

STENTING OF RUPTURED GASTRODUODENAL ARTERY PSEUDOANEURYSM

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ABSTRACT

Gastroduodenal artery (GDA) aneurysm is a rare surgical entity that causes various symptoms. In the case of rupture, it usually presents an ominous prognosis and mortality rate of up to 40%. Although open surgical procedure is a mainstay, endovascular intervention is emerging a promising treatment in recent years, due to its advantages and safety. We present a case of upper gastrointestinal bleeding caused by ruptured GDA pseudoaneurysm in a 71-year-old woman, with medical episodes of acute pancreatitis, a pancreatic body tumor removal surgery was performed, and now the tumor is relapsing and metastasizing. The treatment approach is blocking off the pseudoaneurysm by a covered stent. The procedure was successful and the patient is asymptomatic. Two months later, the pseudoaneurysm reduces its size and completely excluded from the preservation of the blood flow in the artery. Follow-up to 26 month, patient is well, no symptoms or recurrence. Endovascular interventional treatment in the case of GDA aneurysms is considered a promising alternative not only to open surgery but also to an effective emerging technique even in the acute setting.

Keywords: *Gastroduodenal artery - Covered stent - Aneurysm*

I. INTRODUCTION

Visceral artery aneurysm is a rare surgical entity (0.01 - 0.2% population) with a mortality rate of up to 40%, usually presenting in the celiac trunk, hepatic and splenic arteries [1,2]. GDA aneurysms are rare, accounting for approximately 1.5% of all visceral artery aneurysms [3]. The etiology of aneurysms is unclear, most of the cases rising while pancreatitis, trauma, post-surgery, hypertension [1,4].

Visceral artery aneurysm is usually asymptomatic or may cause vague symptoms until

rupture, severe abdominal pain, gastrointestinal bleeding, hemodynamic instability predominate, and threat life. The urgent surgical management is the mainstay; however, it is an invasive technique so it increases risks and severe post-surgical complications. With the development of medical technology in recent years, visceral aneurysms can be treated by endovascular intervention, which is minimally invasive. Aneurysms embolization with intravascular coils or covered stents, and most current studies show good consequences [2,5,6].

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In this article, we presented a rare case of ruptured GDA pseudoaneurysm which was treated by endovascular intervention with covered stent.

II. CASE REPORT

A 71-year-old woman was admitted to the emergency room with hematemesis. Three months prior to hospitalization, she complained about dull pains in epigastric area. One day before hospitalization, she had an intensified epigastric pain associate with nausea. On the day of hospitalization, she was admitted to Thong Nhat hospital's emergency room with hematemesis, an indetectable amount of blood and associating with an intensified epigastric pain.

Regarding her medical history, she had had a pancreatic tumor that was removed 2 years ago, 3 episodes of pancreatitis pre- and post-surgery. After the procedure, she was diagnosed with an aneurysm in the epigastric area but no treatment was performed. In last year, she had two gastrointestinal bleeding episodes which required to be treated in

hospital but she refused surgical management for removing her aneurysm.

Her clinical examination includes an average general state, anemia's signs, pale epidermidis, abdominal examination: a mass in the pulsation epigastric area. A complete blood count (CBC): WBC 12.2 k/uL, RBC 2.25 M/uL, HCG 5.6 g/dL, Hct 18.3%, PLT 215 k/uL. Upper GI endoscopy findings include old blood in the stomach, no detection of the bleeding area after cleaning by water. CT angiography's findings demonstrate a pseudoaneurysm in the hepatic hilar area which originates from a GDA's branch, enhancement in the artery phase, size # 71x72mm, neck # 4mm, distance to the origin of GDA # 12mm, the adjacent adipose tissue infiltrates and hematoma surrounded aneurysm evoke a threatened rupture (**Figure 1**).

Recurrent pancreatic tumor in the pancreatic cutting position invades the small intestinal mesenteric root. Metastasing's findings in the base of both lungs with metastasized nodes.

