

# WHAT YOU NEED TO KNOW: LIVER BIOPSY

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Liver biopsy is usually the most specific test to assess the nature and severity of liver diseases. In addition, it can be useful in monitoring the efficacy of various treatments. There are currently several methods available for obtaining liver tissue, each with its own advantages and disadvantages. These methods will be explained in some detail later in this article.

The size of the biopsy specimen, which varies between 1 and 3 centimeters in length and between 1.2 and 2 millimeters in diameter, represents 1/50,000 of the total mass of the liver. Usually, for evaluation of diffuse liver disease (that is, disease which occurs throughout the liver, such as in hepatitis C), a specimen of 1.5 centimeters in length is adequate for a diagnosis to be made.

A liver biopsy can give valuable information regarding staging, prognosis, and management. For example, in patients with chronic hepatitis C infection, not only is there a poor correlation between symptoms or levels of serum alanine aminotransferase (ALT – a liver enzyme which, at elevated levels, is indicative of liver-cell destruction) and histologic features of the liver (that is, whether the tissue and architecture of the liver are intact or damaged), but also patients with completely normal levels of liver enzymes may be found to have clinically significant fibrosis or cirrhosis on biopsy. If the patient has mild disease and is infected with genotype 1a or 1b of the hepatitis C virus, a decision may be made to defer treatment, since these genotypes are relatively resistant to interferon. If a decision is made to treat such a patient with a combination of interferon and ribavirin and there are adverse effects, the treatment can be stopped. Conversely, if the patient has moderate-to-advanced disease, treatment will most likely be offered. If the patient has a virologic response (that is, the viral count decreases markedly) and tolerable side effects with treatment, continued therapy would be strongly encouraged. The finding of cirrhosis on liver biopsy will determine the need for further examinations, such as upper endoscopy to rule out esophageal varices (swollen veins in the esophagus which may hemorrhage) and screening for cancer with blood tests for the presence of alpha-fetoprotein (AFP) and ultrasound of the liver.

In alcoholic liver disease, the severity of the clinical symptoms and the degree of liver-enzyme elevation correlate poorly with the extent of liver damage, particularly in patients who continue to drink alcohol. The long-term prognosis depends on the severity of hepatic, or liver, injury determined upon biopsy. Liver biopsy provides an accurate diagnosis in approximately 90 percent of patients with unexplained abnormalities revealed on liver-function tests.

The various methods for performing a biopsy of the liver are as follows:

(1) Percutaneous Liver Biopsy – this type of biopsy is done directly through the skin into the liver. Needles for percutaneous liver biopsy are broadly categorized as suction needles, cutting needles, and spring-loaded cutting needles that have a triggering mechanism. The cutting needles, except for the spring-loaded variety, require a longer time in the liver during the biopsy, which may increase the risk of bleeding. A greater incidence of bleeding after biopsy has sometimes been observed with large-diameter needles. If cirrhosis is suspected on clinical grounds, a cutting needle is preferred over a suction needle, since fibrotic tissue tends to fragment with the use of suction needles. This would render the tissue sample less useful or even useless for diagnostic purposes.

Ultrasonography performed before a liver biopsy identifies mass lesions (defined areas of suspicious or diseased tissue) that may not present symptoms and defines the anatomy of the liver and the relative positions of the gallbladder, lungs, and kidneys. Most hepatologists agree that all patients should undergo ultrasonography of the liver before a percutaneous biopsy is performed. However, it is debatable whether the routine use of ultrasonography to guide the biopsy reduces the rate of complications, provides a higher diagnostic yield, or is cost effective.

It is now standard practice to perform liver biopsy on an outpatient basis, provided that various criteria are met. The Patient Care Committee of the American Gastroenterological Association has published practice guidelines for outpatient liver biopsy. The patient must be able to return to the hospital in which the procedure was performed within 30 minutes after the onset of any adverse symptoms. Reliable persons must stay with the patient during the first night after the biopsy to provide

care and transportation, if necessary. The patient should have no serious medical problems that increase the risk associated with the biopsy. The facility in which the biopsy is performed should have an approved laboratory, a blood-banking unit, an easily accessible inpatient bed, and personnel to monitor the patient for at least 6 hours after the biopsy. The patient should be hospitalized after the biopsy is performed if there is evidence of bleeding, a bile leak, pneumothorax (air or gas in the pleural space), or other organ puncture, or if the patient's pain requires more than one dose of analgesics in the first 4 hours after the biopsy.

