

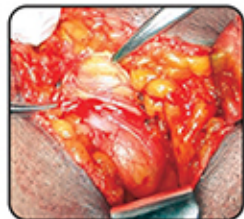
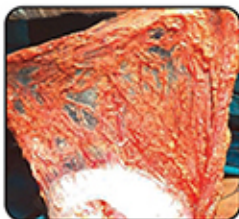
Updated with 8th AJCC (2017)

SURGERY ESSENCE

A Must-buy Book for NEET-PG, INI-CET & FMG Exams

Thoroughly Revised and Updated Edition
Including Latest Exam Pattern Questions,
Important Annexures and Image-based Questions

Updated from Bailey and Love,
Sabiston, Schwartz, Smith Urology,
Campbell Urology and Harrison's



Pritesh Singh

10th
Edition



JAYPEE

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***** Most Important
 **** Very Important
 *** Important

PYOGENIC LIVER ABSCESS

PYOGENIC LIVER ABSCESS

- Liver is MC site of abdominal visceral abscess^Q
- PLA accounts for majority of hepatic abscesses^Q
- Higher incidence of cryptogenic abscess occur in Asian series^Q
- No significant gender, ethnic or geographic differences in disease frequency^Q
- Associated comorbid conditions: Cirrhosis, CRF, history of malignancy

E. coli	MC in western countries ^Q
Klebsiella pneumoniae	MC in Asian countries ^Q
Staphylococcus	MC in children, suffering from chronic granulomatous disease ^Q

- Multiple abscesses occur in patients with a biliary origin^Q
- Solitary abscesses are more likely than multiple abscesses to be polymicrobial.

Routes of Infection in PLA

- **Biliary tract (MC):**^Q
 - CBD stones leading to cholangitis (in Asia)^Q
 - Hilar cholangiocarcinoma in western countries^Q
 - CBD strictures
- **Portal vein (2nd MC)**^Q
- **Hepatic artery:**^Q
 - Hematogenous spread, usually monomicrobial, staphylococcus or streptococcus
- **Direct extension:**
 - From subdiaphragmatic abscess
 - From empyema in chest
 - From suppurative cholecystitis
 - From perinephric abscess
- Penetrating or blunt trauma
- Cryptogenic

Clinical Features

- MC presenting symptom is fever^Q.
- MC LFT abnormality is an elevation of ALP^Q.
- Classic presentation: Fever, jaundice (25%)^Q, and right upper quadrant pain & tenderness
- Fever, chills, & abdominal pain are the most common presenting symptoms
- Usually single, involve right lobe^Q
- Malignancy, jaundice, deranged LFT and sepsis are associated with poor prognosis.

Endogenous Endophthalmitis in PLA

- A rare complication specific to **Klebsiella**^Q hepatic abscesses
- Occurring in 3% of cases.
- More common in **diabetic patients**^Q.
- **Early diagnosis** and **treatment** represent the best chance to **preserve visual function**^Q.

Diagnosis

- USG & CT are the main diagnostic modalities^Q
- Diagnosis is confirmed by aspiration & culture^Q
- CXR: Elevated hemidiaphragm, right sided pleural effusion or atelectasis

Treatment

- Percutaneous catheter drainage + IV antibiotics has become the treatment of choice^Q.
- After 2 weeks of parenteral antibiotics, oral agents should be used for further 4 weeks.

AMOEBIIC LIVER ABSCESS

AMOEBIIC LIVER ABSCESS

- Caused by **Entamoeba histolytica** whose cysts are acquired through the **feco-oral route**^Q
- Trophozoites reach the liver through **portal venous system**^Q.

- Solitary and more common in right lobe of liver**^Q.
- Low incidence of invasive amoebiasis in menstruating women**^Q

- Majority of patients are **young men** (may be due to heavy alcohol consumption)

Pathogenesis

- MC form of invasive disease is **colitis**, frequently affects the **cecum & ascending colon**^Q
- In colon: **Flask-shaped ulcers**^Q (MC site: **Cecum & ascending colon**)^Q
- Synchronous hepatic abscess** is found in **one third** of patients with active amebic colitis.

Clinical Features

- MC symptom is **abdominal pain**^Q
- Typical clinical picture**: Patient of **20-40 yrs of age**, with history of travel to **endemic area**, presents with **fever**, chills, anorexia, **right upper quadrant pain**^Q.
- Results from an obligatory colonic infection, a **recent history of diarrhea** are **uncommon**^Q.

- Active colitis and amoebic liver abscess rarely occur simultaneously**, as a rule **colonic lesions are silent**^Q
- Jaundice is rare**^Q
- Raised PT is MC LFT abnormality**^Q.

Diagnosis

- USG and CT are the **main diagnostic modalities**^Q

- Diagnosis is confirmed by serological tests**^Q (ELISA) for anti-amoebic antibodies.
- Cultures of amoebic abscess are usually sterile or negative**^Q.

- CXR: Elevated hemidiaphragm, right sided pleural effusion or atelectasis
- ALA: **Reddish-brown anchovy paste**^Q; **more reliable characteristic** than color is the **odour** of the fluid.

Treatment

- Metronidazole** (750 mg orally TDS × 10-14 days) is the **mainstay of treatment** and is **curative in over 90%** of patients^Q, clinical improvement is seen within 3 days.
- Luminal agents** include **iodoquinol, paromomycin & diloxanide furoate**^Q.
- Average time to **radiologic resolution** of abscess is **3-9 months**

Indications of Aspiration in ALA

- Diagnostic uncertainty^Q
- Failure to respond** to therapy in 3-5 days^Q
- Pyogenic superinfection**^Q
- High risk of rupture** (size **>5 cm, left lobe abscess**)^Q
- Pregnancy**^Q (Therapeutic trial with high dose Metronidazole is deemed inappropriate)

Complications

- Most frequent complications: Rupture into the **peritoneum** (MC)^Q, pleural cavity, or pericardium.
- Size of abscess** appears to be the **most important risk factor** for rupture
- Laparotomy** is indicated in cases of doubtful diagnosis, **hollow viscus perforation, fistulization** resulting in hemorrhage or sepsis, and **failure of conservative therapy**.
- Treatment of rupture into the pleural space: **Thoracentesis**^Q
- Rupture into bronchi is self-limited** with postural drainage & bronchodilators^Q.

HYDATID DISEASE

HYDATID DISEASE

- Hydatid disease is a **zoonosis**, occurs primarily in **sheep-grazing areas**^Q of the world
- Endemic in **Mediterranean countries, Middle East, Far East, South America, Australia, New Zealand, & East Africa**.

- Humans contract the disease from dogs**, and there is **no human-to-human transmission**^Q.
- Hydatid cyst is caused by **Echinococcus granulosus**^Q.
- Other species affecting human beings: **E. multilocularis, E. vogelli, E. oligarthus**^Q
- Malignant hydatidosis is caused by E. multilocularis**^Q

Life-cycle

- Dogs are the **definitive host**^Q of *E. granulosus*
- Eggs are passed (up to thousands of ova daily) and deposited with the dog's feces.
 - **Sheep:** Usual **intermediate host**^Q
 - **Human:** **Accidental dead end intermediate host**^Q without human to human transmission
- In the **human duodenum**, parasitic embryo releases an **oncosphere**, that **penetrate mucosa**, allowing access to **bloodstream**^Q.
- In the blood, **oncosphere** reaches **liver (MC)**^Q or **lungs**, develops its **larval stage**, **hydatid cyst**.
- Organs most commonly involved are: **Liver > Lungs > Spleen > Kidney > Brain > Bone**^Q.

Hydatid Cyst

- Three weeks after infection, a visible hydatid cyst develops
- The cyst wall has two layers:
 - **Ectocyst:** outer **gelatinous membrane**^Q – **Endocyst:** inner **germinal membrane**^Q
- **Pericyst:** Fibrous capsule **derived from host tissues**, develops around the hydatid cyst.

