Delayed Rupture of Mycotic Hepatic Artery Aneurysm in a Patient with Infective Mitral Endocarditis-First Case in Korea

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ABSTRACT

Mycotic aneurysms of the hepatic artery are usually caused by mycotic infection in patients suffering with bacterial endocarditis. Mycotic aneurysms have become very rare recently due to early intensive antibiotic treatment for infective endocarditis. Despite of the non-specific symptoms, these aneurysms show a high possibility of sudden death if thye ruptured. Therefore, early detection and surgical repair of aneurysms are very important. We report here on a case of hepatic artery mycotic aneurysm that presented as sudden shock and rupture. **(Korean Circulation J 2007;37:43-46)**

KEY WORDS : Hepatic artery ; Aneurysm ; Rupture ; Shock ; Endocarditis.

Introduction

Mycotic aneurysms are rarely complicated in patients suffering with infective endocarditis. The diagnosis can be difficult, and especially when the aneurysms are located in the deep vessels. The incidence of mycotic hepatic artery aneurysms has decreased, probably because of the early administration of effective antibiotics for infections.[1] However, if not treated, these aneurysms are associated with a high possibility of rupture and extremely high mortality.[2] In Korea, mycotic aneurysms of the cerebral artery and superior mesenteric artery have been reported on.[3][4] However, there have been no case reports about mycotic hepatic artery aneurysm.

We report here on a case of a 71-year-old woman who had a mycotic aneurysm of her hepatic artery along with infective endocarditis. She was successfully treated with an appropriate diagnosis and emergency surgical repair for sudden rupture of the hepatic artery.

Case

A 71-year-old woman visited the emergency room be-

cause of her suddenly developed right upper abdominal pain and jaundice for 1 day. She had taken antibiotics for infective endocarditis prior to admission. Replacing the mitral valve with a mechanical replacement(St. Jude Medical Mechanical Heart Valve, SJM® Masters Series, MN, U.S.A.) was performed to treat prolapse with severe mitral regurgitation due to infective endocarditis with streptococcus anginosus 3 months previously(Fig. 1). Anticoagulation with warfarin has been maintained since the mitral valve surgery. There was no other specific medical or family history.

On the physical examination, her body temperature was 36.5℃, the blood pressure 140/80 mmHg, the heart rate 90/min, and the respiratory rate 20/min. She had acutely ill-looking appearance and icteric sclerae. The heart sounds were regular with a good metallic click. The breath sounds were clear without wheezing or rales. Abdominal examination revealed decreased bowel sounds without any palpable mass. However, there was a direct and indirect tenderness over the right upper quadrant and epigastrium with a positive Murphy's sign.

On the laboratory findings, the blood cell counts are as follows: the hemoglobin 13.6 g/dL, the white blood cell count $7.8 \times 10^3/\mu L$ and the platelet count $284 \times 10^3/\mu L$. The initial coagulation profiles showed a partial thromboplastin time of 67.0 seconds(an international normalized ratio of 9.5). According to the serological biochemical assay, the liver function tests revealed a total bilirubin of 4.7 mg/dL, a direct bilirubin

of 1.9 mg/dL, an AST of 183 IU/L, an ALT of 117 IU/L, alkaline phosphatase of 200 IU/L and γ-GTP of 92 IU/L.

A 4×4 cm sized cystic mass was noticed adjacent to the liver on the abdominal ultrasound examination. A typical arterial pulse wave was detected within the cystic mass by color Doppler ultrasound(Fig. 2). Multidetector computed tomography(MDCT, Philips®, MX 8000IDT16, Netherlands) revealed a 4.4×4.1×5.2 cm sized mass with contrast enhancement at the arterial phase(Fig. 3) and a hepatic artery aneurysm was suspected. During the intensive care, she had been taken intravenous antibiotics and a vitamin K supplement. On the second in-hospital day, loss of the patient's clear mentality and then hypotension occurred suddenly. The blood pressure

