

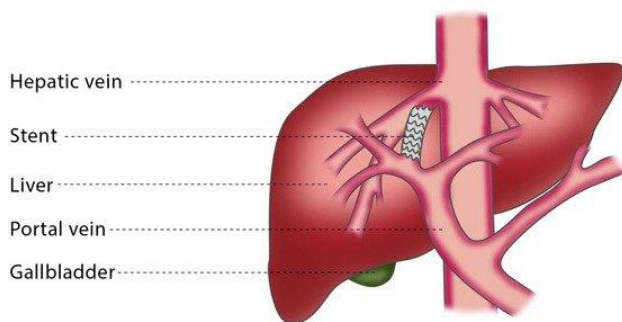
Transjugular Intrahepatic Portosystemic Shunt (TIPS)

Transjugular **I**ntrahepatic **P**ortosystemic **S**hunt (TIPS) is a procedure to create a new connection between two blood vessels in your liver. TIPS connects the portal vein (carries blood from digestive organs to the liver) and the hepatic vein (carries blood from the liver to the heart) in the liver. A TIPS procedure:

- changes the blood flow in the liver (allows blood draining from the bowel to go back to the heart while avoiding the liver)
- reduces abnormally high blood pressure in the veins of the stomach, esophagus, bowel and liver
- reduces the risk of bleeding from enlarged veins across the esophagus and stomach

Imaging such as x-ray fluoroscopy and ultrasound are used to guide the doctor as they create this new connection.. A small metal tube called a stent is placed to keep the connection open. The stent allows some of the blood that would ordinarily pass through the liver to bypass the liver entirely. This bypass lowers the high blood pressure in the portal vein and lessens the risk that the high pressure will cause the enlarged veins to bleed.

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Preparation Note: You may be advised to stop taking aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs) or blood thinners several days before your procedure.

Follow all instructions about when to stop eating and drinking and when to bathe before your procedure.

What are some common uses of the procedure?

A TIPS procedure is used to treat complications of portal hypertension (increased pressure in the portal vein system). Portal hypertension can cause blood to flow backward from the liver into the veins of the spleen, stomach, lower esophagus, and intestines. This causes the vessels to enlarge, fluid to build-up in chest or belly, and bleeding. Complications of portal hypertension treated with TIPS includes:

- variceal bleeding: Bleeding from any of the veins that normally drain the stomach, esophagus, or intestines into the liver
- portal gastropathy: An engorgement of the veins in the wall of the stomach, which can cause severe bleeding
- severe ascites: Fluid build-up in the abdomen. hydrothorax: Fluid build-up in the chest
- Budd-Chiari syndrome: A blockage in one or more veins that carry blood from the liver to the heart

What does the equipment look like?

- **x-ray and ultrasound equipment:** Fluoroscopy converts x-rays into video images. Doctors use it to watch and guide procedures. The x-ray machine and a detector suspended over the exam table produce the video. Ultrasound machines use high frequency sound waves to create images of the body. The machine has a computer console, a video monitor and a transducer. The transducer is a small hand-held device that resembles a microphone. When the transducer is pressed against the skin, it directs small pulses of high-frequency sound waves into the body. The sound waves bounce (echo) off the tissues inside your body. The transducer captures the waves that bounce back and sends them to the computer to create images (which show on the monitor). Ultrasound technology is used on submarines and bats produce and use their own form of ultrasound to navigate and find prey. Some exams may use different types of transducers during a single exam.
- **stent:** A metal mesh tube, often covered in GORE-TEX fabric
- **balloon-tipped catheter:** A long, thin (about 1/8" in diameter) plastic tube with an inflatable balloon at the tip that can be used to open a narrow passage

What happens during the procedure?

This procedure, which takes 60-90 minutes) is usually done under conscious sedation. You will be given medication to relax and make you sleepy but you will not be unconscious. After you are sedated, the physician will:

- numb an area just above your right collarbone with a local anesthetic and make a very small incision
- identify your internal jugular vein, located above the collarbone, using ultrasound, and guide a catheter into the vein
- guide the catheter toward the liver and into one of the hepatic veins using real-time x-ray guidance
- measure the pressures in the hepatic vein and right heart to confirm the diagnosis of portal hypertension, and to determine the severity of the condition
- inject contrast material in the hepatic vein to identify the portal venous system and help plan for the placement of the TIPS stent
- use a TIPS needle (a special long needle extending from the neck into the liver) to gain access from the hepatic vein into the portal system
- put in a stent from the portal vein into the hepatic vein, under fluoroscopy**. Once the stent is in the correct position, the balloon in the catheter is inflated, and the stent is put in place
- check your portal vein pressure to make sure it has gone down
- remove the catheter (with the balloon deflated)

A small bandage is placed over the neck area. Stitches are not normally needed. You will be admitted to the hospital following your procedure, where you will be closely observed.

