

Sonographic Diagnosis and Follow-up of Idiopathic Hepatic Artery Aneurysm, an Unusual Cause of Obstructive Jaundice

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ABSTRACT: Hepatic artery aneurysms are rare. We report an idiopathic hepatic artery aneurysm causing obstructive jaundice in a case in which the common hepatic artery arose from the superior mesenteric artery. The diagnosis of hepatic artery aneurysm was suggested by gray-scale sonography, which showed that the common bile duct and intrahepatic biliary radicles were dilated with no obvious intraluminal abnormality and showed no evidence of a mass in the head of the pancreas. A papillotomy of the papilla duodeni major was performed to relieve the cholestasis. Repeat sonography 2 weeks later showed dilatation of the common bile duct and a cyst-like lesion at the porta hepatis impressing the anterior part of the common bile duct. Doppler sonography confirmed pulsatile flow within the cyst-like lesion. Helical CT showed a well-circumscribed lesion with a density similar to that of the abdominal aorta, and mesenteric angiography showed a 3-cm, smooth aneurysm arising from the common hepatic artery, which originated from the superior mesenteric artery. The aneurysm was successfully treated with transcatheter embolization. © 2001 John Wiley & Sons, Inc. *J Clin Ultrasound* 29:466–471, 2001.

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Hepatic artery aneurysms are rare. Wilson first described this lesion in 1809.¹ Twenty percent of splanchnic aneurysms arise from the hepatic artery.² Of the hepatic artery aneurysms,

extrahepatic aneurysms occur 4 times more frequently than intrahepatic lesions, with two thirds of the extrahepatic lesions arising from the common hepatic artery.³

We present a case of a sonographically diagnosed idiopathic hepatic artery aneurysm that caused obstructive jaundice. To the best of our knowledge, this is the first report of an idiopathic hepatic artery aneurysm causing obstructive jaundice in a case in which the common hepatic artery arose from the superior mesenteric artery (SMA). We also discuss the role of sonography in the diagnosis and follow-up of patients who have undergone embolization for hepatic artery aneurysms.

CASE REPORT

A 62-year-old woman presented with a 2-month history of upper abdominal pain and a 2-week history of progressive jaundice. The pain was constant and unrelated to meals. There was no history of vomiting, hematemesis, weight loss, surgery, or trauma. On physical examination, the patient was icteric and had tenderness in the epigastrium and right upper quadrant. She passed dark stools and had abnormal liver function in a cholestatic pattern.

Abdominal sonography was performed using a model 128 XP/10 ultrasound scanner (Acuson, Mountain View, CA) and a 3.5-MHz curvilinear transducer. Sonography showed that the common

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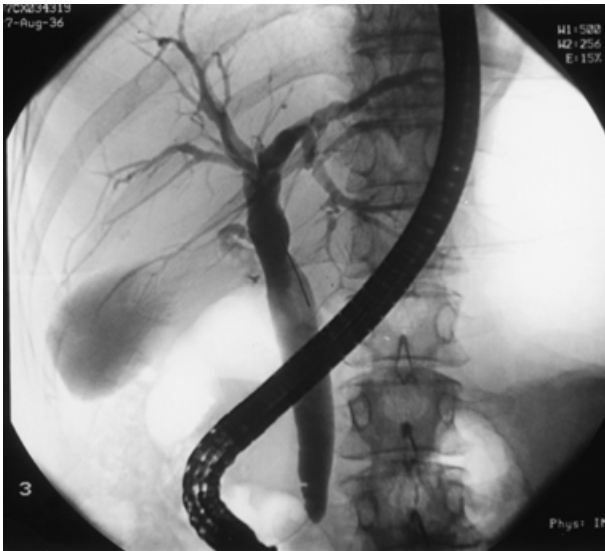


FIGURE 1. Endoscopic retrograde cholangiopancreatography image shows a dilated common bile duct with no evidence of gallstones or other intraluminal abnormality.

bile duct and intrahepatic biliary radicles were dilated without any obvious intraluminal abnormality. There was no evidence of a mass in the head of the pancreas. The patient was further examined with endoscopic retrograde cholangiopancreatography, which demonstrated a dilated common bile duct with no intraluminal abnormality (Figure 1).

