LIVER ABSCESS

Key Concepts
- Types of Liver Abscess
- Causes of Liver Abscess
- Clinical features of Liver Abscess
- Treatment of Liver Abscess

Abstract
The most common source of liver abscess is the biliary tree in patients with cholecystitis, choledocholithiasis, or cholangitis. Less common sources include other intra-abdominal processes, such as appendicitis or diverticulitis, and hematogenous spread from sources such as an infected heart valve or the oral cavity. Amebic liver abscess should be considered in endemic areas or patients who have been to the tropics. However, there are many potential causes of liver abscesses, including: Abdominal infection such as appendicitis, diverticulitis, or a perforated bowel. Infection in the blood. Infection of the bile draining tubes. Recent endoscopy of the bile draining tubes. Trauma that damages the liver. Treatment should include drainage, either percutaneous or surgical.

Key words: Liver Abscess, Amebic Abscess, Percutaneous drainage.

BACK GROUND
The most common source of liver abscess is the biliary tree in patients with cholecystitis, choledocholithiasis, or cholangitis. Less common sources include other intra-abdominal processes, such as appendicitis or diverticulitis, and hematogenous spread from sources such as an infected heart valve or the oral cavity. Amebic liver abscess should be considered in endemic areas or patients who have been to the tropics. Fungal microabscesses are seen primarily in patients with compromised immune systems. Rarely, liver abscess may be due to trauma, secondary infection from an amebic abscess or a necrotic malignant hepatic tumor, or direct extension from local structures.

A single abscess is the most common presentation; spread to the liver via the vascular route is associated with multiple abscesses. The right hepatic lobe is affected more than twice as frequently as the left, due to vascular anatomy. Aspiration of abscess fluid and subsequent culture guide antibiotic choice.

Bacterial abscess of the liver is relatively rare; however, it has been described since the time of Hippocrates (400 BC), with the first published review by Bright appearing in 1936. In 1938, Ochsner’s classic review heralded surgical drainage as the definitive therapy; how
ever, despite the more aggressive approach to treatment, the mortality rate remained at 60-80%.1

**ETIOLOGY**

- The 3 major forms of liver abscess, classified by etiology, are as follows:
- Pyogenic abscess, which is most often polymicrobial, accounts for 80% of hepatic abscess cases in the United States.
- Amebic abscess due to *Entamoeba histolytica* accounts for 10% of cases.2
- Fungal abscess, most often due to *Candida* species, accounts for less than 10% of cases.

However there are many potential causes of liver abscesses, including: Abdominal infection such as appendicitis, diverticulitis, or a perforated bowel infection in the blood infection of the bile draining tubes Recent endoscopy of the bile draining tubes Trauma that damages the liver. The most common bacteria that cause liver abscesses are: *Bacteroides* Enterococcus, *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Streptococcus*. In most cases, more than one type of bacteria is found.

**Causes of pyogenic liver abscesses**

- Biliary obstruction (cholangitis)
- Haematogenous
  - Portal Vein (mesenteric infection)
  - Hepatic artery (bacteraemia)
- Direct extension
- Trauma
  - Penetrating or non penetrating
- Infection of liver tumour or cyst

**EPIDEMIOLOGY**

The frequency in hospitalized patients ranges from 8-16 cases per 100,000 persons. Untreated, pyogenic liver abscess remains uniformly fatal. With timely administration of antibiotics and drainage procedures, mortality currently occurs in 5-30% of cases. The most common causes of death include sepsis, multiorgan failure, and hepatic failure.3

Pyogenic liver abscess shows no gender difference. Amebic abscess is 10 times more common in men than in women.

Socioeconomic status: Malnutrition, immunocompromise, and excess alcohol intake (which is believed to impair immunologic response) predispose to amebic liver abscess in those exposed to *Entamoeba histolytica*.

**CLINICAL FEATURES**

- Hepatic abscesses are usually associated with fever, right upper quadrant pain, or other systemic signs of infection.
- Typically the sequela of a colonic/intestinal infection follow.
- Patients have fever, anorexia, weight loss, nausea, and vomiting,
- but only 50% have signs localized to the RUQ, such as pain, tenderness, hepatomegaly, and jaundice.4

**DIAGNOSIS**

- **LAB STUDIES**
  - CBC count with differential s of : Anemia of chronic disease and Neutrophilic leukocytosis
  - Liver function studiesHypoalbuminemia and elevation of alkaline phosphatase (most common abnormalities)
  - Elevations of transaminase and bilirubin levels (variable)
  - Blood cultures are positive in roughly 50% of cases.
  - Culture of abscess fluid should be the goal in establishing microbiologic diagnosis.
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- Enzyme immunoassay should be performed to detect E histolytica in patients either from endemic areas or who have traveled to endemic areas.\(^5\)

LATEST PROCEDURES
1. Percutaneous needle aspiration
2. Percutaneous catheter drainage

TREATMENTS
An untreated hepatic abscess is nearly uniformly fatal due to complications that include sepsis, empyema, or peritonitis from rupture into the pleural or peritoneal spaces, and retroperitoneal extension. Treatment should include drainage, either percutaneous or surgical.

