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Case Report

Successful Management of a Proper Hepatic Artery Aneurysm by Embolization without Liver Dysfunction

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Abstract

The occurrence of a hepatic artery aneurysm (HAA) is rare, accounting for approximately 20% of splanchnic aneurysms. Further, HAA rupture can become a life-threatening situation. We describe the case of a 65-year-old woman with a proper hepatic artery (PHA) aneurysm, which was managed successfully by transcatheter arterial embolization with microcoils. The patient was asymptomatic, and the lesion was incidentally detected by computed tomography (CT) examination. We successfully performed coil embolization of the PHA aneurysm by balloon occlusion of the common hepatic artery. The embolization did not cause complications such as liver dysfunction and liver infarction. Thus, given that transcatheter arterial embolization is minimally invasive, we consider it a valuable method in the initial treatment of an HAA.

INTRODUCTION

The occurrence of a hepatic artery aneurysm (HAA) is rare, accounting for approximately 20% of splanchnic aneurysms, but it has a relatively high frequency within the distribution of splanchnic aneurysms, being second to splenic artery aneurysms, which is the most common one. In many cases, patients remain asymptomatic, so HAAs are often incidentally detected by computed tomography (CT) or abdominal ultrasonography examination. When the diameter of the aneurysm tends to increase, patients present nonspecific symptoms such as upper abdominal pain and back pain. Rupture of an HAA can cause biliary tract bleeding, jaundice, and gastroduodenal bleeding. The mortality rate at the time of rupture is reported to be as high as 20%. Therefore, even if an HAA is detected incidentally, early treatment is desirable. Open surgical aneurysmectomy with or without reconstruction is the conventional treatment for HAA. In recent years, endovascular treatment, a minimally invasive and safe method, has been applied to treat HAAs, yielding satisfactory results. Here, we describe a case of a proper hepatic artery (PHA) aneurysm that was successfully treated with coil embolization.

CASE PRESENTATION

A PHA aneurysm was incidentally detected during a CT examination of a 65-year-old woman undergoing a follow-up evaluation for a gallbladder polyp. The patient had no history of abdominal trauma or surgery or a family history of aneurismal disease.

Enhanced abdominal CT showed the presence of a saccular aneurysm of the PHA, 2.9 cm in diameter (Figure 1A,B). We attempted to isolate and pack the PHA aneurysm using detachable coils. A 5-French sheath (Medikit, Miyazaki, Japan) was inserted in the right femoral artery. Celiac arteriography showed the saccular aneurysm, located distally in the PHA

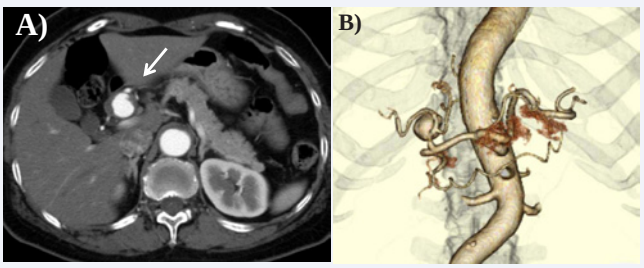

Figure 1 Computed tomography (CT) findings. A) Enhanced abdominal CT examination shows a saccular aneurysm of the proper hepatic artery (PHA), 2.9 cm in diameter (arrow). B) 3-dimensional CT angiography shows the aneurysm arising from the distal site of the PHA. The aneurysm is shown having a narrow neck.

(Figure 2A). Superior mesenteric arteriography did not reveal any additional aneurysms. A 5.2-French balloon catheter, 9 mm in diameter (Terumo Clinical Supply, Gifu, Japan), was advanced to the common hepatic artery in order to control blood flow and avoid migration of the coils (Figure 2B). Under balloon occlusion, a 2.0-Fr microcatheter (Goldcrest Neo, Kosin, Tokyo, Japan) was advanced to the origin of the right and left hepatic arteries to be used as efferent arteries. We then performed embolization from the origin of the right and left hepatic arteries to the distal part of the PHA using interlocking detachable coils (IDC, Boston, MA, USA). Next, we pulled back the microcatheter into the aneurysm, and performed embolization of the aneurysm by packing with platinum coils (Tornade, Cook Medical, USA). Finally, we performed embolization at the proximal site of the PHA using platinum coils.

Postembolization celiac arteriography showed complete disappearance of the aneurysm. Moreover, blood flow to the liver parenchyma was mediated by a collateral pathway via the right and left gastric arteries (Figure 2C,D). After the procedure, hepatic enzyme laboratory values did not worsen. Follow-up CT 1 month after embolization indicated no liver infarction.

