Hepatitis

What is hepatitis?

Hepatitis is an inflammation of the liver that is most commonly caused by viruses but may also be due to chemicals, drugs, alcohol, inherited diseases, or autoimmune disease. The inflammation can be acute, flaring up and then resolving within a few weeks to months, or chronic, enduring over many years. Chronic hepatitis may persist for 20 years or more before causing significant symptoms related to progressive liver damage such as cirrhosis, liver cancer, or death.

The liver is a vital organ located in the upper right-hand side of the abdomen. It performs many functions in the body, including processing the body's nutrients, manufacturing bile to help digest fats, synthesizing many important proteins, regulating blood clotting, and breaking down potentially toxic substances into harmless ones that the body can use or excrete. Inflammation may (in severe cases) interfere with these processes and allow potentially toxic substances to accumulate.

The following table summarizes some common types of hepatitis. Click on the links to read more about the various types.

Type of Hepatitis	Description	Examples of Causes
Viral	Infection with one of the hepatitis viruses causes inflammation; may be acute or chronic depending on virus.	In the US, most common causes are hepatitis A, B and C viruses.
Chemical or drug induced	The liver processes many substances for the body to use and/or then eliminate. Some of these substances are toxic to the liver and can result in hepatitis.	Acute or chronic exposure to alcohol, acetaminophen
Inherited	Certain gene mutations that are passed from one generation to the next can result in a disease that damages the liver, causing hepatitis.	Wilson disease, hemochromatosis, alpha-1 antitrypsin
Non-alcoholic Fatty Liver	Fat deposited in the liver in increasing amounts can lead to decreased amount of healthy liver tissue.	Associated with metabolic syndrome

Autoimmune	The body's immune system inappropriately produces antibodies directed against liver tissue.	Associated with type I diabetes, Sjorgren syndrome

Signs and Symptoms

The signs and symptoms of hepatitis are the same, regardless of the cause, but vary from person to person and may vary over time. Many people have few, mild, and/or vague symptoms that may be mistaken for the flu. Some of the more common signs and symptoms include:

- Fatigue
- Nausea
- Abdominal pain
- Joint aches
- Itching
- Jaundice

Some may experience additional symptoms such as loss of appetite, dark colored urine, or light colored stools. More serious complications can involve accumulation of fluid in the abdomen (ascites) and mental confusion.

A physical examination may reveal a liver that is tender and enlarged. Chronic hepatitis usually causes no symptoms or may be noticeable as only a loss of energy and tiredness. In some people, chronic hepatitis can gradually damage the liver and, after many years, cause liver failure. The chronic form typically lasts for many years and only rarely goes away without treatment.

Laboratory Tests

There are several laboratory tests that may be used in cases of known or suspected hepatitis. These tests may be used for various reasons and may fall into one or more of these categories:

- General chemistry tests used to detect liver inflammation and/or damage
- Screening tests used to detect Viral Hepatitis; for example, screening for exposure to hepatitis B or hepatitis C may be done because of increased risk of the disease (use of illegal drugs, multiple sex partners) or at the time of blood donation.
- Tests used to help diagnose the underlying cause
- Follow-up tests used to monitor progression of hepatitis and/or help guide treatment

Acute hepatitis is often suspected and testing done because of the appearance of symptoms such as fever, loss of appetite, and nausea, often accompanied by dark urine, pale stools, and yellow discoloration of the skin and the whites of the eyes (jaundice or icterus).

Chronic hepatitis is more commonly detected as a result of abnormal routine test results. In a patient who is having no, few, or vague symptoms, hepatitis may be first discovered during routine testing such as a Comprehensive Metabolic Panel (CMP).

The CMP is a group of tests frequently ordered as part of a yearly physical. It includes several tests from the liver panel. These tests may be the first indication of liver inflammation or injury. While these tests may help to detect hepatitis, they do not determine the underlying cause. Additional testing may be necessary to pinpoint the cause and to help direct treatment.

