Liver Cirrhosis

A Toolkit for Patients

Hepatology Program

UNIVERSITY OF MICHIGAN HEALTH

MICHIGAN MEDICINE

Table of Contents:

Welcome

Welcome to the Cirrhosis Management Program at the University of Michigan. As your healthcare team, we take pride in doing everything possible to maximize your health. However, we cannot do this alone. You, the patient, can make an enormous difference in your health by eating right, taking your medications properly, and taking control of your disease management. This toolkit provides you with the information and tools you need to make informed decisions, avoid hospital stays and ER visits, and improve your quality of life.

To schedule an appointment or speak with a nurse call: **(844) 233-0433**

Cirrhosis Patient Education Page (Care Guides)

http://careguides.med.umich.edu/cirrhosis

Visit page to learn about:

- Liver Cirrhosis
- Treating Complications
- Managing your Disease
- Diet and Nutrition
- Medications

and much more

Handouts, booklets, websites, apps and videos **created or approved** by Michigan Medicine Experts

Information You Can Trust!

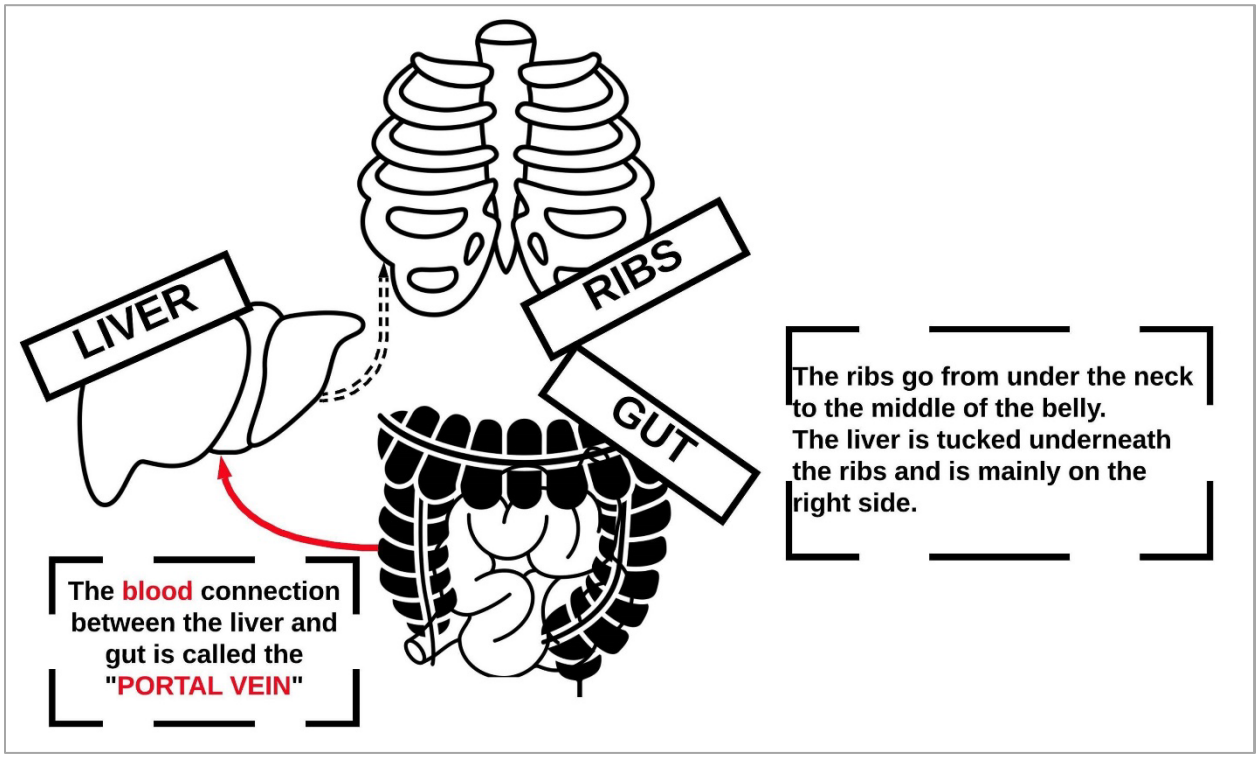
UNIVERSITY OF MICHIGAN HEALTH
MICHIGAN MEDICINE

Cirrhosis Basics

Where is the liver?

The **liver** is located under the ribs on your right side (figure 1). It is connected to your digestive system (gut) by a blood vessel that is called the **portal vein**.

Figure 1



What does the liver do?

The body cannot survive without the liver. The liver does many important things:

- Makes things that help the body function properly
- Cleans the blood
- Stores important things for the rest of the body to use as needed

What are the functions of the liver?

Liver function:	Example:	What this does:
Makes things	Bile	Helps digest food
	Albumin protein	Does many things, including keeping water from leaking out of blood vessels
	Clotting proteins	Prevents bleeding after a cut
	Anti-clotting proteins	Prevents clots in blood
	Hormones (many)	• Helps make platelets (part of blood) • Keeps blood pressure regular • Keeps bones and muscle healthy • Keeps iron level normal for blood making
	Cholesterol	Different types of cholesterol affect the heart in different ways, both good and bad. Cholesterol is also needed to build hormones made by other organs.
	Glucose	A sugar that powers your body (your liver has to make it if you have not eaten for a few hours)
Cleans blood	Ammonia removal	The body's digestion or breakdown of protein makes a toxin (ammonia) which is toxic to your brain and muscle
	Bilirubin removal	Comes from breakdown of old red blood cells and the liver usually disposes (too much bilirubin happens when liver is not functioning properly, causing jaundice)
Stores things	Vitamins	Vitamins A, D, E, K, and B12
	Minerals	Iron, copper
	Energy	Sugar, fat

What is cirrhosis?

Cirrhosis is scarring in the liver due to liver disease. Many things can cause liver disease:

- Viruses - like hepatitis B or C
- Toxins like alcohol or a buildup of liver fat that is often associated with diabetes or being overweight.
- Something inherited through your genes or caused by the body's immune system hurting the liver cells.

Basically, all liver diseases cause inflammation. **Inflammation** is redness, swelling, pain or heat. It is a protective reaction to injury, disease or irritation. It's like if you burn your skin and it becomes red (**inflamed**). When the redness fades, you are left with a scar. In the liver, the same thing happens. Inflamed liver cells get replaced by scar. This is called **fibrosis**. When fibrosis becomes severe, cirrhosis develops. A liver with cirrhosis is hard, bumpy, and often shrinks.

What happens when you have cirrhosis?