- **Scolecex** develop into an **adult tapeworm** in **definitive host**^Q
- Scolecex **differentiate** into a **new hydatid cyst** in **intermediate host**^Q
- **Hydatid sand:** **Freed brood capsules** and **scolecex** in the hydatid fluid

Clinical Features

- **Equally common** in males & females, age of **45 years**.
- **Most (75%)** are **singular**, located in **right liver (VII & VIII)**^Q.
- **Mostly asymptomatic**^Q until complications occur

- **MC presenting symptoms:** Abdominal pain, dyspepsia & vomiting.
- **MC sign:** **Hepatomegaly**^Q

- **Complications:** Rupture of the cyst into the **biliary tree (MC)**^Q or **bronchial tree**, or free rupture into **peritoneal, pleural, or pericardial cavities**.
- **Intrabiliary rupture** is **MC complication** of **hydatid liver cysts**^Q
- Free ruptures can result in disseminated echinococcosis and a potentially fatal anaphylactic reaction.

Diagnosis

- **USG and CT** are the **main diagnostic modalities**^Q
 - **Daughter cyst** within the **large cyst (rosette appearance)** & **calcification of wall** are **highly suggestive** of **hydatid cyst**^Q.

- **Diagnosis is confirmed** by **serological tests**^Q (**ELISA, Immunoblot, Arc-5, IHA**) for antibodies.
- **Ring like calcification on CECT** is seen in **hydatid cyst**^Q

- In cases of **suspected biliary involvement (Jaundice)**, **ERCP (gold standard)**^Q or **PTC** is necessary.

Treatment

- **Most cysts** are **treated surgically**^Q
- **Conservative management** is appropriate in **elderly patients** with **small, asymptomatic, densely calcified cysts**^Q.
- **Treatment options:** **PAIR**, **pericystectomy**, **marsupialization**, leaving the cyst open, **drainage of the cyst**, **omentoplasty**, or **partial hepatectomy** to encompass the cyst.
- Currently, **PAIR** is the **preferred method** of **treatment**^Q for **anatomically & surgically appropriate lesions**

Surgery remains the treatment of choice for cysts where

- **PAIR is not possible** or **cysts are refractory to PAIR**^Q
- For **complicated cysts** (communicating with biliary tract)^Q

- **Radical (resection)** and **conservative (drainage & evacuation)** surgical approaches appear to be **equally effective** at controlling disease.
- **Pericystectomy** is the **preferred surgical approach**^Q (complete cyst with surrounding fibrous tissue are removed)
- If surgical **cystectomy** is **not technically feasible**, then **formal liver resection** can be done.

Chemotherapy in Hydatid Disease

- Chemotherapy with **albendazole** or **mebendazole** is effective at **shrinking the cysts**
- **Cyst disappearance** occurs in **fewer than 50%** of patients^Q.
- **Preoperative treatment** may **decrease the risk for spillage**^Q and is a reasonable and safe practice.
- **Chemotherapy without definitive resection** or **drainage** is only considered **for:**
 - **Widely disseminated disease**^Q – Patients with **poor surgical risk**^Q

Treatment of *E. multilocularis*

- *E. multilocularis* cyst is **always multiloculated**^Q.
- Treatment is **surgical resection**^Q.

PAIR

PAIR (PUNCTURE, ASPIRATION OF CYST CONTENT, INJECTION OF SCOLICIDAL AGENT, AND REASPIRATION)

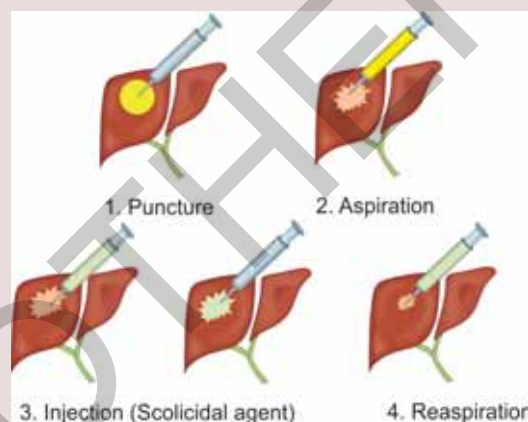
- Currently, **PAIR** is **preferred method of treatment**^Q for **anatomically & surgically appropriate lesions**
- The **efficacy of PAIR** in managing hydatid cysts is **>75%**.
- During PAIR, patient is given **prophylactic coverage of albendazole**

Scolicidal Agents

- **Hypertonic (20%) saline**^Q: 100% scolical with contact time of 6 minutes
- 0.5% **cetrimide** with 0.05% **chlorhexidine**^Q
- **Absolute alcohol**^Q
- 10% **povidone iodine**^Q

Contraindications of PAIR

- Superficially located cysts^Q
- **Inaccessible or hazardous location**^Q of cyst
- Cysts with **multiple internal septal**^Q divisions (**honeycombing pattern**)
- **Dead or inactive cysts**^Q
- Cysts **communicating with biliary tree**^Q
- **Lung or brain cysts**^Q



Most Common

	Symptom	Sign	Laboratory abnormality
Pyogenic abscess	Fever ^Q	RUQ tenderness ^Q	Raised ALP ^Q
Amebic abscess	Abdominal pain ^Q	Hepatomegaly ^Q	Raised PT ^Q
Hydatid cysts	No symptom or Abdominal pain ^Q	RUQ mass ^Q	Eosinophilia

ACTINOMYCOSIS OF LIVER

ACTINOMYCOSIS OF LIVER

- Most commonly, *Actinomyces* **reaches liver through portal vein**^Q.
- Liver is gradually replaced by **multiple abscesses**, typical **honey comb liver**^Q

Diagnosis

- Needle aspiration: **Actinomyces in pus**^Q

Treatment

- Antibiotic (**Penicillin**) is the **DOC**^Q.

HEPATIC CYST

SIMPLE HEPATIC CYST

- Contain **serous fluid**, **do not communicate** with the biliary tree, and **do not have septations**^Q
- **Single** in 50% cases^Q

Treatment

- Nonsurgical treatment: **Aspiration and injection of a sclerosing agent** (most frequently **ethanol**)^Q.
- Surgical therapy: **Fenestration** or **unroofing** the **extrahepatic** portion of cyst^Q.

Complication

- MC complication: **Intracystic bleeding**^Q.

POLYCYSTIC LIVER DISEASE

- Autosomal dominant^Q disorder, often found is association with polycystic renal disease
- MC extra-renal manifestation of ADPKD^Q
- Liver cysts are always preceded by kidney cysts^Q.

- Renal function and hepatic cyst load are correlated^Q.
- Associated condition: Berry aneurysm and mitral valve prolapse^Q.

Types

- Type I: Few large cysts (>7-10 cm)
- Type II: Multiple medium cysts (5-7 cm)
- Type III: Diffuse small to medium cysts (<5 cm)

Treatment

- Laparoscopic unroofing^Q for small number of large cysts
- A combination of cyst unroofing + liver resection^Q for reducing liver volume.
- MC complication specific to surgery: Ascites

Complications

- The main complication is bacterial infection^Q of a cyst.
- Other complications: Intracystic bleeding, cholestasis, portal hypertension
- Liver failure has not been observed in these patients.

LIVER TUMORS

- MC malignancy of liver: Metastasis^Q
- MC primary malignancy of liver: HCC^Q
- MC primary malignancy of liver in children: Hepatoblastoma^Q
- MC benign tumor of liver: Hemangioma^Q

LIVER HEMANGIOMA**LIVER HEMANGIOMA**

- MC benign tumor of the liver^Q.
- Mainly seen in women of 45 years^Q.
- Small capillary hemangiomas (no clinical significance), larger cavernous hemangiomas
- Usually single and <5 cm in diameter, occur equally in right & left liver^Q.
- Giant hemangioma: Lesions >5 cm

Pathology

- Microscopically: Endothelium-lined, blood-filled spaces that are separated by thin, fibrous septa.
- Enlargement of hemangiomas are by ectasia^Q rather than neoplasia.

