



Monitoring Hepatitis C

A variety of blood tests and imaging procedures are used to monitor liver health status.

April 1, 2024

People with chronic hepatitis C virus (HCV) infection should receive regular tests to monitor the health of their liver and their overall health. Test results may be overwhelming at first, but eventually they will become easier to understand. Here are some common tests for people living with hepatitis C.

Liver Function Tests

Also called a liver or hepatic panel, this battery of blood tests assesses several aspects of liver function.

- Alanine transaminase (ALT; formerly known as SGPT): ALT is an enzyme released by damaged liver cells. Elevated ALT may indicate liver inflammation, which can lead to fibrosis. People with acute, or recent, HCV infection can have very high ALT levels. Those with chronic HCV can have normal, slightly elevated or substantially elevated levels, which may vary over time. Higher levels reflect ongoing liver damage. The upper limit of the normal range for ALT is usually around 30 IU/L for women and 40 IU/L for men. ALT is sometimes reported as a multiple of the upper limit of normal (ULN).
- Aspartate transaminase (AST; formerly known as SGOT): AST is another liver enzyme that may indicate liver damage, though it can also be elevated in people with other conditions. Higher levels in people with chronic HCV may reflect ongoing liver damage. The normal range for AST is slightly lower than for ALT. A higher AST level compared to ALT may indicate more severe liver disease.
- Alkaline phosphatase (ALP) and gamma glutamyl transpeptidase (GGT): These enzymes may be high in people with progressive liver disease, especially those with bile duct blockage, but elevated levels can also indicate other conditions.

- **Albumin:** Albumin is a protein made by the liver. A low level can indicate impaired liver function, though it can also reflect other gastrointestinal or kidney conditions.
- **Bilirubin:** Bilirubin is a pigment in bile that is produced during the normal breakdown of red blood cells. A high level may indicate liver damage. Elevated bilirubin in the blood can cause jaundice (yellowing of the skin and eyes).
- **Prothrombin Time (PT) and International Normalized Ratio (INR):** Prothrombin time measures how long it takes blood to clot. The liver makes clotting factors, so prolonged clotting time may indicate declining liver function. The INR is clotting time expressed as a standardized measure that makes it easier to compare results across labs.

Complete Blood Count

The complete blood count (CBC) is an inventory of different types of blood cells. These can be grouped into three categories: red blood cells, white blood cells and platelets. The number and characteristics of these cells in a blood sample provides a wealth of useful information.

- **Red Blood Cells (RBC), Hemoglobin (HGB) and Hematocrit (HCT):** Red blood cells, or erythrocytes, are responsible for delivering oxygen throughout the body. Hemoglobin is the protein in RBCs that transports oxygen. Hematocrit refers to the proportion of blood that is made up of RBCs. Low levels may indicate anemia, which can lead to fatigue. Low hemoglobin is a common side effect of the older hepatitis C drug ribavirin.
- **White blood cells (WBCs):** White blood cells, or leukocytes, are immune system cells that defend the body against invaders. Major types include lymphocytes (B cells and T cells), monocytes and granulocytes (basophils, eosinophils and neutrophils). High levels may indicate infection or inflammation. Interferon treatment for hepatitis C (now seldom used in the United States) may cause a drop in WBCs.
- **Platelets:** Platelets are cell fragments that enable the blood to clot. A low platelet count (thrombocytopenia) can lead to easy bleeding and bruising. A declining platelet count can have various causes, but in people with hepatitis C, it may indicate that liver disease is progressing.

Tests During Treatment

Certain tests may be done during hepatitis C treatment, but these are less important when using modern direct-acting antivirals with high cure rates.

- **Viral Load (HCV RNA):** This test is first performed after a positive HCV antibody test to see if a person has active infection. Unlike HIV, rising and falling HCV viral load is not associated with hepatitis C progression. During treatment, viral load tests may be used to monitor how well antivirals are working. Sustained virological response (SVR), or continued undetectable HCV RNA at 12 or 24 months post-treatment, is considered a cure.
- **Drug-Resistance Tests:** Despite the high cure rates of modern HCV antivirals, treatment sometimes fails because of drug-resistant virus. These are usually natural viral genetic variations rather than mutations that arise due to prior treatment or poor adherence. If treatment isn't working, doctors may test for resistance-associated variants to guide the selection of a new regimen, but routine resistance monitoring usually isn't necessary.

Diagnostic Tests

Standard lab tests don't tell the whole story when it comes to hepatitis C. Liver enzyme levels and viral load do not reflect how much damage the liver has actually sustained. A variety of tests may be done to assess liver health.

The widely used Metavir system includes scores for liver inflammation and fibrosis. The extent of liver inflammation, or histological activity, is graded from A0 to A3. Fibrosis has five stages: F0 (no fibrosis), F1 (minimal fibrosis), F2 (substantial fibrosis), F3 (advanced fibrosis) and F4 (cirrhosis).

- **Liver biopsy:** A biopsy uses a long needle to extract a sample of liver tissue, which is examined under a microscope to look for inflammation, fibrosis, liver fat and other abnormalities. The procedure is usually done on an outpatient basis with local anesthesia. Liver biopsies are generally safe, but they are invasive and can be uncomfortable. While biopsies are considered the "gold standard" for assessing liver health, they are increasingly being replaced by noninvasive methods.
- **Imaging tests:** Various noninvasive and painless imaging methods may be used to monitor liver health, including ultrasound, which uses sound waves; computed tomography (CT), or specialized X-rays; and magnetic resonance imaging (MRI), which uses magnetic fields and

radio waves.

- **Fibroscan:** Transient elastography, or Fibroscan, is a newer ultrasound technology that measures liver elasticity. A higher “liver stiffness” score indicates more advanced fibrosis.
- **Biomarker Indices:** Various algorithms are used to indirectly estimate the extent of liver fibrosis. These include different combinations of patient characteristics (such as age) and blood test results (such as ALT and platelet count). Widely used indices include FIB-4, FibroTest and ELF.

Liver Cancer Surveillance

People with chronic hepatitis C, particularly those with cirrhosis, are at increased risk for hepatocellular carcinoma (HCC), the most common type of liver cancer. Even after being cured of hepatitis C, people with advanced fibrosis or cirrhosis should undergo regular monitoring for liver cancer.

- **Alpha-fetoprotein (AFP):** AFP is normally produced by the fetus during development, but elevated AFP in adults may be a sign of liver cancer. AFP testing may be used for cancer surveillance, but it is not as reliable as regular scans.
- **Ultrasound scans:** Regular ultrasound scans can detect liver tumors at an early stage, when they are easier to treat. Scans are recommended every six to 12 months.

Understanding Your Results

Laboratory and imaging test results can be complex. Results should be interpreted by an expert—don’t attempt to do so on your own. Don’t worry too much about a single abnormal result, as trends over time are more meaningful. Keep copies of your medical records so you can track changes.

Even if tests show you have cirrhosis, try not to panic. Cirrhosis is a serious condition, but it doesn’t necessarily mean your life is in immediate danger. If you haven’t already been treated for hepatitis C, seek treatment promptly. Modern antivirals are highly effective and well tolerated even for people with advanced liver disease. Avoid alcohol, eat a healthy diet, get regular exercise and take other steps to improve the health of your liver and your overall quality of life.