

The Outcome of Embolization of the Non-Traumatic Pancreatic Pseudoaneurysm : A Single Center Experience

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Introduction

Non-traumatic pancreatic pseudoaneurysms represent a rare but potentially life-threatening vascular complication associated with various pancreatic pathologies. Unlike traumatic pseudoaneurysms, which result from direct injury, non-traumatic cases often arise secondary to inflammatory conditions, pancreatitis, or neoplasm. We present a series of cases and investigate the pathophysiologic mechanisms, diagnostic modalities, with a focus on the role of minimally-invasive intervention such as coil embolization.

Methods

We employed a retrospective analysis of patients with non-traumatic pancreatic pseudoaneurysms who underwent endovascular treatment from January 2018 to December 2023. The patient clinical presentations, preprocedural imaging findings (estimated size, amount, and originated blood vessel), procedural methods, and the fate of the aneurysm, outcome, and postprocedural complication (splenic infarct or abscess, splenic vein thrombosis, recurrence of the aneurysm) were meticulously reviewed.

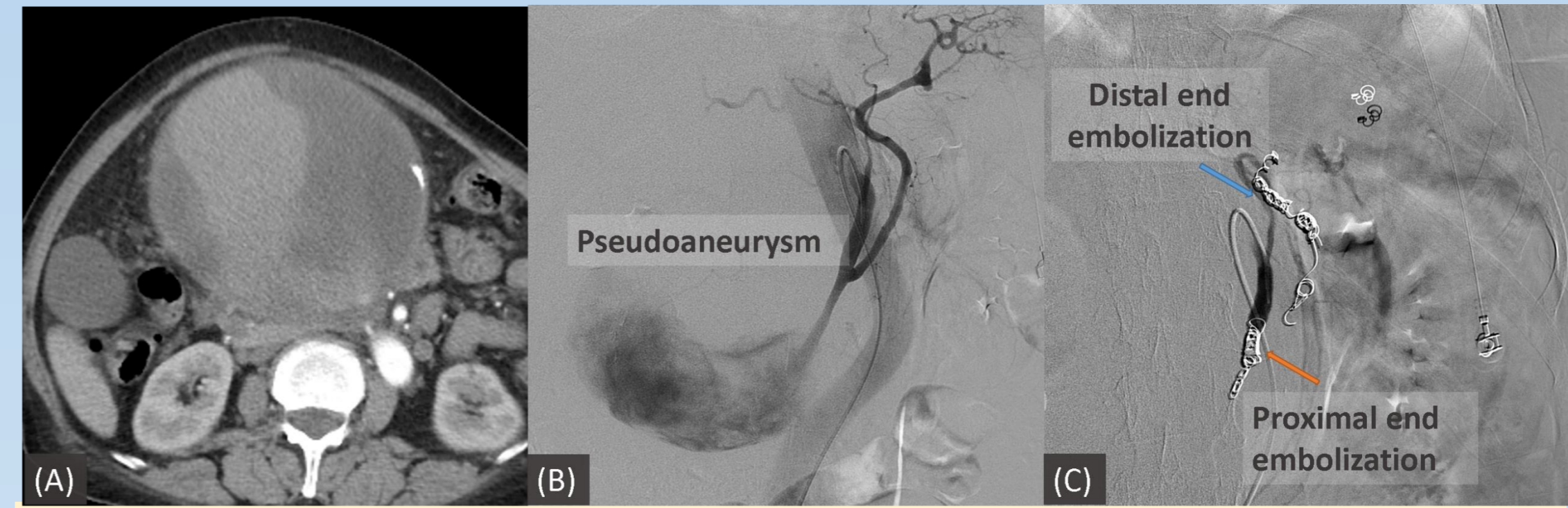
Result

16 patients were included in our institute. Pre-operative abdominal CT examination showed that 14 patients had pancreatitis, and the other 2 patients had received liver transplantation. All 16 cases were solitary pseudoaneurysms. The pseudoaneurysms ranged from 0.6 to 15 cm in size. The location and other details of the pseudoaneurysm are listed as below (see table).

