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Opinion Article

Reducing the Impact of Portal Hypertension Effect on Liver: Pathological Mechanisms

Juan Carolina*

Department of Hepatology, National Yang-Ming University School of Medicine, Taipei, Taiwan

DESCRIPTION

Portal hypertension is a condition that occurs when the blood pressure in the portal vein, which carries blood from the digestive organs to the liver, becomes abnormally high. This can lead to serious complications, such as bleeding from enlarged veins (varices) in the esophagus, stomach, or intestines, fluid accumulation in the abdomen (ascites), confusion and mental changes (hepatic encephalopathy), and liver failure. The most common cause of portal hypertension is cirrhosis, which is scarring of the liver tissue due to chronic liver damage from various causes, such as viral hepatitis, alcohol abuse, autoimmune diseases, or genetic disorders. Cirrhosis reduces the blood flow through the liver and increases the resistance to the portal blood flow.

The diagnosis of portal hypertension is based on the presence of signs and symptoms of its complications, such as gastrointestinal bleeding, ascites, encephalopathy, or jaundice. In addition, some tests can help confirm the diagnosis and assess the severity of portal hypertension, such as imaging studies (e.g., ultrasound, CT scan, MRI), pressure measurement studies (e.g., hepatic venous pressure gradient), and endoscopic diagnosis (e.g., upper endoscopy to detect varices). The treatment of portal hypertension aims to prevent or manage its complications and to treat the underlying cause of liver disease. The main strategies include:

- Drugs that lower the portal blood pressure (e.g., beta blockers, nitrates) or reduce fluid retention (e.g., diuretics) can help prevent or reduce bleeding from varices and ascites.
- Endoscopic therapy procedures can stop or prevent bleeding from varices by injecting a sclerosing agent (sclerotherapy) or placing a rubber band around them (band ligation) can be performed during an upper endoscopy.
- Shunt therapy procedures that create a new pathway for the portal blood flow to bypass the liver and reduce the portal pressure (e.g., transjugular intrahepatic portosystemic shunt or TIPS) can be performed by an interventional radiologist.
- Operations that remove part of the liver (resection) or replace it with a healthy one (transplantation) can be considered for some patients with advanced liver disease who are eligible for surgery.

Portal hypertension can increase the perioperative mortality risk of liver transplantation, especially if the Mean Pulmonary Artery Pressure (mPAP) is above 45 mmHg-50 mmHg. This is because portal hypertension can cause porto-pulmonary hypertension, which is a form of pulmonary arterial hypertension that affects the lungs and the heart. Porto-pulmonary hypertension can impair the right ventricular function and increase the risk of heart failure and bleeding during and after liver transplantation. It may not cause any symptoms until complications develop. Some of the possible symptoms and signs of portal hypertension in liver disease are:

- Gastrointestinal bleeding occurs when the enlarged veins (varices) in the esophagus, stomach or intestines rupture and bleed. This can cause vomiting of blood (hematemesis), black or tarry stools (melena) or bright red blood in the stools (hematochezia).
- Ascites is fluid accumulation in the abdomen due to increased pressure in the portal vein and reduced production of albumin by the liver. Ascites can cause abdominal distension, discomfort, shortness of breath and increased risk of infection.
- Encephalopathy is a condition that affects the brain function due to high levels of ammonia and other toxins in the blood that are not cleared by the liver. Encephalopathy can cause confusion, disorientation, drowsiness, mood changes and coma.

CONCLUSION

Portal hypertension is a serious complication of liver disease that can cause bleeding varices, ascites, encephalopathy and liver failure. It is diagnosed by blood tests, imaging studies, pressure measurement studies and endoscopic diagnosis. It is treated by medications, endoscopic therapy, TIPS, surgical shunt or liver transplantation. The best way to prevent portal hypertension is

Correspondence to: Juan Carolina, Department of Hepatology, National Yang-Ming University School of Medicine, Taipei, Taiwan, E-mail: caro@yan.tw

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to prevent or treat the underlying cause of liver disease. As a result, the pressure in the portal vein rises and the blood is diverted to other veins that are not equipped to handle such a large volume of blood. These veins become dilated and fragile, and may rupture and bleed.