

Cirrhosis

Cirrhosis means the liver has been hurt for so long that healthy tissue turned into scar tissue. Blood cannot flow through properly. The liver cannot do its jobs. Problems stack up in waves.

THE ONE-LINE TRUTH

Long-term injury from alcohol, viral hepatitis, fatty liver disease, autoimmune attack, or inherited metal and metabolic problems slowly replaces healthy liver cells with hard scar tissue and bumpy regeneration nodules that cannot do the liver's work.

The chain — how it unfolds

1. Scar tissue blocks blood flow through the liver, so pressure builds up in the portal vein. — why: Imagine water flowing through a sponge. Scar tissue turns the sponge into a hard rock, so blood cannot seep through the tiny channels anymore. Pressure upstream in the portal vein climbs from normal (5–8 mmHg) to high (>10 mmHg), like a clog in a drainpipe.
2. High portal pressure forces blood to find backup routes around the liver, ballooning weak veins into varices. — why: Blood backs up and reroutes through small veins in the esophagus (food tube), stomach, and rectum. These veins are not built for high pressure, so they swell into fragile, thin-walled varices that can burst and bleed suddenly, causing life-threatening bleeding (hemorrhage).
3. High pressure pushes watery fluid out of blood vessels into the belly, forming fluid buildup in the belly (ascites). — why: High pressure in the portal vein and low albumin (because the liver cannot make enough) let fluid leak out of blood vessels and pool in the abdominal cavity. The kidneys sense low blood flow and hold onto salt and water, making the fluid buildup in the belly (ascites) worse—a vicious cycle.
4. The spleen swells and traps platelets, so the platelet count drops. — why: Backed-up blood from the blocked portal vein pools in the spleen, stretching it. The swollen spleen (splenomegaly) traps and destroys platelets, causing a low platelet count (thrombocytopenia) (low platelet count), which adds to bleeding risk.

5. The liver cannot make enough albumin or clotting factors, so fluid leaks everywhere and bleeding starts easily. — why: Albumin is the sticky protein that holds water inside blood vessels; without enough, water leaks into tissues (peripheral swelling (edema) in legs, fluid buildup in the belly (ascites) in belly). Clotting factors (II, VII, IX, X) are made only in the liver; without them, blood cannot clot properly, so patients bruise easily, bleed from gums, or bleed dangerously after procedures.
6. The liver cannot clean ammonia and toxins, so they build up and poison the brain, causing hepatic encephalopathy. — why: Gut bacteria make ammonia. Normally the liver converts ammonia to urea (which kidneys remove safely). In cirrhosis, ammonia and other toxins bypass the liver through collateral veins or the liver simply cannot process them. Ammonia crosses into the brain and disrupts thinking, causing confusion, tremor (asterixis, a flapping hand tremor), slurred speech, sleepiness, and in severe cases, coma.
7. Bile backs up inside the liver, spilling bilirubin into the blood and turning skin and eyes yellow (jaundice). — why: Scar tissue squeezes bile ducts and liver cells cannot process bilirubin properly. Bilirubin (a yellow pigment from broken-down red blood cells) builds up in the blood, deposits in skin and eyes (jaundice), and spills into urine (dark, tea-colored urine). Bile salts in the skin cause intense itching.
8. The kidneys sense low blood flow, clamp down, and can spiral into hepatorenal syndrome, a form of kidney failure with no kidney disease. — why: Blood pools in dilated vessels and ascitic fluid, so less reaches the kidneys. The kidneys think the body is dehydrated and constrict their blood vessels to save water, which paradoxically drops kidney blood flow even more. Creatinine rises, urine output falls, but the kidneys themselves are not damaged —this is hepatorenal syndrome, driven purely by cirrhosis and circulatory dysfunction. It is reversible only with liver transplant or sometimes with vasoconstrictors plus albumin.

Spot it — what you see, and why

- Yellow skin and eyes (jaundice): The damaged liver cannot clear bilirubin (a yellow waste product from old red blood cells) from the blood, so it builds up and stains the skin and whites of the eyes.
- Swollen belly (ascites): Scar tissue blocks blood flow through the liver, so pressure builds up in the vein bringing blood from the intestines. This high pressure forces watery fluid out of blood vessels and into the belly.
- Spider-shaped blood vessels on the chest and shoulders (spider angiomas): The sick liver cannot break down estrogen (a hormone) properly, so estrogen levels rise and cause tiny blood vessels near the skin to swell and branch out like spider legs.
- Swollen veins on the belly that look like twisted ropes (caput medusae): High pressure in the blocked liver veins forces blood to find other paths around the liver, pushing belly-wall veins to swell and bulge under the skin.

- Breast growth in men (gynecomastia): The damaged liver cannot break down estrogen, so levels rise in men and cause breast tissue to grow.
- Shaking hands (asterixis or flapping tremor): The liver cannot clean ammonia (a toxic waste from digesting protein) out of the blood, so ammonia builds up and poisons the brain, causing the hands to jerk and flap when held out.

