



Liver Biopsy

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Foreword

The liver biopsy is considered by many experts to be the most specific diagnostic tool used to assess the nature and severity of liver diseases such as hepatitis C. Liver biopsies are important for many reasons, such as accurate diagnosis or ruling out any coexisting liver disease, staging and grading the severity of liver disease, treatment decisions, patient and provider reassurance, and as a benchmark for gauging future disease progression. There are many different types of liver biopsies, such as the percutaneous, transjugular, laparoscopic, fine-needle aspiration and open surgery liver biopsy. This fact sheet will concentrate on the percutaneous liver biopsy, but a brief overview of the other types of liver biopsies will be provided at the end of the liver biopsy section. In addition, this fact sheet will discuss the various grading and staging models to interpret a liver biopsy.

Before the Procedure

Prior to the liver biopsy procedure, some blood tests will be performed to determine how well the blood clots. It is important that all medications that could potentially increase the risk of bleeding be stopped prior to the procedure – your medical care provider will advise when to stop certain medications. Your medical provider will also advise you about fasting before the procedure.

The Procedure

A liver biopsy is usually performed in an office or hospital as an out-patient procedure. The most common type of biopsy is a percutaneous (through the skin) needle biopsy. Ultrasonography may be performed before the biopsy to identify lesions in the liver and pinpoint the exact location at which the biopsy needle will be inserted. Some people prefer light sedation before the procedure to alleviate the fear of possible discomfort. However, a person must be fully conscious during the procedure to help avoid potential complications.

HCSP FACT SHEET

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The information in this fact sheet is designed to help you understand and manage HCV and is not intended as medical advice. All persons with HCV should consult a medical practitioner for diagnosis and treatment of HCV.

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There are three different types of needles (suction needle, cutting needle and spring-loaded). The area around where the needle is inserted is numbed with a local anesthetic before the actual insertion of the biopsy needle. You will be asked to take a deep breath (to move other organs out of the way) and the needle will be inserted. The actual procedure is accomplished in a very short period of time – generally one-tenth of a second. The specimen can vary between 1 and 3 centimeters in length and 1.2 and 2 millimeters in diameter, which represents 1/50,000 of the total mass of the liver.

After the procedure is completed you will have to lay on the right side (where the needle was inserted) to put pressure on the injection site to help prevent possible bleeding. The amount of time that people are required to lay on their right side is between 2 – 4 hours. Your blood pressure and other vital signs will be monitored. The cost of a liver biopsy can range from \$1,500.00 to \$2,000.00.

Side Effects and Complications of a Liver Biopsy

The most common side effect of the biopsy is pain – an estimated 30% of patients experience pain. Complications from a liver biopsy are rare and occur only in 1 out of 1,000 biopsies or less. Potential severe complications from a liver biopsy include bleeding, bleeding that requires hospitalization or transfusion, puncture of a surrounding organ and death.

Role of Liver Biopsy

Liver biopsies are performed for a variety of reasons from diagnosis to treatment issues. Diagnosis of other coexisting liver diseases is of prime importance in the management and treatment of hepatitis C. For instance, the

diagnosis of hemochromatosis, occult hepatitis B and Nonalcoholic Steatosis can only be made by a liver biopsy and can have an important impact on the treatment and prognosis of hepatitis C.

The most important role of the liver biopsy is the ability to characterize the stage the extent of liver inflammation, injury and fibrosis. We know that the amount of HCV RNA (viral load) does not correlate with disease progression or severity. Testing alanine aminotransferase levels or ALT is widely used to monitor patients with hepatitis C, but ALT is a non-specific marker of liver injury and levels of this enzyme do not accurately reflect the damage caused by HCV. For instance, approximately 30% of people with hepatitis C have normal ALT levels. Most people with normal ALTs have minimal fibrosis and their rate of disease progression is reduced compared to those with elevated ALTs. However, since some people with normal ALT levels can progress on to serious disease further diagnostic assessment is necessary.

There are other biochemical markers used to assess the severity of HCV liver disease: ALT/AST ratio, platelet counts and prothrombin time (PT). However, in one study 20% of cirrhotics did not have these specific markers and the diagnosis of cirrhosis would have been missed if a liver biopsy had not been performed. Non-invasive liver tests are discussed in another fact sheet.

Alternative Liver Biopsy Procedures

Alternatives to the percutaneous liver biopsy are transjugular, laparoscopic, open surgery, and fine-needle aspiration liver biopsy. These types of liver biopsy are not commonly performed unless there are more specific areas of the liver to examine or certain medical reasons that prohibit the use of a percutaneous liver biopsy.

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Transjugular Liver Biopsy

The procedure involves inserting a catheter (flexible tube) into the right jugular vein that runs long the neck. Once the catheter is inserted a fine needle is directed down through the hepatic vein and a piece of liver tissue is removed. The main drawback to this type of liver biopsy is that the tissue samples are generally small, which could affect the analysis of liver inflammation and scarring. The other disadvantage is the cost, which can be twice the amount of a percutaneous liver biopsy.

Laparoscopic Liver Biopsy

This is a procedure that is very seldom used by gastroenterologists. This procedure may be performed if there is another surgery being performed in the general area of the liver. It may also be used to rule out other causes of liver disease and to evaluate ascites (the accumulation of fluid in the abdominal cavity). The procedure is performed by making small incisions in the abdomen and inserting instruments to obtain a piece of liver tissue. A laparoscope (a form of telescope) can be inserted to view the abdominal cavity, surrounding organs and ascites fluid.

