

For more information about thalassemia and liver issues, or about other issues involved with thalassemia care, talk with your health care professional, or contact the Cooley's Anemia Foundation (800-522-7222 or info@cooleysanemia.org) or one of the Thalassemia Centers of Excellence.

The Thalassemia Centers of Excellence have the most highly trained thalassemia experts in the country. They are located at:

Children's Hospital Boston
 Children's Hospital Los Angeles
 Children's Hospital Oakland
 Children's Hospital of Philadelphia
 Children's Memorial Hospital (Chicago)
 Weill Medical College of Cornell University (New York)

Many other hospitals are satellite centers affiliated with these Centers. Please contact the Cooley's Anemia Foundation for a list of these satellite centers.



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Living with Thalassemia

Hepatitis and Liver Issues in Thalassemia

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Issues in Thalassemia Care

Many people with thalassemia develop liver-related issues (sometimes called hepatic issues) that can become a problem if left undiagnosed and untreated. Knowing what steps to take to help prevent liver issues, and knowing what to do to improve your health if they arise, is very important for people with thalassemia.



Understanding of and treatment for liver issues has improved greatly over the years, so patients today are dealing with these issues in a positive manner. Patients whose care is handled by a team of experts with specific experience in thalassemia are in an excellent position to receive the kind of care that can minimize the problems associated with liver issues and ensure optimal outcomes.

Why do people with thalassemia sometimes have liver issues?

People with thalassemia suffer from iron overload, either as part of their bodies' attempts to combat anemia by creating more red blood cells (which contain iron) or from the transfusions of red blood cells that they receive

to treat the anemia. Unless removed through chelation, this excess iron cannot leave the body. It stays in the blood or settles in organs, such as the heart and liver.

One of the liver's functions is to store reserves of iron for when the body needs it, so in some ways it is already "welcoming" to iron; but the amount it receives from a patient who does not properly chelate is far more than it can handle. If too much iron settles in the liver, it "clogs" it, leading to scars known as "fibrosis," and keeping it from functioning properly. If the liver becomes severely injured and scarred, it is said to have "cirrhosis," a serious complication.

In addition, some patients develop liver complications because they become infected with a virus such as hepatitis A, B or C. Hepatitis B and C can cause fibrosis and cirrhosis. Hepatitis A rarely causes severe damage on its own, but it can worsen the damage caused by hepatitis C. One route of transmission for all three of these viruses is from blood transfusion from infected donors.

But transfusions are part of thalassemia major therapy.

How can I be safe?

There are vaccinations for hepatitis A and B although, in some cases, a person may still contract the disease even after vaccination. At this time, there is no effective vaccination for hepatitis C.

"One blood transfusion in 1,935,000 transmits hepatitis C."

The U.S. government has numerous safeguards in place to increase the safety of the donated blood supply. In 1992, tests were developed that have significantly reduced the chance that a donated unit of blood will contain a hepatitis virus.

According to the American Red Cross, about one blood transfusion in 205,000 transmits a hepatitis B infection, and one blood transfusion in 1,935,000 transmits hepatitis C. Not

information about the appropriate use of this therapy in people with thalassemia.

Reversing fibrosis and cirrhosis is difficult. In most instances, the course of treatment is aimed at preventing damage from worsening. In addition to changing iron chelation therapy, treatment includes stopping all alcohol intake, as well as possibly eliminating or limiting some medication, vitamins and supplements that may affect the liver. (No such changes in treatment should be implemented without first involving all members of the patient's health care team.)

As cirrhosis progresses, it can cause a range of complications including fluid build-up in the abdomen, bleeding in the digestive tract and changes in mental function. These complications require treatment, which can range from dietary changes, to medications (including diuretics, beta blockers and antibiotics), to surgery to prevent interior bleeding.

Cirrhosis can also lead to liver cancer, so it is important to monitor a patient's status in this area regularly. Tests to measure AFP (alpha-fetoprotein) levels, which can indicate the possibility of liver cancer, and the use of abdominal ultrasound are an important part of determining if this is a risk.

It's important to remember that there is a great deal that can be done to prevent liver complications in thalassemia. Making sure that you undergo a complete annual comprehensive care evaluation, as well as quarterly (or monthly, when necessary) Liver Function Enzyme Screenings, is essential to maintaining a healthy liver.

After a liver has already sustained damage, it is important to do everything possible to prevent further damage. Regular testing and monitoring by a team of experts with knowledge in thalassemia and liver issues is crucial for patients who have sustained liver damage.

What can I do to help prevent liver complications?

The two most important things that a person with thalassemia can do to prevent liver complications are to maintain compliance with an appropriate chelation therapy and to undergo annual testing to identify early warning signs of potential problems.

