

Successful Hemostasis With Endoscopic Suturing of Recurrent Duodenal Ulcer Bleeding After Failed Initial Endoscopic Therapy and Embolization

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ABSTRACT

Peptic ulcer bleeding is a common condition where endoscopic therapy offers a safe and definitive treatment. However, management of peptic ulcer bleeding can be more complex when there is large volume, recurrent bleeding in a critically ill patient. We present a patient with life-threatening, recurrent duodenal ulcer bleeding who failed both standard endoscopic therapy and transarterial embolization. Hemostasis was achieved through a combination of standard endoscopic therapy and endoscopic suturing.

INTRODUCTION

A significant proportion of endoscopically treated bleeding peptic ulcers rebleed and require either repeat endoscopy, transarterial embolization (TAE), or surgical exclusion of the ulcer. The selection of treatment for rebleeding depends on the patient's clinical status and risk factors. Repeat endoscopic therapy is preferred in most cases because it is most effective at achieving hemostasis with the least risk of complications.¹⁻³ However, high-risk features present on the index endoscopy, such as ulcer size >2 cm or hypotension, increases the risk for failed repeat endoscopy and necessitates salvage surgery or TAE.^{1,4} Standard endoscopic approaches for hemostasis include a combination of epinephrine injection, placement of hemostatic clips, or thermal coagulation. A novel approach that has been shown to control peptic ulcer bleeding is endoscopic suturing.⁵ We report a case of recurrent peptic ulcer bleeding with high-risk features after failed TAE that was successfully treated with endoscopic suturing.

CASE REPORT

A 41-year-old man with no significant medical history was found unconscious with signs of multiple trauma. He had a complicated hospital course in the critical care unit, which included respiratory failure, sepsis, and hypotension requiring vasopressors. Ten days into his admission, he developed massive hematemesis with a drop of his hemoglobin from 11.4 to 7.3 g/dL requiring multiple transfusions of packed red blood cells. Initial upper endoscopy revealed a large, cratered, 15-mm ulcer with a visible bleeding vessel located on the anterior wall of the duodenal bulb. A total of 12 mL of 1:10,000 epinephrine was injected around the ulcer with blanching of the adjacent mucosa. Bipolar cautery was applied to the vessel and a few oozing pigmented spots, with successful hemostasis at the end of the procedure (Figure 1).

After endoscopy, the patient's vasopressor requirements decreased, and his hemoglobin was 8.5 g/dL that evening. However, overnight, he became hypotensive again, and his hemoglobin dropped to 5.8 g/dL. Owing to the emergent nature, computed tomography angiogram was deferred, and he was transferred directly to interventional radiology, where selective arteriograms showed extravasation of contrast from the right duodenal branch of the gastroduodenal artery, followed by successful coil embolization (Figure 2). The patient remained in a critical condition after the procedure and continued to have active bleeding. His surgical intensive care team planned to have him undergo emergent salvage surgery with a laparotomy, duodenotomy, and suture ligation of the bleeding vessel; however, we offered to perform a salvage repeat endoscopy first.

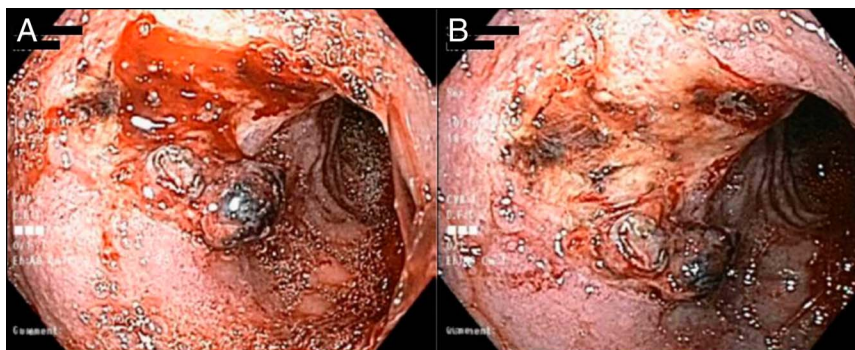


Figure 1. Initial endoscopy showed the (A) large ulcer on the anterior portion of the duodenal bulb with a visible bleeding vessel, pigmented spots, and an adherent clot. (B) Injection with epinephrine and application of bipolar cautery achieved hemostasis.

On repeat endoscopy, we discovered a new, large (>2 cm) ulcer with a spurting vessel (Forrest type 1a) in the posterior-inferior portion of the duodenal bulb (Figure 3). We attempted hemostasis with an injection of a total of 20 mL of 1:10,000 epinephrine and multiple applications of thermocoagulation of the visible vessel with the hemostasis grasper. There was still oozing from the ulcer. Placement of hemostatic clips was not attempted because of the difficult orientation of the ulcer and risk of perforation. Because any further thermocoagulation would also pose a considerable risk for perforation, we decided to oversew the ulcer with endoscopic sutures. The OverStitch endoscopic suture system (Apollo Endosurgery, Austin, TX) was mounted onto a double-channel endoscope, and one interrupted suture was placed at the inferior and superior edges of the ulcer. The suture was carefully cinched to reduce the size of the ulcer. This allowed placement of a second running suture in parallel to complete the closure of the ulcer bed. Hemostasis was successful, and the patient did not have further bleeding during his hospital course. Before discharge to subacute rehabilitation, his hemoglobin was 8.1 g/dL, and he had a negative *Helicobacter pylori* serology. On a follow-up telephone call a year after the procedure, he remains well with no further gastrointestinal bleeding.

