



Jejunal Migration of the Stent-Graft Used for Common Hepatic Artery Pseudoaneurysm

총간동맥 가성동맥류의 치료로 삽입한 스텐트 그래프트의 공장으로의 위치 이동

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Hemorrhage after pancreaticobiliary surgery is an infrequent but fatal complication. It is primarily caused by rupture of the pseudoaneurysm, and treatment options include endovascular coil embolization or endovascular stent-graft placement. Herein, we report a case of migration of an arterial stent-graft that was placed in the common hepatic artery to treat pseudoaneurysm after pylorus-preserving pancreaticoduodenectomy. The stent-graft migrated to the jejunum and was eventually excreted from the body.

Index terms Foreign-Body Migration; Hepatic Artery; Stent; Aneurysm, False

INTRODUCTION

Following pancreaticobiliary surgery, there are some risks of complications such as infection, anastomotic leak, delayed gastric emptying, and bleeding. Visceral artery pseudoaneurysm is the leading cause of bleeding. The primary options for the treatment of pseudoaneurysm are coil embolization or stent-graft placement. Compared with coil embolization, stent-graft placement can reduce the duration of the procedure and preserve the distal blood flow (1). There have been several reported cases of coil migration to the gastrointestinal (GI) tract after treatment for visceral artery pseudoaneurysm or aneurysm (2-6); however, migration of a stent-graft is very rare, with only one case reported in the literature (7). To our knowledge, this is the first case of stent-graft migration from the common hepatic artery (CHA) to the jejunum.

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CASE REPORT

A 63-year-old female with a history of pylorus-preserving pancreaticoduodenectomy (PPPD) for cancer of the ampulla of Vater presented with abdominal pain and melena one month after the surgery. CT revealed a $45 \times 36 \times 43$ -mm CHA pseudoaneurysm embedded near the site of the pancreaticojejunostomy (Fig. 1A). Celiac arteriography showed a pseudoaneurysm with a wide neck (13×13 -mm), arising from the site of origin of the gastroduodenal artery (Fig. 1B). The patient immediately underwent placement of a 6×50 -mm stent-graft

Fig. 1. Jejunal migration of the stent-graft placed for common hepatic artery pseudoaneurysm.

A. Enhanced abdominal CT shows pseudoaneurysm of the common hepatic artery with a wide neck.

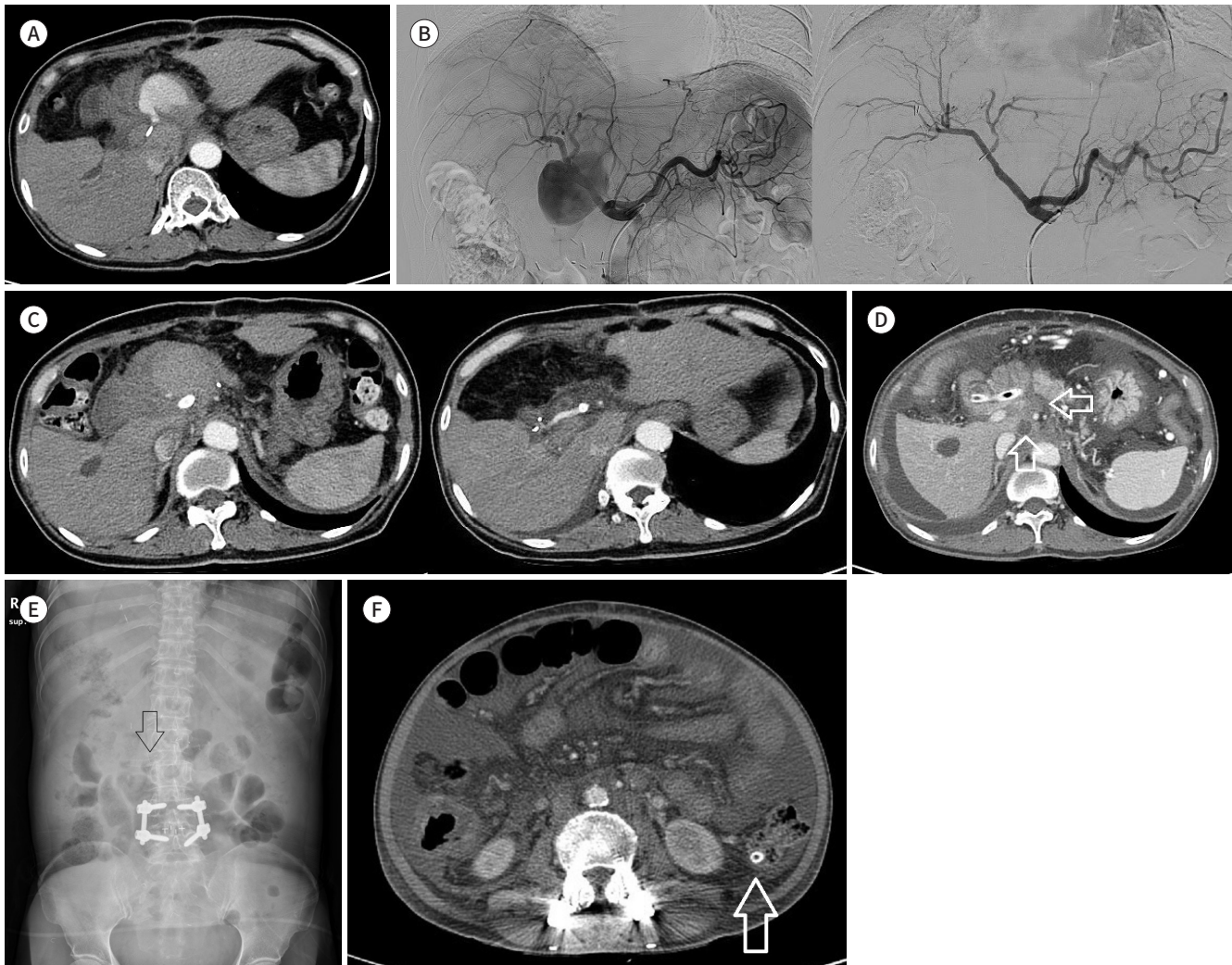
B. Celiac arteriogram shows pseudoaneurysm of the common hepatic artery (left); image acquired immediately after stent-graft placement shows preserved hepatic flow, with no extravasation of the contrast agent (right).

