

〈Case Report〉

A Case of Bleeding from a Postbulbar Duodenal Ulcer Successfully Treated by Surgery

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ABSTRACT **Background:** Postbulbar duodenal ulcers bleed more easily than duodenal bulbar ulcers. In cases of hemorrhagic shock that does not improve with rapid fluid infusion or blood transfusion, emergency surgery should be considered. However, emergency surgery in patients with hemorrhagic shock or coagulopathy usually has a remarkably poor outcome. We herein report a case of bleeding from a postbulbar duodenal ulcer with hemorrhagic shock that was successfully treated by surgery.

Case presentation: A 60-year-old man was admitted to our hospital because of suspected septic shock associated with Rickettsia tsutsugamushi disease. His condition was stabilized after admission. However, on the fourth day after hospital admission, the patient suddenly developed melena and shock. His blood pressure was stabilized by massive fluid infusion. Close examination led to a diagnosis of bleeding from an ulcer in the horizontal part of duodenum. Hemostasis was achieved with cauterization and clips under endoscopy. However, rebleeding was observed on the same day. Because the patient was in shock, we performed emergency surgery. We decided not to perform ulcerectomy because of his poor general condition. We made a longitudinal incision in the duodenum and cauterized the bleeding ulcer. Next, we covered the ulcer with the surrounding duodenal mucosal-muscular layer to prevent rebleeding from the ulcer. The duodenal incision was longitudinally closed with a running suture. Furthermore, we added a gastrojejunostomy (Devine's modified method) to prevent irritants such as food from passing through the ulcer. The patient's general condition was stable postoperatively, and no rebleeding occurred.

Conclusions: We experienced a case of bleeding from a postbulbar duodenal ulcer with hemorrhagic shock, which was rescued by surgery. Postoperative ulcer bleeding was prevented

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by surgical cautery followed by covering the ulcer with duodenal mucosa-muscular layer and gastrojejunal anastomosis.

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BACKGROUND

Postbulbar duodenal ulcers are less common than duodenal bulbar ulcers¹⁾. However, postbulbar ulcers have a higher bleeding rate than duodenal bulbar ulcers¹⁾. Endoscopic hemostasis is the first consideration for the treatment of bleeding from postbulbar ulcers. If endoscopic hemostasis is difficult, transcatheter arterial embolization (TAE) may be considered²⁾. However, in cases of hemorrhagic shock, damage control surgery is an alternative³⁾. These treatments carry the risk of rebleeding, whereas radical surgery carries a high risk of complications⁴⁾. Thus, the treatment strategy for postbulbar duodenal ulcer bleeding is controversial due to its rarity. We herein report a case of postbulbar duodenal ulcer bleeding with hemorrhagic shock that was successfully treated by surgery.

CASE PRESENTATION

A 60-year-old man with a history of diabetes, chronic renal failure, chronic obstructive pulmonary disease, and cerebral infarction visited a local doctor because of fever and malaise. He was taking no antiplatelet drugs or nonsteroidal anti-inflammatory drugs (NSAIDs). The patient was suspected to have sepsis associated with *Rickettsia tsutsugamushi* disease, and was treated with an antibiotic (minomycin). The next day, he was referred to the emergency department of our hospital because of shock vital (blood pressure, 84/50 mmHg; heart rate, 121 beats/min). The blood test results were as follows: white blood cell count, $33,46 \times 10^3/\mu\text{L}$; hemoglobin, 16.6 g/dL; platelet count, $208,000/\mu\text{L}$; C-reactive protein, 38.65 mg/dL; prothrombin time-international normalized ratio, 1.40; activated partial