Compensated cirrhosis

The earliest stage of cirrhosis is called **compensated cirrhosis**. At this stage you may have no symptoms. In fact, a person may live many years with cirrhosis without knowing it. If your liver disease is treated, the cirrhosis could stay 'compensated' for many years. But if nothing is done about the cause of cirrhosis the liver's condition may worsen. For example, if you continue to drink alcohol, or if hepatitis or other causes of cirrhosis are not treated. Liver function can improve if the cause of liver disease is treated, such as stopping alcohol, or treating hepatitis. The liver can regenerate but recovery takes time.

Symptoms of cirrhosis

Symptoms of cirrhosis may include things such as:

- Severe itch
- Muscle cramps
- Sleep problems
- Falls
- Sex trouble and/or dysfunction

As cirrhosis progresses, more symptoms may develop. These include:

- Low energy
- Poor appetite
- Weight loss
- Loss of muscle

Cirrhosis does two things:

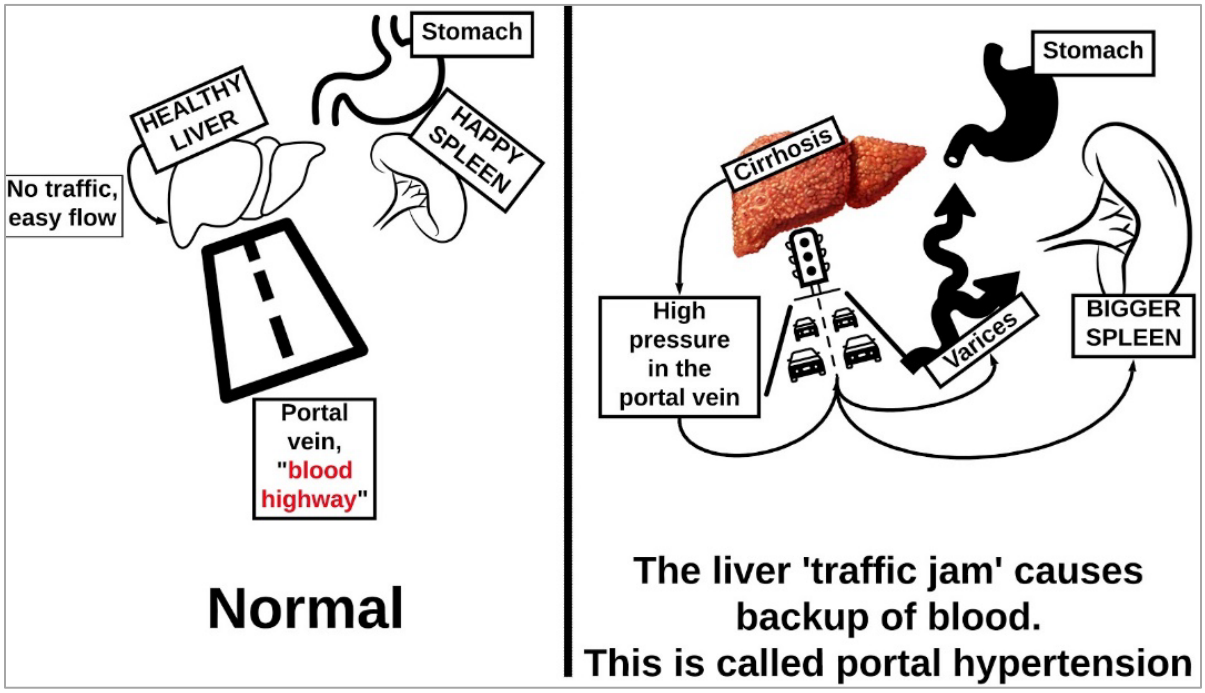
1. Decreases the liver's ability to do the things it needs to do.
2. Changes the way the blood flows through the body.

All blood flows from your gut to your liver. Blood normally flows through the liver like an open road, but cirrhosis causes a traffic jam for the blood flow (see figure 2). As blood flows more slowly, it causes a buildup of pressure in the **portal vein**, the connection between the gut and the liver. This is called **portal hypertension**. The result is a backup of blood that causes many problems:

- It can reroute blood through veins called "**varices**". Some varices can be found in the tube that carries food from your mouth to your stomach (the esophagus) or in your stomach itself. Sometimes varices bleed, we are going to talk more about this later.
- Causes the spleen to grow big as it fills with blood. The spleen takes on so much blood, it ends up soaking up things like platelets, lowering the amount of platelets that can be found on blood tests.

- If blood is being routed away from the liver, it means that blood is not being cleaned by the liver. This causes toxins to flow freely in the blood.
- By directing blood away from the liver, it causes less blood to go to the heart. This can stress the body, particularly the kidneys.
- Increased pressure in the portal vein also causes fluid to build up in the abdomen (ascites) (pronounced “a-sigh-tees”) causing the belly to swell.

Figure 2



There may come a point when the stage of cirrhosis becomes “**decompensated cirrhosis.**” At this stage you can also develop the following serious problems:

- **Bleeding varices** - Internal bleeding from swollen blood vessels in the esophagus
- **Ascites** - a buildup of fluid in the belly
- **Encephalopathy** (pronounced “en-sef-a-lop-a thee”) - confusion from the buildup of toxins in the blood
- **Jaundice** - yellowing of the eyes and skin

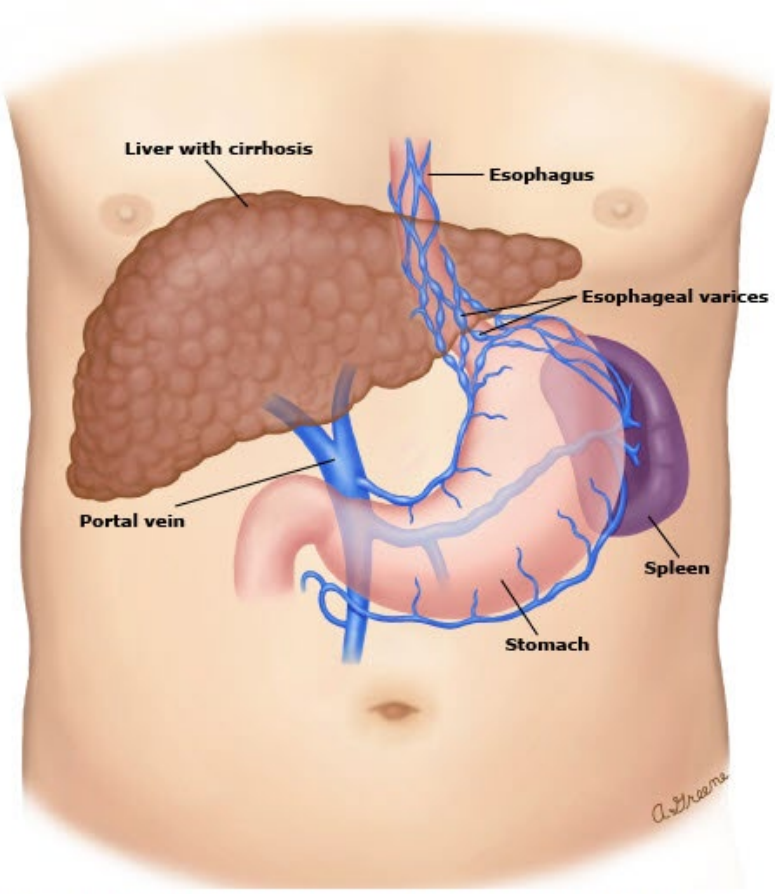
Sometimes even in this late stage, if the cause is removed (such as alcohol), the liver can slowly heal. Other times, the only way to cure cirrhosis is to replace the sick liver with a healthy liver – this is called liver transplantation.

