



# Embolotherapy of Ruptured Gastroepiploico-Colic Communicating Artery with Median Arcuate Ligament Syndrome: A Case Report

정중활췌인대 증후군 환자에서 나타난  
위그물막-오른잘록창자 교통동맥의 파열에 대한  
색전치료: 증례 보고

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Aneurysm of collateral vessels in celiac axis stenosis has seldom been reported. We report a case of hemoperitoneum due to spontaneous aneurysmal rupture of a previously unreported collateral vessel in a patient with median arcuate ligament syndrome. A 37-year-old man without any history of illness or trauma exhibited hemoperitoneum with an aneurysm in the right subhepatic area on CT. CT findings also included celiac stenosis due to median arcuate ligament thickening. Celiac and superior mesenteric artery angiography revealed an abnormal communicating artery aneurysm between the right gastroepiploic and right colic arteries. We named this aberrant anastomosis “gastroepiploico-colic communicating artery.” This rare collateral channel may cause spontaneous aneurysmal rupture in the presence of celiac stenosis. We successfully treated the aneurysmal rupture by transcatheter arterial embolization.

**Index terms** Collateral Circulation; Median Arcuate Ligament Syndrome; Aneurysm; Embolization, Therapeutic; Aneurysm, Ruptured; Vascular Malformations

## INTRODUCTION

In celiac axis stenosis, rich collateral circulations are known to develop from the superior mesenteric artery (SMA) to branches of the celiac artery (1); aneurysm of these collateral vessels has seldom been reported (2). Such aneurysms typically involve pan-

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creaticoduodenal and gastroduodenal arteries, and may rupture spontaneously (3). Here, we report a case in which we performed successful transcatheter arterial embolization for aneurysmal rupture of a previously unreported omental branch, the “gastroepiploico-colic communicating artery.”

## CASE REPORT

A 37-year-old male was referred to our emergency department with a complaint of abdominal pain that had been present for 1 day. On physical examination, he complained of tenderness in the right upper abdomen. He had no remarkable history of illness or trauma. His vital signs and hemoglobin level were relatively stable. Blood pressure was 126/76 mm Hg, pulse rate was 81 beats/minute, and hemoglobin level was 13 g/dL.

On the CT scan, the celiac stenosis was determined to be a result of median arcuate ligament syndrome. The median arcuate ligament was thickened, thereby compressing the celiac trunk (Fig. 1A). Enhanced abdominal CT and reconstructed CT angiography showed hemoperitoneum with an aneurysm in the right subhepatic area without any other direct extravasation of contrast, so the aneurysm was the convincing focus of bleeding (Fig. 1B). The aneurysm appeared to be located on a branch of the gastroduodenal artery (GDA) or SMA. Because the patient denied any trauma history or coagulopathy, the aneurysm was suspected to have ruptured spontaneously.

After taking CT scan, the hemoglobin level reduced to 11.9 g/dL, and packed red blood cell transfusion was initiated. Additionally, urgent arterial angiography was performed to establish a diagnosis and initiate proper treatment.

Both celiac and SMA angiography procedures were necessary for further evaluation. The GDA could not be visualized on celiac angiography. Only the common hepatic artery, proper hepatic artery (PHA) and splenic artery were shown. (Fig. 1C). However, SMA angiography revealed opacification of the GDA and other celiac branches, including the PHA and splenic artery (Fig. 1D); this was suggestive of celiac stenosis with collateral vessels. This patient had collateral pathways for celiac stenosis, including the pancreaticoduodenal arcades, dorsal pancreatic artery, and the communicating vessel between the right hepatic artery and SMA.

The aneurysm demonstrated on CT was then visualized on SMA angiography; it was in the right subhepatic area, as expected, but was present in an abnormal communicating artery between the right gastroepiploic and right colic arteries (Fig. 1E).