Beyond that, there are several other steps that you can take. Limiting your alcohol intake is important, as too much alcohol damages the liver. If a person with hepatitis C uses alcohol, there is a risk of severe damage. Drinking plenty of water is also beneficial to liver health, as is maintaining a healthy diet. A discussion with your hematologist and/or a nutritionist who understands the special requirements of a person with thalassemia is helpful in determining the diet that is appropriate for you.

“Appropriate chelation and annual testing are important in preventing liver issues”

How are liver complications treated?

In many cases, changes to a patient’s iron chelation therapy are necessary. Removing as much iron as possible from the liver is essential to prevent complications from worsening. The specific course of treatment varies from individual to individual.

Hepatitis A usually is mild and does not last long, so there is usually no special treatment other than dietary changes, and nutritional support for diarrhea.

Both hepatitis B and C are often treated with specific antiviral drugs. One of the most effective treatments in the general population is the combination of peginterferon alfa and ribavirin. Despite early concerns that this treatment may result in more frequent transfusions, recent studies have indicated that many patients are capable of benefiting significantly from this combination therapy, even when the treatment necessitates temporary increases in transfusion requirements. Ongoing and future studies will provide more

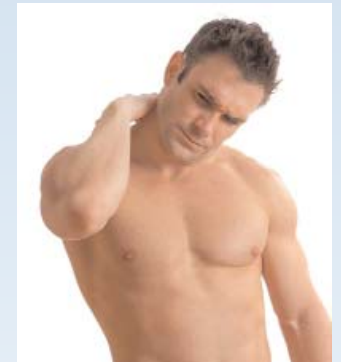
everyone who becomes infected with a hepatitis virus develops the disease ; the benefits of blood transfusion for a person with thalassemia far outweigh the risks.

What symptoms are related to liver issues?

Often a person may be infected with a hepatitis virus and have no symptoms; in such cases, hepatitis B or C can go undiagnosed for many years. (Symptoms of hepatitis A usually show up within 2 months.)

When symptoms of hepatitis are present, the most common include:

- Low-grade fever
- Headache
- Fatigue
- Nausea/vomiting
- Diarrhea
- Loss of appetite
- Stomach pain (usually on the right side, slightly below the ribcage) and bloating
- Muscle aches
- Joint pain
- Itchy skin
- Dark urine
- Pale (gray-ish) stool
- Jaundice (yellowing of the skin and/or eyes)
- Mood swings
- Night sweats



Muscle aches, mood swings and stomach pain are possible symptoms of hepatitis



Symptoms of cirrhosis may include:

- Redness on the palms of your hands
- Red, spider-like rash on the chest, shoulders or face
- Swelling in the stomach, legs or feet (due to fluid build-up)
- Muscle loss
- Weight loss
- Frequent infections
- Fatigue
- Tendency to bruise easily
- Itching
- Frequent nosebleeds
- Blood in stool or urine
- Confusion or memory problems
- Jaundice



Bruising and confusion or memory problems are among the symptoms of cirrhosis



How are liver complications diagnosed?

There are a number of tests involved in assessing the health of the liver that can provide information about possible complications.

Every three months, a Liver Function Enzyme Screening (AST/SGOT, ALT/SGPT) should be taken. This test can act as an "early warning system" to alert your doctor to any potential problems.

A Liver Function Enzyme Screening can act as an "early warning system"

If the ALT levels are higher than they should be, your doctor should consider repeating these tests every month. If the ALT is persistently elevated for 6 months or more, a liver biopsy should be considered.

There are a number of other liver-related tests that should be a part of

every thalassemia patient's *annual comprehensive care evaluation*. Whether a patient undergoes each of these tests

every year depends upon certain factors, but the full list includes:

- Hepatitis C Antibody test
- Hepatitis C RNA viral load
- Hepatitis B panel
- Hepatitis A panel
- HIV test
- Serum AFP and abdominal ultrasound
- Liver iron assessment via biopsy or via MRI (R2 measurement or FDA-approved Ferriscan)

What is involved with these tests?

Most of these tests are blood tests. An abdominal ultrasound is an examination of internal organs with a non-invasive external device that creates a soundwave-generated picture of the liver.

A liver biopsy is a procedure in which a small portion of the liver is removed and examined for evidence of iron loading, scarring or other problems. Typically, a needle is inserted through the ribcage or below the ribcage and a spring loaded needle biopsy of liver tissue is obtained, using ultrasound guidance. Sedation and local anesthesia is commonly used for this procedure. For children under six years of age, general anesthesia is recommended.

MRI (Magnetic Resonance Imaging) is a non-invasive iron measurement called R2 or Ferriscan. The patient lies on a table that moves inside an MRI machine. The machine takes "pictures" of the organ. This is a painless procedure. The patient must lie still and hold his/her breath while each picture is taken. If the patient is not old enough to do so, general anesthesia is given during the imaging. While MRI machinery is very common at hospitals, today iron readings can only be done at specific thalassemia treatment centers which have the necessary software.