Treating Decompensated Cirrhosis

Preventing bleeding from esophageal varices

What causes bleeding from esophageal varices?

A backup of blood from the scarred liver (traffic jam causing portal hypertension) may cause the veins in the wall of the esophagus to enlarge. The **esophagus** is the swallowing tube that connects the throat to the stomach. The pressure inside the enlarged veins, called **esophageal varices**, is higher than normal. The increased pressure can cause the veins to burst, leading to sudden and severe bleeding.



What are signs of bleeding from esophageal varices?

Unless the varices break and bleed, you will have no symptoms. Signs of bleeding varices are life-threatening. **You must go to the emergency room, immediately, if you have any of the following symptoms**:

- Vomiting of large amounts of fresh blood or clots
- Black and tarry stool

What can be done to prevent serious bleeding?

If you have liver disease that could cause varices to form, your doctor may recommend that you have an upper endoscopy test (EGD) to determine if varices are present and what their size is. Larger varices have a higher risk of breaking and bleeding. There are two main treatments to prevent bleeding:

1. Medications called beta blockers
2. Banding

Your doctor may decide to use one, or both, of these treatments.

1. Beta blocker medication

Beta blockers are pills you can take to reduce blood flow and pressure in varices. Your doctor will generally start you on a very low dose of one of these drugs:

- Propranolol (Inderal®), taken twice a day
- Nadolol (Corgard®), taken once a day
- Carvedilol (Coreg®), taken once or twice a day

When using propranolol or nadolol, your doctor may check your heart rate (pulse). The goal of treatment is to give you enough of one of these drugs to reduce your heart rate by 25%. Carvedilol is not adjusted based on the heart rate. The dose of medication will be increased slowly until this goal is reached. Most people with low blood pressure tolerate beta blockers well.

Tell your doctor if you get dizzy or lightheaded after taking these medications.

2. **Banding**

   If varices do bleed, doctors may apply rubber bands to the varices to block them. If the varices still bleed after treatment with medication and rubber bands, you may need a TIPS procedure (Transjugular Intrahepatic Portosystemic Shunt).

3. **Transjugular intrahepatic portosystemic shunt or TIPS procedure**

   TIPS is the placement of a shunt (internal tunnel) within the liver to improve blood flow. It is performed through the veins and does not require surgery. TIPS can help control bleeding from varices if other simple measures fail. Sometimes it is used to prevent re-bleeding from varices. In some cases, it can also help to decrease fluid buildup (ascites). About 30 out of 100 (30%) of patients develop mental confusion after TIPS, and in some cases the shunt must be closed back down. Rarely, jaundice and liver failure develops after a TIPS procedure.

Managing Ascites

What is ascites?

One common problem caused by high pressure in the veins of the liver is **ascites**. Fluid leaks out into the belly and begins to fill it up. This can make the abdomen (belly) enlarge like a balloon filled with water. The legs can get swollen too. This can be very uncomfortable.

What are the causes of ascites?

Portal hypertension (a buildup of pressure in the portal vein) due to cirrhosis is the most common cause of ascites. The main thing that causes the extra fluid build-up in people with portal hypertension is salt intake (sodium). For this reason, your doctor will review with you the need for a low sodium diet.

What are the signs and symptoms of ascites?

In mild cases, there are usually no symptoms. As more fluid collects, the abdomen swells and you may experience:

- Increase in abdominal size
- Loss of appetite or difficulty eating, because there is less room for food
- Frequent heartburn
- Abdominal pain
- Back pain
- Changes in bowel function
- Fatigue
- Swelling (edema)
- Difficulty breathing, especially when you are lying down
- The most dangerous problem associated with ascites **is infection**, which can be life threatening. Go to the emergency room immediately **if you have ascites and experience a fever or new severe belly pain.**

How do you treat ascites?

- **Avoid further liver damage**
  Stop all alcohol consumption.
- **Low salt (sodium) diet**
  The buildup of fluid is the result of too much salt (sodium) intake. **Most** of the salt in a person's diet comes from **processed foods,** even for people who do not use a salt shaker**.** For this reason, it is important to reduce your salt

intake by carefully reviewing how much sodium is in your food and drink. We usually aim for less than 2000mg of sodium per day. Often you will be asked to work with a nutritionist. **Please note**: even though fluid is building up, this is not a problem with water or fluid intake! It's the salt/sodium that causes the fluid to build up in the belly. The key is to limit your salt intake, not your fluid intake.

- **Diuretic medications ("Water Pills")**
  These medications help the body get rid of the extra salt and fluid through the kidneys. Common medications include spironolactone (Aldactone®), and furosemide (Lasix®). One treatment plan begins with 100 mg of spironolactone and 40 mg of furosemide every morning. Weight (fluid) loss is often slow. If there is no weight loss in the first 2 weeks, the dose is gradually increased. Response to treatment varies and finding out which treatment plan works best for you takes time, as the doctor adjusts the dose of medications over a period of weeks or months.
- **Paracentesis (Tap)**
  Paracentesis is draining fluid out of the abdomen with a needle. This is done using local anesthetic (lidocaine). Taps provide relief of ascites symptoms, but the fluid eventually returns. You must follow strict sodium restriction and diuretic therapy in order to slow down the build-up of fluid. Frequent taps can increase the risk of infection, and cause an imbalance of nutrients (potassium and sodium) levels in the blood. It can also worsen kidney function.
- **Monitor progress**
  During treatment, it is important that both you and your doctor monitor your weight and blood tests. This is especially true if you are taking diuretics (which may cause reduced kidney function and changes in your blood levels of sodium and potassium). The best way you can help the doctors manage your fluid problem is by recording your weight and dose of water pills (diuretics) every day. Use the log available to record your weight

and diuretic dose daily:
(http://www.med.umich.edu/1libr/hepatology/Cirrhosisweightlog.pdf)
In addition, keep track of dates when you have taps (paracentesis).

