



Balloon tamponade for control of myotomy bleeding during peroral endoscopic myotomy

Andrew M. Joelson, MD, Sara Welinsky, MD, Amrita Sethi, MD

INTRODUCTION

Peroral endoscopic myotomy has revolutionized the management of achalasia. Although capnoperitoneum or capnomediastinum are not uncommonly seen in the immediate postprocedure setting, severe adverse events such as perforation and bleeding requiring cessation of the procedure are rare. Individuals with a sigmoid-shaped esophagus are known to be at increased risk for adverse events. Minor bleeding is relatively common during submucosal tunneling and is treated easily using coagulation from the dissecting needle itself, cap tamponade, or coagulation forceps for larger vessels. In a large multicenter series of over 1800 patients, only 6 (0.3%) developed hemorrhage during tunneling that required cessation of the procedure and additional hemostatic maneuvers. During myotomy, bleeding requiring intervention is less common. We present a case of severe hemorrhage during myotomy treated with balloon tamponade, additional myotomy, and coagulation.

CASE REPORT

A 53-year-old man with achalasia, status post-Heller myotomy 12 years prior, presented with worsening

dysphagia, regurgitation, and 50-pound weight loss over 2 years. An esophagram revealed dilation of the esophagus and delayed passage of contrast through the gastroesophageal junction. Endoscopy was performed and demonstrated a dilated, sigmoid-shaped esophagus (Fig. 1) with a hypertonic lower esophageal sphincter. Endoluminal functional lumen imaging probe revealed a distensibility index of $1.5 \text{ mm}^2/\text{mm Hg}$ at a volume of 40 mL. After a discussion of management options, the patient elected to undergo peroral endoscopic myotomy.

During the procedure (Video 1, available online at www.giejournal.org), a wider-than-normal tunnel was created, given the sigmoid shape of the esophagus, to ensure proper orientation and adequate extent of the tunnel and myotomy. The myotomy was performed in a retrograde fashion. A submucosal bridging vessel was injured at 44 cm, resulting in hemorrhage and poor visualization (Figs. 2 and 3). Attempts at needle-knife coagulation, cap tamponade, and hemostasis using coagulating forceps were unsuccessful. Although additional hemostasis was attempted, thoracic surgery and interventional radiology were contacted to determine whether emergency treatment was needed. It was ultimately decided that completion of the myotomy would increase exposure to the vessel and confirm hemostasis. Therefore, a

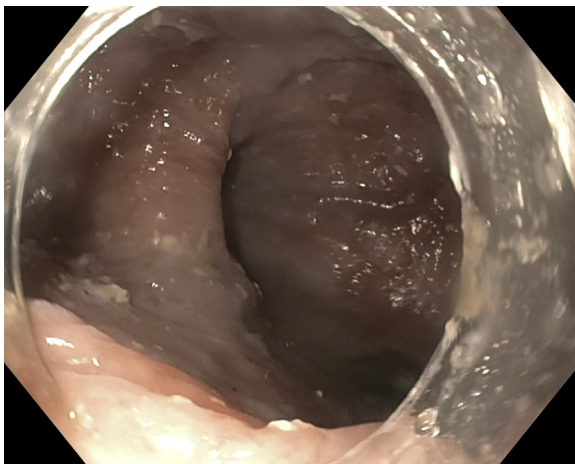


Figure 1. Upper endoscopy showing a dilated and tortuous esophagus.

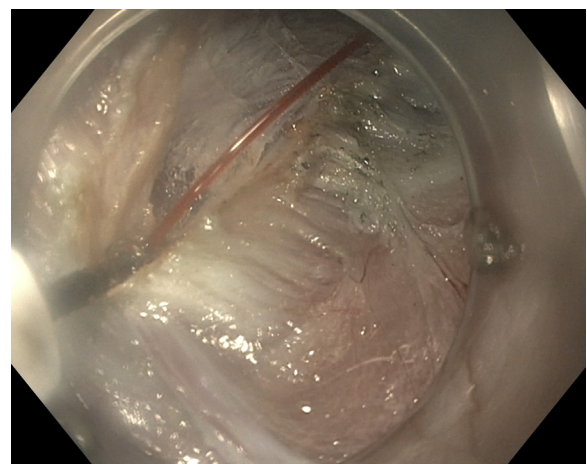


Figure 2. Injury to a submucosal bridging vessel during myotomy at approximately 44 cm from the incisors.

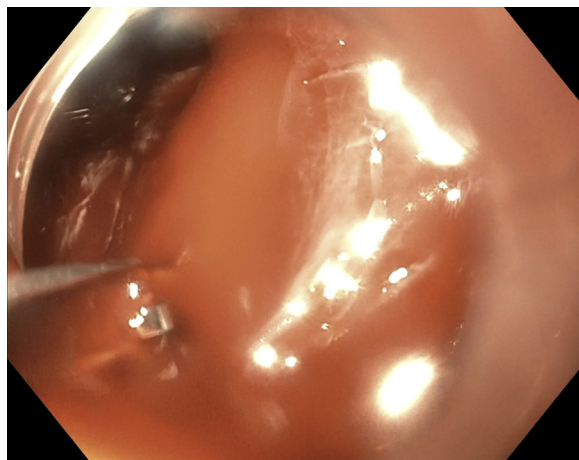


Figure 3. Obscured view owing to hemorrhage.

