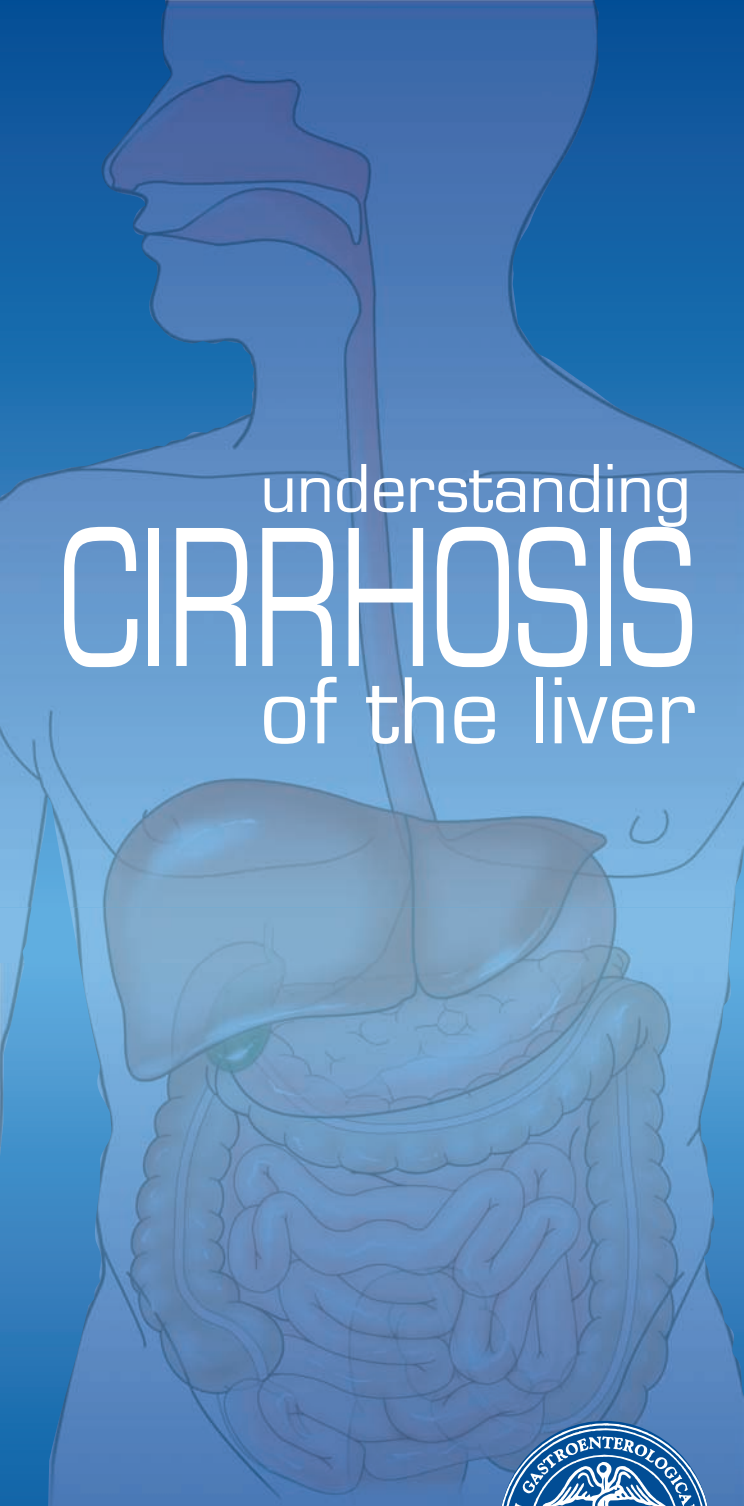


# understanding CIRRHOSIS of the liver

A patient's guide from your doctor and

THE AMERICAN GASTROENTEROLOGICAL ASSOCIATION AGA

# Cirrhosis Basics

— The liver is one of the most important organs in your body and weighs about 3 pounds.

— It sits in the upper right side of the abdomen, below the ribs.