- **Transjugular intrahepatic portosystemic shunt, or TIPS procedure**
  TIPS is the placement of a shunt (internal tunnel) within the liver to improve blood flow. A TIPS procedure is performed through the veins and does not require surgery. TIPS can help control bleeding from varices if other simple measures fail. In some cases, it can also help to decrease fluid buildup (ascites). About 30 out of 100 (30%) of patients develop mental confusion after TIPS, and in some cases the shunt must be closed back down. Rarely, jaundice and liver failure develops after a TIPS procedure.

- **Liver transplant**
  Developing ascites as a complication of cirrhosis of the liver is a concerning sign. Liver transplant is the best treatment if you are an appropriate candidate, but unfortunately, not all people qualify for this procedure. Talk to your doctor about liver transplant if you have decompensated cirrhosis.

Special risks and considerations in ascites

- **Spontaneous bacterial peritonitis**
  This condition occurs when ascites becomes infected, and it can be life threatening. Symptoms include fever and abdominal pain but you may not have these symptoms in the early stages. If you have an infection of ascites, you will need to be admitted for IV (intravenous) antibiotics. After the first episode of peritonitis is treated, you will take an antibiotic pill to prevent future episodes of peritonitis. Sometimes we recommend antibiotics to prevent peritonitis even in people who have never had it.

- **Hepatic hydrothorax**

  This condition occurs when ascites fluid ends up in the chest. There are small holes in the **diaphragm** – the broad muscle that separates the chest and belly. Fluid bubbles up and surrounds the lung, filling the space between the ribs and the lung. This happens to about 1 in 20 people with ascites. It causes shortness of breath that can be severe. It can also become infected which can be life threatening with symptoms just like spontaneous bacterial peritonitis. The treatment is the same as ascites. Sometimes a treatment called thoracentesis is needed, where a needle is passed between the ribs to drain fluid.
- **Hepatorenal syndrome**

  This refers to serious, life threatening kidney failure that sometimes develops in people with cirrhosis and ascites. To treat the condition your doctor will stop diuretic medications, and will search for a cause that can be reversed such as dehydration or infection.

Managing Hepatic Encephalopathy (HE)

What is hepatic encephalopathy?

A poorly working liver may lead to the build-up of toxins. These toxins can cause problems such as:

- Falls
- Poor sleep
- Mood changes (crankiness)
- Poor concentration
- Inability to calculate (do bills, manage money)
- Less alertness

If it gets bad, these toxins can even cause a coma. See Figure 1, below. These changes are all symptoms of **hepatic encephalopathy**. Sometimes we call this "HE".

Figure 1:

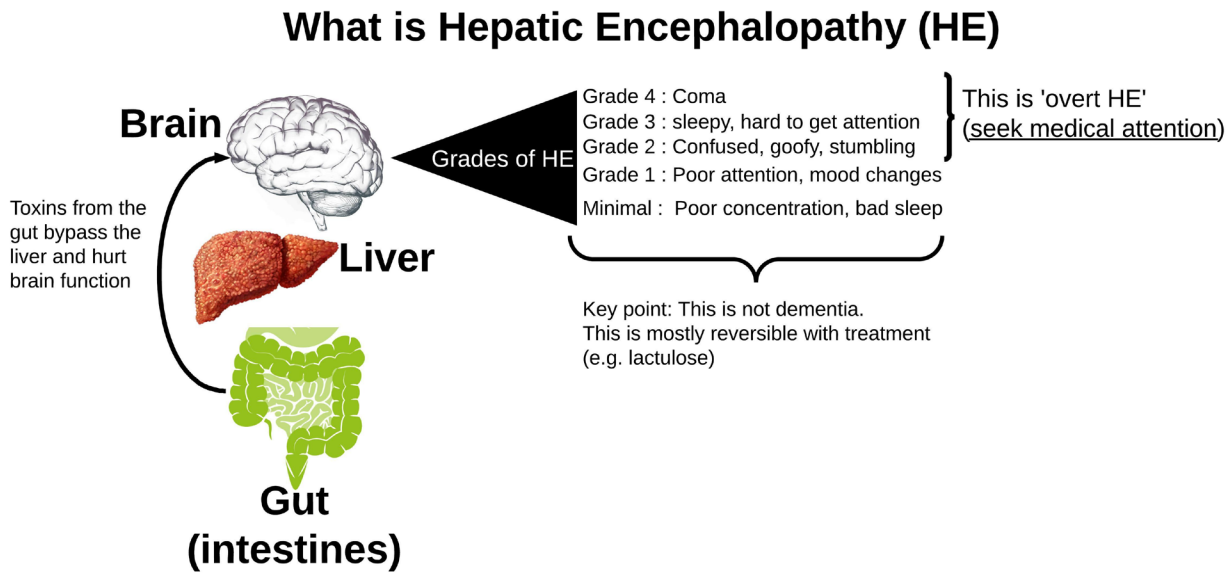


Figure 1 image description:
HE is when toxins from the gut bypass the liver and hurt brain function. There are different grades (levels) of HE. Grades 2-4 are serious and require immediate medical attention:

- Grade 4: Coma
- Grade 3: Sleepy, hard to get attention
- Grade 2: Confused, goofy, stumbling
- Grade 1: Poor attention, mood changes
- Minimal: Poor concentration, bad sleep

Key point: This is not dementia. This is mostly reversible with treatment such as lactulose.

How is Hepatic Encephalopathy diagnosed?

This diagnosis is made by a clinician such as a doctor, physician assistant, or nurse practitioner. We examine you, listen to you or your caregivers and use the information about what is happening in your life to make the diagnosis. There is no blood test for hepatic encephalopathy. It often occurs in people with high ammonia levels, but not always. People with low ammonia can have hepatic encephalopathy and people with high ammonia may not have hepatic encephalopathy.

How is Hepatic Encephalopathy treated?

1. Your doctor may stop medications that can make you confused. Some of the main medications we worry about are called benzodiazepines which include Ativan, Xanax, and valium. Some pain medications can also make hepatic encephalopathy worse.
2. Lactulose is the primary medication we use to treat hepatic encephalopathy. **Lactulose** is a syrup. It helps flush toxins from your gut by trapping them in your stool and making you poop more frequently. Other laxatives or medications that make you poop more will not do the same thing. People usually start with 2 or more tablespoons of lactulose syrup once or twice a day. The dose is gradually increased until you are having about 2-4 soft stools a day. Lactulose is one of the only medicines where it is up to you and your family to adjust the dose.
   - **Increase** the dose if:
     - Your stools are firm
     - You are having fewer than 2 stools per day
     - You are developing symptoms like worsening sleep, falls/stumbling, mood changes, or confusion.
   - **Decrease** the dose if you are having more than 4 loose stools per day.
3. Some people will need a medication called rifaximin (Xifaxan®). This is an **antibiotic** (used to treat infections caused by bacteria) that only works in the intestine. This medicine lowers your risk of developing an episode of severe hepatic encephalopathy.