DISCUSSION

Endoscopic suturing provides a novel method for hemostasis of bleeding peptic ulcers, particularly when standard endoscopic therapy has failed to provide a durable response, target orientation precludes standard endoscopic therapy, or further endoscopic treatment with cautery could cause perforation. Endoscopic suturing requires greater expertise than standard endoscopic therapies, and its use is likely reserved for unique situations with certain, but not limited to, aforementioned risk factors. There have been only a limited number of published experiences with endoscopic suturing for controlling peptic ulcer-related bleeding. The largest single-center experience was recently published as a case series that showed 100% success rate with hemostasis, preventing delayed bleeding using endoscopic suturing, specifically in peptic ulcer-related bleeding.⁶ The success of endoscopic suturing likely shares similarities to surgical ligation with underrunning of the vessel. An additional benefit is exclusion of the ulcer bed from acidic gastric contents allowing for stabilization of clot.⁷ Endoscopic suturing is likely not needed in most cases of peptic ulcer bleeding, but it may prove valuable in cases where the risk for rebleeding is high and standard endoscopic therapy would fail or have a high risk for complication.

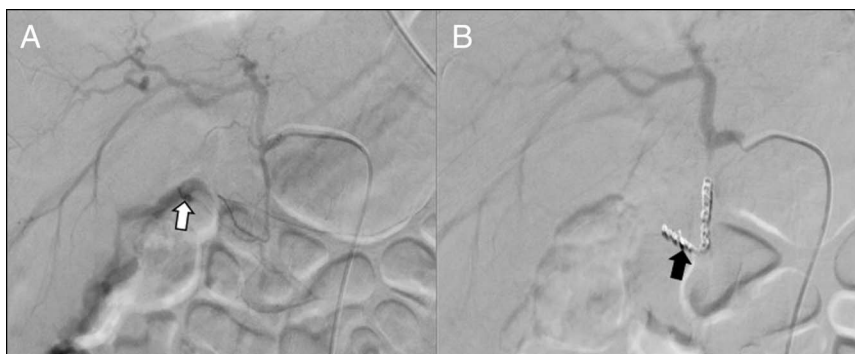


Figure 2. (A) The arteriogram of the common hepatic artery showed extravasation of contrast (white arrow) from the right duodenal branch of the gastroduodenal artery. (B) Successful coil embolization (black arrow) was performed.

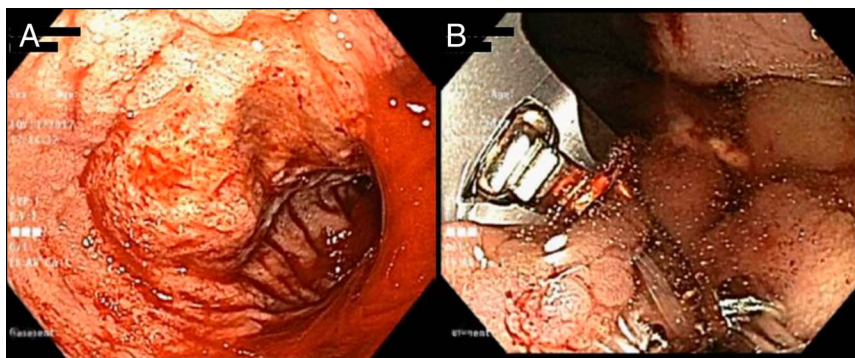


Figure 3. Repeat endoscopy showed (A) a large ulcer on the posterior portion of the duodenal bulb with an actively bleeding visible vessel and (B) one interrupted suture was placed at the edges of the ulcer to reduce the size.

There are multiple risk factors identified in the literature associated with increased risk for peptic ulcer rebleeding after endoscopy. These risk factors can help identify patients who may benefit from endoscopic suturing.^{8–10} In our case, the patient had high transfusion requirements (>5 units), hemorrhagic shock with systolic pressure <100 mm Hg, and active bleeding during endoscopy. Owing to the massive amount of rebleeding after index endoscopy, he received emergent TAE. The failure of TAE as evidenced by ongoing bleeding would typically suggest that repeating endoscopy with conventional hemostatic methods would have been unlikely to control the bleeding.

TAE typically offers definitive treatment to bleeding but also has significant rebleeding rates and rare cases of ischemic complications.^{11,12} It is possible the new ulcer found could have developed from postembolization ischemia. Endoscopically treating ulcers in the posterior margin of the duodenal bulb has increased the risk of rebleeding and adverse outcomes.^{9,13} Because we had already used multiple applications of thermo-coagulation to the ulcer bed without successful hemostasis, oversewing with endoscopic sutures was a safer alternative.

In conclusion, in a critically ill patient who had failed endoscopy and TAE, surgery would have a high risk for morbidity and mortality. Endoscopic suturing should be considered in a patient with high risk for rebleeding, rebleeding after TAE, and when there is concern for duodenal bulb treatment complications. Further studies will help determine the clinical criteria that would favor endoscopic suturing in peptic ulcer-related bleeding.

DISCLOSURES

Author contributions: NT Chuang wrote the manuscript. A. Agarwal and R. Kim wrote and revised the manuscript. R. Kim is the article guarantor.

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