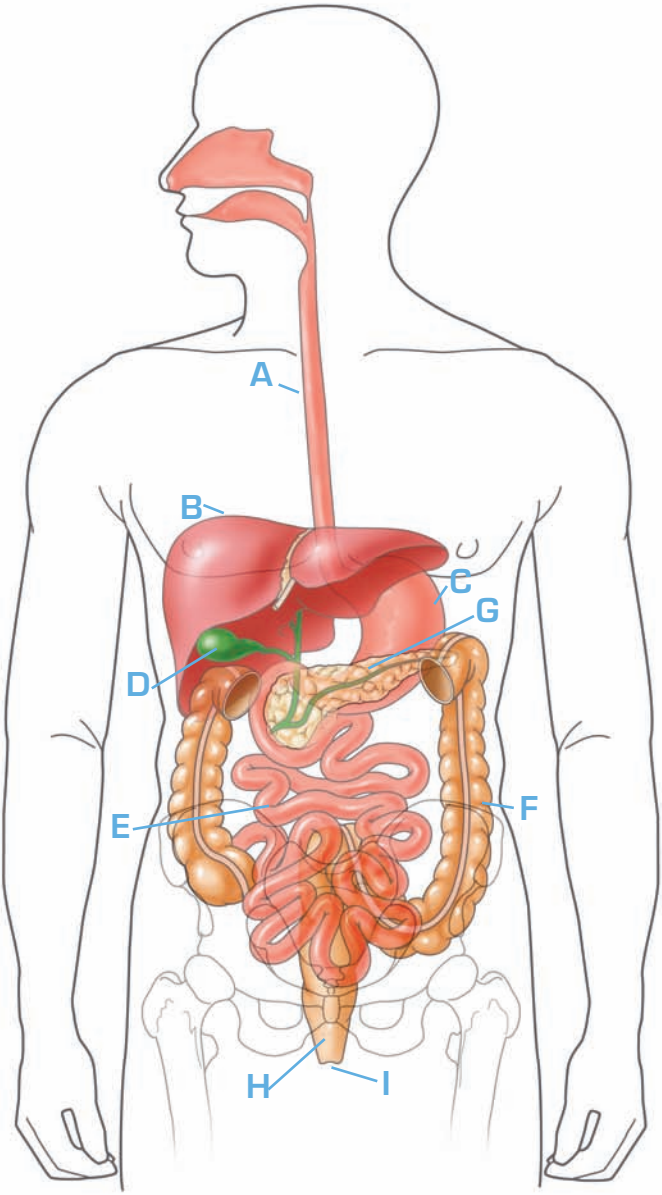
— The functions of the liver include:
  – Making bile.
  – Changing food into energy.
  – Cleaning alcohol and poisons from your system.

— Cirrhosis occurs when the liver is permanently scarred or injured by chronic conditions and diseases.

— The scar tissue that forms in cirrhosis harms the structure of the liver, blocking the flow of blood through the organ.

— Good nutrition is the key to management of advanced cirrhosis.

# Your Digestive System




A. Esophagus
B. Liver
C. Stomach
D. Gallbladder
E. Small Intestine
F. Large Intestine
G. Pancreas
H. Rectum
I. Anus

To help you understand and manage your condition, the AGA Institute provides you with the following information, designed to give you some basic facts, to help you better understand your condition and to serve as a starting point for discussions with your doctor.

The liver weighs approximately 3 pounds and is the largest organ in the body. It is located in the upper right side of the abdomen, behind the lower ribs. When chronic diseases cause the liver to become permanently injured and scarred, the condition is called cirrhosis.

The scar tissue that forms in cirrhosis harms the structure of the liver, blocking the flow of blood through the organ. The loss of normal liver tissue slows the processing of nutrients, hormones, drugs and toxins by the liver, as well as the production of proteins and other substances made by the liver.

## Impact of Cirrhosis

Cirrhosis is the eleventh-leading cause of death by disease in the U.S. About 25,000 people die from the complications of cirrhosis each year; almost half of these are alcohol related. There also is a great toll in terms of human suffering, hospital costs and the loss of work by people with cirrhosis.

# Causes of Cirrhosis

Cirrhosis has many causes. It can result from direct injury to the liver cells (such as from hepatitis) or from indirect injury via inflammation or obstruction of bile ducts, which drain the liver cells of bile.

Common causes of direct liver injury include:

- Chronic alcoholism (most common cause in the U.S.).
- Chronic viral hepatitis (types B, C and D).
- Autoimmune hepatitis.

Common causes of indirect injury by way of bile duct damage include:

- **Primary biliary cirrhosis**: the liver's bile ducts are slowly destroyed.
- **Primary sclerosing cholangitis**: bile ducts inside and outside the liver become inflamed and scarred.
- **Biliary atresia**: injury and loss (atresia) of the bile ducts that are responsible for draining bile from the liver; affects newborn infants.

Less common causes of cirrhosis include direct liver injury from inherited disease such as cystic fibrosis, alpha-1-antitrypsin deficiency, galactosemia and glycogen storage disease.

Two inherited disorders result in the abnormal storage of metals in the liver leading to tissue damage and cirrhosis:

- **Wilson's disease**: Patients store too much copper in the liver, brain, kidneys and corneas of the eyes.
- **Hemochromatosis**: Too much iron is absorbed and the excess iron is deposited in the liver and other organs, such as the pancreas, skin, intestinal lining, heart and endocrine glands.