thromboplastin time (APTT), 35.9 s; creatinine, 6.19 mg/dL; blood urea nitrogen, 93 mg/dL; and procalcitonin, 251 pg/mL. Computed tomography (CT) scans of the head, chest, and abdomen showed no obvious abnormalities. We started vasopressor administration, tracheal intubation, ventilator management, and continuous hemodialysis in the intensive care unit of our hospital. We took three sets of blood cultures and administered broad-spectrum antibiotics (carbapenem + vancomycin + minomycin). We administered proton pump inhibitors regularly from the day of admission. We administered a continuous infusion of heparin to prevent blood clots during long-term bed rest, measured APTT periodically through blood tests, and adjusted the amount of heparin so that the APTT was 55~80 sec. The patient's general condition stabilized thereafter, and the vasopressor was discontinued on the second day of hospitalization. On the third day of hospitalization, his renal function improved and spontaneous urination was observed; therefore, the continuous hemodialysis was withdrawn. On the 4th day of hospitalization, however, the patient suddenly developed melena and shock (blood pressure, 56/28 mmHg; heart rate, 109 beats/min). We stabilized his blood pressure with massive fluid infusions. A contrast-enhanced CT scan of the chest and abdomen suggested bleeding from the duodenum (Fig. 1). We performed emergency upper endoscopy and found bleeding from an ulcer in the horizontal part of duodenum. Hemostasis was achieved with cauterization and clips under endoscopy. However, melena was observed again that night. The patient's blood pressure gradually decreased, and tachycardia was observed. A blood test showed that his hemoglobin

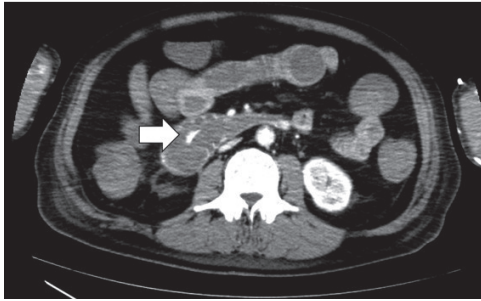


Fig. 1. Thoracoabdominal enhanced computed tomography. Contrast medium was found in the intestinal tract near the third part of the duodenum (⇒).

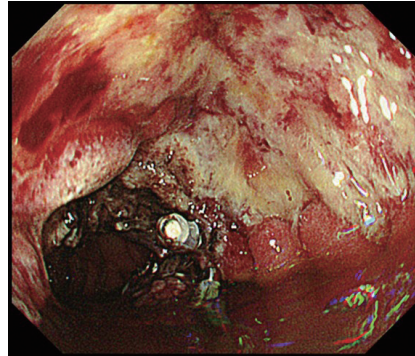


Fig. 2. Upper gastrointestinal endoscopy. A bleeding ulcer was observed in the third part of the duodenum. Hemostasis was achieved with cauterization and clips under endoscopy.

concentration was 9.2 g/dL, indicating further deterioration. Plain CT showed a large amount of blood in the stomach and duodenum. We diagnosed with rebleeding. Despite rapid fluid infusion and blood transfusion, no improvement in blood pressure was observed. Because the patient's blood pressure was unstable and a large amount of blood had accumulated in the duodenum, it seemed difficult to stop the bleeding due to poor visual field using an endoscope. As the location of bleeding was confirmed during the previous endoscopy, surgery seemed superior to TAE in terms of certainty of hemostasis. Therefore we performed emergency surgery.

We made a midline abdominal incision. No adhesion or ascites was present in the abdominal cavity. The horizontal part of duodenum exhibited a thickened wall with partial purple discoloration (Fig. 3a). Judging this to be the bleeding point, we made a longitudinal incision in the duodenum around this site. Immediately after making the incision, we found a large amount of bleeding. Arterial bleeding from the ulcer was cauterized (Fig. 3b). The ulcer was found on the pancreatic side of the horizontal part of duodenum (arrow in Fig. 3c). The papilla of Vater was well away from the ulcer (triangle in Fig. 3c). Next, we covered the ulcer with the surrounding duodenal mucosal-muscular layer using

a 3-0 barbed suture to prevent rebleeding from the ulcer (Fig. 3d). The duodenal incision was then closed with a continuous 3-0 barbed suture. The duodenum was constricted secondary to coverage of the ulcer with the duodenal mucosal-muscular layer (Fig. 3e). We added a gastrojejunostomy (Devine's modified method). Finally, we placed drains in the foramen of Winslow and retroperitoneal space from the right flank as well as an intraduodenal drainage tube and an enteral feeding tube transgastrically from the left flank. The tip of the intraduodenal drainage tube was placed near the sutured duodenal ulcer. The tip of the enteral feeding tube was placed in the small intestine on the anal side from the gastrojejunostomy (Fig. 3f). The operation time was 192 minutes, the bleeding volume was 1,150 mL, and the blood transfusion components were 8 units of red cell concentrates and 4 units of fresh frozen plasma.