Clinical Features

- Most commonly asymptomatic and incidentally found^Q on imaging studies.
- Large compressive masses may cause vague upper abdominal symptoms^Q.
- Kasabach-Merritt syndrome^Q: Syndrome of thrombocytopenia & consumptive coagulopathy, rarely seen
- LFTs & tumor markers are normal^Q

Diagnosis

- Diagnosis is made radiologically.
- CT and MRI are diagnostic if a typical peripheral nodular enhancement^Q pattern is seen.
- Percutaneous biopsy is potentially dangerous & inaccurate, not recommended^Q.

Treatment

- Observation for asymptomatic cases^Q
- Enucleation with inflow control is TOC for symptomatic cases^Q

FOCAL NODULAR HYPERPLASIA

FOCAL NODULAR HYPERPLASIA

- FNH is **second MC benign tumor**^Q of the liver.
- Usually a **small (<5 cm) nodular mass** arising in a normal liver, involves right & left liver equally.
- Mainly seen in **young women**, associated with **OCPs use**^Q

Pathology

- **Central fibrous scar**^Q with **radiating septa** in the mass
- Typical hepatic vascularity is **not seen** with **atypical biliary epithelium**^Q
 - **Central scar** contains a **large artery** that branches out into multiple smaller arteries in a **spoke-wheel pattern**^Q (on angiography)

Clinical Features

- **Incidental finding** at laparotomy or more commonly on imaging studies in most patients,.
- **Vague abdominal pain** in symptomatic cases
- AFP levels are **normal**.

Diagnosis

- Most cases of FNH can be diagnosed radiologically, on **CECT** or **MRI**
- **Homogeneous mass** with a **central scar**^Q that rapidly enhances during the arterial phase of contrast administration.
- Histologic confirmation and resection for definitive diagnosis if radiologic diagnosis is difficult

Treatment

- **No treatment**^Q in asymptomatic patients with typical radiologic features
- **Resection** in cases of **diagnostic uncertainty**, for **histologic confirmation**^Q.

HEPATIC ADENOMA

HEPATIC ADENOMA

- **Benign** proliferative disorder of hepatocytes
- Predominantly found in **young women (20-40 years)**, associated with **OCPs**^Q
- Usually **single**^Q (multiple lesions in 12-30%)

Pathology

- Composed of **cords of benign hepatocytes** containing **increased glycogen & fat**, without **bile ductules**, **fibrous septa**, **portal tracts** or **central vein**^Q.
 - **Bile ductules** are **not seen**, only few or **no Kupffer cells** are seen^Q.
 - **Normal architecture** of the liver is **not present**^Q in these lesions.

- Contain large plates of hepatocytes separated by **dilated sinusoids** which are **perfused solely** by **peripheral arterial feeding vessels** (lack **portal venous supply**), under **arterial pressure**^Q.
- **Hemorrhage & necrosis**^Q are commonly seen

Clinical Features

- Symptomatic (upper **abdominal pain**) in **50-75%**^Q, related to hemorrhage or local compressive symptoms.
- Tumor markers (AFP) are **normal**^Q.

- Two major risks: **Rupture** (with potentially life-threatening **intrapertitoneal hemorrhage**) & **malignant transformation**^Q.
- Risk for **rupture** is **30-50%**, related to **size**^Q.
- Risk for **transformation** into **HCC** is **low**^Q.

Diagnosis

- **MRI**: Well-demarcated heterogeneous mass containing **fat** or **hemorrhage**.

CT Findings in Hepatic Adenoma

- **Hypervascular & heterogeneous** on the **arterial phase** and become isodense or hypodense on the portal phase as a result of **arteriovenous shunting**
- Distinctive findings from FNH: **Smooth surface** (95%), presence of **necrosis & hemorrhage** (25%), and **tumor capsule** (25%)^Q.

- **Angiography**: **Hypervascular** well circumscribed tumor **supplied by peripheral arteries**^Q.
- **Resection** may be necessary to **secure a diagnosis** in **difficult cases**^Q.

Treatment

- **Acute hemorrhage:** Hepatic artery embolization^Q, after stabilization, resection of the mass.
- **Resection for symptomatic masses^Q**
- **Resection before a planned pregnancy**, as behavior during pregnancy has been unpredictable

PELIOSIS HEPATITIS**PELIOSIS HEPATITIS**

- It is an uncommon disorder characterized by **multiple, small, blood-filled sinuses^Q**
- Commonly occurs in **immunocompromised** postransplant patients, **AIDS** patients, and patients taking long term **steroids^Q**.

Etiology

- Drugs causing it are **androgens**, **azathioprine**, **tamoxifen**, **estrogen** & **vitamin A^Q**.

Diagnosis

- Radiographically these lesions present as **diffuse hypodense areas** spread **throughout the liver^Q**
- CT and MRI show enhancement on early images, which may progress from central to peripheral on delayed imaging.

Treatment

- The **treatment** for bleeding lesion has been **angiographic embolization^Q**.

RISK FACTORS FOR HEPATOCELLULAR CARCINOMA

Conditions Associated with Hepatocellular Carcinoma					
1. Cirrhosis		2. Metabolic diseases		3. Environmental	
Condition	Risk	Condition	Risk	Condition	Risk
• HBV^Q • HCV^Q • Alcohol^Q • Autoimmune chronic active hepatitis • Cryptogenic cirrhosis	High High High High	• Hereditary hemochromatosis^Q • Hereditary tyrosinemia^Q • Alpha-1 antitrypsin deficiency • Ataxia telangiectasia^Q • Types 1 & 3 glycogen storage disease • Galactosemia^Q • Citrullinemia • Hereditary hemorrhagic telangiectasia • Porphyria cutanea tarda • Wilson's disease^Q • Orotic aciduria • Alagille's syndrome^Q (congenital cholestatic syndrome)	High High Moderate Moderate Moderate Moderate Moderate Moderate Moderate Low Moderate Moderate	• Thorotrast • Androgenic steroids^Q • Cigarette smoking^Q • Aflatoxin^Q	Moderate Moderate Low to moderate Moderate

HEPATOCELLULAR CARCINOMA**HEPATOCELLULAR CARCINOMA**

- MC primary liver malignancy is HCC^Q
- HCC represents MC solid organ cancers^Q.
- HCC: MC malignancy responsible for death in patients with cirrhosis.

- More prevalent in Asia & sub Saharan Africa^Q (high frequency of chronic infection with HBV & HCV^Q)
- 100 folds increase in risk in individuals with HBV infection^Q

- More common in males, 60-90% arise in cirrhotic liver^Q
- Post necrotic cirrhosis has highest risk^Q of developing into HCC
- Alcoholic cirrhosis & Primary biliary cirrhosis has lower risk^Q

- Strong propensity for invasion of vascular channels^Q

Pathology

- **Gross Morphology:** Hanging, pushing & invasive tumors^Q.
- **Histologic patterns:** Trabecular, pseudoglandular or acinar, compact pattern and scirrhous pattern

Clinical Features

- MC symptom is abdominal pain > weight loss^Q

Significant weight loss: 5% in 1 month or 10% in 6 months or 20% in 1 year^Q

- Usually presents at **late stage**^Q, symptoms at advanced stage are **vague**
- Non-specific symptoms (anorexia, weight loss) and **Hepatomegaly**^Q

Paraneoplastic Syndromes in HCC

- **Hypercholesterolemia (MC)**^Q > hypoglycemia^Q, erythrocytosis, hypercalcemia

- **Vascular bruit** (25%), GI bleed (10%), tumor rupture (2-5%), jaundice due to biliary obstruction (10%), paraneoplastic syndrome (<5%).

Tumor Markers

- Protein induced by Vitamin K Absence (PIVKA; Des-gamma-Carboxy Prothrombin); **glypican-3**; **AFP** fractions^Q

- Lectin fraction-3 of AFP (**AFP-L3**) is **highly specific to HCC** and also an indicator of **poorly-differentiated** histology and **unfavorable prognosis**^Q
- Serum **AFP** level is elevated above **20 ng/mL** in >70% of patients with HCC.

