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NOVEL USE OF GLIDESCOPE INDIRECT LARYNGOSCOPY FOR INSERTION OF A MINNESOTA TUBE FOR VARICEAL BLEEDING

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☐ **Abstract—Background: With improvements in endoscopic and interventional radiologic therapies, insertion of gastroesophageal balloon tamponade catheters, commonly known as Sengstaken-Blakemore or Minnesota tubes, is a rarely performed procedure for esophageal or gastric variceal bleeding. In small hospitals or freestanding emergency departments, endoscopic or interventional radiology (IR) therapies might not be available, so patients with exsanguinating variceal bleeding must be stabilized or temporized for transport to larger hospitals. Occasionally, tamponade devices are necessary as a rescue therapy for failed endoscopic or IR therapies or can be used as definitive therapy in select cases. In addition to being rarely performed, there are multiple technical complications associated with blind insertion of tamponade catheters. Discussion: We describe a novel use of indirect laryngoscopy using a Glidescope for assisting in placement of a Minnesota tube in 4 patients with exsanguinating esophageal bleeding. Conclusions: Insertion of a Minnesota tube for bleeding esophageal or gastric varices is an uncommon, technically challenging procedure that can be lifesaving, and is something emergency physicians, intensivists, and gastroenterologists should be capable of performing. Addition of indirect laryngoscopy may help to improve rapid, safe, and successful placement of these devices.** © **2015 Elsevier Inc.**

☐ **Keywords—Minnesota tube; varices; procedure; tamponade; indirect laryngoscopy**

INTRODUCTION

Since the initial description of using a balloon tamponade device for esophageal varices by Sengstaken and Blakemore in 1950, this seldom-performed procedure has proven to be lifesaving (1). In the setting of acute exsanguination secondary to gastrointestinal hemorrhage, placement of a balloon tamponade device can be used as a temporizing measure to control bleeding until more definitive therapy can be arranged, or, in select cases, as a definitive therapy. At most hospitals, definitive therapy for variceal bleeding begins with endoscopic evaluation and therapy, including banding, sclerotherapy, or stenting of varices. Additional therapies may include interventional radiology for embolization or transjugular intrahepatic portosystemic shunting, or surgical interventions, such as esophagectomy or gastrectomy. These definitive therapies are often not immediately available 24 hours per day.

With the improved mortality afforded by rapid endoscopic therapy, balloon tamponade catheters are rarely utilized as an index therapy. A 2003 multicenter study of 725 patients with variceal bleeding reported index therapy of balloon tamponade was employed in only 5.5% of patients, while in a more recent case series of 1308 patients with gastric variceal bleeding, balloon tamponade was used as the index, nonpharmacologic therapy in only 1.9% of patients (2,3). Despite the low utilization

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of tamponade therapy, a 2006 case series of 100 patients with variceal bleeding in which balloon tamponade was employed, 48% had a balloon catheter placed after failed attempts at endoscopic therapy. Overall, tamponade was effective in achieving hemostasis in 61% of patients (4).

Given the infrequent nature at which this blind technique is performed, it is often associated with serious complications, particularly if the device is malpositioned in the airway or not advanced far enough into the stomach, such that the gastric balloon is inflated in the esophagus (5–7). Many of these complications are associated with operator inexperience and difficult pharyngoesophageal anatomy. In an attempt to improve proper placement of a Minnesota tube, we employed the use of indirect visualization via Glidescope video laryngoscopy, and report our experience with 4 patients in whom we used this technique.

DISCUSSION

Technique

A consistent method for insertion of the Minnesota tube (C. R. Bard, Covington, GA) was employed in all cases. Due to large-volume hematemesis, all patients had been endotracheal intubated to protect their airway. The Minnesota tube was placed in a bedside ice bath to transiently improve rigidity of the tube. Before insertion of the tube, serial volumes of air were injected into the gastric and esophageal ports, and corresponding pressures were recorded. All patients were then sedated and paralyzed using cisatracurium. The Glidescope (Verathon Inc., Bothell, WA) was inserted into the patient's mouth and the proximal esophagus was visualized (see Figure 1). Although we experienced no hematemesis, we had two