4. Your doctor will likely recommend a high protein diet. Your body's muscle plays a big role in cleaning your blood. We need to support it by making sure you eat enough protein. The general amount of protein we recommend is 1 gram protein for every kilogram (about 2 pounds) of your body weight). You may hear from other doctors or websites that high protein is bad. **That advice is outdated.** Without high protein you may lose muscle, experience more hepatic encephalopathy, and become weaker. For more information see "Cirrhosis Nutrition Therapy" here: http://www.med.umich.edu/libr/hepatology/CirrhosisNutritionTherapy .

When should I go to the emergency room for Hepatic Encephalopathy?

Some people with this condition develop active and severe hepatic encephalopathy.

Get urgent medical attention if you are:

- Disoriented
- Confused
- Falling asleep inappropriately

We want you to be seen in the emergency department if you have these symptoms because hepatic encephalopathy can be a sign of infection, dehydration, or kidney damage, and those issues need to be treated urgently.

Nutrition Therapy

What is nutrition therapy for cirrhosis?

Nutrition therapy for cirrhosis consists of a low sodium, high protein diet. The following information will explain why this type of diet is important along with tips to help you follow it to the best of your ability.

- It helps the liver perform its many functions
- Your body needs more protein and calories than it has in the past
- The body may not be able to store as many nutrients as usual
- It lowers the risk of infections
- It lowers the risk of fluid retention (ascites)
- It provides energy for daily activities and socializing!

How often should I eat?

- Eat every 2-4 hours when awake
- Have a late evening snack before bed
- Eat a snack in the middle of the night if you're awake!

Low sodium diet

Why do I need to follow a low sodium diet?

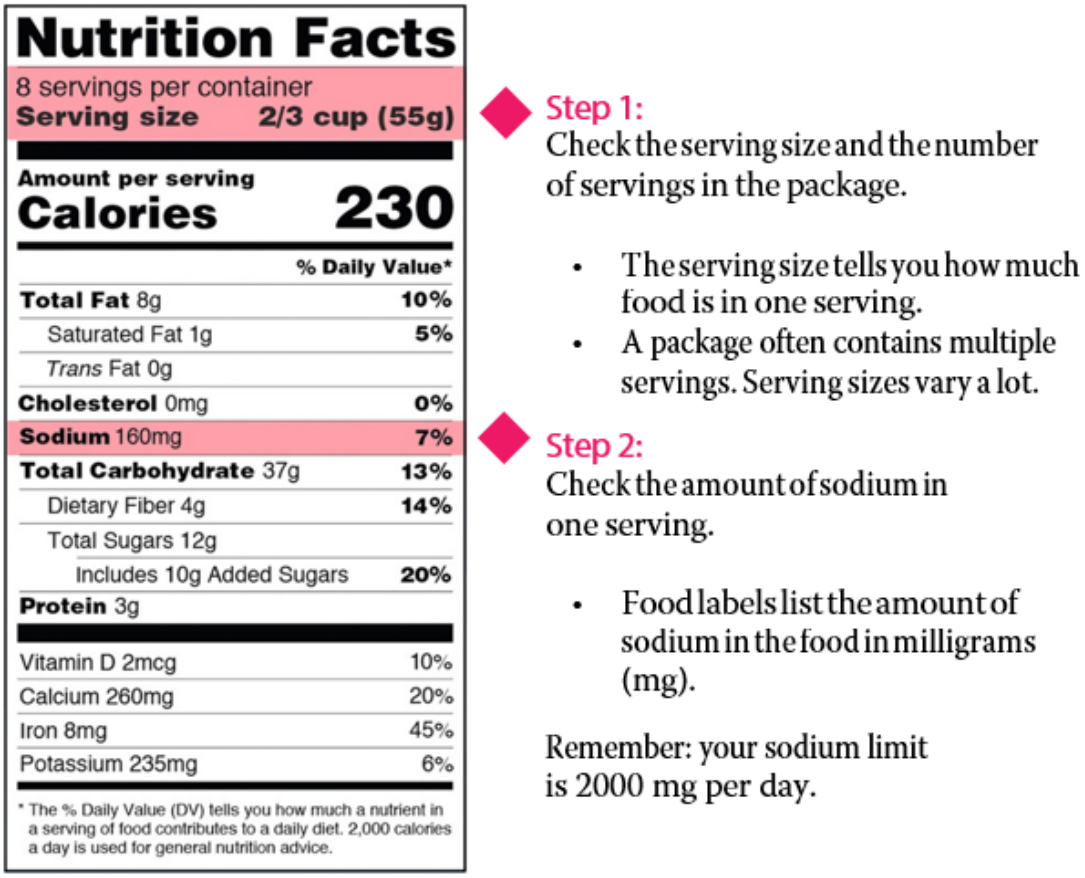
Fluid buildup (often called ascites or edema) is a common complication with liver cirrhosis. Too much sodium in the diet can lead to more fluid buildup. **Sodium** is a mineral that attracts water and plays a role in fluid balance in our bodies.

How do I follow a low sodium diet?

- Limit your sodium intake **to no more than 2,000 mg (milligrams) per day.**
- **Sodium** is a naturally occurring mineral found in almost all foods. Read Nutrition Facts labels to determine how much sodium you are eating (see Figure 1 below):

    - Always look at the serving size, first. Then, look at the sodium contents.
    - The example in Figure 1 shows 160mg of sodium in 2/3 cup.
- Consider keeping a notebook and write down everything you eat throughout the day along with how much sodium is in it, using Nutrition Facts labels, like in Figure 1.
    - You can also use food tracking websites or apps such as MyFitnessPal.com or Cronometer.com to track your sodium intake. These are especially helpful when you come across a food without a Nutrition Facts label.
- Use restaurant and fast-food establishment websites to look up nutrition facts and information ahead of time to check the menu's sodium content to make a healthier choice.
- Consider using www.healthyheartmarket.com for an online grocery store of just low sodium foods.

Figure 1



What should I monitor when following a low sodium diet?

Salt

Salt is a major source of sodium. It is made up of two minerals: sodium and chloride. All forms of salt (such as sea salt and pink Himalayan salt) have just as much sodium as regular salt. **1 teaspoon of salt contains 2,300mg of sodium**. Salt is often added to foods, especially processed foods, which increases their sodium content. Please avoid salt substitutes such as No-Salt, Nu-Salt, Also Salt. These are very high in potassium and may cause an imbalance in electrolytes, especially if taking certain diuretic medications.

What seasonings can I use instead of salt?

- Spices (try *Mrs. Dash* salt-free brand)
- Herbs
- Lemon juice
- Vinegars
- Visit www.saltfreerubs.com for more zero sodium seasonings

Water softeners

If you have well water, water softeners can add additional sodium since they are often made of sodium chloride. **Try using potassium chloride softeners instead or drink bottled water**.

