
PORTAL VEIN ANEURYSM: ULTRASOUND IDENTIFICATION.

Wanee OJARUSPORN, MD, and Chusak SIRIVANICHAJ, MD

ABSTRACT

Portal vein aneurysm is a rare clinical entity with less than 50 published cases in the English literature. With the more frequent uses of radiological imaging modalities in the evaluation of abdominal complaints, this pathology will be more common than previously recognized. The radiologist must be aware of these aneurysms and their imaging features. We present two patients who were incidentally diagnosed with an extrahepatic portal vein aneurysm. The sonographic appearance of an anechoic saccular or fusiform vascular mass contiguous with the portal vein or its tributaries is diagnostic of a portal vein aneurysm. Etiology, clinical significance and management strategies for extrahepatic portal vein aneurysms are discussed.

Venous aneurysms seldom occur, secondary to the low velocity and low pressure flow state that exist in veins. They appear most frequently in the neck and in the lower limbs.¹ Aneurysm of the portal vein is the most common visceral venous aneurysm.² Because they occur so infrequently, they may be confused with arterial aneurysms, pancreatic or hepatic cysts. Color duplex sonography provides an excellent mean of definitively diagnosing portal vein aneurysms and can be used as a noninvasive means for follow-up evaluation.

We recently encountered two cases of extrahepatic portal vein aneurysm. Both lesions were incidentally detected by a routine sonographic examination.

CASE REPORTS

CASE 1

A 42-year-old man who had no major medical problems presented with chronic abdominal pain and dyspepsia. There was no previous or present history of liver, gallbladder, or pancreatic diseases, nor any signs of portal hypertension. Physical examination and liver function test were within normal limits. An abdominal sonogram demonstrated a fusiform dilatation of the extrahepatic portal vein about the confluence of the superior mesenteric vein and splenic vein with a maximum diameter of 4 cm. (Fig. 1). No other

abdominal pathology was identified. Angiography was performed and confirmed the diagnosis.

CASE 2

A 57-year-old man was referred for an abdominal ultrasound examination to monitor the aortic dissection. The patient gave no history of underlying liver disease or pancreatitis. Stigmata of chronic liver disease and signs of portal hypertension were absent on physical examination.

Laboratory analysis revealed mild elevation of liver-associated enzymes but was otherwise normal. Abdominal sonogram demonstrated a dilatation of the main portal vein at the junction

of the splenic and superior mesenteric veins measuring 2.5cm in diameter (Fig. 2). The liver contour was smooth and the echogenicity was normal as well as the pancreas and spleen.

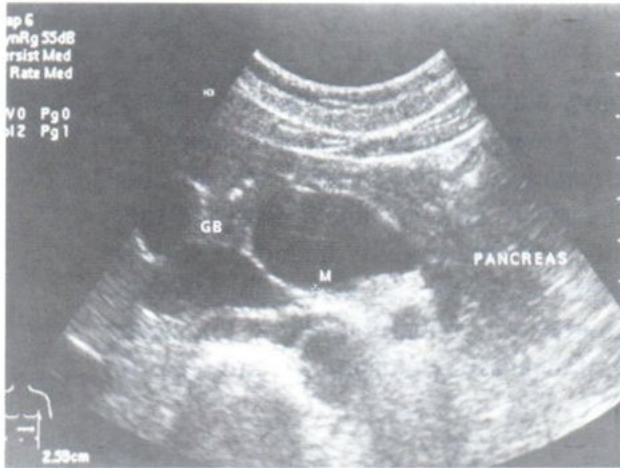


Fig. 1 Transverse ultrasound scan of epigastrium reveals fusiform dilatation of the extrahepatic portal vein (M) measuring 4x3.5x2.6 cm. GB= gallbladder

