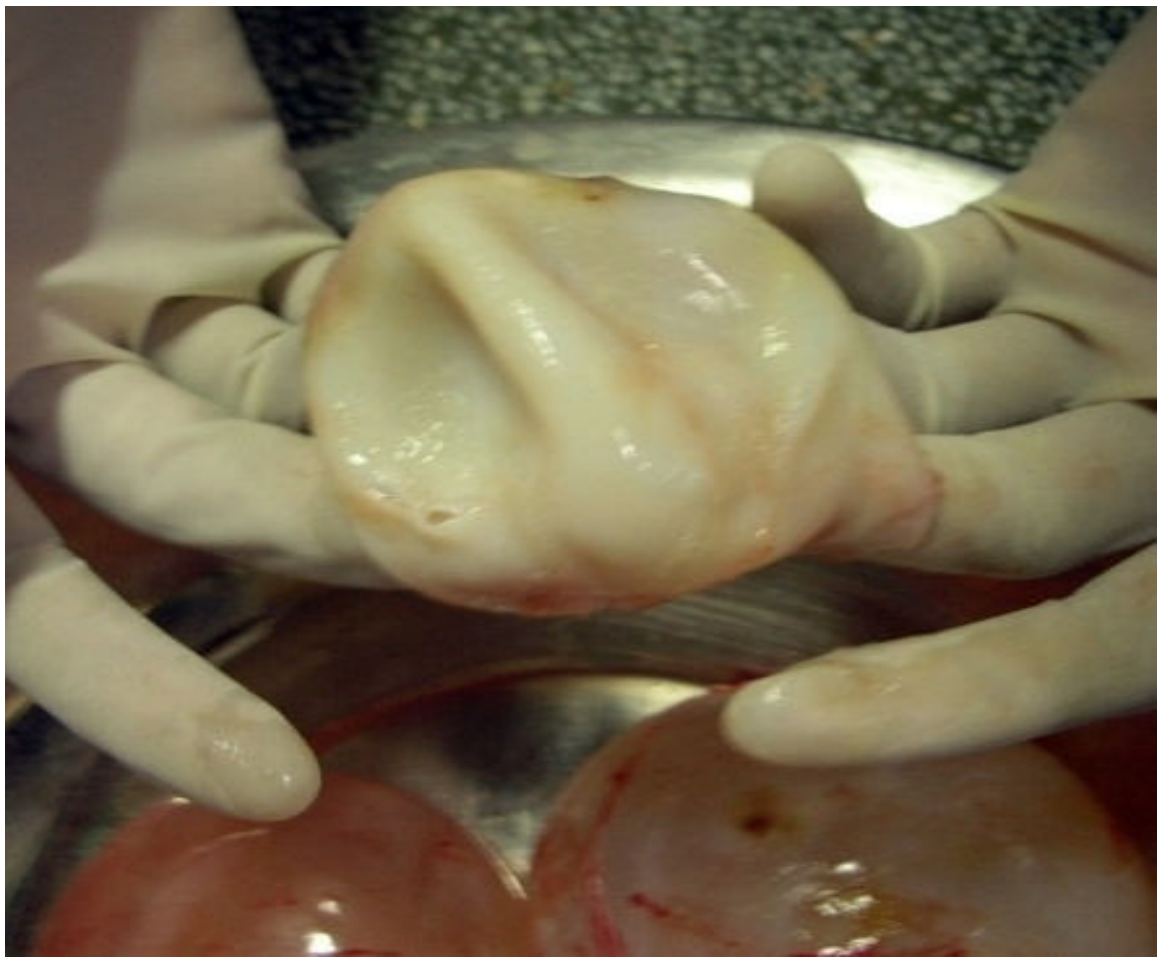
Hydatid cyst layers



Hydatid cyst

- Complete calcification around it indicates *dead cyst*.
- For viability – intrahydatid cyst pressure >35cm H2O
- Most common site – right lobe segment VII and VIII.
- 1st apperance – 3weeks later.

Hydatid cyst



Symptoms and signs

- Feeling of lump.
- Dull aching pain RHC.
- Obstructive jaundice.
- Breathlessness or asthma.
- Palpable hepatomegaly with globular lump.