- Monoclonal antibody **HepPar-1** (hepatocyte paraffin-1) identifies a unique antigen on **hepatocyte mitochondria** and is used to identify hepatocytes or HCC.

Diagnosis**Non-invasive Diagnostic Criteria for HCC**

- **Focal lesion 1-2 cm:** Two imaging techniques with **arterial hypervascularization & venous washout**^Q.
- **Focal lesion >2 cm:** One imaging technique with **arterial hypervascularization & venous washout**^Q.
- Techniques to be considered: Dynamic CT & MRI.

- Screening is based on regular **ultrasound scanning in high risk population**^Q
- Biopsy proof of HCC is **not required**^Q

Treatment

- Complete excision^Q by partial hepatectomy or by total hepatectomy and transplant is the only treatment modality with **curative potential**^Q.

Remember: Only 15-20% of HCC is resectable, because rest of the tumors have

- Multicentricity, Bilobar involvement^Q
- Portal vein invasion, Lymphatic metastasis^Q

Okuda Staging System for HCC (BATA)^Q

Clinical parameter	Cut-off value	Points
Serum Bilirubin	<3	0
	>3	1
Serum Albumin	>3	0
	<3	1
Tumor size	<50%	0
	>50%	1
Ascites	Absent	0
	Present	1
Stage I = 0; Stage II = 1-2 points; Stage III = 3-4 points.		

Cancer of the Liver Italian Program (CLIP)

- Components: PACT (Portal vein thrombosis, AFP levels, Child-Pugh stage, Tumor extension)^Q
- CLIP system is applicable to **Hepatitis C-related HCC** cases^Q

Chinese University Prognostic Index

- Components: BA₃TS (Bilirubin; A₃: Ascites, AFP, ALP; TNM stage; Symptoms)^Q
- Applicable to **HBV related HCC in China**^Q.

Barcelona Clinic Liver Cancer Staging System

- It was developed to allow for the **indication** of the **best therapy** for each stage of HCC^Q and is **best suited** for **treatment guidance** and to **select early-stage patients** who could benefit from **curative therapies**.
- It divides patients into four major groups (early, intermediate, advanced and end stage)
- It considers variables related to **tumor stage, liver functional status, physical status** and **cancer related symptoms**^Q.

Treatment Options for Hepatocellular Carcinoma

1. Surgical: • Resection • Orthotopic liver transplantation	4. Transarterial: • Embolization • Chemoembolization • Radiotherapy
2. Ablative: • Ethanol injection • Acetic acid injection • Thermal ablation (cryotherapy, radiofrequency ablation, microwave)	5. Systemic: • Chemotherapy • Hormonal • Immunotherapy
3. Combination Transarterial and Ablative	6. External-beam Radiation Therapy

FIBROLAMELLAR HEPATOCELLULAR CARCINOMA**FIBROLAMELLAR HCC**

- Occurs in **young adults** without underlying **cirrhosis**^Q
- **Non-encapsulated** but well, circumscribed, so **high resectability rate**^Q
- Grows slowly and has **better prognosis**^Q

Pathology

- Well demarcated & **non-encapsulated** and may have a **central fibrotic area**^Q.
- Composed of **large polygonal tumor cells** embedded in a **fibrous stroma** forming **lamellar structures**

- **Calcification**^Q differentiates FHCC from FNH in 35-55% of FHCC; **heterogeneous enhancement**^Q is also an important imaging finding.

Clinical Features

- Occurs in **younger patients**^Q without a history of cirrhosis.

- FHCC **does not produce AFP**^Q
- Associated with **elevated neurotensin**^Q & **Vitamin B₁₂ binding globulin levels**^Q

Treatment

- **Better prognosis** than HCC due to **high resectability rates**, **lack of chronic liver disease**, and a more **indolent course**^Q.
- **Long-term survival** can be expected in about 50-75% of patients **after complete resection**^Q
- **Recurrence** is **common** and occurs in at least 80% of patients^Q.
- Presence of **lymph node metastases** predicts a **worse outcome**^Q.

COLORECTAL LIVER METASTASIS**COLORECTAL LIVER METASTASIS**

- About **20%** of these patients are candidates for a potentially **curative liver resection** with a **5-year survival rates** range from **25-58%**^Q.
- About **two-third** of cases **recur**, but in high-risk situations (**four or more tumors, extrahepatic disease**), recurrence rates are generally **80% or higher**^Q.
- Resections of **extrahepatic metastases** that appear to be associated with the **best outcome** are **limited lung metastases, locoregional recurrences** of the primary tumor, and **portal lymph nodes**.

Factors most influential on outcome of Colorectal liver metastasis

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> • Size >5 cm^Q • Lymph node-positive primary lesion^Q | <ul style="list-style-type: none"> • Disease free interval <1 year^Q • CEA >200 ng/mL^Q | <ul style="list-style-type: none"> • More than one tumor^Q |
|---|---|--|

- **Synchronous liver metastasis** is associated with poor prognosis

Local Ablative therapy for liver secondaries				
Mechanism	Technique	Zone of Necrosis	Advantages	Disadvantages
Freezing	Cryotherapy	3-5 cm	Large zone of necrosis Easily followed by ultrasound	Requires laparotomy Large size probe size
Hyperthermic coagulative necrosis	Radiofrequency or microwave ablation	2 cm	Percutaneous technique	Small size of necrosis
Local injection therapy	Ethanol, acetic acid, chemotherapy, hot saline	3 cm	Simple, inexpensive	Inhomogenous distribution

HEPATOBLASTOMA

HEPATOBLASTOMA

- MC primary hepatic tumor of childhood, more common in males^Q.
- Low birth weight may represent a risk factor^Q.
- Most cases are sporadic, also associated with Beckwith-Wiedemann syndrome & FAP^Q.
- No evidence of association with HBV or HCV infection or any other chronic viral hepatitis^Q.
- These patients usually do not have cirrhosis or inborn errors of metabolism^Q.

Pathology

- Five histologic subtypes: Fetal, embryonal, mixed mesenchymal, macrotubular, and anaplastic or small cell.

Clinical Features

- Median age of presentation is 18 months, and almost all cases occur before 3 years^Q.
- MC presenting sign is an asymptomatic abdominal mass^Q.
- Mild anemia & thrombocytosis^Q are commonly found at presentation.

- Serum AFP levels are elevated in 85-90% of patients and can serve as a useful marker for therapeutic response^Q.

Diagnosis

- CT scan reveals a vascular mass that is often (50%) speckled with calcification^Q.
- To confirm the diagnosis, an initial biopsy^Q is required.

Treatment

- For unresectable tumors, the initial surgical procedure should include a diagnostic biopsy and placement of a vascular access device for chemotherapy^Q.
- A second laparotomy is performed after four cycles of chemotherapy, if imaging studies show a good response, and the tumor appears resectable.

- Neoadjuvant chemotherapy (cisplatin, 5-fluorouracil, vincristine) followed by resection^Q
- 50% of patients with pulmonary metastases can be cured with resection^Q of the hepatic tumor and chemotherapy or resection of the pulmonary metastases^Q.

Prognosis

- Survival appears to be dependent on complete resection^Q.
- Long-term survival rates of 60-70% can be expected with complete resection^Q.

EPITHELIOID HEMANGIOENDOTHELIOMA

EPITHELIOID HEMANGIOENDOTHELIOMA

- Malignant soft tissue tumor of endothelial origin^Q.
- Infantile variety is benign, adult one is malignant & highly aggressive^Q.
- Female predominance is related to vinyl chloride exposure & OCPs^Q.
- In approximately one half of cases, cutaneous hemangiomas are also present (45%)^Q.

Pathology

- Factor VIII staining^Q differentiates it from other nonvascular tumors.
- Liver parenchymal architecture is preserved^Q.

Diagnosis

- Percutaneous **biopsy**^Q is performed for diagnosis.
- CT scan: Irregular hypodense lesions that may have **hypervascular enhancement**^Q in the periphery following injection of intravenous contrast.

