

## *All About Hepatitis C (HCV)*

### What is HCV?

HCV (Hepatitis C Virus) is a virus that infects the body and has an especially strong effect on liver cells. It can be detected by blood tests. If it is causing damage to the liver, this can be detected by blood tests for liver enzymes.

HCV is a virus that changes its structure (mutates) often and quickly. As soon as the immune system makes an antibody to kill the virus, the virus changes, and the immune system has to make a new antibody. This means the person stays infected for a long period of time, chronically.

### What is hepatitis?

Whenever the immune system responds to the infection, it produces inflammation in an effort to kill the virus.

- "Hepatic" means "involving the liver."
- "-itis" means "inflammation."
- So the word "hepat-itis" means "liver inflammation."

Whenever a part of the body becomes inflamed, part of the way it heals is by forming scar tissue, also known as "fibrosis." If the liver becomes severely scarred and is unable to function properly, this is a kind of fibrosis that is called "cirrhosis."

### Acute HCV - When you first get infected

- Symptoms can start 3-12 weeks after being exposed to the virus.
- 60-70% of patients with acute infection have no symptoms at all.
- 20-30% have the symptom of jaundice (yellow eyes and skin).
- 10-20% have only flu-like symptoms of fatigue, loss of appetite, and/or abdominal pain.
- Only 15% get sick enough to need hospitalization during acute infection.
- There is no treatment other than rest, fluids, and good nutrition.
- About 15-25% recover fully - the immune system fights off the virus and makes it go away.

### Chronic HCV - Months and decades later

Chronic hepatitis develops in about 75-85% of people who catch the virus.

During the first 20 years with chronic HCV, cirrhosis develops in 10-20% of people with the virus. In some people, liver damage develops much more quickly - after just a few years - but we do not have any tests to predict whom this will happen to.

However, we do know that, in many patients, the virus is not the only thing causing liver damage. For example:

- Alcohol strongly interacts with the viral infection, producing much worse damage than either would alone. This is true with even small amounts of alcohol.
- Fatty liver caused by the metabolic syndrome\* interacts with the infection, to cause worse liver damage.
- Age plays a role: liver damage develops faster as a person grows older, speeding up especially after age 40.
- Men are at higher risk than women.
- Getting other forms of hepatitis, like autoimmune hepatitis, or viral hepatitis A and B, also worsen the damage. People with HCV are urged to get vaccinated to prevent HAV and HBV. (Unfortunately, we do not have a vaccine against hepatitis C virus yet.)

*\* The metabolic syndrome is a collection of conditions including high blood pressure, high cholesterol, high blood sugar, and high body weight.*

Cirrhosis itself can cause liver cancer (hepatocellular carcinoma). The risk of cancer is about 1-4% per year, for people who already have cirrhosis.

A liver tumor can be detected by ultrasound, except in very early cases. (In other words, a "normal" ultrasound doesn't completely rule out liver cancer, if a person is at a high risk.) Unfortunately, there isn't any evidence that detecting liver cancer reduces the risk of death. We do not have good treatments for liver cancer.

Twenty-year follow-up studies of patients with HCV have shown that liver disease was the cause of death in only 2-6% of cases. This means that, over twenty years, at least 94% of deaths in people with the virus were NOT caused by liver disease.

### Who should be tested?

- Those who ever injected illegal drugs, even if they only injected once.
- Persons who received clotting factor concentrates produced before 1987.
- Persons who were ever on long-term dialysis.
- Persons with persistently abnormal ALT levels.
- Persons who got transfusions or transplants before July 1992.
- Health care, emergency medical and public safety workers after needle sticks or other exposures to HCV-positive blood.
- Children born to HCV-positive mothers. (Babies can get anti-HCV antibodies from their mothers during pregnancy without being infected with the virus. For this reason, testing should not be done until the baby is at least 12 months old.)

Note: Blood transfusions given in the United States after 1992 had a very low risk of transmitting HCV (3 infections per 10,000 units transfused). The current risk is nearly zero. There has not been a new case from blood transfusion for over a decade.

### Antibody blood tests:

Testing usually starts with the EIA (enzyme immuno-assay), which detects "anti-HCV" antibodies made by your immune system.

If the EIA test is positive, it is followed by confirmatory testing with an additional, more specific test called the RIBA (recombinant immuno-blot assay), to eliminate false-positive results.

Sometimes the second test is "indeterminate" and should be repeated in two or more months.

Anti-HCV antibodies can be detected in about 70-80% of patients as soon as they have symptoms, and in about 90% of patients in the first three months of symptoms.