DISCUSSION

HAAs account for 20% of all splanchnic aneurysms, and almost 50–75% of these are true aneurysms [1,2]. The etiology of HAAs varies and includes trauma, infection, iatrogenicity, atherosclerosis, and necrotizing vasculitis caused by polyarteritis nodosa or fibromuscular dysplasia [1-3]. HAAs are generally asymptomatic and usually found incidentally by imaging studies such as CT or ultrasonography. The most common symptoms are right upper quadrant abdominal pain radiating to the back, jaundice, and intra-abdominal or gastrointestinal hemorrhage [1-3].

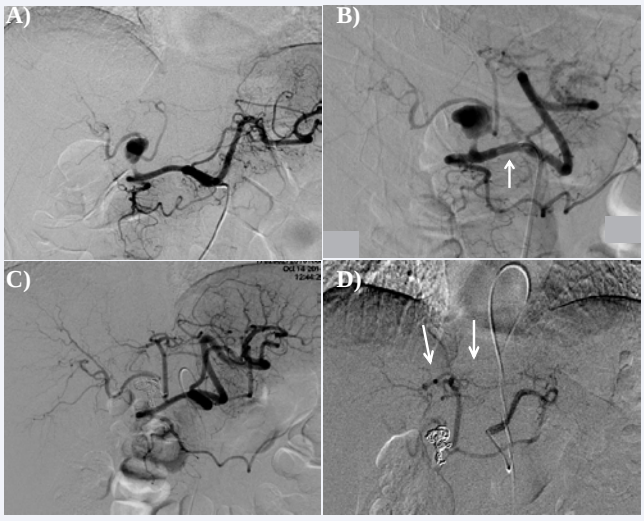

Figure 2 Angiographic findings and treatment. A) Celiac arteriography shows the aneurysm at the distal site of the proper hepatic artery. B) Balloon catheter was advanced to the common hepatic artery (arrow), and common hepatic arteriography was performed in 45° right anterior oblique view. C) Postembolization celiac arteriography shows complete disappearance of the aneurysm. Moreover, blood flow to the liver parenchyma was mediated by collateral pathway via the right and left gastric arteries. D) Postembolization left gastric arteriography shows the left hepatic artery (arrow) via anastomoses from the left gastric artery.

In the last decade, HAA rupture was reported in 65% of cases, and this was associated with a mortality rate of 21% [4]. Treatment is recommended for HAAs with a diameter of more than 2 cm [2]. More than 70% of HAAs are isolated to the segment proximal to the hilum of the liver, whereas 20% have combined intra- and extraparenchymal involvement; only 3% are localized exclusively within liver [5].

Endovascular embolization without reconstruction has become the primary treatment for intrahepatic aneurysms or asymptomatic common HAAs. However, vascular reconstruction is required for the treatment of PHA aneurysms to prevent hepatic ischemia resulting from interruption of collateral circulation through the gastroduodenal, pancreaticoduodenal arcade, and right gastric arteries [6,7]. Occlusion of arteries in the hepatic hilum by embolization may cause an interruption in the arterial blood supply to the liver, thus presenting a risk of liver infarction [8]. Charnsangavej et al. have described the angiographic classification of hepatic arterial collateral pathways, noting at least 22 possible routes (4 intrahepatic and 18 extrahepatic routes) [9].

We performed embolization of the PHA and the proximal site of the right and left hepatic arteries to avoid embolization of their distal sites, since we did not expect that the gastroduodenal and pancreaticoduodenal arcade arteries would develop into major extrahepatic collateral pathways. This approach allowed us to protect other collateral pathways such as the left gastric artery and inferior phrenic routes, which have been described as major extrahepatic collateral pathways. In the present case, postembolization celiac arteriography demonstrated the right and left hepatic arteries connecting with the right and left gastric arteries as collateral pathways.

After coil embolization of the PHA for the aneurysm, there was no evidence of hepatic dysfunction or liver infarction. Therefore, the findings of the present case suggest that embolization of arteries in the hepatic hilum without vascular reconstruction is an accessible alternative if the development of a collateral pathway is expected.

In many cases, the HAA receives a significantly large and rapid blood flow. Coil embolization is associated with a high risk of coil migration to important internal organs such as the liver and pancreas. When blood flow is very rapid, as in the present case, using a balloon catheter could be a safe method for coil embolization without the risk of coil migration.

In conclusion, embolization of the HAA, including the PHA and arteries in the hepatic hilum, is safe and effective. Moreover, the development of collateral pathways via the extrahepatic arteries was expected after the procedure; thus, there was no liver infarction due to the treatment. We consider that transcatheter arterial embolization, a minimally invasive method, is valuable and may be useful as initial treatment for an HAA.

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