Treatment

- **Total hepatectomy and liver transplantation**^Q (disease is diffuse & multifocal).

BILIARY CYSTADENOMA**CYSTADENOMA**

- Mostly **intrahepatic**^Q (83%), may occur within the **extrahepatic bile ducts** (13%) or **GB** (0.02%).
- Located in the **right lobe** (50%)^Q
- Cystadenoma with **mesenchymal stroma** occurs exclusively in **young and middle-aged women**^Q

Pathology

- Cyst has a globular external surface with **multiple protruding cysts** and **locules** of various sizes.
- **Fluid** content is **mucinous**.
- Lined with **columnar epithelium** and have **papillary infoldings**.

Clinical Features

- Usually presents as a **large cystic mass**^Q (10-20 cm).
- Mainly affects **women**^Q older than 40 years.
- **Majority of patients** present with a **history of abdominal pain or mass**

Diagnosis

- **Ultrasound**: Cystic structure with varying wall thickness, **nodularity**, **septations**, and fluid-filled locules.
- **CECT**: **Enhancement** of the **cyst wall** and **septa**^Q
- **ERCP**: Displacement of the intrahepatic bile ducts by the tumor and **no communication** between the **biliary tree** and **cystadenoma**.

Treatment

- **Enucleation** for neoplastic cysts with **no signs of malignancy**^Q
- **Formal hepatic resection** for neoplastic cysts with signs of **malignancy**^Q

BILIARY CYSTADENOCARCINOMA**BILIARY CYSTADENOCARCINOMA**

- **Rare malignancy**, typically **intrahepatic**^Q in location.
- May arise from preexisting **biliary cystadenomas**.
- **Female**^Q to male ratio is 2:1; **CA 19-9** is **raised**^Q

Pathology

- The presence of an **associated ovarian-like stroma**^Q in **female** patients appears to signify a **favorable prognosis**
- Tends to be **multilocular**, fluid from the cyst can be blood stained, clear, or bile tinged.
- **Preoperative cyst aspiration** is **not recommended** because there is a risk for **peritoneal tumor seeding**^Q

Clinical Features

- Cystadenocarcinoma tends to be **larger than cystadenoma**, but clinical features are similar

Diagnosis

- **Radiologic findings**: Thick or irregular wall, **peripheral enhancement**, associated **mass**, or **papillary tumor projections**^Q into the cyst cavity.

Treatment

- The only **potentially curative treatment** is **complete removal**, by a **major liver resection with clear margins**^Q.
- **Survival rates** for this disease have been reported in the range of **25% to 100%** at 5 years.

WILSON'S DISEASE**WILSON'S DISEASE**

- Wilson's disease is an **autosomal recessive**^Q inherited disorder of copper metabolism.
- Characterized by **excessive deposition** of **copper** in the **liver, brain**, and other tissues^Q.
- **Major physiologic aberration**: Excessive absorption of copper from the **small intestine** and **decreased excretion** of copper by the **liver**^Q.
- Defect on chromosome **13q (ATP7B gene)**^Q

Pathology

- Kayser-Fleischer rings consist of **electron-dense granules** rich in **copper** and **sulfur**.
- Rings form **bilaterally**, **initially** appearing at **superior pole**^Q of cornea, then inferior pole, &, ultimately, circumferentially.

Clinical Features

- Patients with Wilson's disease usually present with **liver disease** during **first decade** of life or with **neuropsychiatric illness** during **third decade**^Q.

- Any young patient with **unexplained chronic** or **fulminant liver disease** should be investigated for Wilson's disease^Q.
- **Kayser-Fleischer rings** are formed by **deposition of copper** in **Descemet's membrane** in limbus of cornea. The color may range from **greenish gold** to **brown**^Q
- When well developed, rings may be **readily visible** to the **naked eye** or with an ophthalmoscope
- When not visible to the unaided eye, rings may be identified using **slit-lamp** examination or **gonioscopy**.

- **Kayser-Fleischer rings** are observed in up to **90%** of individuals with **symptomatic Wilson's disease** and are **almost invariably present** in those with **neurologic manifestations**^Q.

Diagnosis

- Approximately 90% of patients have **ceruloplasmin levels** of **<20 mg/d^Q** (reference range, 20-40 mg/dL).

- **Urinary copper excretion rate** is **>100 mg/d^Q** (reference range, <40 mg/d) in most patients with symptomatic Wilson's disease.
- **Hepatic copper concentration** is regarded as the **criterion standard for diagnosis** of Wilson's disease.

- A liver biopsy with sufficient tissue reveals levels of **>250 µg/g of dry weight**^Q even in asymptomatic patients.

Treatment

- **Zinc**^Q is the **treatment of choice** for **maintenance therapy** in Wilson's disease.

COURVOISIER'S LAW**COURVOISIER'S LAW**

- In **obstruction** of the **common bile duct** due to a **stone**, **distention** of gallbladder seldom occurs; the **organ** usually is **shriveled**^Q.
- If there is no disease in the gallbladder and the **obstruction** is due to **cancer** of **ampulla, pancreas** or **bile duct**, then **gallbladder** will be **distended**^Q.

Exceptions to Courvoisier's Law

- **Double impaction of stones**^Q (one in cystic duct & other in CBD).
- **Pancreatic calculus obstructing the ampulla** of Vater^Q
- **Oriental cholangiohepatitis**^Q
- **Mucocele** due to **stone** in the **cystic duct**^Q

LIVER ANATOMY**Functional Anatomical Divisions of Liver**

- **Functional anatomy** of the liver is based on Couinaud's division of liver into eight (subsequently nine) functional segments, based upon the distribution of **portal venous branches** & location of **hepatic veins** in the parenchyma (Couinaud 1957).
 - **Segment IX** is a **recent subdivision** of **segment I**, and describes that **part of segment** that **lies posterior** to **segment VIII**^Q.
- Liver is **divided into four portal sectors** by **four main branches** of **portal vein**. These are **right lateral, right medial, left medial** & **left lateral** (sometimes the term posterior is used in place of lateral & anterior in place of medial).
- **Three main hepatic veins** lie **between these sectors** as **intersectorial veins**. These **intersectorial planes** are also called **portal fissures** (scissures). **Fissures** containing **portal pedicles** are called **hepatic fissures**.
- Each sector is sub-divided into **segments** (usually two) based on their **supply** by **tertiary divisions** of **vascular biliary sheaths**.

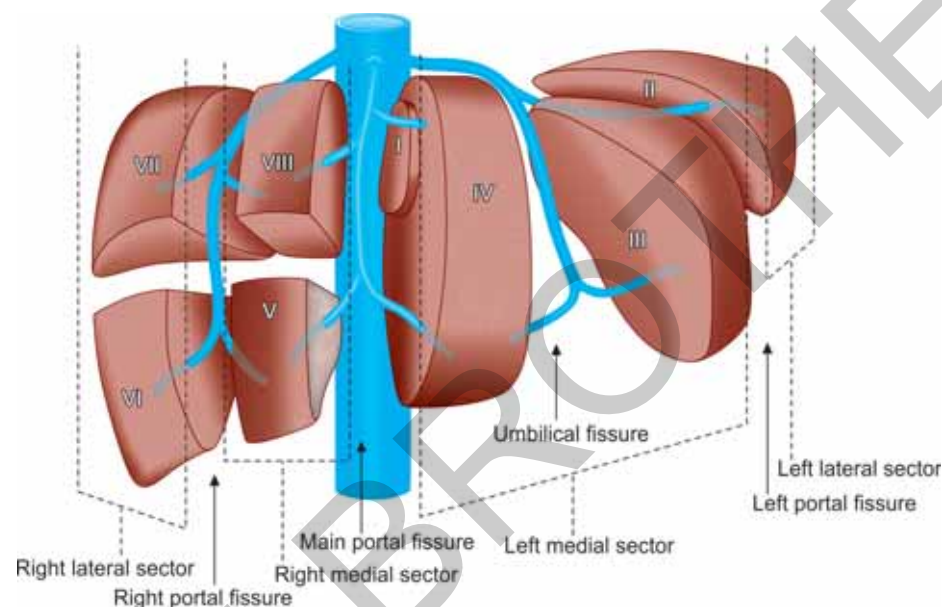
Fissures of the liver:

- Three major fissures, not visible on the surface, run through the liver parenchyma and harbor the three main hepatic veins (main, left & right portal fissures)^Q.
- Three minor fissures are visible as physical clefts of the liver surface (umbilical, venous & fissure of Gans)^Q.

