

## Transcatheter arterial embolization for postoperative intraperitoneal and gastrointestinal hemorrhage in a patient with severe acute pancreatitis

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### ABSTRACT

Pancreatitis is associated with pseudoaneurysm in 4-10% of patients. Intraperitoneal and gastrointestinal hemorrhage resulting from rupture of a pseudoaneurysm is an uncommon complication of pancreatitis. We report a male with severe acute pancreatitis presenting with intraperitoneal and gastrointestinal hemorrhage 13 days and 68 days after debridement and drainage of infected necrosis of pancreas, which were successfully managed by a transcatheter arterial embolization with “two points” (both sides of the bleeding point). This case not only reveals the management of intraperitoneal and gastrointestinal hemorrhage, but also indicates “two points” embolization could be the definitive therapy for hemorrhage secondary to severe acute pancreatitis.

**KEY WORDS:** Severe acute pancreatitis, Hemorrhage, Pseudoaneurysm, Arteriography, Transcatheter arterial embolization.

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### INTRODUCTION

Pancreatitis is associated with pseudoaneurysm in 4-10% of patients, which can lead to massive hemorrhage into the gastrointestinal tract, peritoneal cavity, retroperitoneum or simultaneously into more than one of these sites.<sup>1</sup>Intraperitoneal and

gastrointestinal hemorrhage (IGH) is an uncommon but devastating complication of pancreatitis. Transcatheter arterial embolization (TAE) is one of the treatment options for hemorrhage secondary to severe acute pancreatitis (SAP).<sup>2</sup> However, it is still controversial whether TAE could be the definitive therapy because of high rates of recurrent bleeding and technical failure.<sup>1</sup> In this paper, we report a male with SAP presenting with postoperative IGH twice, which were successfully managed by “two points” embolization.

### CASE REPORT

A 56-year-old male with SAP underwent debridement and drainage of infected necrosis of pancreas in the local hospital. Subsequently he presented with persistent fever, severe cough, and expectoration though expectorant and broad-spectrum antibiotics were used. On the 8th post-operative day clinical deterioration was associated with raised inflammatory markers, and dyspnea.

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He was transferred to the intensive care unit of our hospital for further treatment. Arterial blood gas analysis indicated a severe acidosis. Contrast CT scans revealed bilateral pleural effusions and extensive necrosis of the pancreas with on-going fluid collections. Hypoxia continued to worsen with non-invasive mechanical ventilation and endotracheal intubation was performed. The drainage demonstrated purulent necrotic pancreatic debris with positive culture.

Following a 5-day of stabilization, the patient experienced massive hemorrhage, with fresh blood through the abdominal drains and rectum. The blood pressure dropped from 128/72 mmHg to 88/55 mmHg with tachycardia and a 25g/l decrease in blood hemoglobin concentration. Urgent blood transfusion was commenced and an emergency arteriography revealed a ruptured pseudoaneurysm in the splenic artery. A TAE with "two points" was performed with the simultaneous stop of the intraperitoneal hemorrhage and gastrointestinal hemorrhage Fig.1 and then, gastrointestinal fistula was considered which was confirmed by methylene blue test. Debridement and drainage of remnants infected necrosis, and ileostomy were performed due to the fistula of splenic flexure of colon. He recovered gradually and breathing machine was weaned on the 14th day post-operation.

However, intraperitoneal hemorrhage repeatedly occurred 6 times within 37 days after the surgery. Conservative treatment, including blood transfusions, and gauze packing could induce cessation of bleeding. Sixty-eight days after surgery,

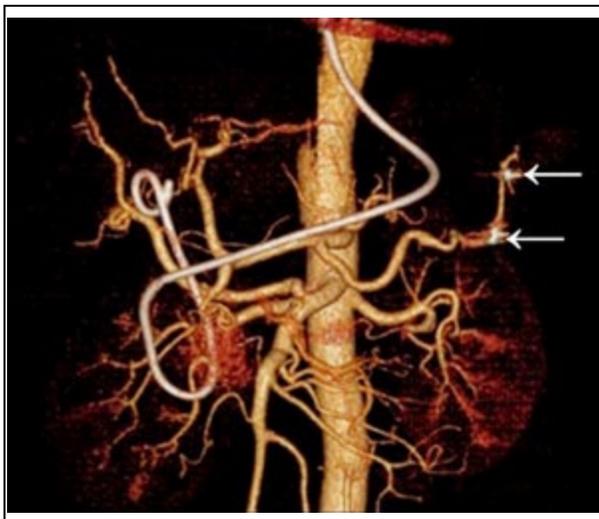


Fig.1 Three-dimensional reconstruction of abdominal blood vessels showing "two points" embolization of the splenic artery (arrows)

he developed sudden epigastric pain, associated with intraperitoneal hemorrhage, hematemesis, and bloody stool from the ileal stoma. Intraperitoneal hemorrhage was successfully managed with gauze packing whereas gastrointestinal hemorrhage was unsuccessfully managed with blood transfusions. Emergency endoscopy was resorted and a duodenal intramural hematoma with active bleeding was found. Selective and superselective arteriography demonstrated a ruptured pseudoaneurysm arising from a small branch of superior mesenteric artery, with blood flowing into the duodenum Fig.2 A, B. A TAE with "two points" was performed again and gastrointestinal hemorrhage ceased immediately Fig.2 C, D.