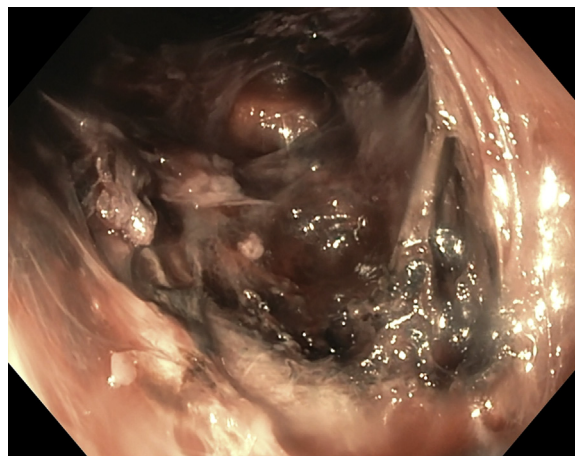


Figure 5. Hemostasis in the submucosal tunnel after second balloon tamponade.

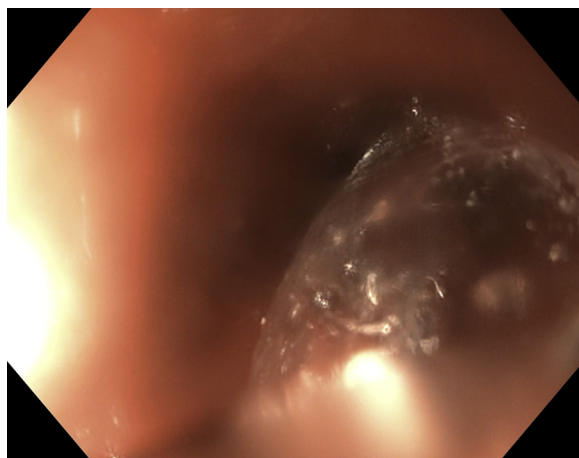


Figure 4. Balloon tamponade within the submucosal tunnel.

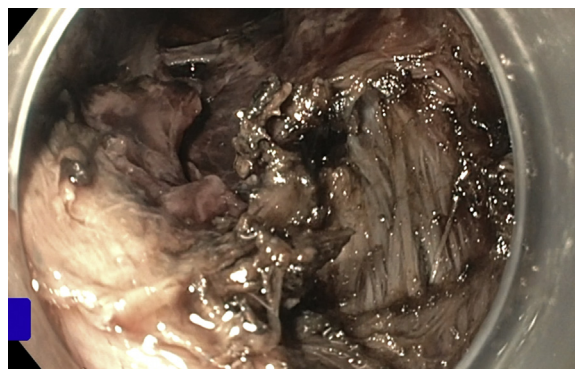


Figure 6. Completed myotomy showing intact longitudinal muscle layer.

10 to 12 controlled radial expansion (CRE) balloon was inflated within the tunnel, and pressure was held briefly (Fig. 4). Initially, there was cessation of bleeding and improved visualization, and additional targeted coagulation was performed. Although the brisk bleeding stopped, a slow ooze persisted, and there was concern that the culprit vessel had not been visualized. Therefore, additional balloon tamponade was performed with a 12 to 15 CRE balloon inflated to 13.5 mm Hg, resulting in effective cessation of oozing (Fig. 5). The myotomy was completed in an antegrade fashion with no further bleeding. A clip was placed at the site of the injured vessel in the event of delayed bleeding requiring further therapy such as angiographic embolization. The procedure was completed without further bleeding, and the mucosotomy was closed (Fig. 6). A follow-up esophagram was negative for leakage



Figure 7. Esophagram on postoperative day 1, negative for leakage of contrast.

of contrast (Fig. 7), and the patient did not experience further bleeding. He was discharged on postoperative day 3, tolerating a diet of progressive textures.

DISCUSSION

Although bleeding has been reported both intraoperatively during submucosal tunneling and in the perioperative period, substantial bleeding requiring additional mechanisms of hemostasis is quite rare, occurring in 0.2% to 0.7% of cases.^{1,2} Bleeding is most common during tunneling; however, hemorrhage can result from disruption of blood vessels during myotomy.^{3,4} The patient's long history of achalasia and the sigmoid nature of his esophagus likely contributed to the procedural complexity, as has been shown in prior studies.⁴ Mechanical tamponade is an important part of the endoscopist's armamentarium for achieving hemostasis. This is typically accomplished by compressing the tunnel wall with the endoscope's cap or by injecting additional lifting agent,^{3,5} and cases of severe postprocedural bleeding requiring Sengstaken-Blakemore tube tamponade have been reported.^{2,6} We report for the first time the use of a through-the-scope CRE balloon within the submucosal tunnel to provide effective hemostasis enabling exposure of the hemorrhagic site, appropriate treatment, and completion of the procedure.

DISCLOSURE

Dr Sethi is a consultant for Boston Scientific, Medtronic, Olympus, Fujifilm, Micro-tech, and Intuitive Surgical. All other authors disclosed no financial relationships.

Abbreviation: CRE, controlled radial expansion.

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Division of Digestive and Liver Diseases, Department of Medicine, Columbia University Irving Medical Center, New York, New York.

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