The patient's postoperative course was uneventful without rebleeding. A small amount of intestinal fluid-like drainage was observed from the intraduodenal drainage tube. All three sets of blood cultures taken preoperatively were negative. IgG and IgM tests using fluorescent antibody methods were negative for *Rickettsia*. A definitive diagnosis of the cause of this sepsis could not be reached. We finished antibiotic treatment on the 7th postoperative

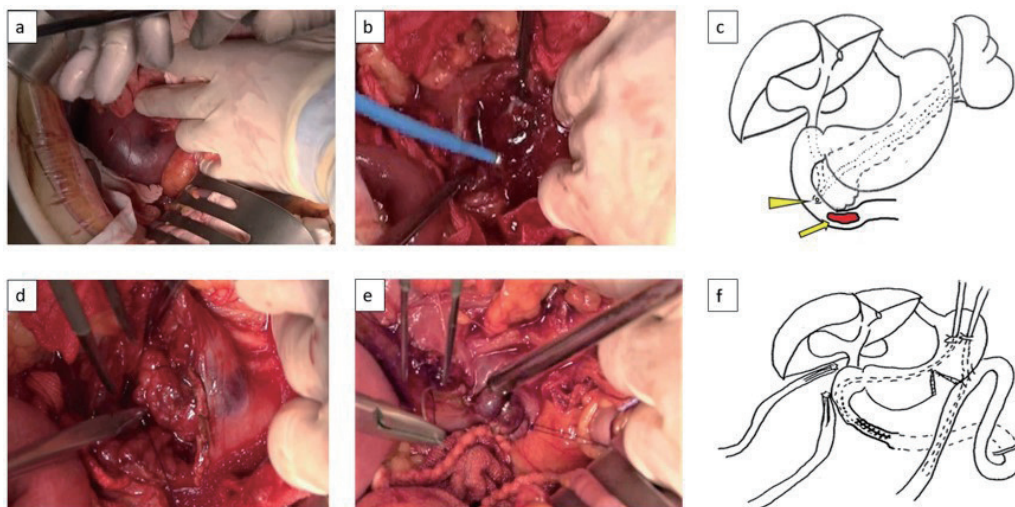


Fig. 3. Surgical findings. a: The third part of the duodenum exhibited a thickened wall with partial purple discoloration. b: We made a longitudinal incision in the duodenum. Arterial bleeding was observed from the ulcer in the third part of the duodenum and was cauterized. c: The ulcer was found on the pancreatic side of the third part of the duodenum (arrow). The papilla of Vater was well away from the ulcer (triangle). d: The ulcer base was sutured through the full thickness of the duodenum (3-0 barbed suture). e: The duodenal incision was closed with a continuous suture (3-0 barbed suture). f: We performed gastrojejunostomy (Devine's modified method). A drain was placed in the foramen of Winslow and retroperitoneal space from the right side of the abdomen, and an intraduodenal drainage tube and enteral feeding tube were placed through the stomach from the left side of the abdomen.

day. The patient's progress was good thereafter. The patient resumed eating on the 12th postoperative day. On the 13th day, he was doing well and was transferred to the referral hospital. On the 20th day after the operation, plain CT showed a suspected leak from the sutured closure site of the duodenum, so we performed conservative treatment. The enteral feeding tube and duodenal drainage tube were thereafter removed without any problem. The patient was discharged home on the 50th postoperative day. The clinical timeline of this case is summarized in Table 1.