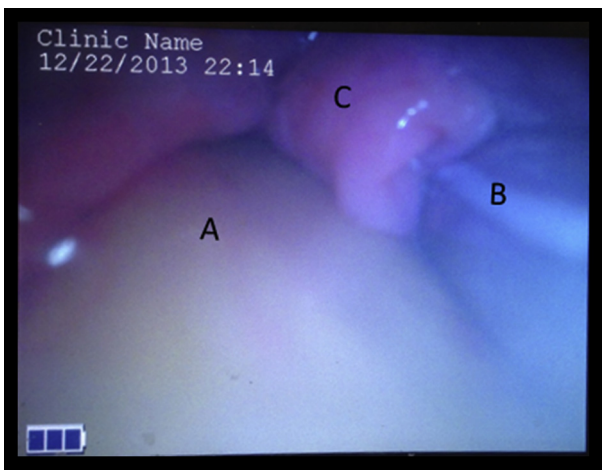

Figure 1. Indirect visualization of (A) Minnesota tube and (B) endotracheal tube via Glidescope indirect videolaryngoscopy. Epiglottis is denoted by (C).

Yankauer suction catheters available in case it should occur. The Minnesota tube was removed from the ice bath, quickly coated with water-based lubricant, then inserted through the patient's mouth. Using indirect visualization via the Glidescope, the tip of the Minnesota tube was directed down the esophagus with the assistance of either Magill forceps or the operator's fingers. Indirect visualization of the oropharynx was maintained throughout insertion of the tube to a depth of 50 cm to ensure the Minnesota tube had not coiled in the mouth. Radiographic confirmation that the Minnesota tube was within the stomach was obtained. The gastric balloon was then inflated with 100 mL of air and manometry was measured to ensure the pressure was within 10 mm Hg of the pre-insertion pressure; a deviation of > 10 mm Hg between pre-insertion and post-insertion being indicative of inflation of the gastric balloon within the esophagus. Repeat radiographic confirmation was obtained and then subsequent volumes of air were then inflated, checking manometry after each 100 mL, to a total volume of 500 mL of air in the gastric balloon. Traction was then applied to the Minnesota tube and a 1 L bag of normal saline (providing 1 kg of traction) was tied to the Minnesota tube and hung from the end of the bed. Hemostasis was achieved in all cases without inflation of the esophageal balloon.

NOVEL USE OF INDIRECT LARYNGOSCOPY

In order to aid in the placement of these devices, we employed the use of a video laryngoscope for indirect visualization of the esophageal tamponade catheter being passed into the esophagus and have successfully utilized this technique in 4 patients. Use of direct laryngoscopy for assistance with esophageal tamponade balloon placement has been utilized previously. However, indirect laryngoscopy offers the advantage of a video display for multiple viewers to observe the placement of the catheter into the esophagus. Additionally, it allows the operator to be positioned farther from the source of the hematemesis, thereby reducing likelihood of blood and bodily fluid exposure. Potential limitations to use of indirect videolaryngoscopy for insertion of a Minnesota tube include the need for additional equipment and occlusion of the camera by blood. We feel, however, that most EDs already have access to a videolaryngoscope, and having two suction devices available during insertion as well as use of pharmacologic paralysis should help prevent occlusion of the camera by blood.

CONCLUSIONS

We advocate the use of indirect laryngoscopy during placement of all esophageal tamponade devices for

several reasons. Indirect video laryngoscopes are becoming increasingly available in emergency departments and intensive care units and take minimal time to prepare for use. Also, procedures such as esophageal tamponade balloon placement are performed in emergency situations, during which use of the videolaryngoscopy can provide visual confirmation of esophageal intubation. Indirect laryngoscopy can additionally help reduce exposure to blood and bodily fluid as compared to direct laryngoscopy. Lastly, indirect laryngoscopy offers the advantage of a display screen for multiple viewers to observe the placement of the catheter into the esophagus, which may improve quality of teaching and instruction in training institutions. The use of indirect videolaryngoscopy has not been previously described with placing esophageal tamponade devices, and our case series successfully demonstrates the usefulness and practicality of this technique.

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