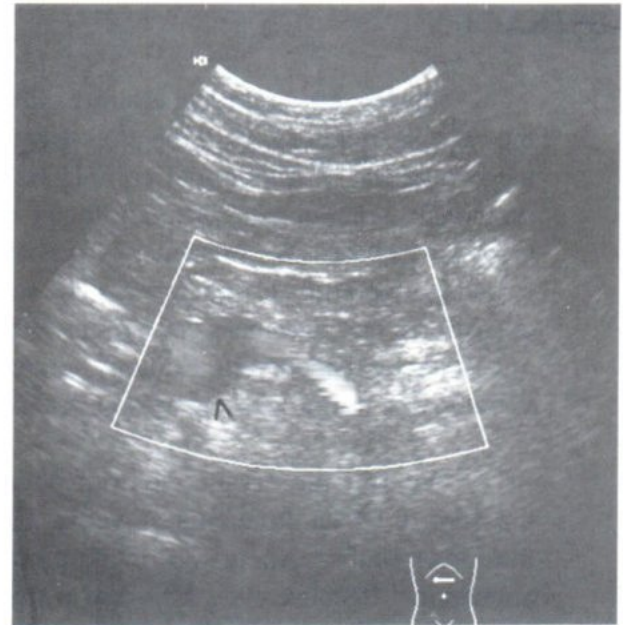


Fig. 2 Transverse color Doppler ultrasound scan of epigastrium shows color in the normal sized splenic vein and 2.5 cm portal vein aneurysm (arrowhead).

DISCUSSION

Portal vein size can show considerable individual variations; therefore, it is hard to define clearly a size at which the diagnosis of a portal vein aneurysm is appropriate.^{3,4} The diameter of the main portal vein varies between 0.64 cm and 1.2 cm, with an average diameter of 0.89cm in patients without liver disease.^{4,6} Doust and Pearce,⁷ studied both normal and cirrhotic patients by ultrasound and the maximum antero-posterior diameter did not exceed 15 mm in normals and 19mm in cirrhotics. Thus, any dilatation of the main portal vein more than 2.0 cm with a saccular or fusiform shape may be termed an aneurysm.^{4,5} The typical saccular aneu-

rysmal appearance may be more important in making the diagnosis than the actual dimension of the vein.⁸

The exact etiology of portal vein aneurysm is still debated. All are true aneurysms involving all layers of the vessel wall and be either congenital or acquired.⁵

Two theories are given in the literature as probable causes for the congenital form: 1) failure of regression of the vitelline veins that form the portal vein during embryological development;⁹ or 2) inherent weakness of the vein wall

and subsequent dilatation under normal portal pressure.^{4,5}

Acquired aneurysms can result from injury to the vessel wall. This injury may be secondary to inflammation in the portal venous wall, blunt or direct trauma, or thrombus formation within the vessel, which irritates and causes disruption to the wall of the portal vein.⁵ Portal vein aneurysm may result from infection in a remote site, such as the appendix, that is carried through the bloodstream and attacks the portal system. Inflammation or infection of adjacent structures, such as the gallbladder or pancreas, have also been shown to destroy or alter the integrity of the vessel wall, leading to aneurysm formation^{4-6,10}

The most commonly reported cause of an acquired portal vein aneurysm is increased portal venous pressure or flow secondary to portal hypertension.^{3-6,10} Some controversy exists as to whether these aneurysms are a result of or the cause of the portal hypertension.¹¹

Glazer et al⁵ reported 15 cases of portal vein aneurysm. Eighty-one percent had no predisposing cause and were believed to be of the congenital form. Many of these cases were totally asymptomatic. The ages ranged from 5-67 years, with the majority occurring in female patients (75%). Small aneurysms tend to be asymptomatic.¹¹ Large aneurysms may give rise to symptoms of compression of adjacent structures. Reported symptoms have included jaundice (caused by pressure on the bile ducts), compression of the duodenum, right upper quadrant or crampy abdominal pain, fever, portal hypertension, gastrointestinal bleeding from varices, and splenomegaly.^{3-6,9,10}

Portal vein aneurysm may result in a variety of complications, including thrombus formation secondary to stasis, acute portal hypertension, and even vessel rupture.^{3-6,9,10} The risk of

complications appears to be low.¹² Patients are usually well with the aneurysm remaining stable in size during follow-up.^{3,10,12-15} The prognosis depends on the complications and the underlying liver diseases.

Treatment varies depending on the clinical manifestations of each case. Surgical treatment should be considered only when the size of the aneurysm increases or a portal thrombus exists.^{12,16} In the literature, operative interventions including aneurysmorrhaphy, porto-caval shunt, and mesocaval shunt were done.^{5,11,13,17,18} Patients with small aneurysms without complications may be evaluated with sequential ultrasound examinations.^{12,14,15,19,20}

Ultrasound is becoming a common modality for diagnosing and evaluating patients with portal venous aneurysms. Computed tomography and magnetic resonance imaging have been used to diagnose and confirm the presence of portal vein aneurysms.^{3-6,10} In cases requiring surgical intervention, angiography may be used.⁴

In our cases, the portal vein aneurysm was found by chance and in the absence of hepatic or pancreatic lesions, it may be assumed that the etiology is congenital. The decision was made to follow the patients clinically and with serial sonography.

