Treatment of Giant Celiac Artery Aneurysm by Conjoined Splenic-Hepatic Trunk Transposition

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Celiac artery aneurysms are extremely rare vascular lesions usually diagnosed by chance. A 62-year-old male was being referred to Kyungpook National University Hospital with a seven day history of upper right quadrant abdominal pain. A computed tomography scan revealed an acute cholecystitis and a 7-cm sized huge aneurysm located from the origin of celiac artery to the bifurcation of celiac artery. After an initial cholecystectomy, the aneurysm was opened and the origin of celiac artery was oversewn with aorta followed by transposing and implanting the conjoined splenic-hepatic trunk to supraceliac aorta. The patient was discharged without complications on the tenth postoperative day. Conjoined splenic-hepatic trunk transposition for the repair of a celiac artery aneurysm may be an appropriate alternative option especially in cases complicated with other infectious conditions.

Key Words: Aneurysm, Celiac artery, Transposition, Splenic artery, Cholecystitis

INTRODUCTION

A celiac artery aneurysm (CAA) is an uncommon form of a visceral artery aneurysm. The reported incidence of a CAA within a visceral artery aneurysm is only 4% (1). The clinical significance of CAA is primarily related to its potential for rupture and the reported contemporary risk for rupture appears to be in the range of 10% to 20% with an associated mortality of 50% (2,3). However, with the increased use of abdominal imaging, such as computed tomography (CT) for abdominal pain, incidental visceral artery aneurysms are now being diagnosed more frequently. Due to the rare diagnosis, no universal consensus exists concerning indications and methods of treatment. Here we report a case of CAA presented with an acute cholecystitis treated by conjoined splenic-hepatic trunk transposition and cholecystectomy.

CASE REPORT

A 62-year-old male was referred to Kyungpook National University Hospital with a seven day history of upper right quadrant abdominal pain. His abdominal pain gradually increased over the period and ultrasonography revealed cholecystitis with concomitant CAA. His past medical
history was significant for cerebral infarction and atrial fibrillation; nine years ago, he underwent mitral valvuloplasty followed by anticoagulation at another hospital.

A CT scan revealed an edematous, distended gall bladder with gallstones consistent with acute calculous cholecystitis and a 7-cm sized aneurysm located from the origin to bifurcation of celiac artery. The bifurcation of the common hepatic artery and splenic artery was free from aneurysmal dilatation and the proximal superior mesenteric artery (SMA) was stenotic (Fig. 1). The inferior mesenteric artery and both the internal iliac arteries were patent, and there were no other associated aneurysms being noted anywhere else.

To control the infection, we performed percutaneous drainage of the gall bladder initially and the bile obtained from drainage cultured *Raoultella planticola*. After drainage and antibiotics therapy for a week, his fever resolved and laboratory values were found to be within normal limits. However, since the patient complained mild epigastric discomfort and the size of CAA was large, thus, a surgery was scheduled. Through an upper midline incision, chole-
cystectomy was initially performed, and the celiac trunk was approached through lesser sac. After control of the branches of the celiac artery with vessel loops and aorta, the aneurysm was opened and the origin of celiac artery was oversewn with the aorta. However, the closure of the celiac artery caused the purple discoloration of the liver possibly due to insufficient arterial flow. Hence we decided to revascularize the celiac artery. To avoid prosthetic graft infection, we chose to perform a conjoined splenic-hepatic trunk transposition. The bifurcation of the common hepatic and splenic artery was disconnected from aneurysm and closed by lateral suture with preservation of the lumen. The proximal splenic artery was dissected distally followed by ligation of splenic artery 5-cm distal to the celiac bifurcation; the conjoined segment of common hepatic and proximal splenic artery was transposed and implanted to the supraceliac aorta (Fig. 2). After anastomosis, the liver color returned to normal.

The aneurysm was atherosclerotic on the pathologic examinations and the postoperative culture from the aneurysm wall was negative for infectious organisms. The patient was discharged without complications on the tenth postoperative day. A follow-up CT at 18 months revealed a fully patent-transposed graft and normal spleen (Fig. 3). No complications were observed during the 24 months of follow-up.

**DISCUSSION**

Since 1950, more than 75% of all reported CAAs were symptomatic (3). However, widespread use of current imaging modalities enabled early diagnosis of asymptomatic CAAs combined with other intra-abdominal disease as above. The general indications for surgical or endovascular treatment of a CAA include symptomatic, a rapid increase in size and CAAs greater than a certain critical size. Since the reported mortality rate associated with a ruptured CAA are 50% or higher, the above criteria are recommended for the treatment (2,3). However, due to its rare diagnosis, there is no consensus concerning the indications and methods of treatment. In fact, similarly to the aortic aneurysm, the most frequently used criteria for intervention is the size of the CAA. However, present size criterion for treatment varies widely according to the investigators and it ranges from 1.5 to 3 cm (2,4,5).

Traditionally, surgery has been the mainstay of treatment and various surgical techniques have been reported, such as aneurysmorrhaphy, aneurysmectomy, and revascularization with a prosthetic or vein graft, primary resection with arterio-arterial anastomosis or a simple ligation (2,4). Additionally, with the advancement of endovascular techniques, embolization or stent grafting is also feasible in some patients in which CAAs with an appropriate neck from the aorta or with a saccular appearance have been reported with positive outcomes (6-8).

The CAA present in our patient had some specific characteristics. Firstly, our CAA had no neck from the aorta and extended to just proximal to bifurcation of common hepatic and splenic artery. Secondly, the proximal superior mesenteric artery was stenotic. Finally, the CAA was associated with an infectious condition. Therefore, the surgical revascularization was necessary since the anatomy was unsuitable for endovascular management and inadequate collaterals from the SMA. Fortunately, the bifurcation of the hepatic
and splenic artery was free from aneurysmal dilatation; therefore, we used the conjoined splenic-hepatic trunk transposition with the possible presence of infection.

The major advantage of our above procedure was that we used arterial conduit. Therefore, conjoined splenic-hepatic trunk transposition can be used in patients with abdominal infections like vein grafts. Also, arterial conduits may be more durable compared to vein graft because its diameter is larger than the saphenous vein and the procedure requires only single anastomosis.

The major concern regarding splenic artery transposition is the infarction of the spleen. Traditional surgical management of splenic artery aneurysms includes proximal and distal ligation with or without aneurysmectomy for lesions in the proximal or middle portion of the splenic artery (9). Revascularization of the distal splenic artery is not generally warranted because collateral flow to the spleen is maintained by the short gastric arteries. Also, as seen in trauma cases, a collection of reports observe the safety of a splenic artery ligation as adjunct to splenorrhaphy with regards to splenic salvage and immune functions (10).

In conclusion, a CAA can be detected incidentally during diagnostic imaging for diseases such as abdominal infection; and conjoined splenic-hepatic trunk transposition for the repair of CAA can be an appropriate alternative procedure, especially in cases associated with infection and a need for revascularization.

REFERENCES