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Case Report *Vascular Interventions*

A rare complication of acute pancreatitis after bronchial artery embolization for refractory and massive hemoptysis: A case report and literature review

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ABSTRACT

We present a case of acute pancreatitis following the transarterial embolization (TAE) procedure for bronchial artery hemoptysis. A 57-year-old Taiwanese male patient with polycystic kidney disease, end-stage renal disease, coronary artery disease, and bronchiectasis presented with refractory and massive hemoptysis. Initially, an angiography was performed, revealing an arteriovenous fistula in the right bronchial artery followed by TAE. Hemoptysis resolved after the procedure without any complications. Two months post-procedure, the patient experienced refractory and massive hemoptysis, which necessitated a secondary angiography and embolization of the right bronchial artery. Acute epigastric pain developed 10 h after the procedure, and acute pancreatitis was diagnosed after excluding other possible causes. The pancreatitis improved with conservative treatment. To the best of our knowledge, this is the first reported case of acute pancreatitis as a potential complication of bronchial artery embolization. The management is similar to that of patients with acute pancreatitis caused by other etiologies.

Keywords: Acute pancreatitis, arteriovenous fistula, bronchial artery, transarterial embolization

INTRODUCTION

Bronchial artery embolization has become a safe and efficient intervention for life-threatening and refractory hemoptysis, with a complication rate of 13.6%. Most complications are self-limiting and include fever, chest pain, back pain, and weakness in the lower limbs.[1] Here, we report a case of acute pancreatitis that developed after transarterial embolization (TAE) for refractory hemoptysis caused by an arteriovenous fistula of the bronchial artery. To the best of our knowledge, this is the first reported case of acute pancreatitis as a potential complication of bronchial artery embolization.

CASE REPORT

A 57-year-old Taiwanese male with a medical history of coronary artery disease status post-stent placement, polycystic kidney disease, end-stage renal disease undergoing regular hemodialysis, and bronchiectasis presented to our emergency department due to massive hemoptysis on that day.

Before this admission, the patient was diagnosed with bronchiectasis and a bronchial arteriovenous fistula, presenting with refractory and massive hemoptysis status post-TAE.

The patient tolerated the procedure well and remained stable, exhibiting no symptoms or signs of complication. Hemoptysis was resolved following the procedure.

Refractory and massive hemoptysis recurred 2 months after the first TAE, with over 500 mL of fresh blood suddenly discharged while the patient was at work. The patient presented to the emergency department with hypoxemia on room air (oxygen saturation 75%), and his oxygen saturation could only be maintained at 95% with a non-rebreathing mask at 15 L/min. The patient was admitted under the impression of deterioration of the underlying bronchiectasis, precipitated by pneumonia. Empirical antibiotic treatment with piperacillin-tazobactam was administered for the pneumonia. A repeated bronchoscopy was performed, which reported no endobronchial structural abnormalities and no active bleeding from the airways. Due to the risks associated with surgical resection, considering the underlying conditions including coronary artery disease and the lesser amount of hemoptysis at that time, a secondary elective angiography of the right bronchial artery was conducted, confirming recanalization of the arteriovenous fistula [Figure 1]. Embolization with Embozene microspheres (700 μm) was performed again. Severe epigastric pain developed 10 h after the procedure. Suspecting an aortic dissection or ischemic bowel, a computed tomography scan with contrast, along with laboratory work-ups, was conducted, revealing mild fat stranding over the pancreatic body, without evidence of aortic dissection or obvious filling defects in the mesenteric artery [Figure 2]. Laboratory data indicated increased amylase (176 U/L) and lipase (155 U/L), with no elevation of hepatobiliary enzymes, triglycerides, lactate, or electrolyte imbalances [Table 1]. Acute pancreatitis was diagnosed, and conservative treatment (nil per os, intravenous fluids, and analgesics with morphine) was initiated. An abdominal ultrasound was performed, revealing no dilation of the common bile duct or bile stones.

The peaks of amylase and lipase were observed 2 days after the procedure (2444 U/L and 2653 U/L, respectively) [Table 1], and oral feeding was commenced 5 days post-procedure, on resolution of abdominal pain and recovery of pancreatic enzymes. The patient reported occasional intolerance to the diet. The patient was discharged 2 weeks after admission, with the restoration of an oral diet fully ensured. Neither abdominal pain nor recurrence of hemoptysis was noted during outpatient clinic follow-up after discharge.