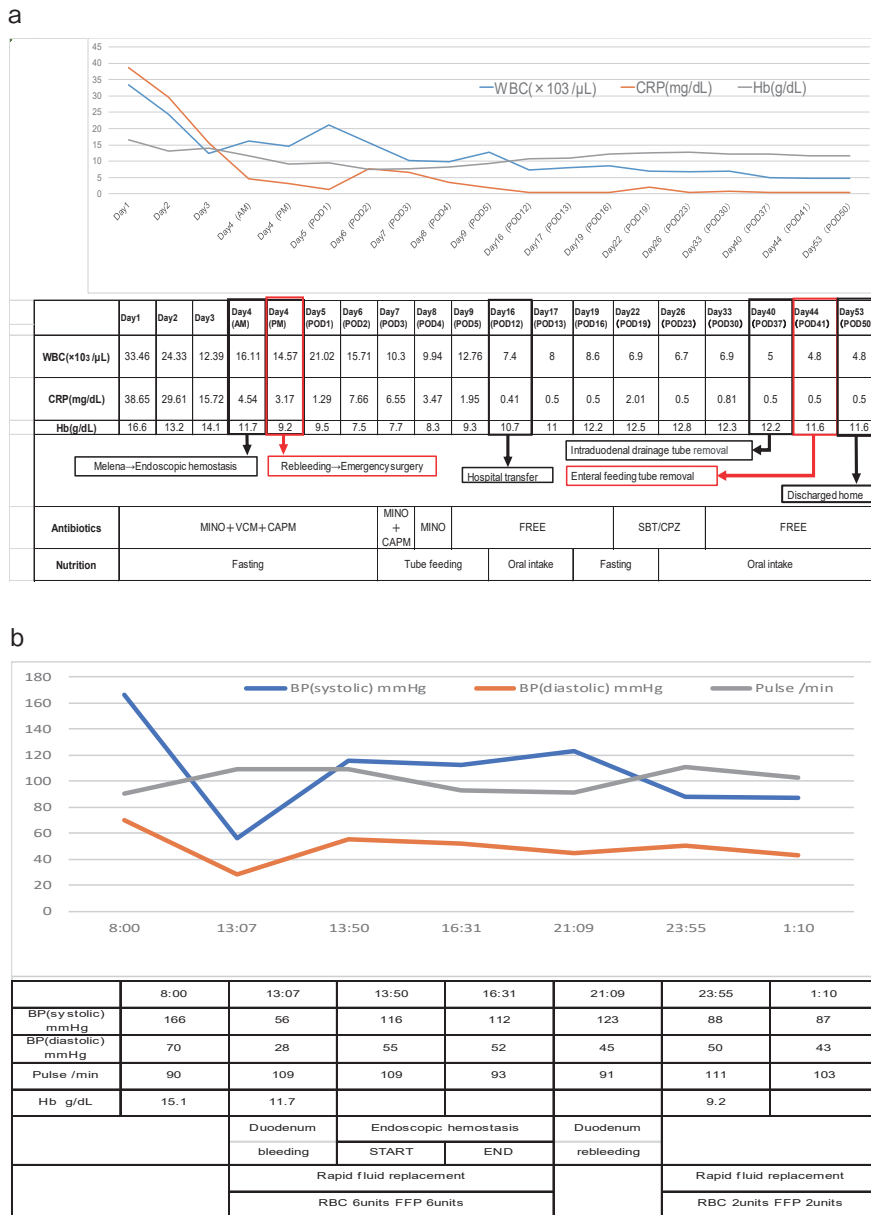
DISCUSSION

A postbulbar duodenal ulcer is defined as a duodenal ulcer that occurs at a distance of 5 cm or more from the pyloric ring⁵⁾. It occurs in 20% of duodenal ulcers, and its bleeding rate is higher than that of duodenal bulbar ulcers, making it more difficult to treat^{6, 7)}. The etiology is unclear and

has been reported to be unrelated to *Helicobacter pylori* infection, NSAID intake, or psychological stress, which are well-known causes of peptic ulcer disease⁶⁾. Previous reports have shown that treatment with acid secretion inhibitors is ineffective because the ulcer site is minimally involved in acid secretion⁸⁾.