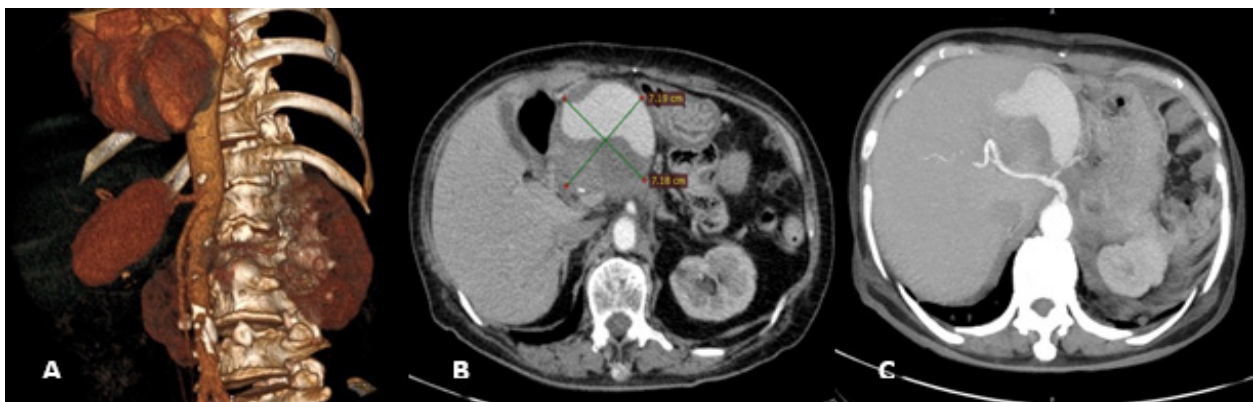


Figure 1: CT contrast enhancement pre-procedure. A: MIP findings demonstrate a massive pseudoaneurysm, enhance contrast in the arterial phase, narrow-neck, and originating from the GDA. B: The sac of pseudoaneurysm is really close to the D2-duodenum, size # 71x72mm, containing a bit old blood and adjacent hematoma. C: 3D VR findings demonstrate the correlation of the pseudoaneurysm and other visceral arteries, strongly enhance contrast in the arterial phase.

Following a general examination and a checkup for her underlying conditions, we perform an urgent endovascular intervention to block the pseudoaneurysm by a covered stent. Technique: Local anesthesia, inserting through the right common

femoral artery, 6F sheath, hydrophilic guiding wire 0.035/150mm (Terumo, Japan), and Yashimoto guiding catheter (Terumo, Japan) to select the celiac trunk. DSA demonstrates a pseudoaneurysm of the GDA, distance # 70mm, narrow-neck, distance

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from the neck to the origin of the GDA is enough to perform covered stent. The procedure was performed by using the interventional 6F sheath (Cordis, US) to set in the celiac trunk, after that, using a microwire 0.014/180mm (Terumo, Japan) to set in the GDA through the pseudoaneurysm. A covered stent PK Papyrus 4x20mm (Biotronik, Germany) was inserted into GDA by a guiding catheter. Using a Roadmap

to localize the mouth of the pseudoaneurysm and the origin of the GDA, carefully confirm the exact position, then expanding the covered stent under careful DSA observation. After the expansion of the stent, the pseudoaneurysm's neck is completely covered by the stent, no leak of contrast material outside the stent and it's completely isolated from the blood flow, as demonstrated by angiography (**Figure 2**).

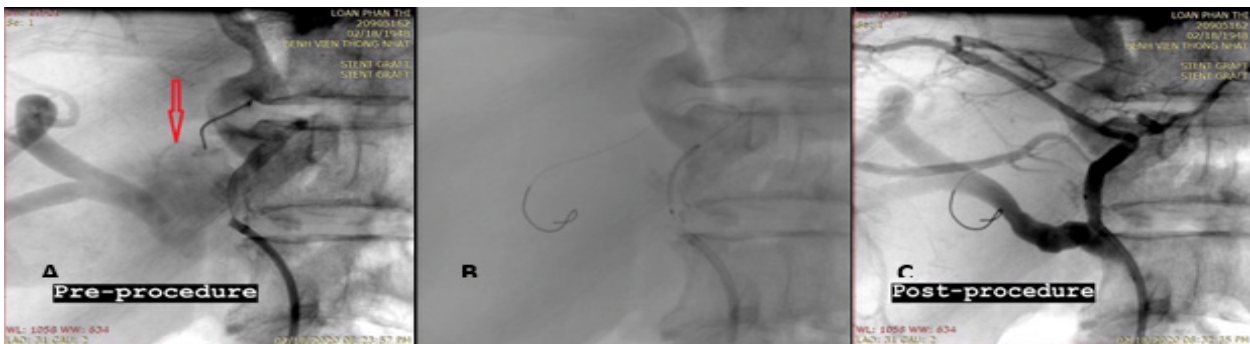


Figure 2: DSA findings. A: In the pre-procedure stage, 6F, microwire 0.014 in the GDA and the pseudoaneurysm (red arrow). B: Guiding catheter, microwire, and unexpanded covered stent in the location of the GDA's pseudoaneurysm. C: In the post-procedure stage, the covered stent is successfully expanded in the right position, the sac of the pseudoaneurysm is completely isolated from the blood flow (no blood inflow) and no negative effects on other arteries.

The procedure was successful, the patient left the hospital three days later. She remains well, without abdominal pain and gastrointestinal bleeding. After 2 months, the sac reduces to #30x50mm, completely liquefying, no more contrast enhancement, no signs of ischemia, or infraction of adjacent organs (**Figure 3**). The abdominal sonography shows that the right position of the covered stent was successfully set in the GDA, clear border of the sac, and no blood inflow.

