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Incidental Left Portal Branch Aneurysm in a Patient with Hepatosplenomegaly: A Case Report and Review of the Literature

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Abstract **Case Report**

Introduction: Portal vein aneurysms (PVA) are rare vascular anomalies, with intrahepatic branch involvement being significantly less common than extrahepatic forms. They are often detected incidentally but can mimic other cystic liver lesions. ***Case Presentation:*** A 60-year-old male presented for evaluation of BI cytopenia and hepatosplenomegaly. Transabdominal ultrasound revealed a coarse liver texture and a dilated main portal vein (15 mm). An anechoic, saccular lesion measuring 22 mm was identified in the Rex recess, communicating with the left portal branch (9 mm). Color Doppler demonstrated turbulent "yin-yang" flow, confirming a left portal branch aneurysm. No elevated liver enzymes were noted. The patient was managed conservatively with serial imaging surveillance. ***Conclusion:*** Color Doppler is mandatory for the evaluation of all cystic-appearing liver lesions to exclude vascular anomalies. Precise identification of a portal vein aneurysm is critical to prevent the potentially fatal complication of accidental percutaneous biopsy and to guide appropriate non-operative management.

Keywords: Portal vein aneurysm, Intrahepatic, Color Doppler, Rex recess, Cystic liver lesions, Portal hypertension.

INTRODUCTION

Portal vein aneurysms (PVA) are rare vascular abnormalities, representing approximately 3% of all venous aneurysms [1]. Since the first description by Barzilai and Kleckner in 1956 [2], the increased utilization of cross-sectional imaging has led to more frequent incidental detection, with a reported prevalence of approximately 0.43% in patients undergoing abdominal computed tomography (CT) [3]. PVAs are typically classified by their location as either extrahepatic or intrahepatic, with intrahepatic branch aneurysms being significantly rarer than those involving the main portal trunk or the splenomesenteric confluence [4].

The etiology of these lesions is generally categorized as either congenital arising from inherent vessel wall weakness or failure of the right primitive vitelline vein to regress or acquired [5]. Acquired cases are most frequently associated with portal hypertension and chronic liver disease, where increased venous pressure and medial hypertrophy eventually lead to vessel wall weakening and subsequent dilation [6].

Accurate diagnosis is essential, as intrahepatic PVAs can mimic other cystic liver lesions. While a diameter of 20 mm is the accepted threshold for the extrahepatic portal vein, intrahepatic branches are considered aneurysmal if they exceed 7 mm in healthy subjects or 8.5 mm in patients with cirrhosis [7]. Identifying these lesions is critical, as misdiagnosis can lead to catastrophic complications, such as accidental percutaneous biopsy of a vascular structure [4]. We present a case of a rare left portal branch aneurysm in the Rex recess, emphasizing the role of multi-modality imaging in confirming the diagnosis and ruling out cystic mimics [8].

CASE REPORT

A 60-year-old male was referred for abdominal evaluation to investigate the etiology of persistent bicytopenia. Physical examination revealed hepatosplenomegaly but no stigmata of chronic liver disease.

Initial transabdominal ultrasound demonstrated a liver with a coarse echotexture and homogenous hepatosplenomegaly. Significant vascular findings included a dilated main portal vein measuring 15 mm and

a dilated left portal vein branch measuring 9 mm, exceeding the established intrahepatic diagnostic thresholds [3, 7].

A focal, saccular, anechoic addition image was identified within the Rex recess, situated between segments II and III, measuring 22 mm in maximum diameter. Color Doppler interrogation demonstrated turbulent, non-pulsatile flow within the lesion, producing the characteristic "yin-yang" sign [5]. This confirmed direct communication with the left portal vein, consistent with a saccular portal vein aneurysm [8].

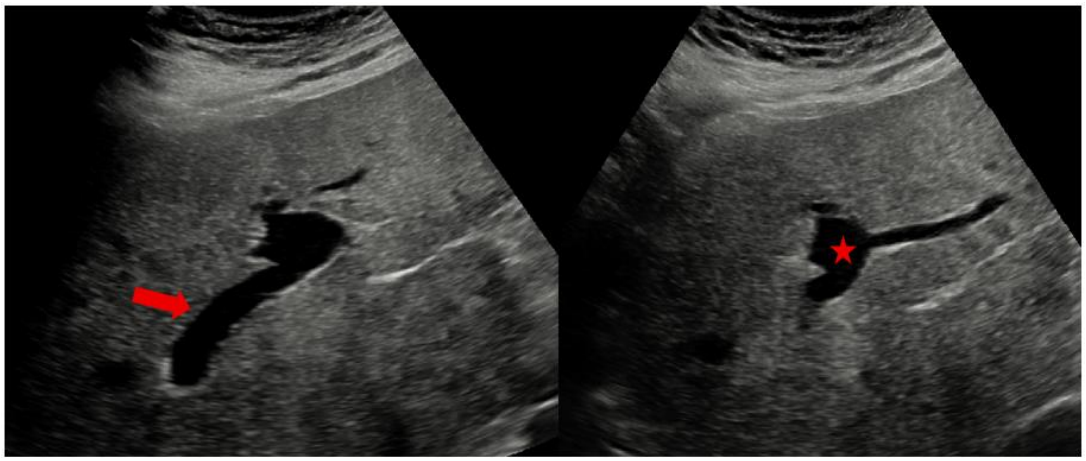

Figure 1: B-mode ultrasound image demonstrating saccular, anechoic structure (asterisk) located in the Rex recess between segments II and III. The image clearly shows the lesion's direct anatomical continuity with the left portal vein branch (arrow)

