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# Bleeding Risk of Stent Removal After EUS-Guided Cystgastrostomy and Metal Stent Placement for Drainage of a Pancreatic Fluid Collection

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## ABSTRACT

Endoscopists are keenly aware of bleeding risks during and immediately after cystgastrostomy and reduce this risk by endoscopic ultrasound guidance to avoid manipulation near major vessels. Bleeding risk associated with cystgastrostomy stent removal after resolution of a pancreatic fluid collection, however, is less evident. We present our experience with bleeding during cystgastrostomy stent removal in a patient with resolved walled-off necrosis and will discuss the significance of unexplained spontaneous upper gastrointestinal bleeding in this setting, which may serve as a warning sign for possible stent erosion into major vessels.

## INTRODUCTION

Endoscopists are keenly aware of bleeding risks during and immediately after cystgastrostomy and reduce this risk by endoscopic ultrasound (EUS) guidance to avoid manipulation near major vessels.<sup>1</sup> Bleeding risk associated with cystgastrostomy stent removal after resolution of a pancreatic fluid collection, however, is less evident. We present our experience with bleeding during cystgastrostomy stent removal in a patient with resolved walled-off necrosis who had a single episode of unexplained overt upper gastrointestinal (GI) bleeding 5 months after initial cystgastrostomy and 2 months after last endoscopic necrosectomy.

## CASE REPORT

A 46-year-old male with a 24 x 15-cm pancreatic fluid collection (Figure 1) secondary to acute pancreatitis was referred for endoscopic cystgastrostomy after conservative management had failed to resolve symptoms of gastric outlet obstruction. The patient underwent an EUS prior to cystgastrostomy, which showed a walled-off necrosis and numerous collateral vessels around the proximal stomach and the collection. Cystgastrostomy was performed in the gastric antrum without any immediately adjacent vessels and away from perigastric collateral vessels. Two 10 French double pigtail stents were placed initially, followed 10 days later by tract dilation to 14 mm and placement of a fully-covered 18 x 80-mm Bonastent (EndoChoice, Alpharetta, Georgia). Four sessions of endoscopic necrosectomy were followed by surgical debridement of a peripancreatic abscess, stent removal, and surgical widening of the existing tract. This tract required subsequent endoscopic dilation and stenting with a 18x60 mm Taewoong (Taewoong Medical Co., South Korea) fully-covered metal stent prior to the final 2 sessions of endoscopic necrosectomy.

Five months after the initial cystgastrostomy, he underwent a computed tomography (CT) that demonstrated resolution of the walled-off necrosis. Computed tomography additionally showed prominent varices and splenic vessels around the pancreas, pancreatic tail, and the stomach, as well as portal vein thrombosis and splenomegaly.

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**Figure 1.** Coronal noncontrast-enhanced CT showing the massive pancreatic fluid collection (arrows) abutting the posterior wall of the stomach (asterisk) before endoscopic cystgastrostomy.

Removal of the stent was planned, but prior to this scheduled procedure, he was admitted to the hospital after a single episode of melena and an acute hemoglobin drop from 11.0 to 8.0 mg/dL. Esophagogastroduodenoscopy showed intact stent without ulceration or bleeding. Endoscopic ultrasound showed multiple large vessels around the stent. Attempt at pulling on the stent resulted in traction of the gastric wall and oozing bleeding around the stent (Figure 2). This raised the possibility that the upper GI bleeding was related to the stent, and thus endoscopy was aborted.

Computed tomography angiogram (Figure 3) showed the stent to be approximately 1.5 mm from large perigastric varices, 4.5 mm from splenic artery, and surrounded at closer proximity by multiple smaller collateral vessels. Interventional radiology and hepatobiliary surgery shared endoscopist's concern that there was a significant risk of laceration of the splenic artery and the surrounding collaterals during the endoscopic removal of the stent. After partial embolization of the splenic artery by interventional radiology, the stent was removed endoscopically without difficulty or bleeding. This was performed in the operating room while having catheter occlusion of the splenic artery available, in presence of hepatobiliary surgery on standby