A papillotomy of the papilla duodeni major was performed to relieve the cholestasis. The patient was subsequently monitored for 2 weeks but did not improve clinically or biochemically. Repeat sonography was performed to assess the status of the biliary system. This showed the common bile duct to be dilated over its entire length. A cyst-like lesion was visualized at the porta hepatis impressing the anterior part of the common bile duct. The lesion had been mistaken for part of the dilated common bile duct on the initial sonograms (Figure 2). Doppler sonography, performed to evaluate the vascularity associated with the lesion, confirmed pulsatile flow within the lesion, consistent with a vascular origin (Figure 3). The findings suggested hepatic artery aneurysm. Helical CT was subsequently performed and showed a well-circumscribed lesion with a density similar to that of the contrast-filled abdominal aorta. Mesenteric angiography, performed to evaluate whether the lesion was solitary or part of a generalized vascular abnormality, showed a 3-cm, smooth aneurysm arising from the common hepatic artery (Figure 4A), which originated from the SMA. No other aneurysms were seen.

In view of the patient's symptoms, it was decided to treat the aneurysm by transcatheter embolization. The aneurysm was packed with 6 steel coils of various sizes, resulting in thrombosis (Figure 4B). The aneurysm was excluded from

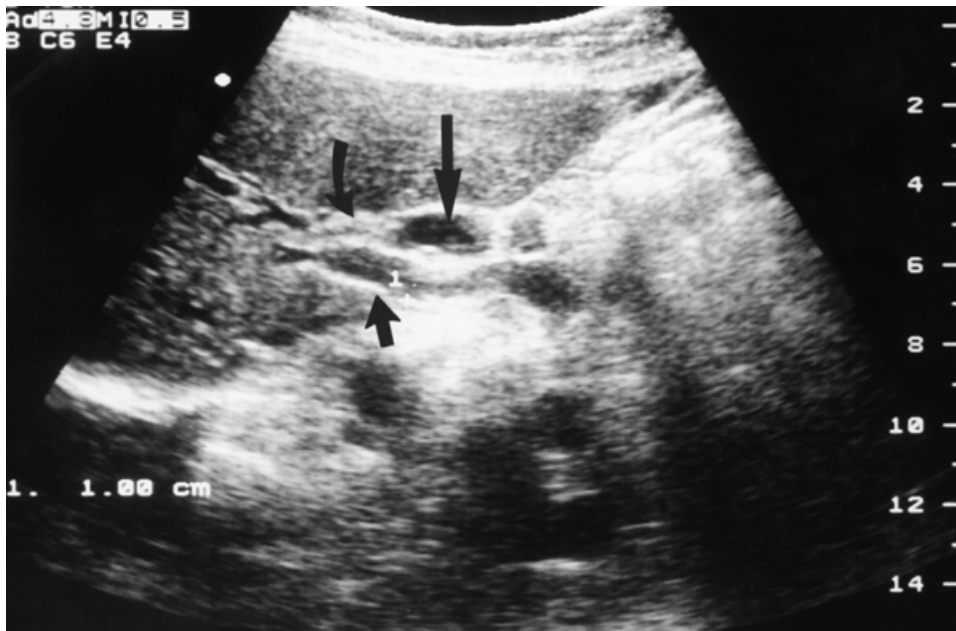


FIGURE 2. Oblique sonogram obtained during the second sonographic examination shows a cyst-like lesion (long arrow) at the porta hepatis, anterior to the common bile duct (curved arrow). The lesion was mistaken for part of the dilated common bile duct on the initial sonograms. Note that the common bile duct is not shown in its entirety, and only its edge has been shown on this frame. The short arrow points to the portal vein.

