

# Hemostasis With Endoscopic Band Ligation for Rupture of Jejunal Varices

Yasutoshi Shiratori, MD<sup>1</sup>, Kenji Nakamura, MD<sup>1</sup>, Takashi Ikeya, MD<sup>1</sup>, Koichi Takagi, MD<sup>1</sup>, and Katsuyuki Fukuda, MD<sup>1</sup>

<sup>1</sup>Division of Gastroenterology, St. Luke's International Hospital, Tokyo, Japan

## ABSTRACT

Compared with the variceal rupture in the esophagus or stomach, rupture of ectopic varices including those in the jejunum is rare, and a definitive hemostatic method is not established. We report our case and review the literature regarding the pathophysiology and hemostatic methods of ectopic varices. A patient presented with hematemesis and cardiopulmonary arrest following hemorrhagic shock. After resuscitation, we performed emergency endoscopy and diagnosed ruptured jejunal varices that were subsequently treated by endoscopic band ligation.

## INTRODUCTION

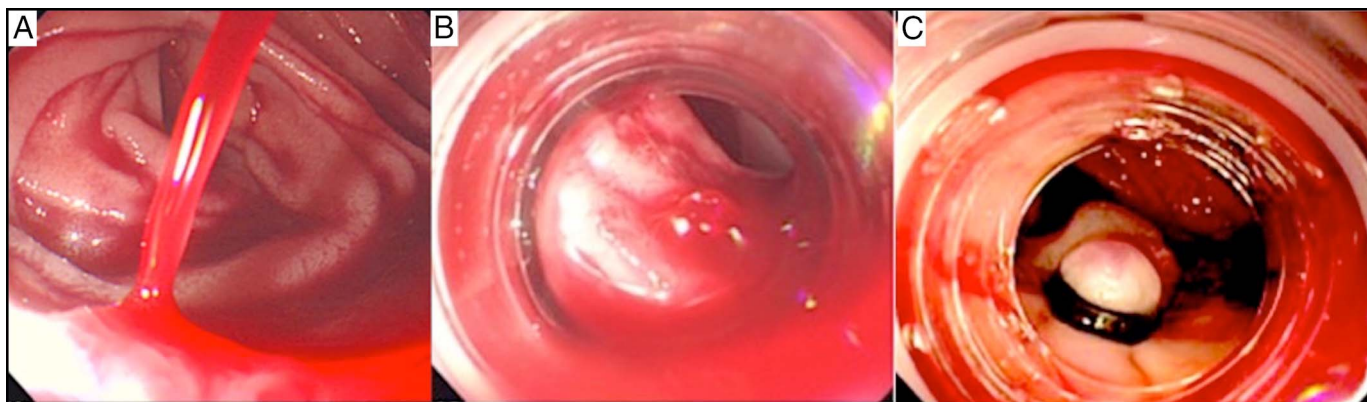
Upper gastrointestinal bleeding may sometimes occur because of ruptured varices, primarily in cases of portal hypertension involving liver cirrhosis.<sup>1</sup> A representative rupture of varices is bleeding from the esophagus or stomach. Although ectopic varices are observed, their rupture is rare.<sup>1,2</sup> Methods of hemostasis for ectopic varices are endoscopic band ligation (EBL), sclerotherapy, transjugular intrahepatic portosystemic shunt (TIPS), balloon-occluded retrograde transvenous obliteration, and surgical options.<sup>2,3</sup> The appropriate treatment is selected according to the situation. There is no definitive hemostatic method for ectopic varices.<sup>3</sup> In addition, the hemodynamics for jejunal variceal formation following total gastrectomy are not well known.<sup>4</sup>

## CASE REPORT

A 76-year-old man of active alcohol use with a history of alcoholic liver cirrhosis, multiple endoscopic variceal ligation (EVL) for the rupture of esophageal varices, and Roux-en-Y reconstruction with total gastrectomy for gastric cancer 10 years ago was urgently transported to the hospital, after he had 3 episodes of hematemesis.

His vital signs were blood pressure, 66/42 mm Hg; heart rate, 124 beats/min; feeble respiration, 20 breaths/min; and SpO<sub>2</sub>, 86% (10 L/min oxygen). Laboratory analysis revealed severe metabolic acidosis (pH, 6.90; HCO<sub>3</sub>, 6.2 mmol/L; base excess, -23.8 mmol/L), elevated lactate levels (16.0 mmol/L), and severe anemia (hemoglobin, 3.8 g/dL). The value of international normalized ratio and Model for End-Stage Liver Disease Sodium (MELD-Na) were 2.22 and 15, respectively. Blood transfusion was performed along with the administration of intravenous noradrenaline and vasopressin in the emergency department. After admission to the intensive care unit, the patient vomited blood again and went into cardiopulmonary arrest. Spontaneous circulation was achieved by chest compressions and adrenaline administration. Since the patient's history included treatment for esophageal varices at another hospital, the patient was suspected to have hemorrhage from esophageal varices. Emergency upper gastrointestinal endoscopy was performed 5 hours after arrival.

Upper gastrointestinal endoscopy revealed effusive blood retention in esophagus. However, esophageal varices were not noticeable, and single spurting bleeding was observed from jejunal varices at the distal side of the esophagojejunal anastomosis. Since there was active and massive bleeding, it was difficult to get a satisfactory view. Nevertheless, hemostasis was successful in performing a single EBL (Figure 1). The hemostatic procedure time was 10 minutes. Post-procedure, no signs of hemorrhage were observed.