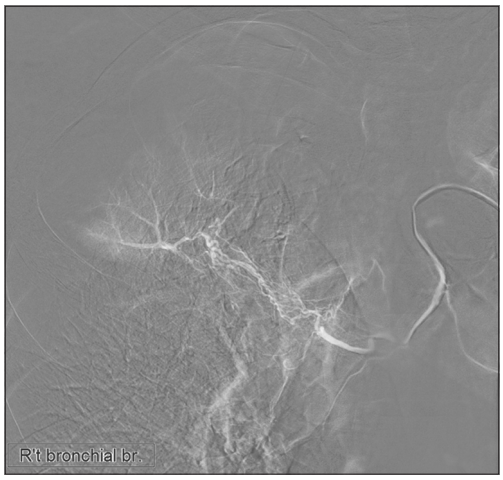

Figure 1: A 57-year-old man with polycystic kidney disease, end-stage renal disease, coronary artery disease, and bronchiectasis presented with refractory and massive hemoptysis. Angiography revealed a serpiginous vascular structure in the distal right bronchial artery, along with early-appearing venous structures, suggestive of a bronchial arteriovenous fistula. After super-selectively catheterizing the right bronchial artery using a microcatheter, transarterial embolization was performed.

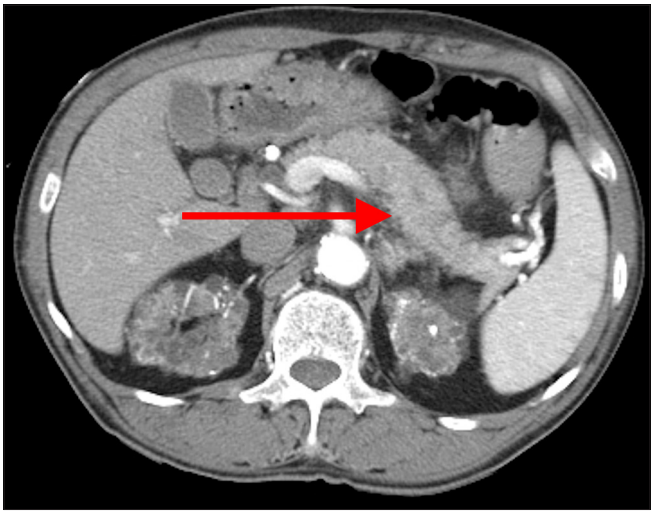

Figure 2: A 57-year-old man with polycystic kidney disease, end-stage renal disease, coronary artery disease, and bronchiectasis presented with refractory and massive hemoptysis. Ten hours after transarterial embolization, acute epigastric pain occurred, and contrast-enhanced computed tomography of the abdomen revealed mild swelling with blurred contours at the pancreatic body, suggestive of acute pancreatitis (red arrow).

DISCUSSION

Hemoptysis is the expectoration of blood from the lower respiratory tract, and most cases of hemoptysis are self-limited. The primary source of hemoptysis is the bronchial artery, which may undergo hypertrophy or neovascularization due to infections, cancer, bronchiectasis, and chronic obstructive pulmonary disease.[2,3] For life-threatening and refractory hemoptysis, the control rate achieved through bronchial artery embolization exceeds 90%.[4] A meta-analysis summarized the complication rate of bronchial artery embolization as 13.6%, with most complications being self-limited, including fever,

Table 1: Data from serial laboratory tests conducted on the patient following the onset of acute abdominal pain occurring 10 h after TAE for refractory and massive hemoptysis.

Days after TAE#	TAE day*	Day 2	Day 3	Day 6	Day 14	After discharge
Amylase (U/L)	176	283	2444	148	283	
Lipase (U/L)	155	503	2653	20	189	33
GOT** (U/L)	19		16		24	19
GPT**(U/L)	9		5		7	
Bilirubin (total) (mg/dL)	0.36		0.5	0.37	0.29	0.48
γ-GT** (U/L)	12		20	16	17	
ALP** (U/L)	47		44	46	54	
WBC** (/μL)	5610		10470	5640	3600	
Hemoglobin (g/dL)	9.2		9.2	8.3	7.4	
Platelet count ($\times 10^3$/μL)	161		150	155	177	
CK-MB** (ng/mL)	1.2	1.4	0.8			
Troponin-I (ng/mL)	0.018	0.016	0.016			
Triglyceride (mg/dL)			113			
Lactate (mmole/L)			0.8			
Sodium (mmole/L)	139		140	135		
Potassium (mmole/L)	3.7		3.9	3.6		
Calcium (mg/dL)			9.8			