Antibiotic therapy as a sole treatment modality is not routinely advocated, though it has been successful in a few reported cases. It may be the only alternative in patients too ill to undergo invasive procedures or in those with multiple abscesses not amenable to percutaneous or surgical drainage.

In these instances, patients are likely to require many months of antimicrobial therapy with serial imaging and close monitoring for associated complications.

<p>| Table 3. Diagnostic radiologic techniques for diagnosis of pyogenic liver abscess |
|-----------------------------------------------|---------------------------------|-----------------------------------------------|</p>
<table>
<thead>
<tr>
<th>Study</th>
<th>Sensitivity</th>
<th>Findings</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasound</td>
<td>80-90%</td>
<td>Hypoechoic areas $\geq 1$cm</td>
<td>Bedside test for diagnosis. Therapeutic drainage guidance.</td>
</tr>
<tr>
<td>CT scan W/I contrast</td>
<td>95-100%</td>
<td>Sharply demarcated mass, hypodense to surrounding parenchyma +/- enhanced rim sign. Double target sign on dynamic study. Gas detected in 20% of lesions</td>
<td>Noninvasive, allows evaluation of concurrent pathology. Assists with therapeutic drainage.</td>
</tr>
<tr>
<td>Hepatic scans</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Technecium</td>
<td>80%</td>
<td>Localized area of decreased uptake, rim sign</td>
<td>Detects lesions $&lt; 2$cm in diameter</td>
</tr>
<tr>
<td>Gallium</td>
<td>50-80%</td>
<td>Localized area of increased uptake</td>
<td></td>
</tr>
<tr>
<td>Indium</td>
<td>90%</td>
<td>Localized area of increased uptake</td>
<td>Tagged cells localize to abscess. Requires the least time of all hepatic scans</td>
</tr>
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Antimicrobial treatment is a common adjunct to percutaneous or surgical drainage.

Surgical drainage was the standard of care until the introduction of percutaneous drainage techniques in the mid 1970s. With the refinement of image-guided techniques, percutaneous drainage and aspiration have become the standard of care.

Current indications for the surgical treatment of pyogenic liver abscess are for the treatment of underlying intra-abdominal processes, including signs of peritonitis; existence of a known abdominal surgical pathology (eg, diverticular abscess); failure of previous drainage attempts; and the presence of a complicated, multiloculated, thick-walled abscess with viscous pus.

Shock with multisystem organ failure is a contraindication to surgery.

Open surgery can be performed by 2 approaches. A transperitoneal approach allows for abscess drainage and abdominal exploration to identify previously undetected abscesses and the location of an etiologic source.

For high posterior lesions, a posterior transpleural approach can be used. Although this allows easier access to the abscess, the identification of multiple lesions or a concurrent intra-abdominal pathology is lost.

A laparoscopic approach is also commonly used in select cases. This minimally invasive approach affords the opportunity to explore the entire abdomen and to significantly reduce patient morbidity. A growing literature is defining the optimal population for this mode of intervention.

A retrospective chart review compared surgery versus percutaneous drainage for liver abscesses greater than 5 cm. The morbidity was comparable for the 2 procedures, but those treated with surgery had fewer secondary procedures and fewer treatment failures.

Postoperative complications are not uncommon and include recurrent pyogenic liver abscess, intra-abdominal abscess, hepatic or renal failure, and wound infection.

Until cultures are available, the choice of antimicrobial agents should be directed toward the most commonly involved pathogens. Regimens using beta-lactam/beta-lactamase inhibitor combinations, carbapenems, or second-generation cephalosporins with anaerobic coverage are excellent empiric choices for the coverage of enteric bacilli and anaerobes. Metronidazole or clindamycin should be added for the coverage of Bacteroides fragilis if other employed antibiotics offer no anaerobic coverage.

Amebic abscess should be treated with metronidazole, which will be curative in 90% of cases. Metronidazole should be initiated before serologic test results are available. Patients who do not respond to metronidazole should receive chloroquine alone or in combination with emetine or dehydroemetine.

Systemic antifungal agents should be initiated if fungal abscess is suspected and after the abscess has been drained percutaneously or surgically. Initial therapy for fungal abscess is currently amphotericin B. Lipid formulations may offer some benefit in that the complexing of drug to lipid moieties allows for concentration in hepatocytes. Further investigation is required for definitive proof. Cases of successful fluconazole treatment af-
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After amphotericin failure have been reported; however, its use as an initial agent is still being studied.

Ultimately, the organisms isolated and antibiotic sensitivities should guide the final choice of antimicrobials.

Duration of treatment has always been debated. Short courses (2 wk) of therapy after percutaneous drainage have been successful in a small series of patients.

Metronidazole drug of choice; repeated courses occasionally necessary

Percutaneous needle aspiration for toxic patient failing to respond to therapy or with suspected imminent rupture or possible bacterial superinfection

Oral course of luminal amebicides (iodoquinol, paromomycin sulfate) after acute therapy to eradicate intestinal cyst phase. 6

REFERENCES
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5. BRITISH MEDICAL JOURNAL, Guidelines,www.bmj.org.uk