decreased from 140/90 mmHg to 60/ 40 mmHg. The hemoglobin decreased as well, from 13.6 g/dL to 10.4 g/dL. After rapid intravascular volume replacement with crystalloid fluid and transfusion of packed red blood cells, the vital signs recovered with a blood pressure of 100/60 mmHg. Under the impression of sudden hypovolemic shock and rupture of the hepatic artery aneurysm, an emergency operation was performed with bedside Doppler ultrasound. The operative findings showed that there was a large amount of blood in the peritoneal cavity and a 3×3 cm sized common hepatic artery aneurysm with pulsatile bleeding. The aneurysmal sac was adhered to the adjacent tissue. There was a fistula between the aneurysmal sac and the common bile duct (Fig. 4). The gall bladder was perforated and filled with
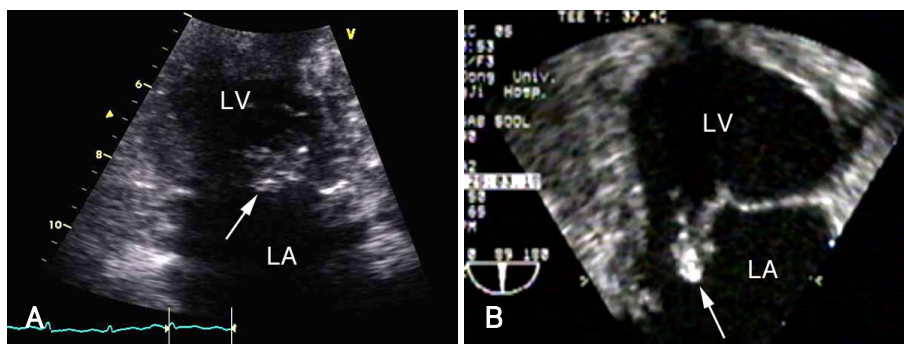

Fig. 1. Transthoracic echocardiographic findings of the magnified mitral valve showed a mobile echogenic mass (arrow) and an attached anterior mitral leaflet (A). The transesophageal echocardiographic findings showed irregular shaped vegetation (arrow) and prolapse before mitral valve replacement (B). LA: left atrium, LV: left ventricle.
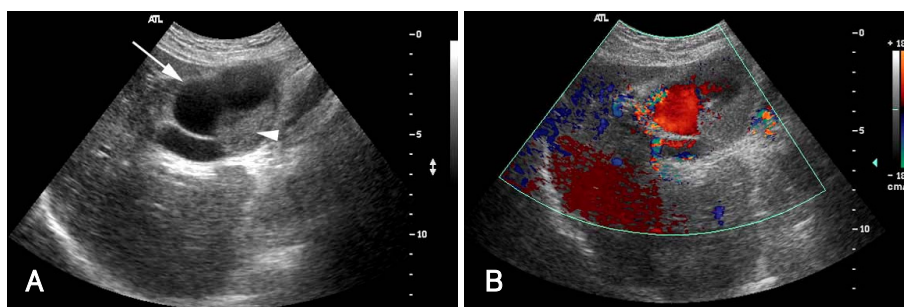

Fig. 2. Ultrasound examination showed a pulsatile hypoechoic cystic mass in the liver (A) and the Doppler scanning demonstrated arterial blood flow in this lesion (B). The white arrow indicates the cystic mass and the white arrow head indicates the mural thrombus.
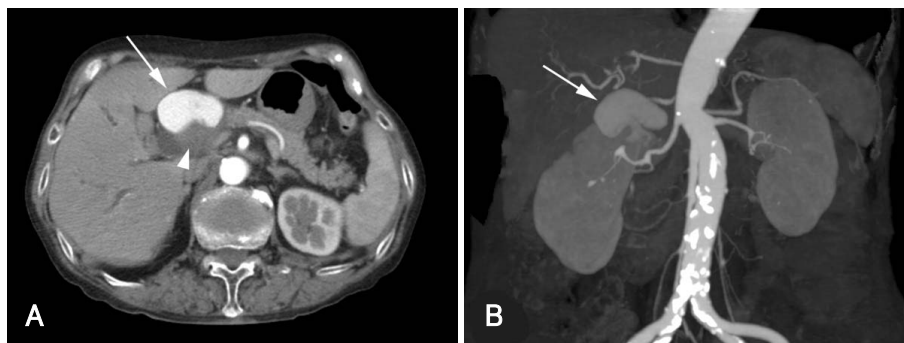

Fig. 3. Axial (A) and coronal CT scanning (B) showed a 4.4×4.1×5.2 cm sized aneurysm with a partially coagulated blood clot and strong contrast enhancement. The white arrows indicate the hepatic artery aneurysm and the arrow head indicates the mural thrombus.
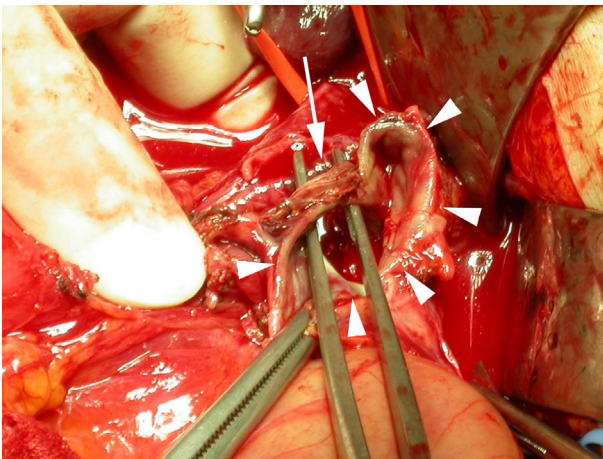
Fig. 4. The operative finding showed that aneurysm of the common hepatic artery was surgically exposed (arrow heads) and a fistula was formed from the aneurysm to the common bile duct (arrow).

