ORIGINAL ARTICLE

Use of an adapted bronchoscope for peroral endoscopic myotomy in a pediatric patient weighing less than 10 kg

Carlos Robles-Medranda, MD, Maria Egas-Izquierdo, MD, Juan Alcívar-Vásquez, MD, Jorge Baquerizo-Burgos, MD, Domenica Cunto, MD

CASE

A 9-kg, 2-year-old female patient with an 18-month history of GERD presented with upper abdominal pain, postprandial vomiting, and weight loss. The esophagogram showed a bird's beak image (Fig. 1). An EGD revealed a tight esophagogastric junction (EGJ) (Fig. 2) and a distensibility index by endoscopic functional lumen imaging probe (EndoFlip EF-325N; Medtronic, Dublin, Ireland) at an EGJ of 3.5, 4, and 4.2 mm^2/mm Hg while inflating the balloon at 20, 30, and 40 mL, respectively (Fig. 3). Achalasia diagnosis was made. The parents refused surgery; therefore, peroral endoscopic myotomy (POEM) was proposed.

PROCEDURE

For POEM, a bronchoscope (6.2 mm tube diameter, 2.8 mm working channel) (Pentax EB-1970K; Pentax Medical, Tokyo, Japan) with a handmade disposable dissection cap created with a piece of a 7.0-mm endotracheal tube (ETT) and an adapted suction and irrigation system was used because of the small diameter of the patient's esophagus (Video 1, available online at www.videogie.org). After antibiotic (gentamicin) lavage, a 1.5-cm longitudinal mucosal incision using a T-type HybridKnife (Erbe Elektromedizin GmbH, Tübingen, Germany) (2.3 × 1.9 mm) was made at the posterior wall of the esophagus (Fig. 4). Methylene blue and saline solution were injected into the submucosa layer. Next, a T-type HybridKnife was used for dissection and coagulation of the submucosa's small vessels to create a tunnel, which extended 8 cm above the cardia. For full-thickness myotomy, the muscle fibers (longitudinal and circular) at the distal esophagus were cut starting 2 cm below the tunnel entry and ending at the cardia. Successful myotomy was confirmed by smooth bronchoscope passage through the EGJ. The submucosal opening was closed using hemostatic clips (Resolution; Boston Scientific, Marlborough, Mass, USA) (Fig. 5).

OUTCOME

The patient was discharged 4 days after the procedure, and the 1-month follow-up showed that her symptoms had improved. At the 15-month follow-up, she was still asymptomatic and had gained 4 kg. EGD and barium esophagogram showed achalasia resolution (Fig. 6).

DISCUSSION

Because children have a longer life expectancy, POEM, or laparoscopic-Heller myotomy, is an appropriate management for achalasia.[1-4] POEM is a promising endoscopic technique that is equally as effective and safe in pediatric patients as in adults; nevertheless, its implementation is limited to a few specialized centers.[3-5]

The small size of our patient's esophagus required the use of a tube with a small diameter and a channel that allows a large-diameter instrument; therefore, a customized fiberoptic bronchoscope had to be used instead of the transnasal (TN) videogastroscope.[6,7] Compared to that of the TN videogastroscope (2.8 mm vs 2.0 mm), the channel of the bronchoscopes allowed the use of adult instruments (ie, 2.7 mm Flush Knife, Fujifilm, Tokyo, Japan, 2.3 mm HybridKnife, Erbe, Tübingen, Germany). The distal attachment cap created with the ETT was able to pass through the cricopharynx while maintaining a wide visual field and working channel. Irrigation and suction were performed simultaneously through an adapted system.

Because of the narrow esophageal lumen in toddlers, endotherapy is technically challenging, and few studies of POEM have been described. A single-center study reported postprocedural pneumoperitoneum in an 11-month-old patient.[8] Recent reports have described a successful POEM using an ultraslim TN gastroscope with a

Abbreviations: EGJ, esophagogastric junction; ETT, endotracheal tube; POEM, peroral endoscopic myotomy; TN, transnasal.

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Instituto Ecuatoriano de Enfermedades Digestivas (IECED), Guayaquil, Ecuador.

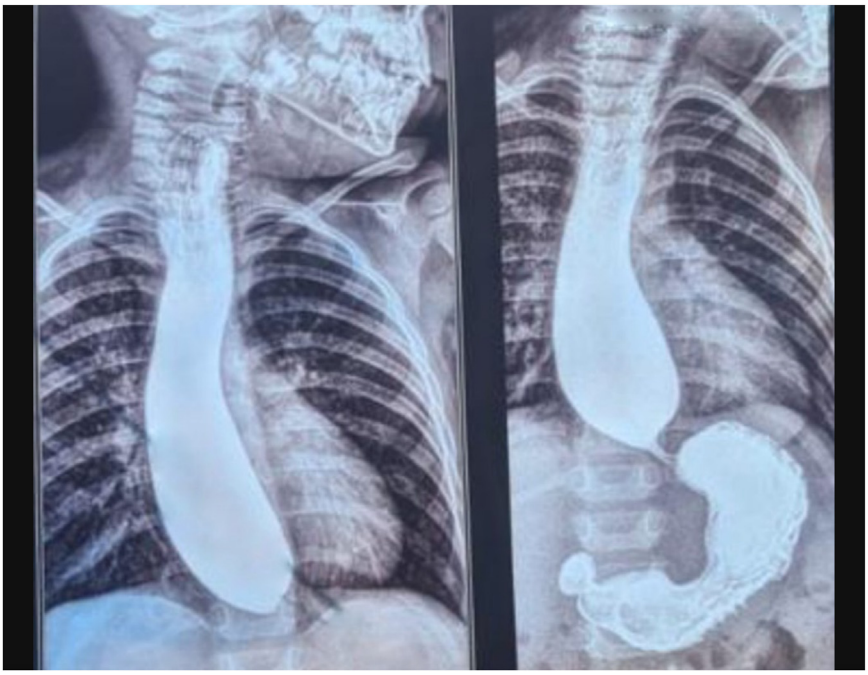

Figure 1. Assessment of esophageal emptying on barium esophagogram before peroral endoscopic myotomy showed a bird's beak sign.

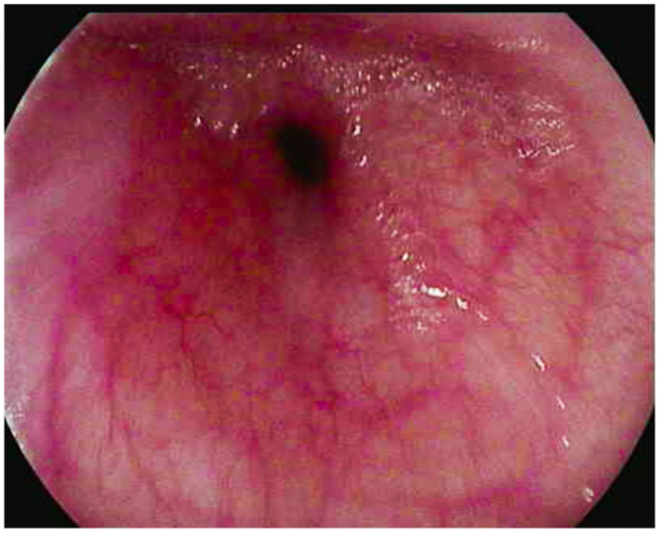

Figure 2. Esophageal obstruction due to tight esophagogastric junction.

customized 5.5-mm ETT in an 18-month-old patient. Because knives fitted with a gastroscope in standard POEM are incompatible, the authors modified the instrument using a tiny 25-mm polypectomy snare and a 6F cystotome for incision and dissection and then used them alternately.[9] Thus, the sole use of a bronchoscope with a customized distal attachment and irrigation/suction mechanism in pediatric POEM improved the safety and feasibility of this standardized technique in an underweight 2-year-old patient, making it a reasonable alternative in similar patients.