** Fluoroscopy is a type of medical imaging that shows a continuous X-ray image on a monitor, like an X-ray movie. During the procedure, an X-ray beam is passed through the body. The image is transmitted to a monitor so the movement of a body part or of an instrument or contrast material through the body can be seen in detail. (U.S. Food & Drug Administration)

What happens during and after the procedure?

- As the contrast material passes through your body, you may feel warm. This will quickly pass.
- When the needle goes into the liver and when the balloon is inflated, you may have some discomfort. If you feel pain, tell your physician; you may be given extra IV medications.
- After the procedure, you will be monitored closely (for bleeding) and your head will be kept elevated for a few hours after you return to your room. There is usually no pain after the procedure.
- Often, patients may go home the next day. (Rarely, there may be life-threatening bleeding, which requires the patient to be monitored in the intensive care unit.)
- You should be able to resume your normal activities in 7- 10 days.
- Follow-up ultrasounds will be frequent to make sure the shunt remains open and works properly.

What are the benefits and risks of TIPS?

Benefits

- A TIPS procedure can produce the same physical results as a surgical shunt or bypass, but without the risks of open surgery.
- This is a minimally invasive procedure so recovery time is shorter than open surgery.
- Your TIPS should have less of an effect than open surgery if you have a liver transplant in the future. Since TIPS doesn't enter through the abdomen, there is no scar tissue in the abdomen. The stent keeping the shunt open is entirely inside the liver and it is removed with the liver during a transplant.
- Studies show TIPS reduces variceal bleeding in more than 9 out of 10 patients.
- No surgical incision is necessary—only a small cut in the skin that does not need stitches.

Risks

- Infection/fever: Fever is a sign of infection.
- Stiffness, bruising, or soreness in the neck (where catheter entered the neck)
- Allergic reaction: There is a very slight risk of an allergic reaction to the contrast material.
- Kidney failure (temporary or permanent): Contrast material may cause kidney problems, particularly in people with poor kidney function.
- Bleeding/vessel damage: Catheter could damage a vessel; bruising or bleeding at the puncture site. The doctor will take precautions to minimize these risks.
- Hepatic encephalopathy: The liver usually removes toxins from the blood. If too much blood containing toxins bypasses the liver, the toxins can go to the brain and affect concentration, mental function, and memory. In extreme cases, it may lead to coma.

Rare (less than 5 of every 100 TIPS patients) but serious complications can include:

- a blocked or infected stent
- bleeding in the belly that might require a transfusion
- cutting blood vessels in the liver
- heart problems or abnormal heart rhythms (arrhythmias)

How do I care for myself at home?

- Eat a healthy diet. Your doctor may ask you to limit salt in your diet.
- Get enough exercise and rest. Avoid alcohol.
- Avoid becoming constipated. Drink 2-3 liters a day, add fiber to diet, keep moving!
- Check with your doctor before taking any medicines, vitamins, herbs, or supplements such as acetaminophen (Tylenol), cold medicines, aspirin, ibuprofen (Advil, Motrin), naproxen (Aleve), etc.
- Keep all your follow-up appointments with your doctor and lab.

When should I call the doctor?

Call your provider if you have:

- fever of 100.4°F (38°C) or higher, or a fever that does not go away
- belly pain, belly that looks swollen (from fluid build-up)
- unusual bruising or bleeding: Bleeding lasts more than 10-15 minutes or that causes dizziness; black or bloody stools; vomit that is bloody or that looks like coffee grounds; blood in your urine or mucus
- swollen legs or ankles, shortness of breath
- confusion and sleepiness
- jaundice (skin and/or whites of your eyes look yellow)

Terms

- **Liver:** Largest organ inside your body, located in upper right abdomen, below the diaphragm. If you are looking down at your stomach, it is on your right side. At any one moment, the liver holds about 1 pint (13% of your blood supply). The liver has 2 lobes and small ducts (tubes) that connect with larger ducts to form the common hepatic duct (which transports bile). The liver filters harmful substances out of blood; makes bile (to breakdown fats); stores sugar (releases it when you need energy); makes new proteins such as globin (a component of hemoglobin, the substance in red blood cells that carries oxygen); and stores iron, vitamins, and minerals.
- **hepatic:** relating to the liver
- **intrahepatic:** within the liver
- **portosystemic shunt** (also known as a liver shunt): an abnormal connection between the portal vascular system and systemic circulation
- **portal vascular system:** the vessels involved in the drainage of the capillary beds of the GI tract and spleen into the capillary bed of the liver. Liver is unusual - it receives both oxygenated and deoxygenated blood
- **systemic circulation:** the vessels supplying oxygenated blood to and returning deoxygenated blood from the tissues of the body
- **shunt:** a passage that is made to allow blood or other fluid to move from one part of the body to another.
- **stent:** a tube temporarily inside a blood vessel, canal, or duct to aid healing or relieve obstruction
- **transjugular:** through the jugular (the jugular vein is located in the neck)