Liver biopsy is a safe procedure when performed by experienced operators. Froehlich et al. noted a lower complication rate for physicians who performed more than 50 biopsies a year. Prior localization of the biopsy site via ultrasound may decrease the rate of complications for physicians who perform liver biopsies infrequently. "Blind" liver biopsies (i.e., without the aid of prior ultrasound localization) should be performed by experienced gastroenterologists, hepatologists, or transplantation surgeons and not by general internists.

Although the liver has a rich vascular supply, complications associated with percutaneous liver biopsy are rare. Sixty percent of complications occur within 2 hours and 96 percent within 24 hours after the procedure. Approximately 1 to 3 percent of patients requires hospitalization for complications after a liver biopsy, especially if the procedure was performed with a Tru-cut biopsy needle. Pain and hypotension (dangerously low blood pressure) are the predominant complications for which patients are hospitalized. Minor complications after percutaneous liver biopsy include transient, localized discomfort at the biopsy site; pain requiring analgesia; and mild, transient hypotension. Approximately one-fourth of patients has pain in the right upper quadrant or right shoulder after liver biopsy. The pain is usually dull, mild, and brief. Ongoing, severe pain in the abdomen should alert the physician to the possibility of a more serious complication, such as bleeding or peritonitis (inflammation of the membrane lining the walls of the abdominal and pelvic cavities). Although very rare, clinically significant intraperitoneal hemorrhage (bleeding within the membrane surrounding the stomach and pelvis) is the most serious bleeding complication of percutaneous liver biopsy; it usually becomes apparent within the first 2 to 3 hours after the procedure. Risk factors for hemorrhage after liver biopsy are older age, more than 3 passes with the needle during biopsy, and the presence of cirrhosis or liver cancer. The patient may then require intravenous fluids and/or blood products.

The mortality rate among patients after percutaneous liver biopsy is approximately 1 in 10,000 to 1 in 12,000. Mortality is highest among patients who undergo biopsies of malignant lesions. Cirrhosis is another risk factor for fatal bleeding after liver biopsy.

(2) Transjugular Liver Biopsy – With transjugular liver biopsy, the liver tissue is obtained from within the vascular system rather than directly through the skin into the liver. This minimizes the risk of bleeding. The procedure involves percutaneous puncturing of the right internal jugular vein located in the neck area, the introduction, with the use of fluoroscopy (a type of x-ray), of a catheter (a flexible tube) into the right hepatic vein (a major vein carrying blood from the liver), and a needle biopsy of the liver performed through the catheter. The duration of the procedure is between 30 and 60 minutes. Electrocardiographic monitoring is required to detect arrhythmias induced by passage of the catheter through the heart. Samples are retrieved from a needle passed through the catheter into the liver while suction is maintained. The samples obtained are small and fragmented, a disadvantage of the technique that may be improved with newer-generation technology.

Adequate tissue for histologic diagnosis can be obtained from 80 to 97 percent of patients in centers where a large number of transjugular biopsies are performed. In various studies, the rate of complications associated with transjugular liver biopsy ranges from 1.3 percent to 20.2 percent, and mortality ranges from 0.1 percent to 0.5 percent.

(3) Laparoscopic Liver Biopsy – Diagnostic laparoscopy is especially useful in the diagnosis of diseases of the cavities enclosing the stomach and pelvis, the evaluation of ascites (the accumulation of fluid in the abdominal cavity) of unknown origin, and the staging of abdominal cancer. It can be performed safely under local anesthesia with conscious sedation. However, the use of laparoscopic liver biopsy by gastroenterologists has declined in favor of less invasive radiologic procedures, and very few gastroenterology training programs now provide instruction in the procedure, which is usually performed by surgeons because of their growing experience with laparoscopic surgery.

(4) Fine-Needle Aspiration Biopsy – Fine-needle aspiration biopsy of the liver is performed under ultrasonographic or CT

guidance. Patients with a history of cancer and liver lesions are good candidates for fine-needle aspiration biopsy. The diagnostic accuracy ranges from 80 to 95 percent and is substantially affected by the expertise of the pathologist. Cytologic findings (microscopic examination of the extracted cells) that are negative for cancer do not rule it out.

Although ultrasound-guided or CT-guided biopsy is usually reserved for focal hepatic lesions (defined areas of suspicious or diseased tissue), limited data suggests that diagnostically useful material can be obtained with automatic spring-loaded biopsy needles guided by ultrasound in over 95 percent of patients, including those with diffuse liver disease (i.e., disease which occurs throughout the liver, such as in hepatitis C). Fine-needle aspiration biopsy is associated with a low risk of seeding of the needle tract with malignant cells and is generally a very safe procedure.

Source Information: From the Liver Center, Division of Gastroenterology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston