Difficult intubation of a Zenker’s diverticulum with an acute angle

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A 94-year-old woman was referred because of oropharyngeal dysphagia and previously failed intubation. A barium swallow revealed Zenker’s diverticulum (ZD) and cricopharyngeal hypertrophy (Fig. 1).

The patient had been referred for endoscopic assessment and management of ZD. Gastroscopy with an insertion tube 9.8 mm in diameter (Pentax EG-2990i, Pentax, Tokyo, Japan) performed with the patient under propofol revealed a 17-mm ZD, but the upper-esophageal sphincter (UES) was at an acute angle, limiting intubation (Fig. 2). Conventional intubation was unsuccessful despite multiple attempts. Eventually, a transparent cap was attached to the tip of the gastroscope, which enabled the cricopharyngeus (CP) muscle to be pushed downward to open up the UES (Video 1, available online at www.VideoGIE.org). This then allowed passage of an 8F nasojejunal tube (NJT) (NJFT8, Cook Medical, Bloomington, Ind) through the accessory channel. The gastroscope was intubated successfully over the NJT (Fig. 3). The NJT was left in to separate the anterior wall of the diverticulum from the posterior wall of the esophagus—a standard approach when the septum (CP) is cut. This permitted treatment by flexible endoscopic division of the septum. The NJT was removed after the procedure.

A difficult intubation may be defined as a clinical situation in which a trained endoscopist experiences difficulty with insertion of a standard gastroscope into the esophagus. The true incidence is unknown, with 1 study reporting failed intubation rates of 1.8%.1

It is well known among endoscopists that pretest anxiety, excessive gag reflex, and structural variations are factors that may pose challenges in intubation. In anesthesia, the Mallampati score (estimated by the distance between the base of the tongue and the

Figure 1. Barium swallow demonstrating Zenker’s diverticulum (ZD), cricopharyngeus (CP), and upper-esophageal sphincter (UES).

Figure 2. Video still image showing endoscopic landmarks of Zenker’s diverticulum (ZD), cricopharyngeus (CP), and upper-esophageal sphincter (UES).
The Mallampati assessment is routinely applied to predict the difficulty of endotracheal intubation. However, it is foreseeable that normal variations in oropharyngeal anatomy may also affect the difficulty of intubation. Mallampati assessment has not been validated in endoscopy.2

The ZD, also known as pharyngeal pouch, is named after the German pathologist Friedrich Albert von Zenker, who, in 1877, described a series of dysphagic patients with herniation of the posterior pharyngeal wall. The exact site was later characterized as Killian’s dehiscence, located between the thyropharyngeus and the CP muscle fibers of the inferior constrictor.3 ZD is a well-recognized cause of failed intubation in a dysphagic patient. Although the condition is relatively rare (incidence estimated at 2/100,000/year),3 intubation of ZD is important for assessment and flexible endoscopic division of the septum, which has been shown to be a safe and effective treatment for ZD.4

Because the closure muscles of the UES comprise the cervical esophagus, CP, and inferior pharyngeal constrictor, increased tone in the UES resulting from CP hypertrophy may also limit intubation,5 which was the case with our patient. Approaches for negotiating ZD have previously been described. These include the use of an overtube,6 a guidewire,7 or a catheter8 to facilitate passage through the UES. Although intubation with a nasoendoscope may be more tolerable compared with conventional gastroscopy,1 it is unclear whether this method is effective in ZD.

Our video case report demonstrates that the application of a transparent cap to a standard gastroscope increases the field of view at the UES, allowing the CP muscle to be pushed down without loss of operating space. Although cap assistance has been described previously in the setting of flexible endoscopic division of the septum, to our knowledge this approach has not been well documented as a technique to overcome cases of failed intubation. In our case, cap-assisted gastroscopy enabled the passage of a nasojejunal tube to negotiate the acute angle of the UES and act as a guide for successful intubation. We believe that other endoscopists may find such a strategy beneficial in cases of failed intubation resulting from ZD.

**DISCLOSURE**

All authors disclosed no financial relationships relevant to this publication.

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**Figure 3.** Still images that “tell the story” of our case. **A,** Landmarks of Zenker’s diverticulum (ZD), cricopharyngeus (CP), and upper-esophageal sphincter (UES). **B,** Nasojejunal tube (NJT) passed through working channel. **C,** NJT tip passed through UES. **D,** Gastroscope advanced over the NJT into esophagus. **E,** NJT in the esophagus separating the esophageal wall from Zenker’s septum. **F,** Septal division started by use of Stag Beetle jr knife.
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