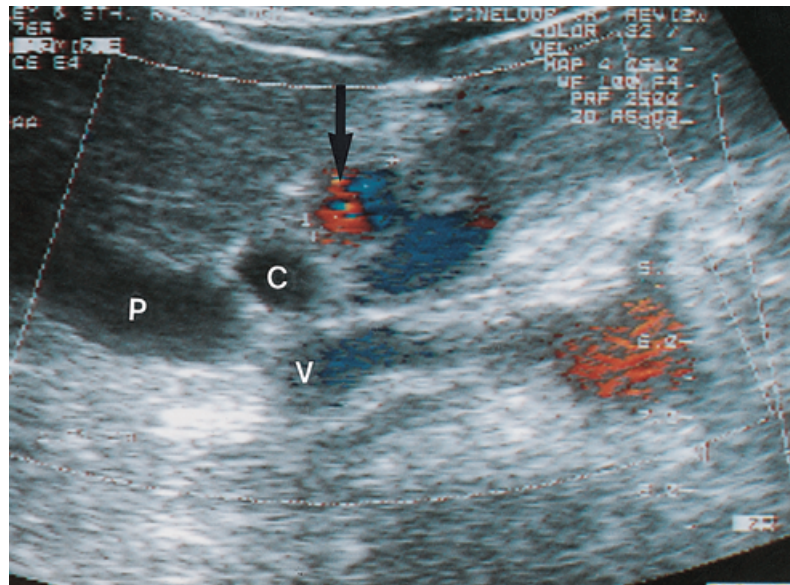


FIGURE 3. Transverse color Doppler sonogram demonstrates bidirectional blood flow within the cyst-like lesion (arrow). C, common bile duct; P, portal vein; V, inferior vena cava.

the circulation. The results of liver function studies returned to normal.

Follow-up sonography after 2 months demonstrated a thrombus within the aneurysmal sac, and no Doppler signals could be demonstrated within the aneurysm (Figure 5). The patient's symptoms had completely resolved.

DISCUSSION

Hepatic artery aneurysms are a rare cause of obstructive jaundice. The common causes of obstructive jaundice are stones of the common bile duct; carcinoma of the head of the pancreas, the ampulla, or the bile duct; biliary stricture; pancreatitis; and sclerosing cholangitis. Most hepatic artery aneurysms (75–85%) are extrahepatic. The parent vessel is most commonly (65%) the common hepatic artery.² Location in the right hepatic artery is less frequent, occurring in 30% of cases; and location in the left hepatic artery is rare.^{4,5}

Mycotic aneurysms historically accounted for most hepatic artery aneurysms but accounted for only 4% in a recent review.⁶ Hepatic artery aneurysms are most frequently caused by atherosclerosis, medial necrosis, inflammatory processes in the vascular wall, trauma, surgery (orthotopic liver transplantation or hepatic tumor embolization), and diagnostic instrumentation.^{2,7,8} Post-traumatic false aneurysms constitute 50% of hepatic artery aneurysms,⁶ a trend probably related to the increased use of percuta-

neous diagnostic and therapeutic procedures. In addition, the increased use of imaging after blunt liver trauma has increased the diagnostic yield for these lesions.⁸

Hepatic artery aneurysm is not initially diagnosed in many cases because of its rarity and lack of unique symptomatology. The presentation of hepatic artery aneurysm is often acute and catastrophic. Quincke's triad of epigastric pain, hemobilia, and obstructive jaundice is seen in only a third of the cases.^{2,9} The patient may have epigastric pain or pain in the right upper quadrant, which at times radiates to the back and suggests disorders of the gallbladder or pancreas. The aneurysm can rupture with equal frequency into the biliary tree or abdominal cavity.^{2,3}

Hepatic artery aneurysm should be included in the differential diagnosis if there is a cyst-like lesion in or around the porta hepatis or adjacent to a dilated duct.¹⁰ Hepatic artery aneurysm should be considered if the common bile duct is dilated in the absence of any obvious cause (ie, a gallstone or pancreatic head mass). Hepatic artery aneurysm should also be considered when no hepatic, biliary, or pancreatic cause can be found for unexplained obstructive jaundice.

Doppler sonography is the recommended modality for the initial investigation of a suspected hepatic artery aneurysm. The vascularity can be confirmed by pulsatile flow within the mass on color Doppler sonography. Further assessment with angiography helps to evaluate whether the