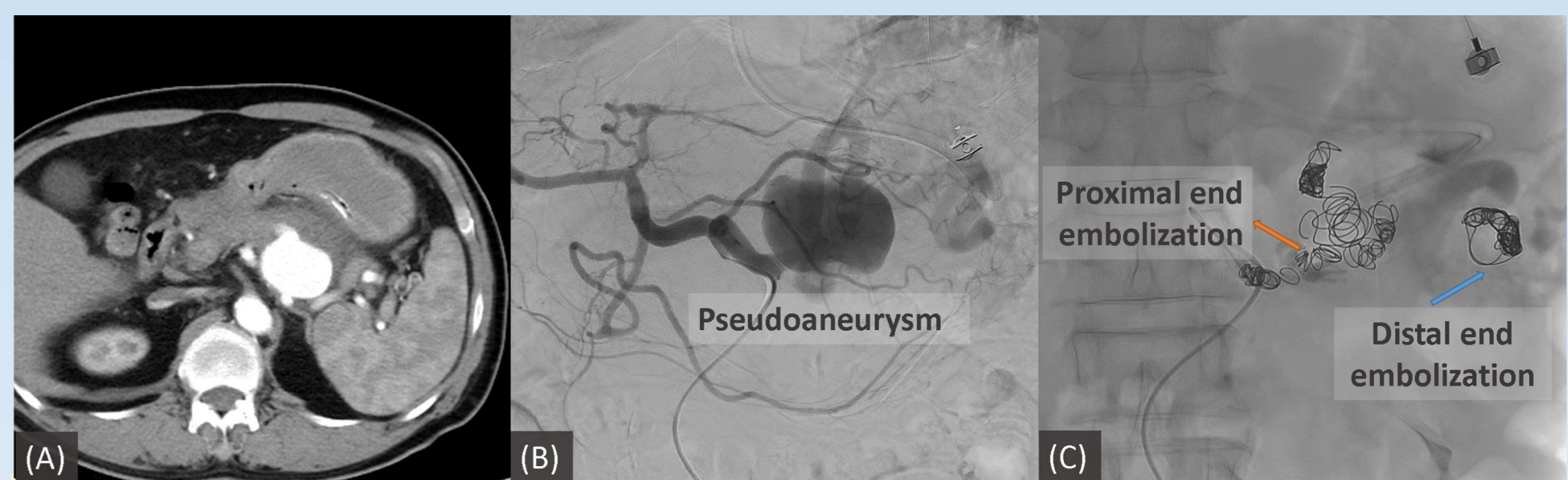
Most treatment adopted embolization, and use the sandwich technique (embolization both of the distal and proximal ends, to avoid back-flow of collateral circulation, such as the pancreaticoduodenal arcades, left gastroepiploic artery, and short gastric artery). All 15 cases were embolized successfully, but one case was transferred to operation (exploratory laparotomy and aneurysmoplasty) due to the pseudoaneurysmal sac with short neck and resulted in coil migration. Of the 13 cases in which the sac was located in the splenic artery, 9 cases were complicated with splenic infarction and subsequent abscess. As for those sacs located in the DPA or IPDA, there were no subsequent cases of splenic infarction and abscess. No splenic vein thrombosis or aneurysm recurrence occurred in any of the 16 patients during inpatient and outpatient follow-up; except for one who eventually died of multiple organ failure.

Table	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
Age/Sex	74/F	51/M	65/M	59/M	68/M	52/M	51/M	67/M
Etiology	Chronic Pancreatitis	Chronic Pancreatitis	Chronic Pancreatitis	Chronic Pancreatitis	Chronic Pancreatitis	Chronic Pancreatitis	Chronic Pancreatitis	Chronic Pancreatitis
Aneurysm size	15 cm	1.7 cm	5.8 cm	1.0 cm	1.4 cm	4.0 cm	0.6 cm	1.0 cm
Method	Coiling	Coiling	Coiling failed, turn to OP	Coiling	Coiling	Coiling	Coiling	Coiling
Originated vessel	DPA	SA	IPDA	SA	SA	SA	SA	IPDA
Outcome	success	success	OP success	success	success	success	success	success
Complication		splenic infarct		splenic infarct	splenic infarct	splenic infarct		
Table	No. 9	No. 10	No. 11	No. 12	No. 13	No. 14	No. 15	No. 16
Age/Sex	59/M	58/M	34/M	61/M	69/M	54/M	54/M	55/F
Etiology	Chronic Pancreatitis	Chronic Pancreatitis	Chronic Pancreatitis	Chronic Pancreatitis	Chronic Pancreatitis	Chronic Pancreatitis	Liver transplant	Liver transplant
Aneurysm size	3.0 cm	3.5 cm	2.4 cm	1.8 cm	4.3 cm	1.5 cm	4.4 cm	1.1 cm
Method	Coiling	Coiling	Coiling	Coiling	Coiling	Coiling	Coiling	Coiling
Originated vessel	SA	SA	SA	SA	SA	SA	SA	SA
Outcome	success	success	success	success	success	success	success	success
Complication	Post op coil migration		splenic infarct	splenic infarct		splenic infarct		

DPA: dorsal pancreatic artery, SA: splenic artery, IPDA: inferior pancreaticoduodenal artery, OP: operation



Case1 : A pseudoaneurysm was originated from dorsal pancreatic artery. Coil embolization was performed successfully with sandwich technique (5Fr C1 catheter, 2.7Fr microcatheter).



Case13 : A pseudoaneurysm was originated from splenic artery. Coil embolization was performed successfully with sandwich technique (5Fr RH catheter, 2.7Fr microcatheter).

Discussion & Conclusion

In this analysis, the major etiology is chronic pancreatitis, which is compatible with literature. As for the 2 cases occurred in the post-liver transplantation, although reasons for the development of pseudo-aneurysms after transplantation remain unclear, one possible factor is similar to aneurysm, which is due to the increase in splenic artery blood flow and the decrease in portal vein resistance.

There is variant size of the pseudoaneurysms in our study. Based on pathophysiology, a pseudoaneurysm may result from enzyme autodigestion and weakening of the peripancreatic artery wall, which results in a vascular cystic structure or secondary hemorrhage into a preexisting pseudocyst of a certain size. Larger size may occurred in the latter.

During coil embolization, the Sandwich technique is suggested, which can avoid the collateral circulation from the pancreaticoduodenal arcades, left gastro-epiploic artery and short gastric artery. Besides, given the extensive collateralization of the viscera, visceral ischemia are not in the embolization of the dorsal pancreatic artery (PDA), superior or inferior pancreatico-duodenal artery (SPDA, IPDA), or even gastroduodenal artery (GDA). As for embolization of pseudoaneurysm supplied splenic artery (SA), which may eventually results in splenic infarction but most not requiring splenectomy. Grossly, coil embolization provide an effective and safety treatment for pancreatic pseudoaneurysm.

In sum, prompt diagnosis and intervention of pancreatic pseudoaneurysm is important. Currently, management is with endovascular coil embolization and/or surgical resection. Endovascular embolization provides a safe, effective treatment, while candidate selection and informing the possibility of post-embolization syndrome still required.

References

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