Very rare causes of cirrhosis include reactions to drugs (e.g., vitamin A, Dilantin, methotrexate, amiodarone), exposure to environmental toxins, and repeated bouts of heart failure with liver congestion.

If the cause of cirrhosis is still not clear after a full evaluation, it is termed "**cryptogenic cirrhosis**." As many as 10 percent of patients with cirrhosis fall into this category.

## Bile Duct Blockage

If a person's bile duct becomes blocked, this also may cause cirrhosis. The bile ducts carry bile formed in the liver to the intestines, where the bile helps in the digestion of fat.

In babies, the most common cause of cirrhosis due to blocked bile ducts is a disease called biliary atresia. In this case, the bile ducts are absent or injured, causing bile to back up in the liver. These babies are jaundiced (their skin is yellowed) after their first month of life. Sometimes they can be helped by surgery, in which a new duct is formed to allow bile to drain again from the liver, or they may require a liver transplant.

In adults, the bile ducts may become inflamed, blocked and scarred due to another liver disease, primary biliary cirrhosis. Another type of biliary cirrhosis also may occur after a patient has gallbladder surgery in which the bile ducts are injured or tied off.

## Obesity

As the incidence of obesity continues to rise, liver disease that may lead to cirrhosis, such as nonalcoholic fatty liver disease (NAFLD) and nonalcoholic steatohepatitis (NASH), may become more prevalent. These diseases resemble alcoholic liver disease, but occur in people who drink little to no alcohol. Patients with NAFLD have fatty livers without inflammation or damage, which may not produce any symptoms. NASH involves the accumulation of fat in the liver cells as well as inflammation of the liver, which can destroy the liver cells and lead to cirrhosis.

# Symptoms of Cirrhosis

Patients with cirrhosis often have few symptoms at first. The two major problems that eventually cause symptoms are loss of functioning liver cells and distortion of the liver caused by scarring. Patients may experience:

- Fatigue.
- Weakness.
- Exhaustion.
- Loss of appetite, often with nausea and weight loss.
- Menstrual abnormalities (absent or infrequent periods not related to menopause).
- Impotence, loss of sexual drive or tender enlarged breasts (for men).

As liver function declines, less protein is made by the organ. For example, decreased production of albumin, a protein, can result in water accumulating in the legs (**edema**) or abdomen (**ascites**). A decrease in proteins needed for blood clotting makes it easy for the person to bruise or bleed.

## Late Stage or Advanced Cirrhosis

In the later stages of cirrhosis, jaundice (yellow skin) may occur, caused by the buildup of bile pigment that is normally passed by the liver into the intestines. Some people with cirrhosis experience intense itching due to bile products that are deposited in the skin. Gallstones often form in persons with cirrhosis because not enough bile reaches the gallbladder. To learn more about gallstones, read the AGA Institute brochure on that topic in your gastroenterologist's office or visit www.gastro.org/patient.

Patients with advanced cirrhosis have difficulty digesting certain proteins that result in toxic levels of ammonia in the blood. This condition is termed "**hepatic encephalopathy**" and can lead to symptoms which range from mild sleep disturbances and difficulty concentrating to unresponsiveness and coma. Many drugs are filtered by the liver, but this process can be slowed down by cirrhosis. Because the liver may not remove the drugs from the blood at the usual rate, a drug may act longer than expected. This is especially true of medications that may be sedating. People with cirrhosis are often very sensitive to medications and their side effects.

A serious problem for people with cirrhosis is an increase in pressure in the blood vessels that flow to the liver. Normally, blood from the intestines and spleen is pumped to the liver through the portal vein. But in cirrhosis, this normal flow of blood is slowed, building pressure in the portal vein (**portal hypertension**). This blocks the normal flow of blood, causing the spleen to enlarge. The blood is frequently "shunted" around the liver to return to the heart by smaller vessels, which may become enlarged. In the stomach and esophagus these engorged blood vessels are termed "varices" and are at increased risk of bleeding, which is another major complication of cirrhosis.

# Diagnosing Cirrhosis

Cirrhosis is diagnosed by a variety of measures including laboratory tests, imaging studies (CT or ultrasound), physical examination and a liver biopsy.

A liver biopsy is performed by passing a needle through the skin to take a sample of tissue from the liver. In some cases, cirrhosis is diagnosed during surgery such as laparoscopy, which uses a camera inserted through a tiny incision in the abdominal wall.

# Complications

The two main problems in cirrhosis are liver failure, when liver cells just stop working, and the bleeding caused by portal hypertension.