Sectors and segments of the liver:

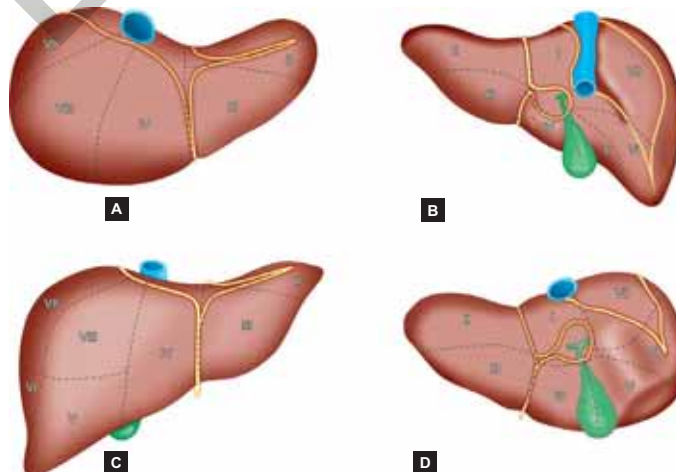
- Sectors of liver are made up of between one & three segments: right lateral sector = segments VI & VII; right medial sector = segments V & VIII; left medial sector = segments III & IV (and part of I); left lateral sector = segment II.

- Segments are numbered in an ante-clockwise spiral centered on the portal vein with the liver viewed from beneath, starting with segment I up to segment VI, and then back clockwise for the most cranial two segments VII & VIII.



The fissures and sectors of the liver. (Right lateral = right posterior; right medial = right anterior)

Segmental Nomenclature			
I	Caudate lobe ^Q	V	Right anterior inferior segment
II	Left lateral superior segment	VI	Right posterior inferior segment
III	Left lateral inferior segment	VII	Right posterior superior segment
IV	Left medial segment or Quadrant lobe ^Q	VIII	Right anterior superior segment



Segments of the liver (after Couinaud). (A) superior view; (B) posterior view; (C) anterior view; (D) inferior view.

Multiple Choice Questions

LIVER ABSCESS

1. **Most common cause of liver abscess in chronic granulomatous disease:** (ILBS 2012)
 - a. Klebsiella
 - b. Staph. aureus
 - c. Peptostreptococcus
 - d. E. coli
2. **Most common cause of liver abscess:** (AIIMS GIS May 2011)
 - a. E. coli
 - b. Proteus
 - c. Klebsiella
 - d. Staphylococcus
3. **Which of the following is the most common cause of pyogenic liver abscess?** (All India 2012, AIIMS GIS Dec 2009) (Recent Question 2014)
 - a. Trauma
 - b. Biliary tract infection
 - c. Colonic Diverticulitis
 - d. Appendicitis
4. **All are true about pyogenic liver abscess except:** (JIPMER GIS 2011)
 - a. Most common route of infection is biliary tree
 - b. Most common site is right lobe
 - c. Klebsiella is most common in gas forming abscess
 - d. Percutaneous drainage is least cured
5. **All are true about amoebic liver abscess except:**
 - a. Metronidazole is mainstay of treatment (PGI Nov 2010)
 - b. Multifocal abscess can not be treated by aspiration
 - c. More common in left side
 - d. More common in female
6. **Liver abscess ruptures most commonly in:** (AIIMS GIS 2003)
 - a. Pleural cavity
 - b. Peritoneal cavity
 - c. Pericardial cavity
 - d. Bronchus
7. **True about amebic liver abscess:** (AIIMS GIS May 2008)
 - a. Male:female >10:1
 - b. Not predisposed by alcohol
 - c. More common in diabetics
 - d. E. histolytica is isolated in >50% from blood culture
8. **Not an indication for percutaneous aspiration in amebic liver abscess:** (AIIMS GIS May 2008)
 - a. Radiographically unresolved lesion after 6 months
 - b. Suspected diagnosis
 - c. Left lobe liver abscess
 - d. Compression or outflow obstruction of hepatic or portal vein
9. **Commonest cause of pyogenic liver abscess:** (AIIMS Sept 96)
 - a. Aspiration
 - b. Hematogenous spread from a distant site
 - c. Direct contact
 - d. Lymphatic spread
10. **Anchovy sauce pus is a feature of:** (All India 99)
 - a. Amebic liver abscess
 - b. Lung abscess
 - c. Splenic abscess
 - d. Pancreatic abscess
11. **In pyogenic liver abscess commonest route of spread is:** (AIIMS Nov 98, AIIMS Nov 95)
 - a. Hematogenous through portal vein
 - b. Ascending infection through biliary tract
 - c. Hepatic artery
 - d. Local spread
12. **True statement regarding pyogenic liver abscess is/are:** (PGI May 2018)
 - a. More common on left side of liver
 - b. Surgical drainage is the treatment of choice
 - c. Most common organism responsible is E. coli
 - d. X-rays are diagnostic
 - e. Diagnosis is confirmed by aspiration and culture
13. **Indications for needle aspiration in liver abscess are:** (PGI June 2006)
 - a. Recurrent
 - b. Left lobe
 - c. Refractory to treatment after 48–72 hours
 - d. >10 cm size
 - e. Multiple
14. **True treatment regarding hepatic amoebiasis:** (PGI 96)
 - a. More common in females
 - b. Multiple lesions
 - c. Mostly treated conservatively
 - d. Jaundice is common
15. **Which one of the following is not corrected regarding amoebic liver abscess?** (ICS 2005)
 - a. Its usual occurrence is in the right lobe
 - b. Patient is toxic
 - c. Surgical drainage is always indicated
 - d. Extension of abscess from liver to pericardium is the most dreaded complication
16. **All are used in treatment of amoebic liver abscess except:** (MAHE 2007)
 - a. Diloxanide furoate
 - b. Chloroquine
 - c. Metronidazole
 - d. Emetine
17. **Not true about amebic liver abscess is:** (DPG 2006)
 - a. Adult forms are seen
 - b. Conservative treatment is generally seen
 - c. Larvae are seen
 - d. USG can diagnose it
18. **A patient with 8 cm × 8 cm abscess in right lobe of liver was treated with aspiration multiple times (3 times) and with systemic amebicide. Now cavity is remaining in right lobe of liver but there is nothing in the cavity. Seven days course of luminal amebicides is given. How will you follow-up?** (AIIMS Nov 2012)
 - a. Stool examination only
 - b. USG weekly for 1 month followed by monthly USG till 1 year
 - c. USG weekly for 3 months followed by CT scan at 3 months
 - d. USG or CT scan monthly and stool examination weekly
19. **A young patient presents to the emergency department with fever and right upper quadrant pain. Clinical examination reveals obvious hepatomegaly but there is no jaundice. Ultrasound reveals a solitary, homogeneous, hypoechoic lesion in the right lobe measuring 5 cm × 5 cm × 4 cm. Tests for hydatid disease were negative. Which of the following is the best recommendation for initial treatment?** (All India 2011)
 - a. Multiple aspirations and antiamoebics/antibiotics
 - b. Catheter drainage and antiamoebics/antibiotics
 - c. Antiamoebics/antibiotics alone
 - d. Hepatectomy followed by antiamoebics/antibiotics