Following the second embolization, all hemorrhagic episodes gradually ceased. Because of the complications with colonic fistula, and multiple infections, the patient made a prolonged but successful recovery.

## DISCUSSION

IGH always occurs in the following situations: (1) one-site bleeding accompanied by a gastrointestinal

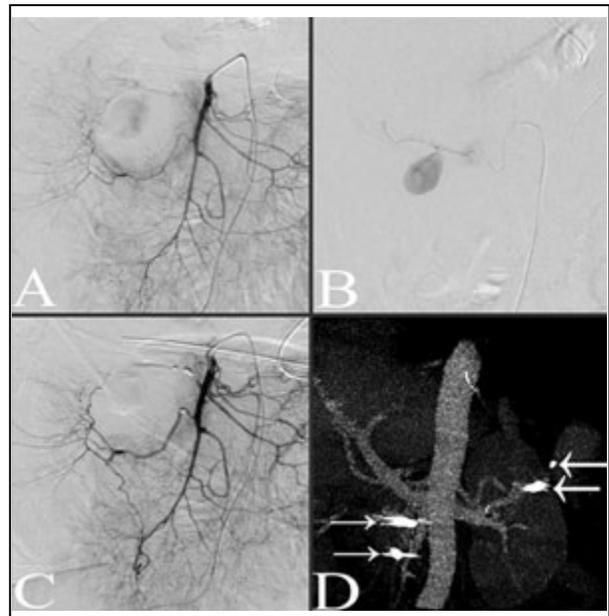


Fig.2 Selective (A) and super selective (B) showed a pseudoaneurysm arising from a small branch of SMA. (C) Plain angiographic image showed embolization with both sides of the pseudoaneurysm. (D) Three-dimensional reconstruction of CT post the second embolization showed coils within the small branches of superior mesenteric artery (thin arrows) and splenic artery (thick arrows). No filling or enhancement of the pseudoaneurysm was evident.

fistula, and (2) multi-site bleeding with or without a gastrointestinal fistula. It may relate to intraperitoneal pathology such as a pseudoaneurysm, and/or gastrointestinal pathology such as a stress ulcer.<sup>3</sup> The rupture of pseudoaneurysms plays a key role in IGH. The splenic artery has been found to be the vessel most commonly involved, followed by the gastroduodenal, pancreaticoduodenal, gastric, and hepatic arteries.<sup>4</sup>

Prompt diagnosis of one-site bleeding or multi-site bleeding with IGH and the sequence of diagnostic investigations remain a challenge. The diagnosis of ruptured splenic artery pseudoaneurysm with blood flowing into the peritoneal cavity and the gastrointestinal tract via a gastrointestinal fistula is always missed. CT scan and endoscopy which can identify a bleeding pseudoaneurysm and locate the gastrointestinal bleeding are usually the first choice of investigations. Endoscopy is also one of the treatment options for gastrointestinal bleeding.

Failure to arrest hemorrhage with CT and endoscopy should be followed with arteriography, which has been accepted into management protocols for hemorrhage associated with SAP.<sup>5</sup> Arteriographic control of bleeding should be attempted as early as possible. Although some reports advocate TAE as only a temporizing therapy before the definitive surgical treatment because of the risk of recurrent bleeding with embolization alone, there are still many reports, including the current case, showing successful TAE in hemodynamically unstable patients with hemorrhage secondary to SAP.<sup>2,5</sup>

The methods of TAE include "one point" embolization (the proximal of the bleeding point) and "two points" embolization. The choice depends on anatomy of the bleeding site. "One point" embolization can be selected without a vascular circle. Otherwise, "two points" embolization should be the best choice. However, the "two points" embolization is recommended to be used whenever possible to prevent recurrent bleeding.<sup>6</sup> Stents can

also be used to treat rupture of pseudoaneurysms.<sup>7</sup> If bleeding is not controlled with TAE, urgent hemostatic surgical intervention is mandatory.

In summary, this case illustrates IGH secondary to SAP twice, successfully managed by "two points" embolization. Based on the literature and the authors' experience, "two points" embolization could be the definitive therapy for hemorrhage resulted from SAP.

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## Authors Contributions:

An-Ping Su and Shuang-Shuang Cao collected the data. An-Ping Su, Shuang-Shuang Cao and Wei-Ming Hu wrote the manuscript. Zhao-Da Zhang, Bo-Le Tian and Xu-Bao Liu were involved in the final editing of the manuscript.