Open Surgical Liver Biopsy

This procedure is rarely performed unless there is already an operation being performed in the general area of the liver. A small piece of liver tissue is extracted by needle or a surgical knife.

Fine-Needle Aspiration Biopsy

A fine-needle aspiration biopsy is usually performed on patients to examine liver lesions or cancer. The procedure is performed percutaneously or endoscopically and has a very high accuracy rate since the needle is longer and can be guided to the exact location of the lesion that needs to be examined.

Grading and Staging

There are a variety of ways to interpret a liver biopsy. The most common scoring methods include Metavir and the histologic activity index (HAI) also called the Knodell. It is important to remember that the length of the liver specimen and the knowledge of the professional reading the biopsy can influence the interpretation of the report.

Metavir

The Metavir scoring system was specially designed to evaluate the liver in people with HCV. The scoring consists of using a grading and a staging system. The grade gives an indication of the activity or amount of inflammation and the stage represents the amount of fibrosis or scarring.

The grade is assigned a number based on the degree of inflammation, which is usually scored from 0-4 with 0 being no activity and 3 or 4 considered severe activity. The amount of inflammation is important because inflammation somewhat correlates with the development of fibrosis.

The fibrosis score is also assigned a number from 0-4:

- 0 = no scarring
- 1 = minimal scarring
- 2 = scarring has occurred and extends outside the areas in the liver that contains blood vessels
- 3=bridging fibrosis is spreading and connecting to other areas that contain fibrosis
- 4=cirrhosis or advanced scarring of the liver

Knodell

The Knodell score or histologic activity index (HAI) is also commonly used to stage liver disease. It is somewhat of a more complex process, but some experts believe that it is a better tool for defining the extent of liver inflammation and damage because it

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provides more information about various aspects of inflammation and scarring. It is composed of four individually assigned numbers that make up a single score. The first component (periportal and/or bridging necrosis) is scored 0-10. The next two components (intralobular degeneration and portal inflammation) are scored 0-4. The combination of these three markers indicates the amount of inflammation in the liver:

- 0 = no inflammation
- 1-4 = minimal inflammation
- 5-8 = mild inflammation
- 9-12 = moderate inflammation
- 13-18 = marked inflammation
- The fourth component indicates the amount of scarring in the liver and is scored from 0 (no scarring) to 4 (extensive scarring or cirrhosis).

Information about the grade and stage of liver disease is helpful for the healthcare provider and the patient in guiding medical management. For example, treatment is usually indicated if the Metavir score is greater than or equal to 2 or the Ishak/Knodell score is greater than or equal to 3. It is important to know this information in order to help guide management and treatment of HCV. For example, if a medical provider is able to estimate the approximate time when someone became infected with HCV, the results of the biopsy will give an indication of the rate of disease progression:

- For people with moderate to severe liver damage it is generally recommended that a more aggressive treatment approach is warranted.
- For people with a milder form of liver disease the decision whether to be treated now is based on many factors including the chances of responding to current HCV treatment, patient willingness to be treated including the person's

work environment and the stability of their personal life.

However, given that people with milder liver disease respond better to current HCV therapies some experts believe that even people with milder forms of HCV liver disease should be treated.

Next Steps

Properly staging the degree of damage to the liver is important in determining the rate of progression. Many people can estimate when they were exposed to HCV by assessing risk factors such as blood transfusions or injection drug use. Duration of HCV and current disease severity can give you a good idea of the rate of future disease progression. For example, someone who believes that he or she has been infected for 20 years and has been graded with stage 1 liver fibrosis may be fairly confident that the rate of progression is slow. This can be confirmed with serial biopsies every 5-7 years. On the other hand, if someone believes she or he has only been infected with HCV for 5 years and the biopsy shows stage 3 fibrosis (pre-cirrhosis) then a more aggressive approach to treatment with HCV medications may be required. This information can be a comfort to the patient and physician and is another tool used to manage HCV.

There is much research looking at various blood tests to actually measure the amount of inflammation and scarring of the liver. However, until these tests are perfected the percutaneous liver biopsy remains the standard of care in managing hepatitis C. For more information about these types of tests see HCSP's [HCV Diagnostic Tools: Non-Invasive Markers of Liver Fibrosis](#).

Sound confusing? Probably the best advice is to work closely with your medical provider to find out whether treatment is needed or not!

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Related publications:

- **An Overview of HCV Diagnostic Tests**
www.hcvadvocate.org/hepatitis/factsheets_pdf/diagnostic.pdf
- **Non-Invasive Markers of Liver Fibrosis**
www.hcvadvocate.org/hepatitis/factsheets_pdf/non-invasive_markers.pdf
- **Reading a Lab Report: A Basic Primer**
www.hcvadvocate.org/hepatitis/factsheets_pdf/Reading%20a%20Lab%20Report.pdf

For more information

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| <ul style="list-style-type: none"> • Centers for Disease Control and Prevention
 www.cdc.gov/Hepatitis • Mayo Clinic:
 www.mayoclinic.com/health/liver-biopsy/MY00949 | <ul style="list-style-type: none"> • MedlinePlus:
 www.nlm.nih.gov/medlineplus/ency/article/003895.htm • National Digestive Diseases Information Clearinghouse (NDDIC)
 http://digestive.niddk.nih.gov/ddiseases/pubs/liverbiopsy/ |
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