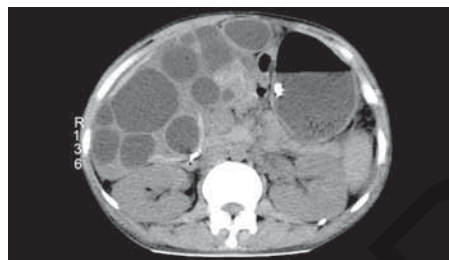
20. **Flask shaped ulcers in colon is caused by:** (Recent Question 2019)
- | | |
|--------------------|----------------------------|
| a. Giardia lamblia | b. Entamoeba histolytica |
| c. H. pylori | d. Enterobius vermicularis |

HYDATID CYST

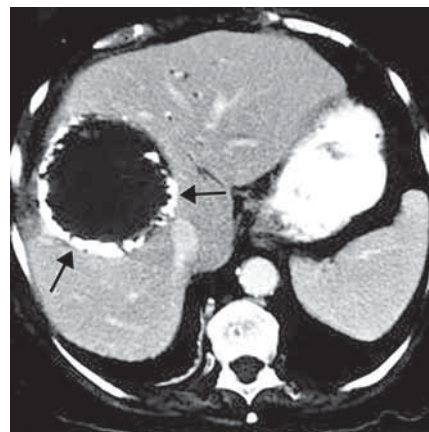
21. **Water lily appearance in a chest radiograph suggests:** (COMEDK 2005, 2004)
- | | |
|-----------------|--------------------------|
| a. Metastasis | b. Cavitating metastasis |
| c. Aspergilloma | d. Ruptured hydatid cyst |
22. **Which of the following is not a sign of pulmonary hydatidosis?** (COMEDK 2010)
- | | |
|--------------------|-----------------------|
| a. Water lily sign | b. Rising sun sign |
| c. Meniscus sign | d. Drooping lily sign |
23. **Ultrasound was performed in a patient of hydatid cyst. What is the name of this sign?**
- | | |
|---------------------|--------------------|
| a. Water lily sign | b. Honeycomb sign |
| c. Spoke wheel sign | d. Triradiate sign |



24. **False about hydatid cyst of liver:** (PGI Nov 2010)
- | | |
|--|---|
| a. Hepatic resection is never done | b. Laparoscopic aspiration of cyst is performed |
| c. Most commonly located in the right liver | d. Mostly asymptomatic |
| e. Most common causative organism is Echinococcus granulosus | |
25. **Not an indication for PAIR treatment in hydatid cyst:** (PGI Nov 2010)
- | | |
|--------------------|-----------------------------|
| a. Size >5 cm | b. Multiloculated |
| c. Cyst in lung | d. Recurrence after surgery |
| e. Perforated cyst | |
26. **Capitonnage is used in treatment of:** (MHSSMCET 2008)
- | | |
|---------------------|-----------------|
| a. Choledochal cyst | b. Dermoid cyst |
| c. Hydatid cyst | d. Renal cyst |
27. **A 40-year-old female presented with abdominal discomfort, dyspepsia and palpable abdominal mass. USG and CECT was performed. What is the diagnosis based on this ultrasound image?**
- | | |
|----------------------|-----------------------------|
| a. Hydatid cyst | b. Multiple HCC |
| c. Liver secondaries | d. Polycystic liver disease |



28. **In the treatment of hydatid cyst, PAIR is contraindicated in:** (PGI Dec 2006)
- | | |
|---|----------------|
| a. Lung cyst | b. Size > 5 cm |
| c. Not amenable to treatment with albendazole | d. Multiple |
| e. Inaccessible location | |
29. **A 40-year-old male presents with a painless cystic liver enlargement of four years duration without fever or jaundice. The most likely diagnosis is:** (UPSC 96)
- | | |
|--------------------------|---------------------|
| a. Amoebic liver abscess | b. Hepatoma |
| c. Hydatid cyst of liver | d. Choledochal cyst |
30. **All are complications of hydatid cyst in the liver except:** (APPG 97)
- | | |
|--------------|----------------|
| a. Jaundice | b. Suppuration |
| c. Cirrhosis | d. Rupture |
31. **During surgical exploration for hydatid cyst of the liver, any of the following agents can be used as scolical agent except:** (UPSC 2004)
- | | |
|-------------------------------|--------------------|
| a. Hypertonic sodium chloride | b. Formalin |
| c. Cetrinide | d. Povidone iodine |
32. **Ring like calcification on CECT is seen in:** (Recent Question 2016)
- | | |
|---------------------|-----------------|
| a. HC | b. FNH |
| c. Liver metastasis | d. Hydatid cyst |



33. **Which of the following is true about hydatid cyst of liver?** (Recent Question 2014, DPG 2007)
- | | |
|---------------------------------------|---|
| a. Surgical management is done always | b. Conservative treatment is effective |
| c. Aspiration is safe | d. E. multilocularis is the most common cause |
34. **Treatment of hydatid cyst:** (APPG 2008)
- | | |
|----------------------------|--------------------------|
| a. Excision of cyst | b. Percutaneous drainage |
| c. Conservative management | d. None |

Explanations

LIVER ABSCESS

1. **Ans. b. Staph. aureus** (Ref: Sabiston 20/e p1445-1449; Schwartz 10/e p1284-1285; Bailey 27/e p1168; Blumgart 6/e p1074, 5/e p1006-1115; Shackelford 8/e p1434, 7/e p1464-1471)

PYOGENIC LIVER ABSCESS IN CHILDREN

- In children, **Staphylococcus PLA^Q** is most common
- Occurs in the setting of **chronic granulomatous disease^Q**, disorder of granulocyte function and **hematologic malignancies**.
- In chronic granulomatous conditions, abscess are **dense and thick**, **early excision** and **treatment** with **antibiotics** against **Staphylococcus aureus** is recommended^Q.

2. **Ans. a. E. coli**

3. **Ans. b. Biliary tract infection**

4. **Ans. d. Percutaneous drainage is least cured**

5. **Ans. c. More common in left side, d. More common in female** (Ref: Sabiston 20/e p1449-1452; Schwartz 10/e p1285; Bailey 27/e p1168; Blumgart 6/e p1074-1076, 5/e p1016-1024; Shackelford 8/e p1431, 7/e p1471-1478)

6. **Ans. b. Peritoneal cavity**

7. **Ans. a. Male:female >10:1**

8. **Ans. a. Radiographically unresolved lesion after 6 months** (Ref: Sabiston 20/e p1452)

AMOEBIC LIVER ABSCESS

- Although **clinical improvement** after **adequate treatment** with antiamebic agents **is the rule**, **radiologic resolution** of the abscess cavity is **usually delayed**.
- The **average time to radiologic resolution** is **3 to 9 months** and can take as long as years in some patients.
- Studies have shown that **more than 90%** of the **visible lesions disappear radiologically**, but a small percentage of patients are left with a clinically irrelevant residual lesion.

9. **Ans. b. Hematogenous spread from a distant site**

Hematogenous spread is most common among the given options.

10. **Ans. a. Amebic liver abscess**

11. **Ans. b. Ascending infection through biliary tract**

12. **Ans. c. Most common organism responsible is E. coli, e. Diagnosis is confirmed by aspiration and culture** (Ref: Schwartz 10/e p1284-1285; Sabiston 20/e p1445-1449; Bailey 27/e p1168)

13. **Ans. b. Left lobe, d. >10 cm size**

14. **Ans. c. Mostly treated conservatively**

15. **Ans. c. Surgical drainage is always indicated**

16. **Ans. a. Diloxanide furoate** (Ref: Goodman Gilman 12/e p1420)

DILOXANIDE FUROATE

- **Diloxanide furoate** is **highly effective luminal amebicide^Q** but has **no systemic anti-amebic activity^Q**, because furoate ester is hydrolysed in the intestine and the released diloxanide is absorbed.
- Diloxanide is a weaker amebicide than its furoate ester and no systemic antiamebic activity is seen despite its absorption.

17. **Ans. c. Larvae are seen** (Ref: Bailey 27/e p1169; Schwartz 10/e p1285)

Larvae are not seen in amoebic liver abscess.