What if I am told my sodium level is too low?

This is usually from having too much fluid buildup in the body. **This does not mean you want to eat more sodium.** Remember, eating too much sodium will make the fluid buildup worse. If you are told this, continue following your low sodium diet unless otherwise directed by your doctor.

Low-salt food list

Good choices	Limit or avoid
Meat, eggs: • Fresh beef, pork, lamb, poultry, fish, wild game • Fresh eggs	Fast food and restaurant food

	Meat, eggs: • Processed meats (bacon, sausage, pepperoni, hot dogs, luncheon/deli meats, corned beef, anchovies, sardines) • Vegetarian “meats”/ vegetarian entrees • Smoked meats or fish, jerky • Microwaveable/frozen meals • Egg beaters
Milk, yogurt, cheeses: • Milk or yogurt • Frozen yogurt, ice cream • Natural Swiss cheese • Low-sodium cheeses • Low-sodium cottage cheeses	Milk, yogurt, cheeses: • Buttermilk, malted milk • Processed cocoa • Processed cheese • Bleu, feta, and other salty cheeses • Regular cottage cheese • Dairy-free alternatives may be higher in sodium
Grains, starches: • Low sodium bread, rolls, breadsticks, bagels • Plain taco shells, tortillas • Pasta, barley, rice cooked without salt • Unsalted cooked cereal • Dried beans, lentils, peas • Unsalted popcorn, pretzels, crackers, chips	Grains, starches: • Bread, rolls, breadsticks made with salt or cheese • Stuffing mixes • Pasta or rice with seasoning packets • Instant hot cereals, ready-to-eat cereals • Salted crackers • Baking mixes such as cakes, pancakes, waffle, or muffins • Salty chips, pretzels, crackers, etc.
Nuts and Seeds: • Unsalted nuts and seeds • Unsalted peanut butter or other nut butters	Nuts and Seeds: • Salted nuts and seeds • Salted peanut butter
Vegetables: • Fresh/frozen vegetables without salt added	Vegetables: • Canned vegetables/soups, vegetable juices

• Homemade tomato sauce or salsa	• Pre-made spaghetti/tomato sauces/salsa • Instant mashed potatoes, boxed • Sauerkraut, olives, pickled vegetables
Fruits: • Any kind of fruit or fruit juice, fresh, frozen, or canned	Fruits: • Adding salt to fruits (such as melon) • Glazed or crystallized fruit
Beverages: • Water, fruit juices • Milk • Coffee, decaf coffee, teas • Cocoa made with milk • Soda with no sodium	Beverages: • Gatorade or other sports drinks • Vegetable juices (V-8) • Instant cocoa mixes • Instant cappuccino mixes
Desserts: • Gelatin desserts • Homemade tapioca or rice pudding • Custard made with milk • Hard candy • Homemade cake, cookies, pie, sherbet, ice cream (limit to 1 serving or less per day)	Desserts: • Instant pudding or other pre-packaged dessert mix • Frozen pies • Store bought cookies, muffins, cakes, etc.
Fats and oils (use sparingly): • Olive and avocado oil • Unsalted butter	Fats and oils (use sparingly): • Salted butter • Margarine
Seasoning and condiments: • Herbs and spices without salt (such as Mrs. Dash) • Lemon juice • Vinegars • Fresh garlic, onion • Fresh horseradish • Low-sodium ketchup, low-sodium hot sauce	Seasoning and condiments: • Table salt, onion salt, garlic salt • Avoid “salt substitute” as this contains high levels of potassium (No-Salt, Nu-Salt) • Soy sauce, tartar sauce, teriyaki sauce. Low sodium soy sauce is often still very high in sodium. • Salad dressings

	• Salsa, Worcestershire sauce, bouillon • Sweet & sour sauces, steak and BBQ sauce • Ketchup, relish, seasoning/coating mix, meat tenderizers, flavored vinegar • Monosodium glutamate (MSG)

High protein diet

Why do I need to follow a high protein diet?

Cirrhosis is a **catabolic disease**, meaning that you are burning a lot of energy. For this reason, your calorie and protein needs are higher than before. Some people experience muscle loss due to their body's increased energy needs. A high protein diet will help prevent this muscle loss and lower your risk of malnutrition.

How much protein do I need?

The goal is to eat 1 gram of protein for every kilogram of your body weight. **Divide your weight in pounds by 2.2 to find your weight in kilograms.**

Example if you weigh 150lbs: 150lbs is about 68kg. Therefore, you need about 68 grams of protein per day.

How do I meet my protein goal?

Include a variety of protein-rich foods with every meal and snack (see list on page 9). Eating multiple sources of protein-rich foods will reduce the chance of repetition and food boredom.

Meal and snack timing

Small, frequent, and protein-rich meals evenly distributed throughout the day will help preserve muscle mass. This means having 6 small meals every day or eating every 2-4 hours while awake.

We recommend a late evening high-protein snack about 1-2 hours before bedtime, such as:

- 1 bottle of high calorie nutritional meal supplement (e.g. Ensure Enlive, BOOST High Protein)
- Peanut butter on 2 slices of toast
- 1 glass of milk mixed with 1 tbsp whey protein powder
- 3/4 cup Greek yogurt with berries
- Apple slices with peanut butter
- Hummus and pita bread
- Chicken salad with whole grain crackers
- Unsalted trail mix

When should meal supplement drinks be used?

Use meal supplements freely. For example, use them after a meal, or instead of a meal if you have poor appetite or are getting full quickly. You can also have meal supplements as snacks between meals.

TIP: Keep a meal supplement in your nightstand for easy access during the night

Remember:

- Eat every 2-4 hours when awake
- Have a late evening snack before bed
- Eat a snack in the middle of the night if you're awake!
- Avoid fasting or long breaks between meals and snacks
- Remember your low sodium diet while making high protein choices. For example, cottage cheese is a good protein source, but it is high in sodium.