C. Enhanced abdominal CT images acquired 2 days after the stent-graft placement show no filling of contrast agent into the pseudoaneurysm (left) and preserved hepatic arterial flow (right).

D. Enhanced abdominal CT image acquired 17 months after the stent-graft placement shows the most of the stent-graft inside the jejunal lumen, surrounded by recurrent mass and lymphadenopathies (arrows).

E. Plain radiograph obtained 18 months after the stent-graft placement shows that the stent-graft (arrow) has moved to the bowel.

F. Enhanced abdominal CT acquired the next day shows the stent-graft (arrow) in the descending colon.



(Viabahn; W.L. Gore & Associates, Flagstaff, AZ, USA) in the CHA to the proper hepatic artery. Subsequent celiac arteriography showed no extravasation of the contrast media and preserved hepatic flow (Fig. 1B). CT at 2 days after the stent-graft insertion showed no filling of the contrast media in pseudoaneurysm and preserved distal arterial flow (Fig. 1C). The patient had no melena and her abdominal pain was relieved after the procedure. Her laboratory tests were within normal limit, which includes complete blood count, aspartate aminotransferase (AST), alanine aminotransferase (ALT), and alkaline phosphatase (ALP).

At 3 months after the treatment, CT showed total occlusion of the stent-graft with thrombus. Also, local recurrence and metastatic lymphadenopathies were observed. The laboratory test for liver function including AST, ALT, and ALP were still within normal limit. On follow up CT images obtained every 4–6 months, the stent-graft gradually moved ventrally.

At 17 months after the stent-graft insertion, she presented with recurrent melena and anemia (hemoglobin, 6.7 g/dL). An endoscopic examination showed old blood in the jejunal loop; however, there was no focus of bleeding in the upper GI tract. Abdominal CT demonstrated no sites of active bleeding. However, CT showed almost every part of the stent-graft locating inside the jejunal lumen with occlusion of common and proper hepatic artery (Fig. 1D). Also, there were recurrent mass and enlarged lymph nodes surrounding the stent-graft.

She received blood transfusion several times and anemia was improved (hemoglobin, 10.7 g/dL). Serial abdominal plain radiography and CT showed that the stent-graft moved to the descending colon and escaped the abdominal cavity (Fig. 1E, F). There was no symptom during the stent-graft migration process.

Written informed consent was obtained from the patient for the procedures. The study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki.