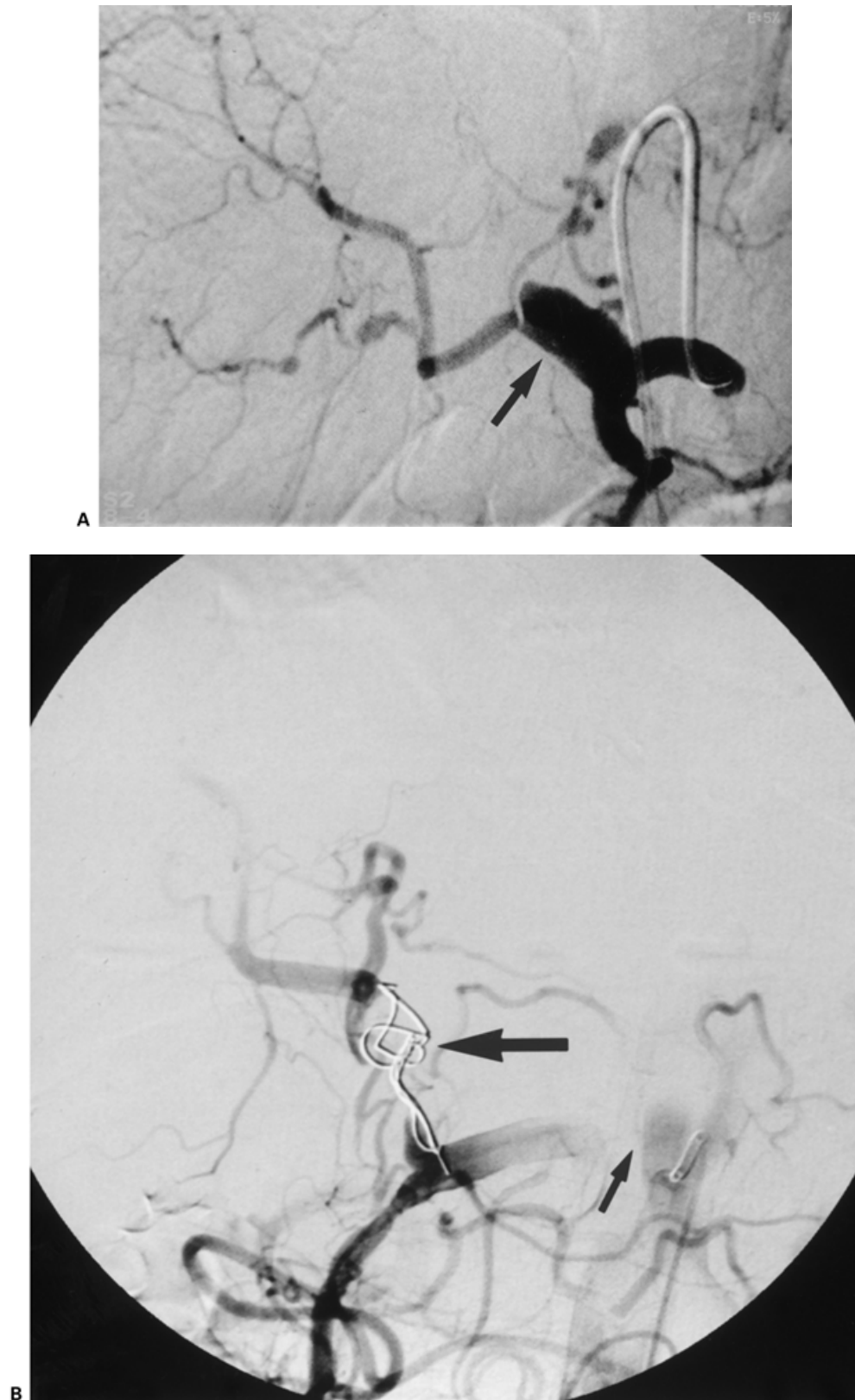


FIGURE 4. (A) Digital subtraction angiogram shows the aneurysm (arrow) of the common hepatic artery. (B) Post-embolization digital subtraction angiogram shows occlusion (large arrow) of the aneurysmal sac. The catheter tip is at the superior mesenteric artery (SMA). Note the anomalous origin of the common hepatic artery from the SMA (small arrow).