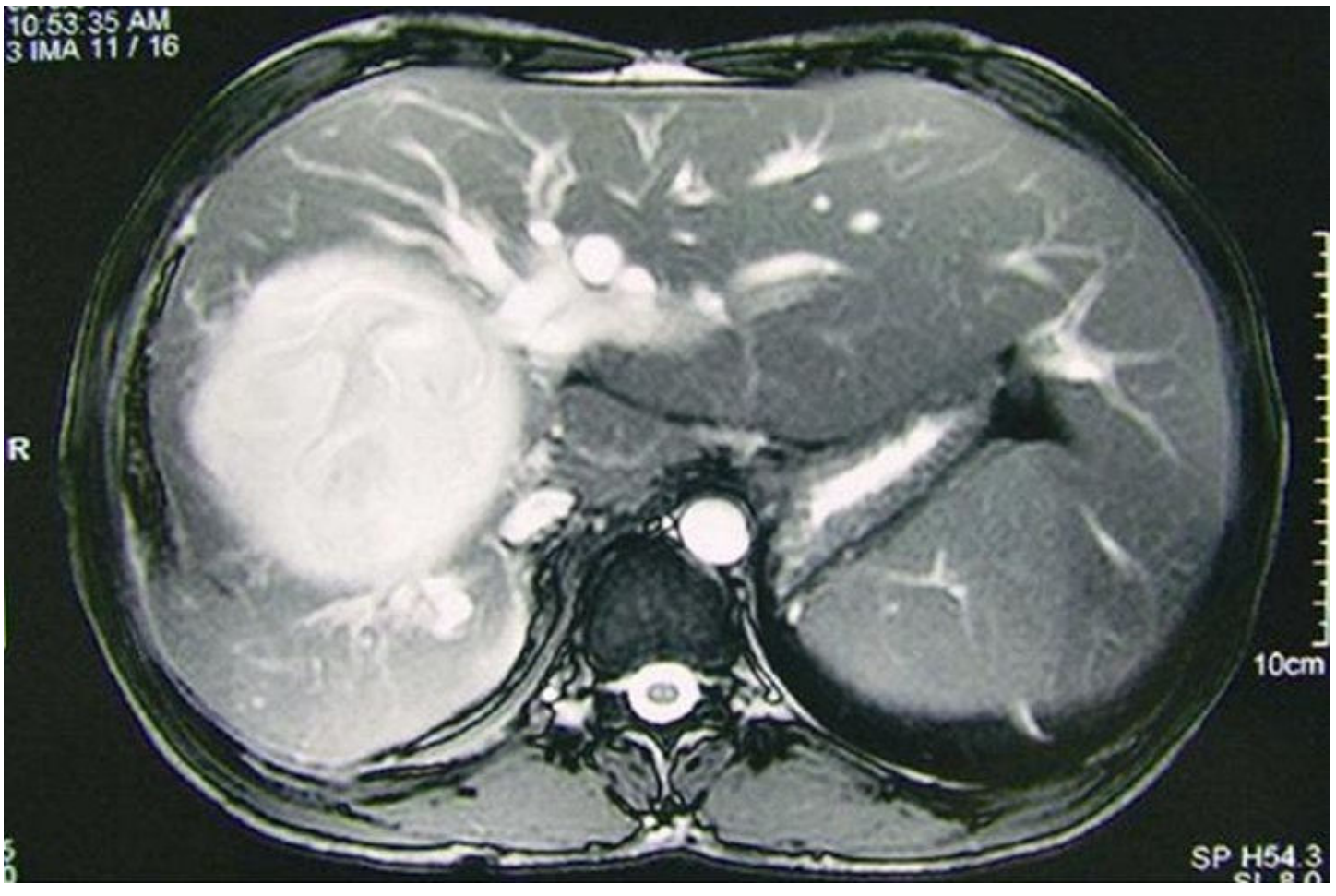
Complications

- Compression – can stretch glisson capsule and compress CBD, portal vein, vena cava.
- Cyst infection – liver abscess formation.
- Rupture into biliry tract – cholangitis, cystobiliary fistula.
- Rupture into pleura /brochial tree.
- Peritoneal rupture.
- Rupture into pericardium, duodenum etc.

Lab tests

- DLC shows Eosinophilia.
- Raised bilirubin, Alkaline phosphatase and GGT – cystobiliary fistula
- USG abdomen
- CECT abdomen
- Serology – ELISA , immunoelectrophoresis, blotting.

Imaging



USG imaging

Imaging signs

- Water-lily sign
- Hydatid sand
- Honey coomb/rosette/spoke wheel appearance
- Calcification.
- Daughter cysts, brood capsules or proctoscolicse in cyst.

Treatment

- If <5cm and asymptomatic, serial USG monitoring 2-3 monthly. Give albendazole 10-15mg/kg body wt for 4-6 weeks.

PAIR

- PAIR – percutaneous aspiration, injection and reaspiration .
- We can inject 20% hypertonic saline, 10% povidone, 0.5% cetrimide, absolute alcohol as scolicidal agent.
- Indications –
- subcapsuler and single cyst.
- Unfit for surgery
- Size >6cm.

Surgery

- Main treatment and best results
- Indications –

1. Young patients.
2. Multiple cysts.
3. Deep seated
4. Causing obstruction

- Types of suregry –

1. Radical
2. Conservative

Conservative surgery

- External tube drainage
- Capsulorrhaphy
- Capitonnage
- Omentoplasty
- Internal collapse
- Marsupialization

Radical surgery

- Pericystectomy
- Hepatic resection – anatomic and non anatomic.

Pre and post op management

- Give albendazole 400mg 3 weeks before surgery
- Give albendazole 400mg 4 to 6 weeks post surgery.
- For E. multiloccularis, post-op albendazole 400mg for 2 years.