**Figure 1.** Endoscopy image of jejunal varices showing (A) spurting bleeding due to jejunal variceal rupture, (B) endoscopic band ligation, and (C) hemostasis obtained.

The patient's hemodynamic status and metabolic acidosis improved after EBL. The values of pH and base excess were changed from 6.90 to 7.31 and from  $-23.9$  to  $-10.9$  mmol/L after hemostasis, respectively. The patient recovered well. His consciousness improved, and extubation was carried out 3 days after admission. On a follow-up upper gastrointestinal endoscopy performed 12 days after the procedure, esophageal varices (LmF1Cb) and a post-EVL ulcer were observed together with yellow granulation tissue. No signs of bleeding were observed (Figure 2). There were no complications, and the patient was discharged from intensive care unit at 15 days and from the hospital at 24 days after admission. One month after leaving the hospital, the patient has not rebled. Elective sclerotherapy and TIPS were considered as additional treatments.

## DISCUSSION

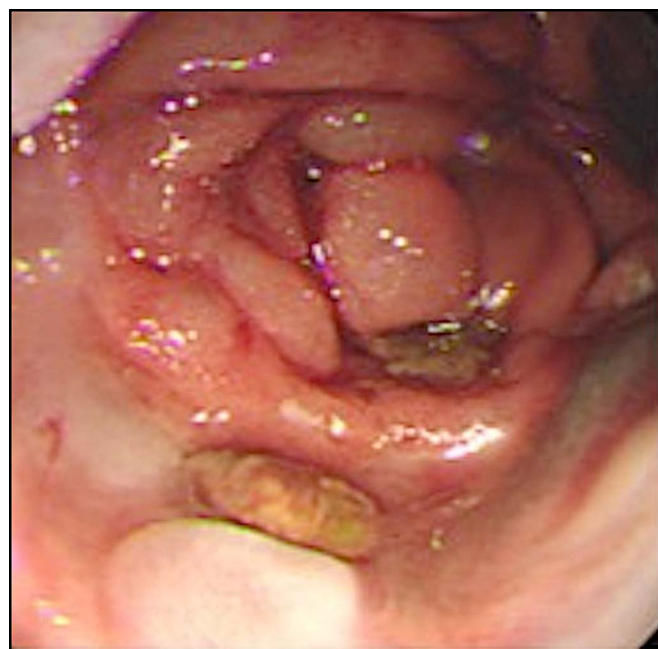
Rupture of ectopic varices including those of jejunum is rare.<sup>1,2</sup> Strategic therapeutic procedures have not yet been established for ectopic varices; hence, bleeding from ectopic varices is potentially life-threatening.<sup>5</sup> We have not found any success reports of EBL for a ruptured jejunal varices following total gastrectomy.

There were 2 important clinical findings with respect to the patient reported here, jejunal variceal formation after total gastrectomy and EBL hemostasis. First, following total gastrectomy, the gastric vasculature including the left gastric vein and the short gastric vein that act as collaterals due to portal hypertension is blocked; therefore, formation of esophageal varices is considered to be relatively rare.<sup>4,6</sup> However, according to the literature, the mechanism for the occurrence of varices is considered mainly to be the outflow through the mesenteric vein that feeds jejunum.<sup>6</sup> A previous case report showed that there is a risk of varices formation in the esophagojejunal anastomosis after total gastrectomy; however, many unknown points still remain.<sup>4,6</sup>

Second, the hemostatic method for ruptured jejunal varices following total gastrectomy are EBL, endoscopic sclerotherapy,

TIPS, surgical devascularization, dissection, and shunt surgery. Little is known regarding the advantages of these treatment options and the long-term progression.

Although there are few case reports regarding hemostasis for ectopic varices, EBL is applied, and endoscopic sclerotherapy is performed especially when there is no active bleeding.<sup>7,8</sup> In some reports, endoscopic hemostasis was unsuccessful, but TIPS was effective for hemostasis.<sup>3,5,9</sup> Elective surgical treatment has also been reported previously.<sup>10</sup> However, in our patient, stabilization of vitals was not achieved, and prompt hemostasis was necessary. EBL is not a complex procedure, and banding is achieved merely by pressing a device against the source of bleeding. The procedure can even be performed in situations with poor visibility with active hemorrhage. In



**Figure 2.** On day 12 after procedure, ulcer of post-endoscopic variceal ligation was observed together with yellow granulation tissue and there were no signs of bleeding.

a previous case series, EBL has been performed for duodenum and small intestinal bleeding, and its safety has been demonstrated.<sup>11–14</sup> Furthermore, sclerotherapy such as histoacryl glue injection has a high risk for complications such as ulcer formation, fistulation, and embolization, and EBL can potentially be the first choice of treatment during emergencies. In contrast, we must consider the risk of complications such as perforation when we perform EBL. In previous reports, routine EBL was not recommended in duodenal bleeding cases.<sup>13–15</sup> In addition, the long-term results of EBL for ectopic varices are unknown. In some cases, improving ectopic varices may have the adverse effect of liver function and exaggeration of other varices. We must be concerned about the risk of rebleeding and hemodynamic changes.

## DISCLOSURES

Author contributions: Y. Shiratori, K. Nakamura, and T. Ikeya wrote and edited the manuscript. K. Takagi edited the manuscript. K. Fukuda revised the manuscript. Y. Shiratori is the article guarantor.

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Informed consent was obtained for this case report.

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