Portal Vein Thrombosis

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KEYWORDS

• Thrombosis • Cirrhosis • Portal vein • Anticoagulation • Thrombophilia • Thromboelastography • Malignancy

KEY POINTS

- Portal vein thrombosis (PVT) is most commonly found in cirrhosis and often diagnosed incidentally by imaging studies.
- There are 3 important complications of PVT: Portal hypertension with gastrointestinal bleeding, small bowel ischemia, and acute ischemic hepatitis.
- Acute PVT is associated with symptoms of abdominal pain and/or acute ascites, and chronic PVT is characterized by the presence of collateral veins and risk of gastrointestinal bleeding.
- Treatment to prevent clot extension and possibly help to recanalize the portal vein is generally recommended for PVT in the absence of contraindications for anticoagulation.
- PVT may obviate liver transplantation owing to a lack of adequate vasculature for organ/vessel anastomoses.

INTRODUCTION

Definition

Portal vein thrombosis (PVT) is defined as a partial or complete occlusion of the lumen of the portal vein or its tributaries by thrombus formation. Diagnosis of PVT is occurring more frequently, oftentimes found incidentally, owing to the increasing use of abdominal imaging (Doppler ultrasonography, most commonly) performed in the course of routine patient evaluations and surveillance for liver cancer. There are 3 important clinical complications of PVT:

- Small bowel ischemia: PVT may extend hepatofugal, causing thrombosis of the mesenteric venous arch and resultant small intestinal ischemia, which has a mortality rate as high as 50% and may require small bowel or multivisceral transplant if the patient survives.[1]

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- Ischemic hepatitis: Because the portal vein accounts for 75%[2] of the blood supply to the liver and 40% of the oxygen to the liver, acute PVT nullifies the liver's ability to resist ischemia owing to its dual blood supply. In acute complete PVT, any hypotensive episode may precipitate or worsen ischemic hepatitis and acute liver failure.
- Gastrointestinal bleeding: PVT may cause acute portal hypertension with subsequent variceal bleeding.

Types

Acute versus chronic

1. Acute PVT. The American Association for the Study of Liver Diseases (AASLD) describes acute PVT as "the sudden formation of a thrombus within the portal vein." The thrombus can variably involve portions of the mesenteric and/or splenic vein.[3] PVT associated with symptoms is commonly classified as acute.
2. Chronic PVT. Also known as portal cavernoma, chronic PVT occurs when the obstructed portal vein is replaced by a network of hepatopetal collateral veins bypassing the thrombosed portion of the vein.[3] A finding of portoportal collaterals or periportal varices which develop over 1 to 3 months typically represents chronic PVT.[4]

Complete versus incomplete

1. Complete PVT is defined by complete obstruction of the portal vein lumen by thrombus. This usually results in hepatofugal venous flow within the mesenteric and splenic vessels.
2. Incomplete PVT thrombosis refers to partial obstruction of the portal vein in which there is still residual hepatopetal flow. This finding might represent either a recanalization of complete PVT or persistent incomplete PVT.

Infected versus noninfected portal vein thrombosis

1. Local inflammation and infection impart a risk for PVT by increasing the local prothrombotic condition and can also result in pylephlebitis (infected, suppurative thrombosis of the portal vein). Common conditions include diverticulitis, appendicitis, and cholecystitis.[5–7] Rarely, in Mirrizi syndrome, in addition to obstructive jaundice, a gallstone in the cystic duct may obstruct the portal vein causing PVT with or without infection.
2. Noninfected thrombus.

Anatomic classification

The anatomic classification of PVT is based on the extent of thrombosis (**Table 1**).[8]

Table 1
Anatomic classification of PVT

Class	Anatomic Extent of Thrombosis
1	Thrombosis confined to the portal vein beyond the confluence of the splenic and SMV
2	Extension of thrombus into the SMV, but with patent mesenteric vessels
3	Diffuse thrombosis of splanchnic venous system, but with large collaterals
4	Extensive splanchnic venous thrombosis, but with only fine collaterals

Abbreviations: PVT, portal vein thrombosis; SMV, superior mesenteric vein.

Data from Jamieson NV. Changing perspectives in portal vein thrombosis and liver transplantation. Transplantation 2000;69(9):1772–4.