Additional resources:

- Watch this video about cirrhosis and high-protein diet: https://michmed.org/AYPWg
- For additional information about nutrition and cirrhosis visit the Nutrition & Cirrhosis webpage (Wellness Toolbox): https://tinyurl.com/2p9amdcc

Common foods with protein

Food item	Measure	Equivalents	Weight (g or ml)	Protein (g)	Sodium (mg)
Meat and meat alternatives					
Beef, pork (cooked)	2.5 oz	Deck of cards	75g	25	45
Chicken, turkey (cooked)	2.5 oz	Deck of cards	75g	20	50
Fish (baked, fried, steamed)	2.5 oz	Deck of cards	75g	18	40
Canned fish in water, low sodium	75 g (1/3 cup)	Deck of cards	75g	18	50-70
Egg	1 large	Deck of cards	50g	6	65
Shrimp (boiled, steamed)	6 small	Deck of cards	30g	6	67
Chickpeas, beans, lentils- canned (rinse first) or boiled	¾ cup	Tennis ball	175 ml	11	30
Peanut butter (commercial)	2 tbsp		30 ml	8	149
Peanut butter (natural)	2 tbsp	Golf ball	30ml	7	2
Peanuts, almonds (unsalted)	½ cup	2 golf balls	37g	8	2
Tofu (regular, firm, extra firm)	150 g	Hockey puck	150g	21	26

Dairy products and supplements					
Milk, skim, 1%, 2%, whole	1 cup		258 g	9	105
Milk, 1% chocolate	1 cup		258 g	9	152
Soy beverage, unsweetened	1 cup		257 g	7	95
Skim milk power	About 1/3 cup		25 g	9	120
Yogurt, Greek (plain, flavored)	¾ cup	tennis ball	180 g	16	65
Yogurt (plain, flavored)	¾ cup	tennis ball	180 g	9	115
Cheddar cheese (from block)	1.5 oz	9-volt battery	50 g	12	300
Mozzarella cheese (from block)	1.5 oz	9-volt battery	50 g	10	186
Swiss cheese	1.5 oz	9-volt battery	50 g	13	96
Meal supplement drinks, high protein plus calories	1 bottle		235 ml	12-15	200-290
Whey protein power	2 tbsp	Golf ball	28 g	20	120
Grains and starches					
Bread, whole wheat	1 slice		35 g	5	165
Bread, pita, whole wheat (6.6 inch diameter)	1 each		64 g	7	372
Bagel, plain	1 bagel		71 g	7	318
Pasta, enriched spaghetti, cooked	1 cup	fist	140 g	8	1

Special K Protein Cereal, (Kellogg's)	1 cup	fist	50 g	10	125
Vector cereal, (Kellogg's)	1 ¼ cup	Fist & 2 golf balls	55 g	5.5	220
Edge cereal, (General Mills)	1 cup	fish	58 g	11	290
Granola bar, (Nature Valley Protein)	1 bar		40 g	10	180
Builder's Bar (Clif)	1 bar		68 g	20	200

Adapted with permission from: From: Tandon P, DenHeyer V, Ismond KP, Kowalczewski J, Raman M, Eslamparast T, Bémeur C, Rose C. The Nutrition in Cirrhosis Guide. University of Alberta, Edmonton, Alberta. 2018. pp. 1- 40.

Liver Cancer: Hepatocellular Carcinoma (HCC)

What is Hepatocellular Carcinoma (HCC)?

Cirrhosis (and some liver diseases without cirrhosis) can cause **Hepatocellular Carcinoma (HCC)**, the most common type of primary liver cancer. **Primary cancer** is the original, or first tumor in the body.

HCC is becoming more common as cirrhosis is becoming more common. It happens to about 2 in every 100 people with cirrhosis every year. "Small" HCC begins as a mass or bump inside the liver which usually grows slowly, but it can grow very fast. Sometimes there are many masses throughout the liver instead of a single mass. Small HCC does not cause symptoms.

Why do we screen for Hepatocellular Carcinoma (HCC)?

Screening tests are done to check for illness when someone has no symptoms. For example, are a colonoscopy or a mammogram. Your doctor may recommend screening for liver cancer. Because HCC is common and often grows slowly, we screen every 6 months. Screening is important because if we catch a liver cancer early when it is small, the treatment for HCC works best. Multiple tools can be used for screening. Usually, we use liver ultrasound and a blood test called 'alpha fetoprotein (AFP)' and we sometimes use CT scans or MRIs as well.

How is Hepatocellular Carcinoma (HCC) diagnosed?

Diagnosing HCC usually starts with ultrasound imaging. **Ultrasound imaging** uses high-energy sound waves to look at tissues and organs inside the body. The sound waves make echoes that form pictures of the tissues and organs on a computer screen (sonogram). Ultrasound imaging can only show if there is a mass or not, it cannot tell you if it is HCC. It is very important to know that sometimes we see masses in the liver on imaging that turn out to not be liver

cancer. For this reason, if we find a liver mass with ultrasound, our next step is to arrange a CT or MRI scan. HCC in many cases can be diagnosed with a CT or MRI scan.

Often your doctor will discuss your scan at a special conference arranged to discuss your care. This conference is called a 'Liver Tumor Board.' Doctors at the tumor board include liver specialists and the HCC treatment team. Occasionally, we determine that a new scan is needed or that a liver biopsy is needed to figure out if you have HCC. A liver biopsy involves passing a needle through your skin and into your liver to take a sample of the mass for review by a pathologist. A **pathologist** is a specialist doctor that looks at biopsies under the microscope.

How is Hepatocellular Carcinoma (HCC) treated?

Treating HCC is a very personal decision based on a discussion with your liver doctor. The main things that inform the choice of treatment are:

- The size, number, and location in the liver of your HCC mass or masses
- How well your liver is working
- If you have symptoms like ascites (fluid in the belly) or varices (veins in the wall of the esophagus are enlarged)
- How fit you are, whether you need help with your daily activities

Treatments could include:

- Surgery
- Procedures done by a specialist radiologist
- Medications prescribed by a cancer doctor
- Supporting you by treating any symptoms, often with a palliative care doctor

6 Key Messages for Family & Caregivers

Key message:	Why?	What should I look for?	What should I do?
1. Track weight every day (at the same time, naked)	Increasing weight may be a sign of fluid building up in the belly.	Monitor the change in weight from where they started.	If weight goes up by 5 pounds or more from the starting weight over 5 days, call the liver doctor to discuss a plan.
2. Look for signs of 'hepatic encephalopathy' (HE) (liver-related confusion)	HE is a treatable condition and can be a sign of serious illness.	Monitor for: **Small changes**: stumbling or falls, mood changes, saying or doing goofy things. **Big changes**: sleeping all the time and will not open eyes much, or not making any sense.	**Small changes**: Make sure they are hydrated, do not let them drive, and call the liver doctor. **Big changes**: **go to the emergency room**. See the handout on Managing Hepatic Encephalopathy (HE): http://www.med.umich.edu/libr/hepatology/he.pdf
3. Adjust lactulose: sometimes more is needed, sometimes less	We use lactulose to treat hepatic encephalopathy (liver-related confusion). It works by binding toxins to get rid of them in bowel movements. The amount someone	Look for the 'small changes' above and pay attention to bowel movements. The goal is about 2-4 soft bowel movements per day.	• **Signs of small changes above:** give an extra tablespoon (20ml) of lactulose. • If there are **more than 2-4 soft bowel movements per day**, they should take less lactulose (that day). Cut back the amount from 1 tablespoon to ½ tablespoon (from 20ml to 10 ml), then the frequency (From 3 times to twice per day).