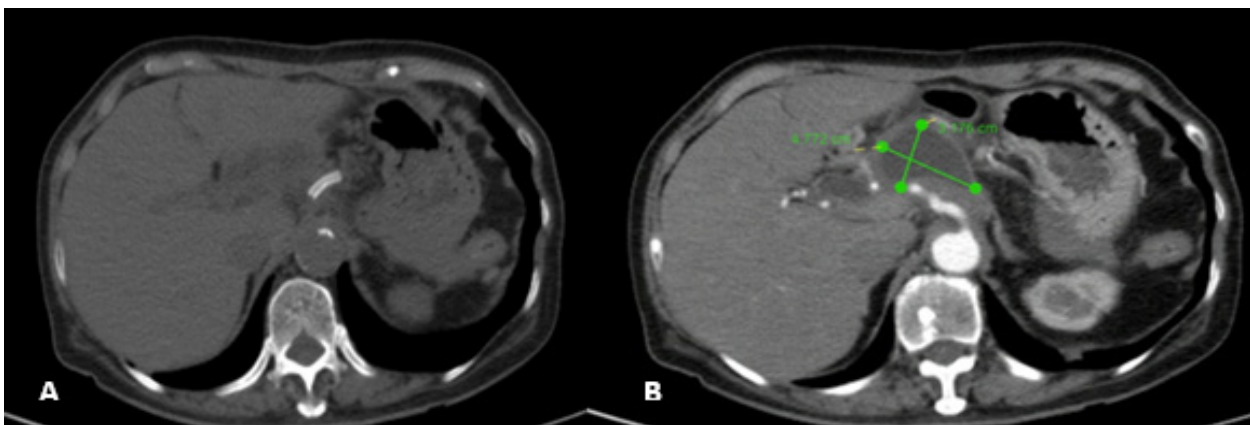


Figure 3: CT contrast enhancement 2 months later. A: On the CT plain findings demonstrate the right position of the stent in the GDA. B: The pseudoaneurysm's size decreases significantly, inside fluid is iso-density, no more contrast enhancement or blood flow.

III. DISCUSSION

GDA aneurysm is really rare, accounting for approximately 1.5% of the visceral aneurysms [1-3]. Pancreatitis, trauma, post-surgery, ulcer, atherosclerosis, and stenosis of the SMA are also a few common etiologies [1,7]. Pancreatitis accompanies 80% of almost aneurysm cases and erosion of the adjacent arteries is the reason why aneurysms establish. There are other uncommon etiologies such as autoimmune diseases and the absence of the celiac axis.

In general, the aneurysm is asymptomatic and it presents as an incidental finding on imaging studies or complication events. However, its complications are various and severe. Based on medical reports, 35% of GDA aneurysms, regardless the size, present with rupture causing abdominal pain, hypotension, hypovolemic shock, and mortality rate of up to 21% [1,4]. Erosion of the adjacent anatomical structures may be manifested with intraperitoneal or gastrointestinal bleeding and hemobilia if the aneurysm ruptures towards the common bile duct and the pancreatic duct [8].

Interestingly, in our case, the pseudoaneurysm was identified before, possibly due to post-surgery of removing pancreatic tumor and pancreatitis, which may cause abdominal dull pain associating with 3 times of gastrointestinal, indicating that the pseudoaneurysm has threatened rupture at least 3 times.

Most recommendations advocate treatment of visceral aneurysm which length longer than 2 cm. However, the GDA aneurysm should be treated as soon as possible. Because some reports show an unclear correlation between ruptured complication and aneurysm's size [6]. Some authors advocate early treatment of visceral aneurysm with an aggressive surgical approach, even if they are asymptomatic, due to high mortality rates in case of rupture. Others support the use of endovascular techniques, either coil embolization or covered stent, with a success rate of 98%, and suggest that open surgery should

be reserved for complicated cases or not selected for endovascular intervention [5,6]. However, there are many underlying conditions on our patient, with a complicated medical history of removal pancreatic tumor surgery which is relapsing and distance metastasis, the sac is massive and signs of threatened rupture, which are high risks if we perform an open surgical approach thus we chose endovascular intervention to approach.

The classic interventional methods and commonly used to treat the aneurysms are coil embolization, gelatin foam, PVA particles, or ONYX [9]. After the procedure, recanalization with incidence rates from 9% to 43% and organ infraction is the most important long-term complication of this technique [10]. Using a covered stent, the sac of aneurysm could be completely excluded and still preserving the blood flow in the artery. This technique demonstrates its advantages and safety as no complication of ischemia, or also no increase of the pressure inside the sack which is vulnerable by coils and may cause aneurysm's rupture. Ishibashi, et al. demonstrated a stent graft is used not only for asymptomatic visceral aneurysm, but also for ruptured, leaking, or dissecting ones. Rossi, et al [5] reported 3 cases of aneurysm stenting in the splenic artery and one of pseudoaneurysm stenting in the common hepatic artery. The procedure was successful in all cases and one patient progressed splenic infraction that was attributed to manipulation of the devices. Tsai, et al. treated effectively a 53-year-old patient with a spontaneously dissecting wide-neck pseudoaneurysm of the SMA with a covered stent.

Currently, there are not any acknowledged universal guidelines for the GDA aneurysm and the treatment has been individualized based on the patient's state, surgeon's selection, techniques, and types of equipment of the hospital. Nevertheless, endovascular intervention should be considered a promising alternative to open surgery, due to less aggressive intervention and lower mortality.

IV. CONCLUSION

GDA aneurysms are rare accompanying various clinical symptoms. Interventional technique of treating GDA aneurysm by covered stent is emerging an effective technique even in the acute setting and especially, in those patients who have high risks of open surgery.

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