18. **Ans. b. USG weekly for 1 month followed by monthly USG till 1 year** (Ref: Sabiston 20/e p1451; Schwartz 10/e p1284; Blumgart 6/e p1087, 5/e p1016-1024; Shackelford 8/e p1440, 7/e p1471-1478)

In **uncomplicated** cases of amebic liver abscess, follow-up is done with ultrasound.

19. Ans. c. Antiamebics/antibiotics alone

- Presence of a **solitary homogeneous, hypoechoic lesion** in the **right lobe** of the liver in a **young patient** with **fever** and **right upper quadrant pain** suggests a diagnosis of **amebic liver abscess**.
- The **initial treatment of choice** for amebic liver abscess is **metronidazole alone**.
- **Multiple aspirations** and/or **catheter drainage** or **hepatectomy** have **no role** in the “initial” management of amebic liver abscess.

20. Ans. b. Entamoeba histolytica (Ref: Schwartz 10/e p1285; Bailey 27/e p58)

HYDATID CYST

21. Ans. d. Ruptured hydatid cyst (Ref: Sabiston 20/e p1452-1455; Schwartz 10/e p1285-1286; Bailey 27/e p1169; Blumgart 6/e p1108, 5/e p1035-1048; Shackelford 8/e p1425, 7/e p1459-1462)

22. Ans. d. Drooping lily sign (Ref: Wolfgang 2/e p309)

- **Drooping lily sign** is seen in **neuroblastoma** and **duplication of ureter**^Q.
- Duplication of ureter: **Drooping lily sign**^Q on IVP (Nonvisualized upper pole of a duplex system displaces the lower pole down, looking like a drooped down lily flower on IVP)

Characteristic Signs of Pulmonary Hydatidosis

- | | |
|---|--|
| <ul style="list-style-type: none"> • Meniscus sign^Q • Double arc sign^Q • Moon sign^Q | <ul style="list-style-type: none"> • Water lily sign^Q • Crescent sign^Q |
|---|--|

WHO Classification of Hydatid Cyst

CL Type	• Well-circumscribed liquid image with a clearly defined wall
CE 1	• Concentric hyperechogenic halo around the cyst which may contain free-floating hyperechogenic foci called hydatid sand ^Q
CE 2	• Multivesicular cyst with the daughter and grand-daughter cysts identified by honeycomb, rosette, spoke wheel or cluster images ^Q
CE 3	• Partial or total detachment of the laminated layer with floating undulated hyperechogenic membranes showing the dual wall, water lilly and water snake signs ^Q .
CE 4	• Cystic and solid components ^Q together without visible daughter cysts.
CE 5	• Matrix or amorphous mass with a solid or semisolid appearance ; limited amount of calcification; least common type.

- Only **completely calcified cyst (eggshell appearance)** is accepted as a **dead cyst**.
- CL, CE 1, and CE 2 are active fertile cysts; CE 3 is a **transitional cyst** with degeneration started; CE 4 is a degenerated cyst; CE 5 is a calcified cyst; CE 4 and CE 5 is **inactive cyst**.

Gharbi Classification of Hydatid Cyst

Type I	Pure (clear) fluid collection ^Q
Type II	Fluid collection with a split wall (Floating membrane) ^Q
Type III	Fluid collection with septa (Honeycomb image) ^Q
Type IV	Heterogeneous complex mass ^Q
Type V	Calcified mass (eggshell) ^Q

23. Ans. a. Water lily sign (Ref: Bailey 27/e p66)

24. Ans. a. Hepatic resection is never done

25. Ans. b. Multiloculated, c. Cyst in lung, d. Recurrence after surgery, e. Perforated cyst

26. Ans. c. Hydatid cyst: (Ref: Blumgart 6/e p1114, 5/e p1045)

Methods of Management of the Residual Cavity after Cyst Evacuation

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> • External tube drainage • Capsulorrhaphy • Capitonnage^Q • Myoplasty | <ul style="list-style-type: none"> • Omentoplasty^Q • Internal collapse^Q • Introflexion^Q • Marsupialization^Q | <ul style="list-style-type: none"> • Introflexion plus omentoplasty • Cystojejunostomy or Cystogastrostomy |
|---|--|--|

27. Ans. a. Hydatid cyst

28. Ans. a. Lung cyst, e. Inaccessible location (Ref: Sabiston 20/e p1454; Bailey 27/e p1169; Blumgart 6/e p1117, 5/e p1047-1048; Shackelford 8/e p1425, 7/e p1461)
29. Ans. c. Hydatid cyst of liver
30. Ans. c. Cirrhosis
31. Ans. b. Formalin
32. Ans. d. Hydatid cyst (Ref: Sabiston 20/e p1452)
- Ring like calcification on CECT is seen in hydatid cyst.
33. Ans. c. Aspiration is safe (Ref: Bailey 27/e p1169)
- Aspiration is safe in Hydatid cyst of liver.
34. Ans. b. Percutaneous drainage
35. Ans. b. ELISA
36. Ans. d. Multiple peritoneal cyst, c. Moribund patients (Ref: Sabiston 20/e p1453)
37. Ans. b. 60%
- The sensitivity of Casoni's test varies from 55 to 65%.
38. Ans. b. Echinococcus multilocularis
39. Ans. d. E. multilocularis (Ref: Sabiston 20/e 1452p; Schwartz 10/e p1286)
40. Ans. b. Water lily sign (Ref: Wolfgang 2/e p309)

"The water-lily sign is seen in hydatid cyst when there is detachment of the endocyst membrane which results in floating membranes within the pericyst that mimic the appearance of a water lily. It is classically described on plain radiographs (mainly chest X-ray) when the collapsed membranes are calcified but may be seen on ultrasound and CT."



HEPATIC ADENOMA

41. Ans. c. Hepatic architecture is maintained (Ref: Sabiston 20/e p1455; Schwartz 10/e p1290-1291; Bailey 26/e p1083; Blumgart 6/e p1284, 5/e p1258-1262; Shackelford 8/e p1537, 7/e p1564-1565)
42. Ans. a. Normal liver architecture
43. Ans. b. Normal liver architecture
44. Ans. a. Hepatic adenoma
45. Ans. b. Liver cell adenoma
46. Ans. a. Usually multiple
47. Ans. b. Hepatic adenoma (Ref: Bailey 27/e p1172; Taber's Medical Dictionary 19/e p1600)

Hepatic adenoma always merits surgery. As no characteristic radiological features to differentiate these lesions from malignant tumor. These tumors are thought to have malignant potential and resection is therefore the treatment of choice.

FOCAL NODULAR HYPERPLASIA

48. Ans. a. FNH (Ref: Sabiston 20/e p1456; Schwartz 10/e p1291; Bailey 27/e p1172; Blumgart 6/e p1306, 5/e p1255-1258; Shackelford 8/e p1536, 7/e p1563-1564)
49. Ans. b. Focal nodular hyperplasia (Ref: Sabiston 20/e p1456; Schwartz 10/e p1291; Bailey 27/e p1172)

The given image shows central stellate scar, which is seen in focal nodular hyperplasia.

50. Ans. b. Surgical resection is required due to risk of malignancy

SURGERY ESSENCE

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Dr Pritesh Singh
Director  Dr Pritesh Institute
MBBS (MAMC), MS (Surgery),
FMS, FIAGES

Dr Pritesh Singh, graduate from Maulana Azad Medical College and postgraduate from Lady Hardinge Medical College, New Delhi, India, is an excellent teacher and has been taking awe inspiring classes in various countries since 2009. He is amongst the best faculty and is very popular with students because of his spellbinding classes. He is a renowned educationist and author of Surgery Essence, which needs no introduction and AIIMS Essence and DPG entrance examination books. The students all over the country admire the way he teaches. He is not just a source of inspiration for his pupils rather he is their role model, as he is young and dynamic. He sets a positive example with his style of teaching, courtesy, cooperation and professionalism. Some students say he is a magician who keeps his students spellbound throughout his class. His performance speaks volumes about his knowledge and precision.

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