Red flags — act now

- Throwing up bright red blood or coffee-ground material (bleeding from swollen veins in the food tube)
- Confusion, extreme sleepiness, or not making sense (ammonia poisoning the brain)
- Black, sticky, tar-like stools (bleeding inside the intestines)
- Sudden belly pain with fever (infection of belly fluid)
- Yellowing skin getting much worse quickly (liver failing fast)

Treat it — in this order

1. Screen with upper endoscopy and prevent variceal bleeding with non-selective beta-blocker (propranolol or nadolol) or endoscopic variceal ligation (banding) → High portal pressure pushes blood backward into fragile veins in the esophagus, making them swell into varices. Beta-blockers lower the pressure inside these veins by slowing the heart and narrowing blood vessels. Banding physically ties off the varices so they cannot bleed. Both cut the risk of life-threatening bleeding by about half.
2. Restrict salt to < 2 grams per day and give spironolactone (aldosterone antagonist) with furosemide (loop diuretic); if fluid buildup in the belly (ascites) is tense or > 5 liters, do large-volume paracentesis and give albumin 6–8 g per liter removed → The scarred liver cannot make albumin, so water leaks out of blood vessels into the belly. Salt holds onto water, making it worse. Spironolactone blocks a hormone (aldosterone) that tells the kidneys to keep salt; furosemide directly tells the kidneys to dump salt and water. Together, they pull fluid back into the blood. Paracentesis drains large amounts of fluid directly, and albumin keeps blood pressure stable during the drain.
3. If ascitic fluid shows > 250 neutrophils/ μ L, start ceftriaxone 2 g IV daily (or cefotaxime); give albumin 1.5 g/kg on day 1 and 1 g/kg on day 3 → Bacteria sneak into ascitic fluid because the immune system is weak in cirrhosis. This infection (spontaneous bacterial peritonitis, SBP) can spread to the blood and cause sepsis. Antibiotics kill the bacteria. Albumin boosts blood volume and helps the kidneys work, which lowers the risk of kidney failure during infection.

4. For hepatic encephalopathy, give lactulose 15–30 mL twice daily (titrate to 2–3 soft stools per day) and add rifaximin 550 mg twice daily → When the liver fails, ammonia from gut bacteria builds up in the blood and poisons the brain, causing confusion or coma. Lactulose is a sugar the body cannot absorb; it traps ammonia in the stool and pulls it out. Rifaximin is an antibiotic that stays in the gut and kills ammonia-making bacteria. Together, they lower brain toxin levels and clear confusion.
5. For hepatorenal syndrome type 1, give albumin 1 g/kg on day 1 (max 100 g), then 20–40 g/day, plus vasoconstrictor (terlipressin, midodrine + octreotide, or norepinephrine); consider dialysis as bridge to transplant → In advanced cirrhosis, blood vessels in the gut widen and steal blood from the kidneys. The kidneys shut down even though they are structurally normal (hepatorenal syndrome). Albumin expands blood volume, and vasoconstrictors squeeze gut vessels to push blood back to the kidneys. This can restart urine flow and buy time for transplant.

Your top priorities at the bedside

1. Check mental status every 2 to 4 hours using a simple tool like asking the patient to draw a five-pointed star or copy overlapping circles; report any new confusion, sleepiness, or hand flapping (asterixis) immediately. — why: Ammonia crosses into the brain when the liver cannot clean it from blood; early hepatic encephalopathy (brain poisoning) can progress in hours to coma and brain swelling; lactulose must start right away to make the patient have 2 to 3 soft bowel movements per day and trap ammonia in stool.
2. Monitor for any vomiting and immediately check if the material is bright red, dark red, or looks like coffee grounds; keep the patient NPO (nothing by mouth), place two large-bore IVs (18-gauge or bigger), and call the provider stat for possible endoscopy. — why: Variceal bleeding (burst swollen veins in the food tube) kills 15 to 20 percent of patients in the first six weeks; octreotide (a vein-squeezing hormone) and antibiotics like ceftriaxone must start before endoscopy; blood transfusion target is hemoglobin 7 to 8 grams per deciliter because higher levels raise pressure in the portal vein and cause re-bleeding.
3. Measure and record belly size at the belly button (umbilicus) every day at the same time; weigh the patient daily before breakfast on the same scale; report weight gain over 2 pounds in one day or belly size increase over 2 centimeters. — why: Fluid buildup in the belly (Ascites) (belly fluid) builds up because the scarred liver cannot make albumin (a blood protein that holds water in vessels) and portal high blood pressure (hypertension) (high pressure in the liver vein) pushes fluid out; tracking helps adjust spironolactone (an aldosterone-blocking diuretic) and furosemide (a loop diuretic) doses; goal is weight loss of 0.5 to 1 pound per day.