The doctor may prescribe blood pressure medication, such as a beta blocker, to treat the portal hypertension. If the patient bleeds from the varices (abnormally dilated and lengthened vein, artery or lymph vessel) of the stomach or esophagus, the doctor can inject them with a sclerosing, or hardening, agent administered through a flexible tube (endoscope) that is inserted through the mouth and esophagus.

In critical cases, the patient may be given a liver transplant or another surgery (such as a **portacaval shunt**) that is sometimes used to relieve the pressure in the portal vein and varices.

# Treatment for Cirrhosis

The treatment of cirrhosis is aimed at stopping or delaying the progression and reducing complications. In alcoholic cirrhosis, for instance, the person must stop drinking alcohol to halt progression of the disease. If a person has hepatitis, the doctor may administer steroids or antiviral drugs to reduce liver cell injury.

- Good nutrition is key to the management of advanced cirrhosis. Diets which include 'easy to digest' forms of protein, such as legumes, poultry and fish, are important as is a low-sodium diet in patients with edema or ascites, the build-up of fluid in the legs or abdomen.
- General measures recommended in patients with cirrhosis should include vaccination for hepatitis A and B and influenza, as any of these diseases, if acquired, can result in significant sickness and death. Patients should be advised against eating raw seafood and should question their physician when taking any prescription or non-prescription medication (e.g., acetaminophen).
- Medications may be given to control the symptoms of cirrhosis, such as itching. Edema and ascites are treated by low-sodium diets and diuretics, which increase urine, to remove excess fluid and prevent edema from recurring.
- Diet and drug therapies can help improve the altered mental function that cirrhosis can cause. For instance, decreasing 'difficult to digest' dietary protein, such as red meat, results in less toxin formation in the digestive tract. Laxatives may be given to help absorb toxins and speed their removal from the intestines.

**Patients with cirrhosis often live healthy lives for many years. If complications develop, they can usually be treated.**

**Many patients with cirrhosis have undergone successful liver transplantation.**

# Go to www.gastro.org/patient for more information on digestive health and tests performed by gastroenterologists and to find an AGA member physician in your area.

The American Gastroenterological Association (AGA) is dedicated to the mission of advancing the science and practice of gastroenterology. Founded in 1897, the AGA is one of the oldest medical-specialty societies in the U.S. Our 16,000 members include physicians and scientists who research, diagnose and treat disorders of the gastrointestinal tract and liver. The AGA Institute runs the organization's practice, research and educational programs.

The content in the series of AGA Institute patient education brochures was reviewed by the following gastroenterologists:

**John I. Allen, MD, MBA, AGAF**
*Minnesota Gastroenterology*
*Chair, AGA Clinical Practice & Quality Management Committee*

**Harry R. Aslanian, MD**
*Yale University School of Medicine*

**Stephen J. Bickston, MD, AGAF**
*University of Virginia Health System*

**Joel V. Brill, MD, AGAF**
*Predictive Health LLC*
*Chair, AGA Practice Management & Economics Committee*

**Marcia I. Canto, MD, MHS**
*Johns Hopkins University*

**Richard Davis, Jr. PA-C**
*University of Florida College of Medicine*

**Mark H. DeLegge, MD, AGAF**
*Medical University of South Carolina*

**Kenneth DeVault, MD**
*Mayo Clinic, Jacksonville*

**Stephen W. Hiltz, MD, MBA, AGAF**
*TriState Gastroenterology*

**Lawrence R. Kosinski, MD, MBA, AGAF**
*Elgin Gastroenterology, S.C.*

**Linda A. Lee, MD, AGAF**
*Johns Hopkins School of Medicine*

**Stephen A. McClave, MD, AGAF**
*University of Louisville School of Medicine*

**Kimberley Persley, MD**
*Texas Digestive Disease Consultants*

**John Schaffner, MD**
*Mayo Clinic, Rochester*

**Joanne A.P. Wilson, MD, FACP, AGAF**
*Duke University Medical Center*

**Cynthia M. Yoshida, MD, AGAF**
*University of Virginia Health System*

**Atif Zaman, MD, MPH**
*Oregon Health and Science University*

AGA INSTITUTE
*AGA Education, Practice and Research*

DHI®

The Digestive Health Initiative® (DHI) is an AGA Institute initiative that offers educational programs on digestive disorders for individuals who are affected by a digestive disease, in an effort to educate the larger health-care community.

This brochure was produced by the AGA Institute and funded by a grant from Takeda Pharmaceuticals North America, Inc.

Takeda

**For more information about digestive diseases, please visit the AGA Web site at www.gastro.org.**



CHRS.PB.0408 2007-030-09056