DISCUSSION

Vascular stent-graft migration to the GI tract is extremely rare, although there have been several reports regarding the migration of endovascular coils. Takahashi et al. (2) reported that the embolized coils in a splenic artery pseudoaneurysm migrated to the stomach via pre-existing fistula, which had formed after chronic pancreatitis. Shah et al. (3) and Skipworth et al. (4) reported that the embolized coils in the splenic artery pseudoaneurysmal sac passed through the rectum through a pre-existing enteric fistula, which would have been a sequela of chronic pancreatitis. Tekola et al. (5) demonstrated the migration of embolized coil fragments from the splenic artery, extruding into the gastric lumen in immunocompromised patient who developed a recurrent infection. Nomura et al. (6) reported that the coils placed in the hepatic artery aneurysm had penetrated the duodenum through aneurysm-duodenal fistula in a patient who had severe adhesions around the duodenal second part. The authors suggested that infection and inflammation at the coil site are the triggers during erosive process. Most reports about arterial coil migration to the GI tract are related to infection and inflammation, which can lead to fistula formation.

Stent-grafts are different from coils in that they have an adequate diameter and length, due to which migration through an arterio-enteric fistula is difficult. Our case had some elements that allowed this rare event to occur. First, the patient had undergone PPPD, leading to a

chronic inflammatory process due to the resected pancreas. Second, a wide arterial wall defect allowed the stent-graft to pass through. Third, the recurrence of the mass and metastatic lymph nodes around the stent-graft would have exerted pressure on the stent-graft, making it difficult for the stent-graft to stay in place. Therefore, the jejunal loop adjacent to the stent-graft placed in the CHA would have been involved in the erosive process and created the arteriojejunal fistula.

We reported the first case of stent-graft migration to the jejunum after treatment for a pseudoaneurysm of the CHA. Although stent-graft placement is an ideal treatment for hepatic artery pseudoaneurysm, there is a risk of stent-graft migration.

Author Contributions

Conceptualization, L.B.; data curation, K.J.; formal analysis, all authors; investigation, all authors; project administration, L.B.; supervision, L.B.; validation, L.B.; visualization, K.J.; writing—original draft, K.J.; and writing—review & editing, all authors.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

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REFERENCES

1. Hasegawa T, Ota H, Matsuura T, Seiji K, Mugikura S, Motoi F, et al. Endovascular treatment of hepatic artery pseudoaneurysm after pancreaticoduodenectomy: risk factors associated with mortality and complications. *J Vasc Interv Radiol* 2017;28:50-59.e5
2. Takahashi T, Shimada K, Kobayashi N, Kakita A. Migration of steel-wire coils into the stomach after transcatheter arterial embolization for a bleeding splenic artery pseudoaneurysm: report of a case. *Surg Today* 2001;31:458-462
3. Shah NA, Akingboye A, Haldipur N, Mackinlay JY, Jacob G. Embolization coils migrating and being passed per rectum after embolization of a splenic artery pseudoaneurysm, “the migrating coil”: a case report. *Cardiovasc Intervent Radiol* 2007;30:1259-1262
4. Skipworth JR, Morkane C, Raptis DA, Kennedy L, Johal K, Pendse D, et al. Coil migration—a rare complication of endovascular exclusion of visceral artery pseudoaneurysms and aneurysms. *Ann R Coll Surg Engl* 2011;93:e19-e23
5. Tekola BD, Arner DM, Behm BW. Coil migration after transarterial coil embolization of a splenic artery pseudoaneurysm. *Case Rep Gastroenterol* 2013;7:487-491
6. Nomura Y, Gotake Y, Okada T, Yamaguchi M, Sugimoto K, Okita Y. Coil migration to the duodenum 1 year following embolisation of a ruptured giant common hepatic artery aneurysm. *EJVES Short Rep* 2018;39:33-36
7. Tokunaga K, Furuta A, Yoshimura M, Togashi K. Superior mesenteric artery stent-graft migration into the duodenum. *J Vasc Interv Radiol* 2019;30:1614

총간동맥 가성동맥류의 치료로 삽입한 스텐트 그래프트의 공장으로의 위치 이동

김지원 · 이병희*

췌장-담도계 수술 후에 발생하는 합병증 중에 출혈은 드물지만 사망률이 높은 합병증이다. 출혈의 주요 원인은 가성동맥류의 파열이며, 코일색전술 혹은 혈관 내 스텐트 그래프트 삽입술이 효과적인 치료 방법으로 알려져 있다. 저자들은 유문부 보존 췌두부십이지장절제술 이후 발생한 총간동맥의 가성동맥류의 치료를 위해 삽입한 스텐트 그래프트가 공장으로 이동한 후 몸 밖으로 빠져나간 사례를 보고하고자 한다.

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