For treatment, embolization was performed at the distal and proximal portions of the aneurysm in the abnormal communicating artery with microcoils (6 mm/2 cm × 8, 8 mm/4 cm × 1, 4 mm/2 cm × 1, Tornado; Cook Medical, Bloomington, IN, USA) by using a microcatheter (Progreat 2.0; Terumo Interventional Systems, Somerset, NJ, USA) (Fig. 1F). Immediate follow-up SMA angiography showed complete embolization of the aneurysm without any immediate complication.

After the embolization, the patient's abdominal pain was relieved and the anemia did not worsen. A CT scan obtained 2 days after the procedure showed improved hemoperitoneum and no evidence of re-bleeding. He was discharged on the eighth hospital day without any additional treatment.

**Fig. 1.** Aneurysmal rupture of the aberrant collateral artery was treated by transcatheter arterial embolization.

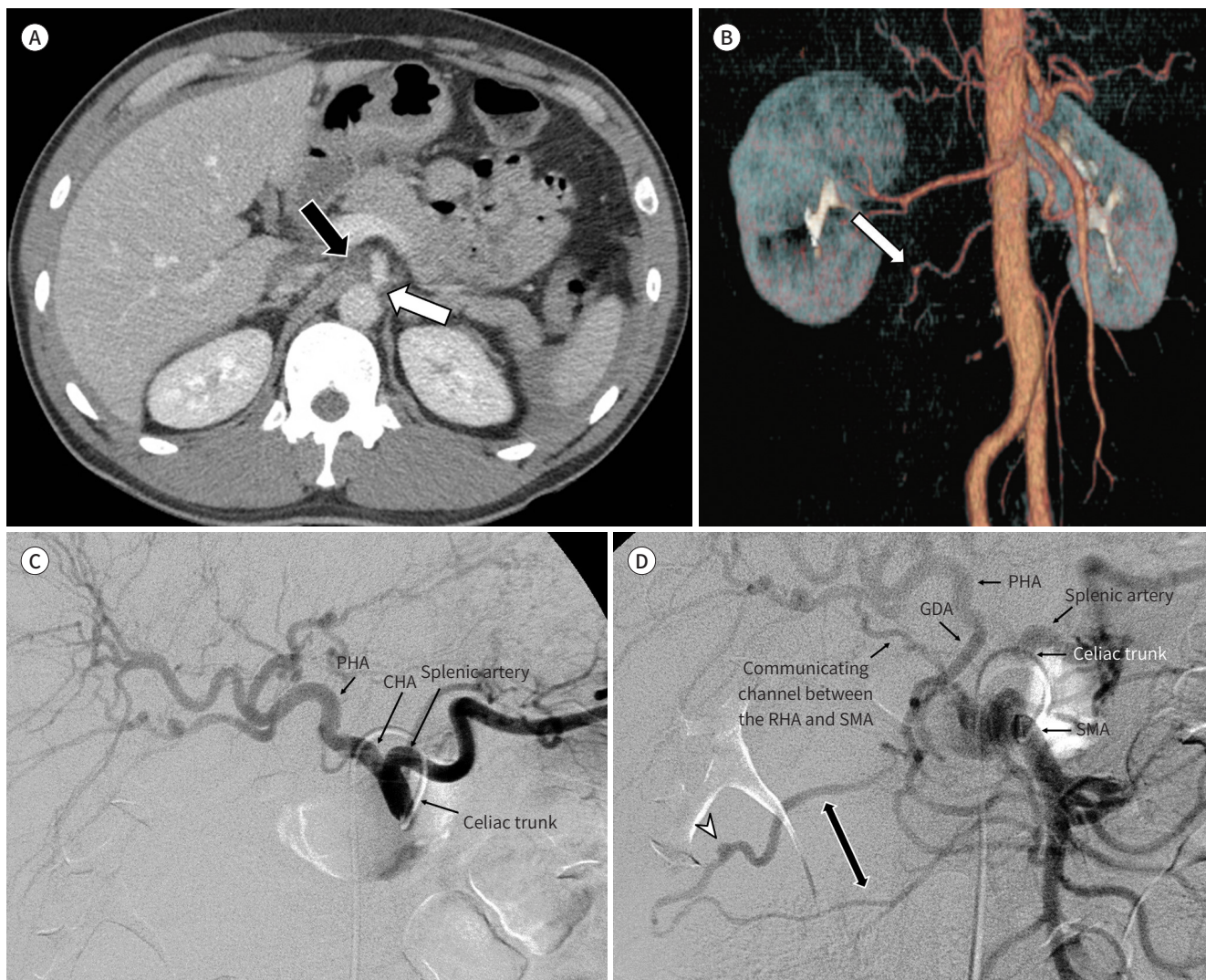
**A.** The median arcuate ligament (black arrow) appeared to be thickened and compressing the celiac trunk (white arrow), consistent with median arcuate ligament syndrome.