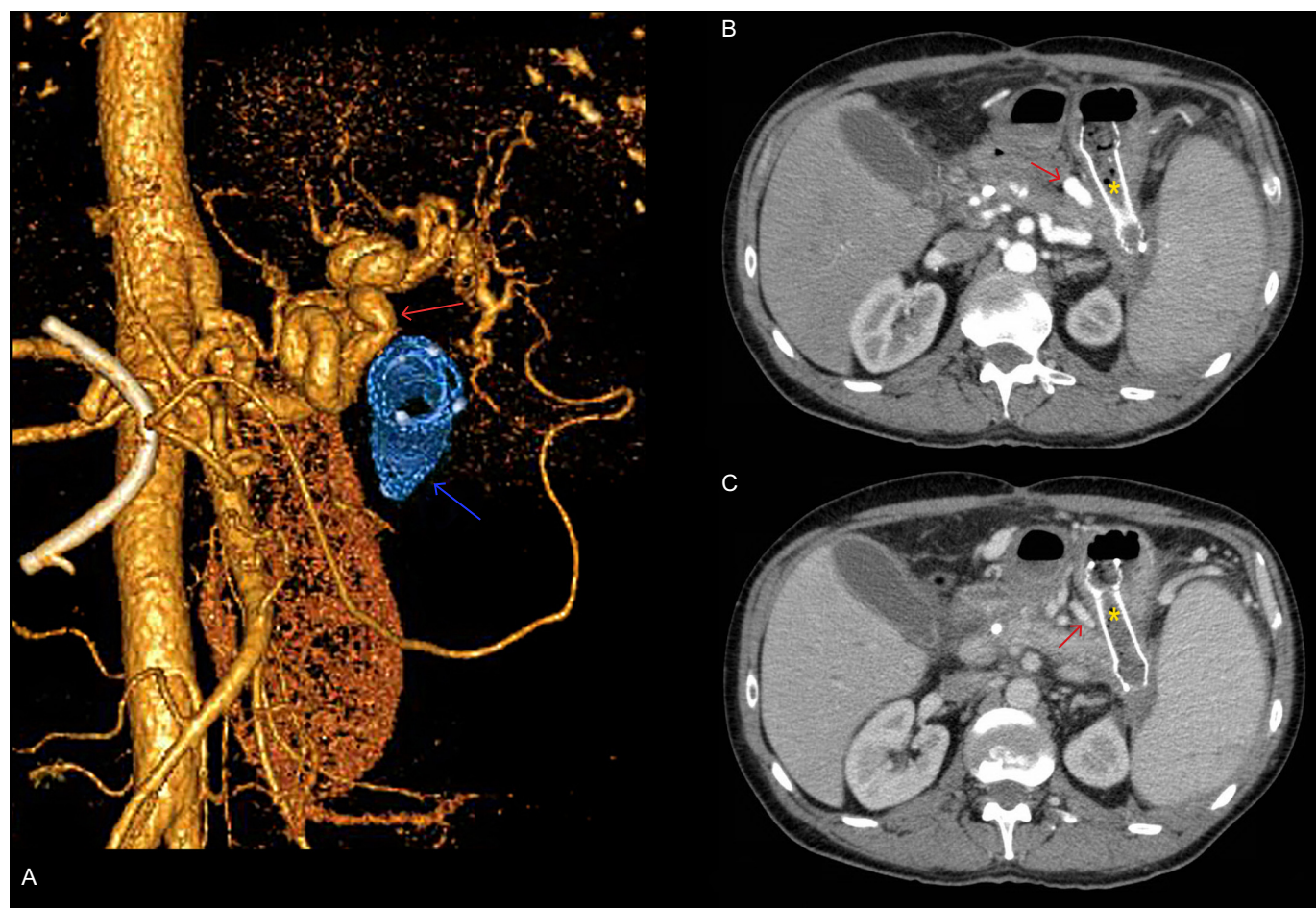


**Figure 2.** Oozing bleeding (arrow) around the cystgastrostomy stent at the time of attempted stent removal.

for exploratory laparotomy and surgical control of potential catastrophic bleeding.

## DISCUSSION

This case points out that the risk of bleeding with cystgastrostomy is not limited only to the periprocedural period. Most endoscopists are keenly aware of the bleeding risks during and immediately after cystgastrostomy but may be less concerned about such risk at the time of stent removal after resolution of a pancreatic fluid collection. This risk may be unexpectedly elevated, as resolution of the pancreatic fluid collection after successful cystgastrostomy carries the risk of altering anatomic relationship of the stent to the vessels, which were presumably avoided by EUS on initial transmural puncture and stent placement. In a series of 89 patients who underwent endoscopic cystgastrostomy, stent erosions into major vessels (gastroduodenal artery, splenic artery) presenting as delayed spontaneous bleeding was thought to be the reason for three of the nine total bleeding complications.<sup>2</sup> In this case, the initial stent placement was performed without any bleeding, without any immediately adjacent vessels and away from the perigastric collateral and splenic vessels. The resolution of the fluid collection, however, likely altered this anatomic relationship. Furthermore, portal and splenic vein thrombosis in this case likely led to the development of prominent portosystemic collateral vessels and varices around the area of the stent. Although the precise source of the spontaneous upper GI bleeding could not be confirmed, it seems reasonable to assume the bleeding was related to the stent



**Figure 3.** (A) Abdominal CT angiography with 3D reconstruction showing the stent (blue arrow) to be approximately 4.5 mm from a tortuous splenic artery (red arrow). (B) Axial arterial phase image showing the stent (asterisk) to be approximately 4.5 mm from a tortuous splenic artery (arrow). (C) Axial portal venous phase image showing the stent (asterisk) to be approximately 1.5 mm from a large perigastric varix (arrow).

given lack of another evident cause, bleeding seen during the attempted stent removal and the proximity of numerous vessels to the stent.

In conclusion, unexplained spontaneous upper GI bleeding presenting as a delayed event after cystgastrostomy and metal stent placement should strongly raise suspicion for erosion or near erosion of the stent into major vessels. This event may serve as a “herald” bleed and should alarm the endoscopist to anticipate potentially higher risk of bleeding at the time of cystgastrostomy stent removal, particularly in patients with known varices and abnormal collaterals. Such patients should undergo vascular evaluation prior to stent removal and may benefit from a multidisciplinary approach to stent removal with interventional radiology and surgery, because laceration of a large vessel at the time of endoscopic stent removal could result in uncontrollable bleeding.

## DISCLOSURES

Author contributions: F. Jalali wrote the article and is the article guarantor. J. Samarasena and J. G. Lee provided editorial input. J. G. Lee edited the final manuscript and supervised manuscript preparation.

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Informed consent was obtained for this case report.

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