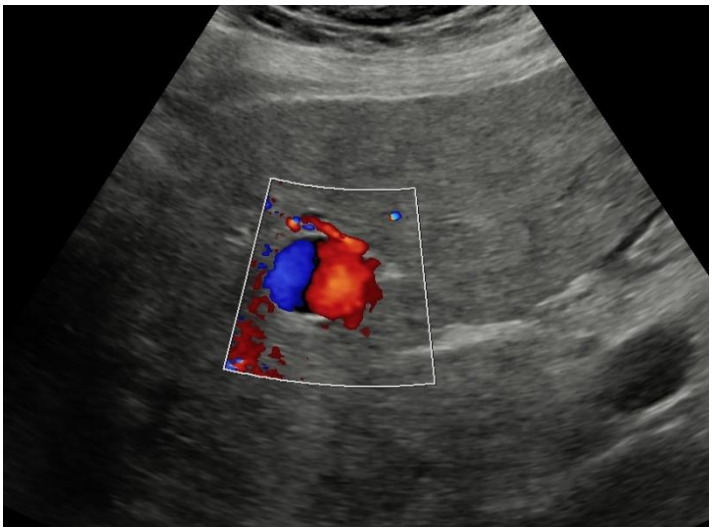

Figure 2 : Color Doppler imaging of the same lesion reveals the pathognomonic "yin-yang" sign. This finding indicates internal turbulent venous flow and confirms the vascular nature of the lesion

Laboratory investigations revealed normal levels of aspartate aminotransferase (AST), alanine aminotransferase (ALT), and total bilirubin, suggesting preserved hepatic synthetic function despite the ultrasonographic evidence of portal hypertension and the clinical presence of bicytopenia.

Given the pathognomonic Color Doppler findings specifically the "yin-yang" sign and the clear communication with the left portal vein the diagnosis of a saccular left portal branch aneurysm was established. Consequently, further cross-sectional imaging with computed tomography (CT) was deferred to avoid unnecessary contrast and radiation exposure [3, 8]. The patient was managed conservatively, with a plan for serial ultrasonographic surveillance to monitor the stability of the aneurysm and to screen for potential complications such as thrombosis or size progression [4, 5].

DISCUSSION

Portal vein aneurysms (PVA) are rare clinical entities that represent an uncommon but important differential diagnosis for cystic liver lesions. Intrahepatic branch aneurysms, such as the one described in this case, are particularly rare compared to extrahepatic PVAs [1, 4]. The incidental detection of this lesion during a workup for bicytopenia highlights the subtle presentation

of these vascular anomalies, which are often discovered during the evaluation of unrelated symptoms or systemic conditions like portal hypertension [3].

The pathophysiology of PVAs is generally categorized into congenital and acquired etiologies. Congenital theories suggest a focal weakness in the vessel wall or a failure of the primitive vitelline venous system to regress during embryogenesis [2, 5]. In contrast, acquired PVAs are frequently associated with chronic liver disease and portal hypertension [6]. In our patient, the presence of hepatosplenomegaly, a dilated main portal vein, and a coarse liver texture strongly suggest a state of occult portal hypertension, which likely contributed to the aneurysmal dilation of the left portal branch.

A critical aspect of managing intrahepatic PVAs is the correct radiological differentiation from common mimics. On gray-scale ultrasound, these lesions can appear as simple hepatic cysts, biliary cysts, or even abscesses [4, 8]. However, the use of Color Doppler is diagnostic; the presence of the "yin-yang" sign reflecting turbulent, bi-directional flow and the demonstration of clear continuity with the portal venous system are pathognomonic [5, 6]. Our case reinforces the findings of Koc *et al.,* and Aiyappan *et al.,* who established that an intrahepatic branch diameter exceeding 7 to 9 mm should be considered aneurysmal [3, 7].

The management of intrahepatic portal vein aneurysms remains conservative in the majority of asymptomatic cases [1]. While complications such as thrombosis, rupture, or compression of the biliary tree have been reported, the risk remains low for stable, incidental lesions [4, 6]. Our decision to manage this patient with serial ultrasonographic surveillance aligns with the current literature, which suggests that most congenital or stable acquired aneurysms do not require surgical intervention unless they become symptomatic or demonstrate rapid growth [5, 8]. This case specifically illustrates that a confident diagnosis can be made through a meticulous ultrasound examination alone, sparing the patient from the risks and costs associated with more invasive diagnostic pathways.

CONCLUSION

This case underscores a critical rule in abdominal imaging: Color Doppler interrogation must be an integral step in the evaluation of any apparent cystic lesion of the liver or spleen. In the setting of hepatosplenomegaly or suspected portal hypertension, the discovery of an anechoic structure should immediately prompt a search for vascular flow. Failure to do so may lead to the misdiagnosis of a portal vein aneurysm as a simple cyst, potentially resulting in catastrophic hemorrhage if a percutaneous biopsy is attempted. For the radiologist, the "yin-yang" sign is a powerful diagnostic tool that confirms the vascular nature of the lesion and dictates a conservative, surveillance-based management strategy.

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