These tests can not tell if your infection is an acute or a chronic infection. Even a person whose immune system wiped out an acute infection (who have killed off the virus) will still be anti-HCV positive.

### Virus blood tests:

These measure the viral RNA directly. In some patients, the detection of viral RNA may be the only evidence of HCV infection (the person does not have symptoms, liver damage, or antibodies).

*Qualitative* tests (from the word "quality") - simply tell you whether virus is present or not, allowing diagnosis of infection.

*Quantitative* tests (from the word "quantity") - estimate the "viral load," or how many viruses are in the blood. However, these tests are not accurate enough to be used to diagnose infection. They are usually used just to tell if treatment is working.

Also, the viral load does NOT necessarily indicate liver damage, how long the infection has been present (acute or chronic), or how severe the infection is.

There is no general agreement on what viral loads are considered low or high. As a rough guideline, per milliliter of blood:

- Below 200 thousand viral equivalents = very low
- 200,000 thousand to 1 million = low
- 1 to 5 million = medium
- 5 to 25 million = high
- above 25 million = very high

See <http://www.hepatitis-central.com/hcv/whatis/vl.html> for more information.

### Genotype tests

HCV is categorized into nine basic genetic types (genotypes). In the United States,

- 72% of people with HCV infection have genotype 1.
- 16-19% have genotype 2.
- 8-10% have genotype 3.
- 1-2% have other genotypes.

Genotype does not indicate how a person got the infection. Genotypes 1a and 1b are less responsive to interferon treatment. However, genotype should not be a deciding factor on whether treatment is started or not.

### Liver function blood tests:

If the virus damages a liver cell, enzymes leak out of the damaged cell into the bloodstream. Liver enzymes called AST and ALT can be measured to indicate whether the virus is currently damaging the liver, and how much. (Older names for these enzymes are SGOT and SGPT, respectively.)

These "liver function tests" do not tell how much total damage has already occurred. (They do not detect the scarring of fibrosis or cirrhosis, for example).

When people have acute HCV (when they are first infected), they usually have ALT levels greater than 600 (average, 1410). ALT levels might go back to normal and stay normal for more than six months, suggesting full recovery. If ALT goes up again and stays up, this indicates chronic liver disease.

If you have the chronic virus but your ALT level is normal, ALT should be rechecked yearly or if symptoms develop. They might be checked more often if you are newly diagnosed, or if there is suspicion of worsening liver inflammation.

### When to see a specialist

If you have the chronic virus and your ALT level stays high, you should see a specialist in liver disease. They might recommend a liver biopsy - a tiny pinch of liver tissue, taken through a needle - to see how much damage has already occurred. Some doctors feel a biopsy is necessary and some do not. Either way, if you decide to enter a treatment program, the liver specialist will help you manage this.

### Other blood tests

- *Bilirubin* is a byproduct of the recycling of red blood cells, and is normally cleared out by the liver. If the liver is not working well, bilirubin builds up in the blood and the level is high. (It also builds up in the skin, causing yellow jaundice.)
- *The INR* (International Normalized Ratio) is a measure of how well the blood can clot. The liver normally makes clotting factors, and if the liver isn't working well, the blood doesn't clot well and the INR is high.
- *Albumin* is the number one protein in blood plasma. It is made by the liver, and levels are low when the liver isn't working well.
- *Platelets* help the blood to clot. They are made in the bone marrow, stimulated by a hormone called thrombopoietin, which is made by the liver. If the liver isn't working well, platelets are low.
- *Hepatitis A and B viruses* worsen any liver damage caused by HCV, and we have vaccinations to prevent them.
- *Alpha-fetoprotein (AFP)* is a marker that is made by some liver tumors. It can also be high in HCV infection and fibrosis/cirrhosis *without* any cancer present. Because of this, it is not a good test for cancer. Ultrasound monitoring, or other imaging, of the liver is more effective.

### Treatment

The goal of treatment is to wipe out the virus, in order to slow or stop liver fibrosis/cirrhosis.

Treatment is often recommended if a person has high ALT levels and/or known liver fibrosis/cirrhosis. We don't know if people benefit from treatment without these conditions, or without symptoms. The person must also have good kidney function and normal blood cell counts, and be able to follow the rules for the treatment (injections given on a regular basis, and testing to monitor success).

The treatment usually consists of interferon and ribavirin, two anti-viral medicines. (Other medicines are in development.) Interferon is made naturally by the body to fight off viruses. For example, it produces many of the symptoms of flu infection, even while it is acting to fight off the flu virus. Ribavirin is a medicine that interferes with the virus's ability to reproduce. It reduces the chance of relapse after treatment is finished.