In addition to the CMP, other general tests may be used both to detect liver injury and to give an indication of how severe it may be. Some of these are listed below:

- Alanine aminotransferase (ALT) - an enzyme found mainly in the liver; the best test for detecting hepatitis
- Aspartate aminotransferase (AST) – an enzyme found in the liver and a few other places, particularly the heart and other muscles
- Alkaline phosphatase (ALP) – an enzyme related to the bile ducts; often increased when they are blocked, but may also be increased with bone disorders
- Gamma-glutamyl transpeptidase (GGT) - an enzyme found in the liver that is very sensitive to changes in liver function; helps to differentiate between the causes of an elevated ALP; if GGT is increased, then the elevated ALP is due to liver, not bone disease.
- Bilirubin - a waste product made from the breakdown of old blood cells; it is a yellow compound that causes jaundice and dark urine when present in increased amounts.
- Albumin - measures the main protein made by the liver and tells how well the liver is making this protein
- Total Protein - measures albumin and all other proteins in blood, including antibodies made to help fight off infections
- Prothrombin time (PT). This test may be ordered in a person with hepatitis or suspected hepatitis. Proteins used in the formation of a blood clot (coagulation factors) are mostly produced by the liver, and prolonged PT may indicate the severity of liver damage.
- A liver biopsy, in which a needle is inserted into the liver to withdraw a small amount of cells that are examined under a microscope by a pathologist, is the most definitive way to diagnose the disease. Since

this is an invasive procedure, it is used primarily when other tests are inconclusive or to determine how much damage to the liver has occurred.

Imaging tests such as ultrasound and specialized X-rays may be used to evaluate the liver, detect hepatitis, help make a diagnosis, and help determine a cause of livery injury.

Viral Hepatitis

A common cause of hepatitis is an infection with a virus. The five viruses primarily associated with hepatitis are named in the order of their discovery: A, B, C, D, and E. In the United States, acute viral hepatitis is most commonly caused by hepatitis A (HAV), hepatitis B (HBV), and hepatitis C (HCV), while only HBV and HCV cause chronic hepatitis.

Hepatitis A is highly contagious and is spread through water and food that have been contaminated with the virus. According to the Centers for Disease Control and Prevention (CDC), there were just under 3,000 new cases of hepatitis A in 2007, but actual numbers may have been higher because many people may not have known that they had the disease. Symptoms may be flu-like and are frequently not identified as being due to hepatitis. Rates of hepatitis A have been dropping and are the lowest in 40 years due to a vaccine introduced in 1995. Hepatitis A causes an acute infection but not a chronic form of the disease. Treatment usually involves only supportive therapy, and most patients recover fully within about six months.

Hepatitis B can be spread by exposure to contaminated blood or needles, through unprotected sex with an infected person, and from an infected mother to baby. It is the most common cause of acute viral hepatitis. According to the CDC, there were over 4,500 acute cases in 2007 in the U.S., although the number may be as much as 10 times higher because many people either have few or no symptoms and/or did not report the disease. In the same year, the number of new cases of HBV in the U.S. was approximately 43,000, a decline from 1991 of about 82%. The dramatic drop in new cases coincided with a new recommendation in 1991 that all newborns be routinely vaccinated.

Most adults with HBV will get better without any intervention, but about 1-3% become carriers - chronically infected and able to spread the disease to others. Currently, it is estimated that 800,000 to 1.4 million people in the U.S. have chronic HBV. Newborns and young children are especially vulnerable to chronic HBV infection. Up to 90% of newborns and 25-50% of children 1 to 5 years old become chronically infected. With the advent of screening pregnant women for hepatitis B and the vaccination of newborns, the number of infected babies has fallen. Most chronic hepatitis B infections are now seen in people born in parts of the world (particularly southern and eastern Asia, southern Europe, and Africa) where infection among newborns still remains common. An estimated 350 million people around the world are chronically infected with HBV.

Hepatitis C is spread by exposure to contaminated blood. The most common mechanism of exposure is the sharing of needles or other "works" used in injecting drugs of abuse such as cocaine or heroin. Other means of becoming infected include occupational exposure of health care workers to used needles or other sharp objects, through sexual

activity that results in tissue tears, from mother to baby during childbirth, and sharing personal items contaminated with blood such as razors and toothbrushes.