**B.** Reconstructed CT angiography showed an aneurysm (arrow) in the right subhepatic area.

**C.** The GDA was not visualized on celiac angiography. Only the CHA, PHA and splenic artery were visible (arrows).

**D.** SMA angiography revealed opacification of the GDA, PHA, splenic artery and the communicating channels between the RHA and SMA (black arrows). The aneurysm (white arrowhead) in the “gastroepiploico-colic communicating artery” (two way arrow).

CHA = common hepatic artery, GDA = gastroduodenal artery, PHA = proper hepatic artery, RHA = right hepatic artery, SMA = superior mesenteric artery



## DISCUSSION

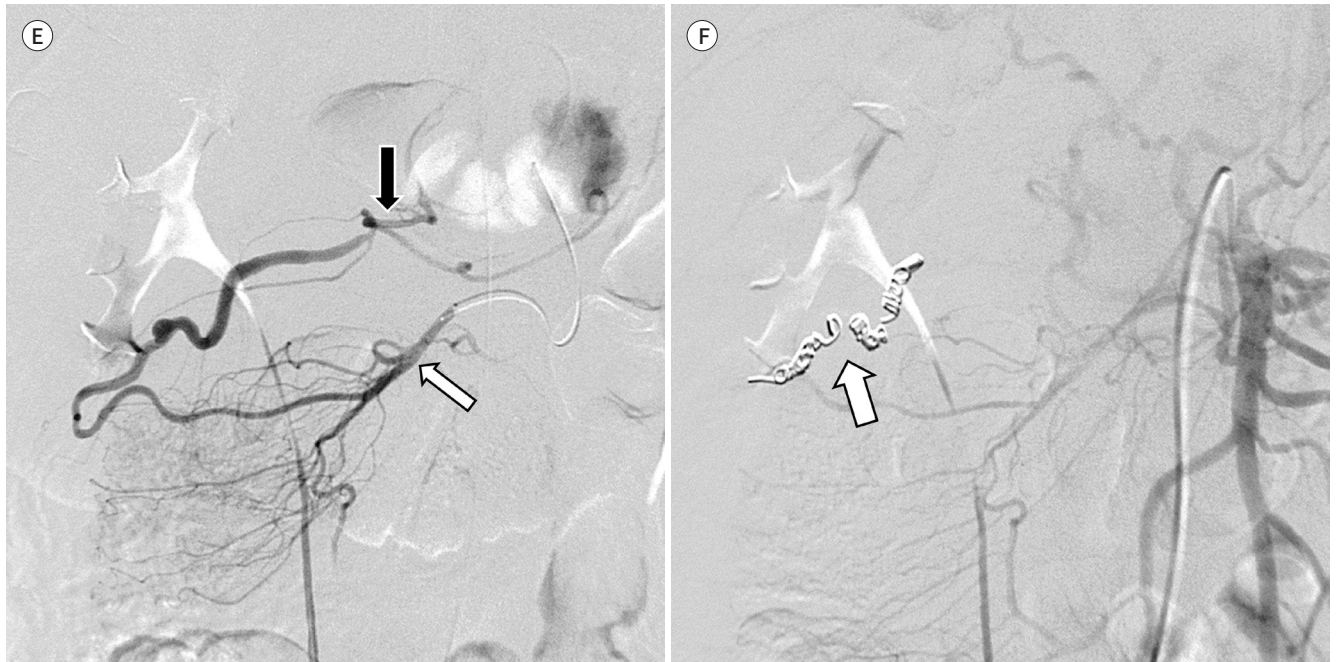
Pancreaticoduodenal arcades, dorsal pancreatic artery, the arc of Bühler, and a communicating channel between the right hepatic artery and SMA are known as collateral pathways in celiac stenosis (1). However, to our knowledge, a communicating artery between the gastroepiploic and right colic arteries in celiac stenosis has not been reported. We named this aberrant anastomosis “gastroepiploico-colic communicating artery.” It may be a collateral pathway arose on the omental anastomosis between the branches of gastroepiploic artery