Key message:	Why?	What should I look for?	What should I do?
	needs is unique to their body.		• If there are **too few** bowel movements, give extra 20mL (tablespoon) lactulose, especially in the morning. Note you may have to go up (or down) each day. If several episodes of diarrhea, **call the clinic.**
4. Assist with what to eat	People with cirrhosis need extra nutrition and most should avoid salty food, especially people with ascites.	Know the foods that are part of a healthy diet for people with Cirrhosis. Foods should be rich in protein. Fruits and vegetables are great for vitamins. Watch the 'sodium' amount on the food labs.	See Cirrhosis Nutrition Therapy guide: http://www.med.umich.edu/libr/hepatology/cirrhosisnutritiontherapy.pdf
5. Treat pain	People with cirrhosis are sensitive to many medications.	Tylenol (acetaminophen) is safe if they take less than 2000 mg (2 grams) per day. Be careful because Tylenol is in many medications. We want you to avoid "NSAIDS": ibuprophen (Motrin, Advil) or naproxen (Aleve). Some pain medicines like naproxen or ibuprofen may cause bleeding or worsen ascites (belly fluid). Opioids cause constipation which can be bad for "HE". So, you may need to increase lactulose.	Before starting any over the counter or prescription pain medication, talk to the liver doctor.

Key message:	Why?	What should I look for?	What should I do?
6. Manage medication	Many people with cirrhosis take many medications.	Always keep a list of the medications on you.	• Arrange medications for the week in a pill box. • The liver doctor may change the medication doses frequently. Ask for a new list from the doctor at each visit.
Final note: It is very important for us to keep track of hospital stays. **Please call, or have the patient call** the liver management nurses if they are **admitted** to an outside hospital and call again once they are **discharged** at: 1(844) 233-0433.			

Resource Section:

Diet Pocket Guide

How to print and fold this pocket guide:

1. Print all pages of the “Cirrhosis Diet Pocket Guide.”
2. Fold the first page in half. Do this by folding the top half of the sheet behind the bottom half of the sheet (using the horizontal line running above the “Cirrhosis Diet Pocket Guide” title as your folding line).
3. Fold the page again, along the vertical line running through the middle of the page to form a book.
4. Follow the same folding pattern for page two.
5. Staple the two folded booklets together with the first page being the “Cirrhosis Diet Pocket Guide” page.

Low vs. high sodium foods (continued)

Low	High
Oil, vinegars, lemon juice, spices, herbs	Salad dressing, soy sauce, teriyaki sauce, hot sauce, ketchup, mustard, BBQ sauce
Unsalted nuts/seeds, unsalted chips and pretzels, plain popcorn kernels	Salted nuts, seeds, regular chips, salted pretzels, microwave popcorn

Low vs. high sodium foods

Low	High
Fresh fruits and vegetables	Canned vegetables, olives, pickled foods, sauerkraut
Fresh meats, fish, poultry Swiss cheese	Canned tuna/chicken, some frozen meats, jerky, smoked meats and fish, deli meat and cheese, bacon, frozen dinners
Plain rice, quinoa, lentils, beans, pasta	Canned beans, seasoned rice/pasta packs, Ramen noodles, baking mixes
Homemade soups and broths	Canned soups, broths

Cirrhosis Diet Pocket Guide

Low sodium basics

- Limit sodium to 2,000mg per day or less
- 1 teaspoon of salt = 2,300mg of sodium
- Pink salt, sea salt, etc. have the same amount of sodium as regular salt
- Avoid salting your food during and after cooking
- Avoid salt-substitutes such as No-Salt and Nu-Salt
- If eating 3 meals and 1-2 snacks per day, aim for 600mg of sodium per meal and 100mg of sodium per snack
- Try to choose fresh, natural foods as much as possible. The less processed, the less sodium!

Low sodium tips when dining out

- Get sauces, dressings, gravies, etc. on the side
- Ask for olive oil and balsamic vinegar as a dressing
- Ask for foods to be unseasoned or without extra salt added
- Avoid fried and breaded foods
- Avoid very cheesy dishes
- Use condiments sparingly
- Watch out for salad toppings such as bacon bits, croutons, cheese, olives, pickles, salted nuts or seeds
- Try to limit eating out in general to once per week or less
- Some restaurants/fast food places have nutrition facts listed online. Check for low sodium options before you go
- Avoid the salt shaker

Good protein examples

- Meat
- Poultry
- Fish
- Eggs
- Milk
- Yogurt
- Cheese
- Beans
- Lentils
- Quinoa
- Tofu
- Nuts
- Seeds

How to read a nutrition facts label

Always read your food labels! This is the easiest way to know how much sodium is in food.

Protein snack ideas

- Whole wheat pita and hummus
- Plain yogurt with fruit
- Orange and a handful of unsalted nuts
- Low sodium cheese and whole grain crackers
- Whole grain bread with peanut butter
- Hard-boiled egg and berries
- Apple or banana with peanut butter
- Low sodium cottage cheese with peaches
- Unsalted nuts and dried fruit trail mix
- Plain yogurt with granola

(Protein snack ideas continued)

- Celery with peanut butter and raisins
- Tuna or chicken salad on whole grain bread
- Nutritional supplement (Boost, Ensure, etc.)

High protein tips

- Eat a protein source with every meal and snack
- Aim for at least 1 gram of protein per kilogram of body weight
- Consume a bedtime snack containing protein
- Try nutritional supplements such as Boost, Ensure, or Premier Protein or protein powders if you are not able to eat enough protein

Cirrhosis Weight Log

Date & Time (try to keep the time consistent, morning if possible)**:**	**Weight** (naked)**:**	**Diuretic** (water pill) **dose:**	**Abdominal girth** (measurement around the belly):

Video resources

- Alcohol: Can My Liver Get Better? https://michmed.org/wnrW5
- Cirrhosis and a High Protein Diet https://michmed.org/j8WG5
- Cirrhosis and a Low Sodium Diet https://michmed.org/JyY5W
- Hepatitis C Virus (HCV) Screening https://michmed.org/PXn5w
- How to Talk About Alcohol With Your Doctor https://michmed.org/AYnWv
- What are Liver Tests? https://michmed.org/mVdzg
- What is Ascites? https://michmed.org/Gzqxx
- What is Cirrhosis? https://michmed.org/e8WjG
- What is Hepatic Encephalopathy? https://michmed.org/nxDBJ

View the full list here: https://careguides.med.umich.edu/cirrhosis

Authors: Elliot Tapper MD; Patricia Bloom MD; Lorraine Bonkowski RDN; Neehar Parikh MD
Edited by: Karelyn Munro BA