Endoscopic hemostasis is the first treatment for bleeding from peptic ulcer²⁾. However, the duodenum may be affected by edema and deformation due to the ulcer, and bleeding cannot be sufficiently stopped in such cases. Transcatheter therapy or surgery may be considered when hemostasis is difficult. In recent years, TAE has become a method of hemostasis that sometimes exceeds surgery in that it can be performed safely and quickly under local anesthesia using an endovascular approach⁹⁾. However, transcatheter therapy requires the presence of a specialist who is proficient in the procedure and may be difficult

Table. 1 a: The clinical timeline of this patient. b: Timeline in the acute phase.



to perform in some hospitals²⁾. Additionally, TAE has a higher rebleeding rate compared to surgery⁹⁾. The posterior wall of the duodenum is innervated by multiple arteries and may suffer from stenosis due to rebleeding or ischemia¹⁰⁾. Ikushima *et al* reported 59 cases of duodenal ulcer bleeding treated with TAE. They reported that three of these patients (5%)

had duodenal stenosis. We consider that intestinal ischemia was caused by embolization of blood vessels other than the bleeding point¹¹⁾. Regarding surgery, we consider that duodenal stenosis is less likely to occur because it is possible to selectively stop bleeding from only the bleeding points on the ulcer surface. Furthermore, gastrointestinal bleeding

must be greater than 0.5 ml/sec to be recognized as contrast medium extravasation on angiography, so bleeding may not always be confirmed¹²⁾. In this regard, the advantage of surgery is that it allows the bleeding point to be seen directly and ensures reliable hemostasis. Furthermore, most of the reports to date have been of gastric or duodenal bulbar ulcer bleeding, and there have been only a few cases of postbulbar duodenal ulcer bleeding. Compared with gastric or duodenal bulbar ulcer bleeding, the controlling vessels of postbulbar duodenal ulcer bleeding are more complex and its etiology is unique. It is necessary to consider treatment strategies for postbulbar duodenal ulcer bleeding separately from those for gastric or duodenal bulbar ulcer bleeding.

In this case, we performed endoscopic hemostasis because the blood pressure was stabilized with prompt fluid and blood transfusions during the first hemorrhage. However, when the patient subsequently experienced rebleeding, his blood pressure did not improve despite prompt fluid and blood transfusions. We determined that definitive hemostasis was necessary, and performed emergency surgery. In cases of hemorrhagic shock, surgical treatment should be focused on stopping the bleeding (damage control surgery), not on radical surgery (extensive excision of the ulcer). Damage control surgery is an established surgical strategy for trauma treatment. In recent years, even in non-traumatic cases, surgery (partial resection or open hemostasis) based on the concept of damage control surgery has been recommended¹³⁾. First, for patients in poor general condition, such as those in hemorrhagic shock or coagulopathy, surgery is temporarily terminated by minimizing hemostasis and controlling infection and inflammation. Postoperatively, after the patient's circulation is stabilized in the intensive care unit, radical surgery is performed¹³⁾. In this case, damage control surgery could have been indicated. However, after

the ulcer bleeding was cauterized, the patient's hemodynamics quickly stabilized, so we decided that it was possible to proceed with the surgery. Additionally, the edema of the stomach and small intestine was mild, which enabled gastrointestinal anastomosis. However, since the ulcer was on the pancreatic side, pancreaticoduodenectomy (PD) was required for radical surgery. PD would carry a high risk of postoperative complications even in the stable hemodynamics. Therefore, we added suturing of the ulcer and gastrojejunostomy (modified Devine method) to prevent irritants such as digestive juices and foods from passing through the ulcer area as much as possible.

For postbulbar duodenal ulcer bleeding, it is important to carefully determine the appropriate treatment strategy in cooperation with endoscopists, radiologists, intensivists, and surgeons, taking into account the findings of the ulcer, patient background, and general condition.

CONCLUSIONS

We experienced a case of bleeding from a postbulbar duodenal ulcer accompanied by hemorrhagic shock, which was rescued by surgery. Postoperative ulcer bleeding was prevented by surgical cautery followed by covering the ulcer with duodenal mucosa-muscular layer and gastrojejunal anastomosis.

ABBREVIATIONS

CT: computed tomography

PD: pancreaticoduodenectomy

ETHICAL APPROVAL

For this type of study, formal consent is not required.

CONSENT FOR PUBLICATION

Written informed consent was obtained from the patient for the publication of this case report and any accompanying images.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

COMPETING INTERESTS

The authors declare that they have no conflicts of interests in relation to the current study.

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AUTHORS' CONTRIBUTIONS

The first draft of the manuscript was written by SM, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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