**Fig. 1.** Aneurysmal rupture of the aberrant collateral artery was treated by transcatheter arterial embolization.

**E.** The “gastroepiploico-colic communicating artery” between the right gastroepiploic artery (black arrow) and right colic artery (white arrow) on right colic arteriography.

**F.** Embolization was performed at the distal and proximal portions of the aneurysm in the “gastroepiploico-colic communicating artery” with microcoils using a microcatheter (arrow).



and colic arteries. We speculate that increased blood flow from the SMA to the celiac branches led to reopening of this communicating channel. Aneurysms and ruptures of collateral arteries in celiac trunk stenosis have been reported (4). Common affected arteries are pancreaticoduodenal artery and GDA (3). In our case, there was an aneurysm in the gastroepiploico-colic communicating artery. An aneurysm typically develops in the weakest vessel; in our patient, this was the gastroepiploico-colic communicating artery, which was newly opened. Otherwise there could be other etiologies that the patient didn't recognize, such as minor trauma.

Transcatheter arterial embolization is now the treatment of choice for vascular aneurysm and aneurysmal rupture. Yet, the timing of preventive treatment for unruptured aneurysm is still controversial. According to Ogino et al. (4), embolization is necessary for all discovered aneurysm in the splanchnic artery because of its high frequency of rupture. However, some authors believed that the relative size of the aneurysm to the originating vessel is the most important factor and the bleeding occurred in aneurysms which had aneurysm-to-artery ratio of at least 3 in their study (5). Also, others suggested that the indication of interventional treatment is visceral aneurysm with 2 cm or more in diameter (6).

Lastly, It is important that in a patient with celiac stenosis, vascular evaluation is needed to screen for aneurysm since aneurysmal rupture of splanchnic vessels can be life-threatening.

#### Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

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## 정중활꼴인대 증후군 환자에서 나타난 위그물막-오른잘록창자 교통동맥의 파열에 대한 색전치료: 증례 보고

이유현 · 김정원 · 박재형\*

복강동맥 협착에서 발달한 이차적인 혈관에서 생기는 동맥류 파열은 매우 드물게 보고된 바 있다. 이 논문에서 우리는 복강동맥 협착에서 보이는 이차혈관 중 이전에 보고되지 않은 이차혈관에서 발생한 동맥류의 자발적 파열과 치료사례에 대해 보고하고자 한다. 특별한 과거력이 없는 37세 남자 환자가 복통을 주소로 촬영한 복부단층촬영영상에서 혈복강 및 오른쪽 간 밑영역에 동맥류 소견과 함께 정중활꼴인대 비대로 인한 복강동맥 협착소견을 보였다. 복강동맥과 상장간막동맥조영술에서 복강동맥 협착 소견이 보였고 오른 위그물막동맥과 오른 잘록창자동맥을 잇는 교통동맥에 생긴 동맥류의 파열을 확인하였다. 우리는 이 비정상동맥을 “위그물막-오른잘록창자 교통동맥”이라고 명명하였고, 경피경관동맥색전술을 통해 동맥류를 성공적으로 치료하였다.

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