blood. The operative procedures included aneurysmectomy and end-to-end anastomosis with the autologous right gastric artery, cholecystectomy and Rouxen-Y hepaticojejunostomy. After operation, her hemodynamic condition became stable without any other symptoms. She was discharged on the postoperative 28th day.

Discussion

The incidence of hepatic artery aneurysm follows that of the most common splenic artery.[5] Although this still remains an uncommon vascular complication, which was first reported by Wilson in 1819, the detection rate has improved more in the recent 20 years rather than the past; this probably reflects the wide spread use of computed tomography(CT) scanning.[6]

80% of hepatic artery aneurysms are extrahepatic and 20% are intrahepatic. The common hepatic artery is the most frequent location(63%), followed by the right hepatic artery(28%), the left hepatic artery(5%), and both hepatic arteries(4%).[7]

The leading etiology is atherosclerosis in 32% of these patients. The other causes are as follows; medio-intimal degeneration in 24%, iatrogenic and external trauma including biliary surgery or radiological intervention in 22%, and mycotic infection in 10%.[8] According to the location, the intrahepatic aneurysms are induced by iatrogenic or blunt external trauma, and the extrahepatic aneurysms often develop at the anastomosis sites created in liver transplantation.[9] As for the less common causes, mycotic aneurysms with bacterial endocarditis, polyarteritis nodosa, tuberculosis and inflammation of the biliary tree have been reported.[10] In this case, the cause of the hepatic aneurysm was residual biliary infection from the recent history of infective endocarditis and gram positive bacterial septicemia.

Most patients with hepatic artery aneurysms have no symptoms. They may present with upper abdominal pain or jaundice by extrinsic compression of the common bile duct or intra-ductal occlusion by blood clots.[11] Quincke's symptom triad of epigastric pain, hemobilia and obstructive jaundice are observed in one third of these patients.[12] There is no specific physical abnormality. A palpable mass, bruit or hepatomegaly may be present. The aneurysms may not be diagnosed in 80% of patients until rupture occurs. The frequent rupture sites are the peritoneal cavity(43%), the biliary tree(41%), the gastro-intestinal tract(11%) or the portal vein(5%).[11,12]

Plain abdominal radiography often demonstrates 'egg-shell appearance calcifications' in the right upper quadrant area.[13] Color Doppler ultrasonography is the modality of choice for screening. A pulsatile mass with an arterial flow pattern is usually observed.[13,14] MDCT can well visualize the detailed anatomy of the visceral arteries via three dimensional reconstruction of the arterial phase.[15] Conventional digital subtraction angiography can be used to rule out other aneurysms through selective catheterization of the celiac, renal, superior and inferior mesenteric arteries.[6]

Treatment options include surgical or endo-vascular repair. Selection of the treatment modality depends on the aneurysm location, the regional vascular anatomy, the etiology and the combined disease of the aneurysm.[16] The proximal aneurysms at the origin of the gastroduodenal artery can be treated with ligation, excision or aneurysmectomy. The distal aneurysms often require surgical excision and repair with autologous tissue.[17] Surgical treatment with vascular reconstruction is always recommended for the low risk patients.[14] Embolization is a less invasive alternative to surgical repair. This therapy decreases the need for exploratory laparotomy and the complications of general anesthesia.[17] This has been recently reported to be the most common therapeutic modality for treating intrahepatic aneurysms.[18] However, this technique is associated with potential risks of hepatic ischemia, liver abscess, cholecystitis and longterm concerns about recanalization of the aneurysm.[19]

Diagnosis of hepatic artery aneurysm is not often prompt or even accurate without performing special imaging studies. Although most of the symptoms are non-specific, combined deep visceral artery aneurysms should be always considered for patient suffering with infective endocarditis. Doppler ultrasound, CT angiography and selective angiography are useful modalities for screening for deep vascular aneurysms in patients suffering with infective endocarditis. This report suggests that early, accurate diagnosis can lead to appropriate treatment for preventing sudden death from rupture of aneurysms.

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