

LIVER BIOPSY

History: Liver biopsy was revolutionized by Menghini in 1958 with development of the “one-second needle biopsy of the liver”.

Background: Liver biopsy is the most specific test to assess the nature and severity of liver disease. Also useful for monitoring the efficacy of various treatments. Several methods of liver biopsy exist:

- Percutaneous biopsy
- Transjugular biopsy
- Laparoscopic biopsy
- Fine needle aspiration guided by CT or US

The typical specimen measures approximately 1 - 3 cm in length, and 1.2 – 2 mm in diameter, representing 1/50,000 of the total liver mass. Hepatologists are typically satisfied with specimens that contain 6-8 portal triads.

Indications for liver biopsy:

- Diagnosis, grading, and staging of alcoholic liver disease, non-alcoholic steatohepatitis, or autoimmune hepatitis
- Grading and staging of chronic hepatitis B or chronic hepatitis C
- Diagnosis of hemochromatosis with estimation of iron levels
- Diagnosis of Wilson’s disease with estimation of copper levels
- Evaluation of the cholestatic liver diseases primary biliary cirrhosis and primary sclerosing cholangitis
- Evaluation of abnormal results of biochemical tests of the liver in association with a serologic workup that is negative or inconclusive
- Evaluation of the efficacy or the adverse effects of treatment regimens
- Diagnosis of a liver mass
- Evaluation of the status of a liver after transplantation or of the donor liver before transplantation
- Evaluation of fever of unknown origin, with a culture of tissue

Percutaneous Liver Biopsy:

- Needles are categorized as suction needles (Menghini needle, Klatskin needle, and the Jamshidi needle), cutting needles (Vim-Silverma needle and Tru-cut needle) and spring-loaded cutting needles. Cutting needles require increased time in the liver, except for the spring-loaded cutting needles, increasing the risk of bleeding. Cutting needles are preferred over suction needles when cirrhosis is suspected on clinical grounds.
- US is performed prior to liver biopsy to identify mass lesions and define the anatomy of the liver and relative positions of the gallbladder, lungs and kidneys.

Liver biopsy is now routinely performed on an outpatient basis, providing certain criteria are met:

- Patient must be able to return to the hospital within 30 minutes should an adverse symptom develop

- A reliable person must stay with the patient for the 1st night following the biopsy
- Patient should have no serious medical problems that increase the risk associated with biopsy
- The facility that performs the biopsy should have an approved laboratory, blood-bank, an easily accessible inpatient bed available, and personnel to monitor the patient for at least 6 hours after the biopsy
- The patient should be hospitalized following biopsy if there is evidence of bleeding, a bile leak, pneumothorax, or other organ puncture, or if the patient's pain requires more than one dose of analgesics in the 1st four hrs after the biopsy.

Contraindicaitons to percutaneous liver biopsy:

Absolute contraindications:

- Uncooperative patient
- History of unexplained bleeding
- Tendency to bleed (PT > 3-5 seconds more than control, platelet count < 50,000, bleeding time > 10 minutes, use of NSAIDS in the past 7 days)
- Blood for transfusion unavailable
- Suspected hemangioma or other vascular tumor
- Inability to identify an appropriate site for biopsy by percussion or US
- Suspected echinococcal cysts in the liver

Relative contraindications:

- Morbid obesity
- Ascites
- Hemophilia
- Infection in the right pleural cavity or below the right hemidiaphragm

Complication of percutaneous liver biopsy:

Complications are rare.

- Approximately 60% occur within the 1st 2 hours following the procedure, and 96% within the 1st 24 hours.
- 1-3% of patients require hospitalization for complications.
- The predominant complications that lead to hospitalization are pain and hypotension.
- Minor complications include localized discomfort at the biopsy site, pain requiring analgesia, and mild transient hypotension (due to vasovagal reaction).
- 1/4 of patients have RUQ pain or right shoulder pain following the biopsy – this is typically dull, mild and brief. Ongoing, severe pain in the abdomen should alert the physician to the possibility of a more serious complication:

Clinically significant intraperitoneal hemorrhage is the most serious bleeding complication.

- Typically becomes apparent in the 1st 2-3 hrs.
- May result from laceration caused by deep inspiration during the biopsy or may be related to a penetrating injury of a branch of the hepatic artery or portal vein.
- If attempts to hemodynamically stabilize the patient with IV fluids and/or blood products persist for a few hours, the use of aggressive resuscitative measures, angiography and embolization or surgical exploration is indicated.
- Small intrahepatic or subcapsular hematomas may be noted after liver biopsy even in asymptomatic patients.

- Large hematomas may cause pain associated with tachycardia, and hypotension.
- Conservative treatment is generally sufficient.
- The least common of the hemorrhagic complications is hemobilia, which usually presents with the classic triad of GI bleeding, biliary pain, and jaundice approximately 5 days after the biopsy.

Other rare complications:

- Biliary ascites
- Bile pleuritis
- Bile peritonitis
- Pneumothorax
- Pneumoperitoneum
- Pneumosrotum
- Subphrenic abscess
- Carcinoid crisis
- Anaphylaxis after biopsy of an echinococcal cysts
- Pancreatitis due to hemobilia
- Breakage of the biopsy needle

The mortality rate following percutaneous liver biopsy is approximately 1/10,000.

Transjugular Liver Biopsy:

- In transjugular liver biopsy the liver tissue is obtained from within the vascular system, which minimizes the risk of bleeding.
- The duration of the procedure is 30 to 60 minutes.
- EKG monitoring is required during the procedure to detect dysrhythmias induced by passage of the catheter through the heart.

Indication for transjugular liver biopsy include:

- Severe coagulopathy
- Massive ascites
- Massive obesity
- Suspected vascular tumor
- Need for ancillary vascular procedures (eg, transjugular intrahepatic portosystemic shunting)
- Failure of percutaneous liver biopsy

The complication rate is between 1.3 % and 20.2 %.

- Complications include: abdominal pain, neck hematoma, transient Horner's Syndrome, transient dysphonia, cardiac dysrhythmias, pneumothorax, formation of a fistula from the hepatic artery to the portal vein or the biliary tree, perforation of the capsule and death.

Laparoscopic Liver Biopsy:

Indications include:

- Staging of cancer
- Ascites of unclear cause
- Peritoneal infections
- Evaluation of an abdominal mass
- Unexplained HSM

Contraindications include:

Absolute:

- Severe cardiopulmonary failure
- Intestinal obstruction
- Bacterial peritonitis

Relative:

- Uncooperative patient
- Severe coagulopathy
- Morbid obesity
- Large ventral hernia

Complications include perforation of a viscus, bleeding, hemobilia, laceration of the spleen, leakage of ascitic fluid, hematoma in the abdominal wall, vasovagal reaction, prolonged abdominal pain and seizures.

Fine Needle Aspiration Biopsy: Patients with a history of cancer and liver lesions are good candidates for FNA biopsy. Cytologic findings that are negative for cancer do not rule it out. FNA biopsy is generally a very safe procedure, even in patients with hemangiomas and echinococcal cysts.

Reference:

Bravo, AA, Sunil GS, Chopra S. Liver biopsy. NEJM 344(7), 2001.

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