CONCLUSION

The sonographic appearance of a cystic mass freely communicating with the lumen of the portal, superior mesenteric, and splenic veins is diagnostic of a portal venous aneurysm. Ultrasonography provides the most cost-effective and noninvasive means of imaging portal vein aneurysms, both diagnosis and follow up evaluation to watch for any complications. Angiography being now considered as a complementary procedure necessary only in determining surgical approach.

REFERENCES

1. Lopez-Rasines GJ, Alonso JM, et al. Aneurysmal dilatation of the superior mesenteric vein: CT findings. *JCAT* 1985; 9: 830-832.
2. Calligaro KD, Ahmad S, Dandora R, et al. Venous aneurysms, surgical indications and review of the literature. *Surgery* 1995; 117: 1-6
3. Lee HC, Yang YC, Shih SL, Chiang HJ. Aneurysmal dilatation of the portal vein. *J Pediatr Gastroenterol Nutr* 1989; 8: 387-389
4. Dognini L, Carreri AL, Moscatelli G. Aneurysm of the portal vein: Ultrasound and computed tomography identification. *J Clin Ultrasound* 1991; 19: 178-182
5. Glazer S, Gasper MR, Esposito V, Harrison L. Extrahepatic portal vein aneurysm: Report of a case treated by thrombectomy and aneurysmorrhaphy. *Ann Vasc Surg* 1992; 6 : 338-342
6. Fanney D, Castillo M, Montalvo B, Casillas J. Sonographic diagnosis of aneurysm of the right portal vein. *J Ultrasound Med* 1987; 6:605-607
7. Doust B, Pearce J. Gray-scale ultrasonic properties of the normal and inflamed pancreas. *Radiology* 1976; 120: 653-657
8. Ohnishi K, Nakayama T, et al. Aneurysm of the intrahepatic branch of the portal vein. *Gastroenterology* 1984; 86: 169-173
9. Shawker TH, Miller D. The persistent vitelline vein segment. *J Ultrasound Med* 1988; 7: 681-685
10. Boyez M, Fourcade Y, Sebag A, Valette M. Aneurysmal dilatation of the portal vein: a case diagnosed by realtime ultrasonography. *Gastrointest Radiol* 1986; 11: 319-321
11. Thomas TV: Aneurysm of the portal vein. Report of two cases, one resulting in thrombosis and spontaneous rupture. *Surgery* 1967; 61: 550-555
12. Ozbek SS, Killi MR, Pourbagher MA, et al. Portal venous system aneurysms, report of five cases. *J Ultrasound Med* 1999; 18: 417-422
13. Brock PA, Jordan PH, Barth MH, et al. Portal vein aneurysm, a rare but important vascular condition. *Surgery* 1997; 121: 105-108
14. Itoh Y, Kawasaki T, Nishikawa H, et al. A case of extrahepatic portal vein aneurysm accompanying lipoid hepatitis. *J Clin Ultrasound* 1995; 23: 374-378
15. Thompson PB, Odham KT, Bedi DG, et al. Aneurysmal malformation of the extrahepatic portal vein. *Am J Gastroenterology* 1986; 81: 695-697
16. Ohnami Y, Ishida H, Konno K, Naganuma H, Hamashima Y, Zeniya A, Masamune O. Portal vein aneurysm: report of six cases and review of the literature. *Abdom Imaging* 1997; 22: 281-286
17. Hermann RE, Shafer WH. Aneurysm of the portal vein and portal hypertension, first reported case. *Ann Surg* 1965; 162: 1101-1104
18. Andoh K, Tanohata K, Asakura K et al. CT demonstration of portal vein aneurysm. *J Computer Assisted Tomography* 1988; 12: 325-327
19. Hagiwara H, Kasahara A, Kono M, et al. Extrahepatic portal vein aneurysm associated with a tortuous portal vein. *Gastroenterology* 1991; 100: 818-821
20. Castor BK, Danhert W. Extrahepatic portal vein aneurysm: Diagnosis with gray scale and color duplex sonography. *J Diagn Med Sonogr* 1996;12: 93-96