In 2007, there were only 849 cases of confirmed acute hepatitis C reported in the United States, but the CDC estimates that the number of new cases is actually much higher - about 17,000. Many cases are not reported and many people do not know they have an infection because they have no symptoms. HCV is less common than hepatitis B as a cause of acute hepatitis but is the most common cause of chronic hepatitis. According to the CDC, about 75% to 85% of those exposed to the virus develop chronic hepatitis C infection. In addition, about 60% to 70% develop chronic liver disease, roughly 5% to 20% will develop cirrhosis over many years, and 1% to 5% are estimated to die from a condition that results from chronic infection such as cirrhosis and liver cancer.

There is no vaccine available to prevent hepatitis C, but research is in progress to develop one. Currently, the best way to avoid getting infected is to limit exposure to possible sources of the virus, especially avoiding the sharing of needles to inject drugs.

Hepatitis D and E are rare in the U.S. Hepatitis D only causes an infection when hepatitis B is present and can make that infection more severe. It is usually spread by exposure to blood or infected needles. Hepatitis E is spread in a similar fashion to hepatitis A and is found primarily in Asia, Africa, and South America.

Signs and Symptoms of viral hepatitis correspond to those of hepatitis in general.

Laboratory Tests

There are a variety of antibody and antigen tests that are available to help diagnose and/or monitor hepatitis caused by the specific hepatitis viruses. For testing information on the most common causes of viral hepatitis, see the pages on hepatitis A, B, and C or see the summary information on them in the table below.

Summary Table: Most common causes of viral hepatitis

Virus	Hepatitis A	Hepatitis B	Hepatitis C
Transmission Route	Fecal-oral	Infected needle or blood, sexual contact	Infected needle or blood, sexual contact
Incubation Time (acute infection)	15-50 days	45-160 days	14-180 days
Onset	Sudden	Either sudden or slow,	Usually slow, unnoticed

		unnoticed	
Severity	Mild	Occasionally severe	Usually slow-developing and symptoms not specific or strong
Chronic form?	No	Yes	Yes
Associated with other diseases?	None	Liver cancer, cirrhosis	Liver cancer, cirrhosis
Testing to Diagnose Acute Infection	HAV-Ab, IgM	HBsAg, Anti-HBc, IgM	Anti-HCV, HCV RNA (note - may have same results as in chronic hepatitis)
Testing to Diagnose Chronic Infection or to Monitor Treatment	N/A	HBsAg, HBV DNA, HBeAg, Anti-HBe	Anti-HCV (once), HCV RNA or viral load, HCV genotype (once)
Tests that Detect Previous Infection	HAV-Ab, IgG	Anti-HBs, Anti-HBc total	Anti-HCV
Vaccine available?	Yes	Yes	No
Common Treatment	None	Chronic form - Interferon, entecavir, tenofovir, lamivudine, adefovir	Chronic form - Interferon (usually with ribavirin)

Abbreviations Defined

HAV-Ab = Hepatitis A Antibody
Anti-HBs = Hepatitis B surface antibody
HBsAg = Hepatitis B surface antigen
HBeAg = Hepatitis B e-antigen

Anti-HBe = Hepatitis B e-antibody

Anti-HBc = Anti-hepatitis B core antigen

HBV DNA = Hepatitis B Virus (test for virus genetic material)

Anti-HCV = Hepatitis C Antibody

HCV RNA = Hepatitis C Virus (test for virus genetic material)

HCV Viral Load = A detection and/or count of the amount of virus in the blood

HCV Genotype = Determines the type of Hepatitis C present (1 of 6 types)

Prevention

The incidence of new cases of viral hepatitis has decreased due to use of safe injection and safe sex practices (important in preventing hepatitis B and C) and the availability of vaccines for hepatitis A and hepatitis B (there is currently no vaccine available for hepatitis C). Screening units of blood for hepatitis B and C has virtually eliminated infections through blood transfusions. A systematic program to screen pregnant mothers for hepatitis B and to vaccinate all newborns has greatly decreased new cases of hepatitis B.