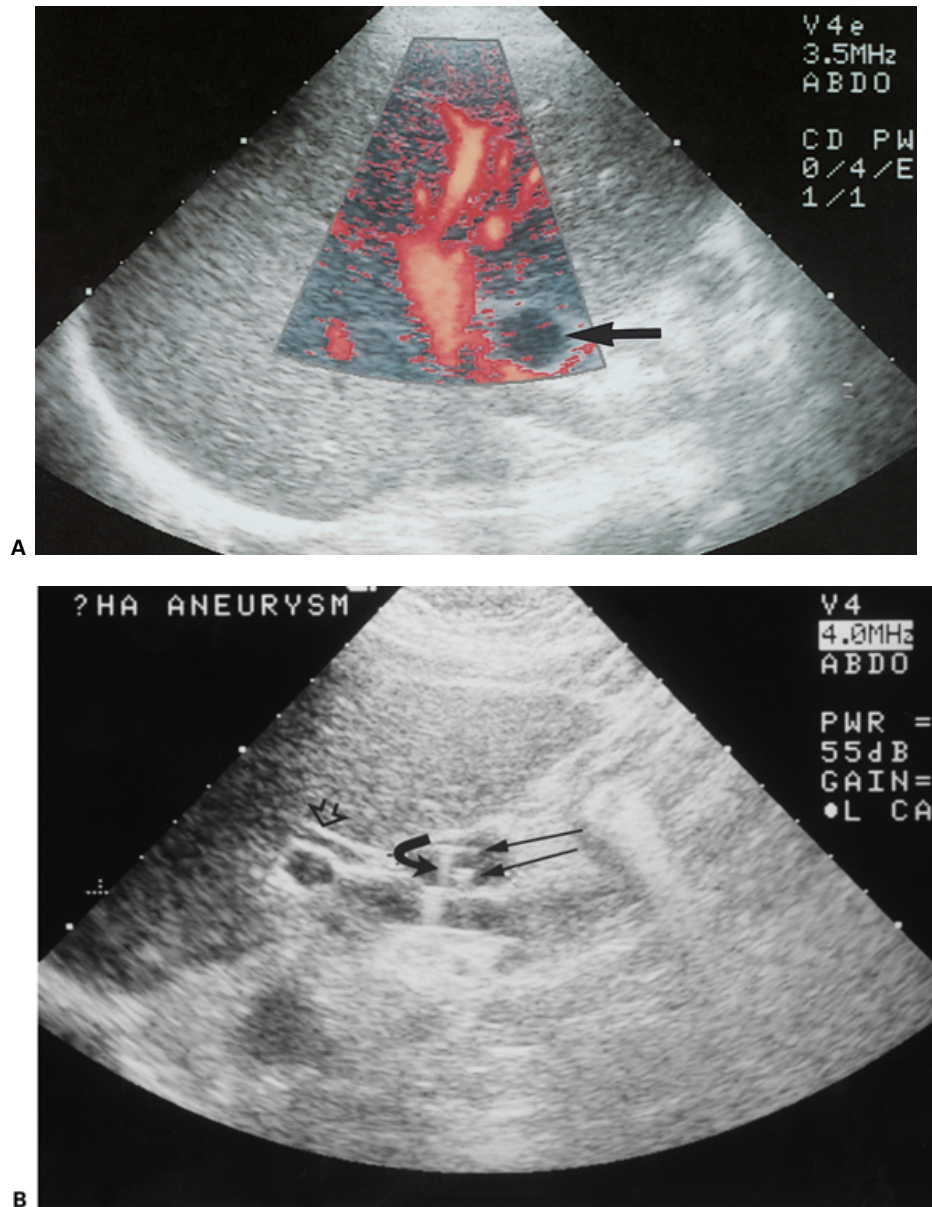


FIGURE 5. (A) Power Doppler sonogram obtained 2 months after embolization demonstrates absence of flow within the aneurysmal sac (arrow). (B) Gray-scale sonogram obtained during the same follow-up examination shows typical comet-tail artifacts (curved arrow) associated with the metallic intravascular coils (straight arrows). The open arrow points to the common bile duct.

lesion is solitary or multiple (seen in 20% of cases)¹¹ and to determine the site of hepatic artery origin. Doppler sonography plays a significant role in the follow-up of patients who undergo embolization, allowing unnecessary follow-up angiography to be avoided.

Unlike with aortic aneurysms, the risk of rupture relative to the size of a hepatic artery aneurysm is unknown, and current opinion is that all lesions warrant therapy.¹² The therapeutic options include embolization of the aneurysm, stenting across the parent vessel, and embolization of the common hepatic artery. The incidence

of hepatic necrosis following interruption of the common hepatic artery is low owing to the rich hepatic collateral supply.^{13–15}

In summary, sonography can help in the diagnosis and follow-up in cases of idiopathic hepatic artery aneurysm causing obstructive jaundice associated with the anomalous origin of the common hepatic artery from the SMA.

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