### How well does it work?

About 50% of patients improve with standard treatment. Their ALT levels go back to normal, and their viral load decreases or becomes undetectable. After treatment ends, however, more than half of these patients relapse. Therefore, only 15-25% of all treated patients have a sustained response one or more years after treatment ends.

If the viral load is undetectable 6 months after treatment ends, the person is considered almost certain to be permanently cured. The liver begins to heal.

Individualized treatment may have a higher chance of success. Varying the brand, dosage, or length of treatment with interferon, and adding additional antiviral medications, may improve an individual's response.

### What are the side effects of interferon?

Most patients have flu-like symptoms early in treatment, but these usually go away. Later, people can have fatigue, nausea/vomiting or diarrhea, "brain fog" with trouble focusing and low motivation, irritability, and depression. The bone marrow can develop difficulty making new blood cells. The dosage must be reduced in 10-40% of all patients because of the severity of these side effects. In 5-15% of cases, the treatment must be stopped altogether because of side effects. The side effects go away if treatment is stopped.

### Other treatments

People with late liver failure should have a liver transplant evaluation. HCV is the leading indication for liver transplants in the United States today. The virus usually comes back after the transplant, but as liver damage from HCV usually develops slowly, transplantation still extends the person's lifespan.

One transplant option is called "living donor" transplantation. The liver is an organ that normally regenerates itself. In a typical transplant, about half of the liver is removed from a healthy donor and used to replace the old liver in the recipient. The donor's liver grows back to near-normal in 4-6 weeks. The transplanted piece grows to full size as well, although it takes longer.

### Preventing HCV

We don't have any tests that can tell if an HCV-positive person is contagious. We have to assume that anyone who tests positive for HCV is potentially infectious, and they will need to prevent exposing others.

#### *To reduce the risk of transmission to others:*

- Don't share toothbrushes, nail cutters, or razors (which might have microscopic blood on them).
- If you are an IV drug user, don't share needles, cottons, cookers, or water.
- Cover up cuts or sores on your skin when you are around others.
- Let any surgeons, acupuncturists, dentists, tattoo artists, wound care nurses, or others know that you are HCV-positive. They will appreciate the information, and are trained to minimize any risk.

The virus is NOT spread by sneezing, hugging, kissing, coughing, food or water, sharing eating utensils or drinking glasses, or casual contact. Persons should not be excluded from work, school, play, child care or other settings because of HCV.

You do NOT need to change your sexual practices if you have a long-term partner. You will need to discuss the risk with any new partners, and practice safe sex to prevent all infections.

You do NOT need to avoid pregnancy or breast feeding. About 5 of every 100 babies of HCV-positive mothers become infected. There is no treatment to prevent this, and no form of delivery (e.g., natural or cesarean section) prevents it. We don't know how these kids are affected as they grow older. Mother's milk and breastfeeding do NOT transmit HCV. (About the same number of formula-fed babies catch hepatitis C from moms as do breastfed babies.)

If you are a healthcare worker, you are NOT restricted from providing patient care. The risk of transmission from an infected provider to a patient appears to be very low. You should observe universal safety precautions as you normally would, to prevent all infections from spreading.

#### To reduce the risk of liver damage:

- Do not drink alcohol - not even a little.
- It's okay to drink coffee!
- Get hepatitis A and B vaccinations, to prevent liver damage infection with multiple viruses.
- Do not take NSAIDs (ibuprofen/Advil, aspirin/Excedrin, naproxen/Aleve, or prescription NSAIDs).
- The maximum safe amount of acetaminophen (Tylenol) from all sources (including prescription painkillers, allergy medicines, etc.) is 2000 mg per day (four extra-strength pills per 24 hours).
- Do not start new medications, including over-the-counter, herbal, or Chinese medicines, without checking with your doctor. Some medicines that are safe for most people, can harm liver cells in a person with HCV.
- Do not take extra vitamin A supplements. Vitamin A can build up to toxic levels in the liver.
- Do not take extra iron supplements, unless supervised by your doctor. Iron can build up in a damaged liver.
- Don't eat raw oysters, sushi, ceviche, or other raw seafood, and avoid exposure to their juices. Germs found in these (*Vibrio*) can cause acute life-threatening liver failure in people with chronic hepatitis.
- Many people with HCV take milk thistle supplements. There is some evidence that this can help to prevent liver fibrosis. See <http://www.aafp.org/afp/2005/1001/p1285.html> for more information.
- Medical marijuana might make HCV worse. See [http://norml.org/index.cfm?Group\\_ID=7010](http://norml.org/index.cfm?Group_ID=7010) for more info.