#TAE: Transarterial embolization. *The laboratory data were obtained 10 h after TAE procedure when the patient had acute epigastric pain. **Abbreviations for laboratory tests: GOT: Glutamic oxaloacetic transaminase, GPT: Glutamic pyruvic transaminase, γ-GT: Gamma-glutamyl transpeptidase, ALP: Alkaline phosphatase, WBC: White blood count, CK-MB: Creatine kinase MB

chest pain, back pain, and lower limb weakness. The most severe complication associated with bronchial artery embolization is spinal artery embolization, although it is rarely reported.[1]

Iatrogenic pancreatitis may arise from procedures involving the ampulla, such as endoscopic retrograde cholangiopancreatography or endoscopic ultrasound, which are commonly recognized etiologies. The diagnosis of acute pancreatitis is established based on abdominal pain, elevated amylase or lipase levels, and imaging findings.[5] The relationship between TAE and complicated pancreatitis is particularly relevant in the context of transarterial chemoembolization (TACE) for hepatocellular carcinoma. The frequency of acute pancreatitis following embolization ranges from 1.7% to 15.2%,[6] with most symptoms developing within 24 h after the procedure.[7] The pancreatic head is most commonly affected in these cases, as it receives blood supply from terminal arteries.[8]

The proposed pathophysiology for the development of pancreatitis after TAE involves the reflux of embolic material into non-target arteries, regardless of the presence of anatomical variants.[6] The management of these cases is typically conservative, even in the most severe instances involving pseudocyst formation or necrotizing pancreatitis.[7] Post-embolization syndrome is a more frequently observed complication that may overlap with pancreatitis, characterized by fever, abdominal pain, nausea, and vomiting.[9] Management of post-embolization syndrome is generally supportive, although preventative measures utilizing N-acetylcysteine or dexamethasone are currently under development.[10]

In our case, the onset of acute pancreatitis occurred within 24 h after embolization, which is consistent with pancreatitis that develops following TACE. The imaging findings revealed an enlarged pancreatic body and tail, accompanied by surrounding fat stranding, which differs from the classical involvement of the pancreatic head typically observed in cases of post-TACE pancreatitis.

In our case, the aortogram performed before embolization demonstrated no anatomical variant of the bronchial artery, which originated from the thoracic aorta. The reflux of the embolic agent from the right bronchial artery through the aorta to the celiac trunk may be a potential cause of the acute pancreatitis that developed post-embolization. However, the pattern of involvement is markedly different from what is seen in cases involving the embolization of hepatocellular carcinoma, as the pancreatic head is generally more vulnerable. This difference may be attributed to the super-selection of the common hepatic artery during TACE for hepatocellular carcinoma and the close proximity of the gastroduodenal artery, which supplies the pancreatic head.

Despite this, neither pathological evidence nor specific radiological evidence indicating embolic changes was found

in our case. It is also possible that pancreatitis resulted from thrombus dislodgement during the TAE procedure. Regardless of the exact underlying mechanism, the occurrence of pancreatitis following TAE remains an important consideration that warrants attention. The diagnosis was based on the exclusion of other commonly encountered etiologies and the classic presentation of iatrogenic pancreatitis. The conservative management of the patient was similar to that for acute pancreatitis of other etiologies, and no complications were observed during outpatient clinic follow-up.

CONCLUSION

We reported a case of acute pancreatitis that developed after TAE for refractory hemoptysis caused by a bronchial arteriovenous fistula. To the best of our knowledge, this is the first case documenting acute pancreatitis as a potential complication of bronchial artery embolization. The clinical presentation and management are similar to those observed in cases of post-TACE pancreatitis, although imaging showed characteristic involvement of the pancreatic tail. The management approach mirrors that of patients with acute pancreatitis due to other etiologies; however, further investigation into the clinical course, management, and long-term outcomes is necessary due to the limited number of reported cases.

Ethical approval: The research/study was approved by the Institutional Review Board at Taipei Medical University Joint Institutional Review Board, number N202411019, dated 2024/11/12.
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