DISCLOSURE

Dr Robles-Medranda is a consultant and key opinion leader for Pentax Medical, Steris, Microtech, G-Tech Medical Supply, CREO Medical, EndoSound, and mdconsgroup. All other authors disclosed no financial relationships.

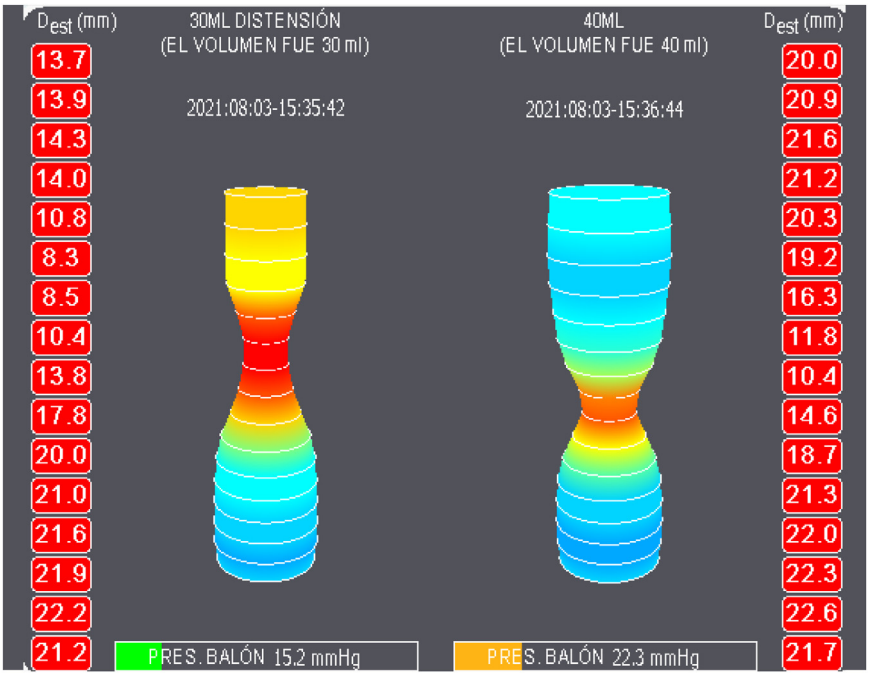

Figure 3. Pre–peroral endoscopic myotomy EndoFlip.

Figure 4. Esophageal submucosal dissection.

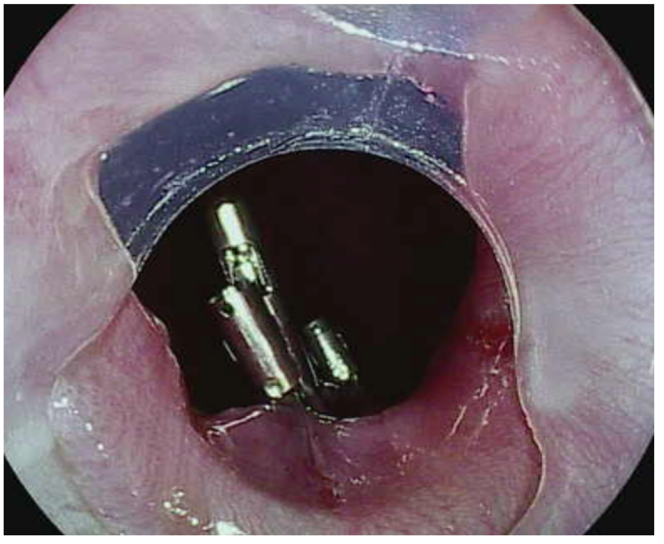

Figure 5. Hemostatic clips for closure of the submucosal incision.

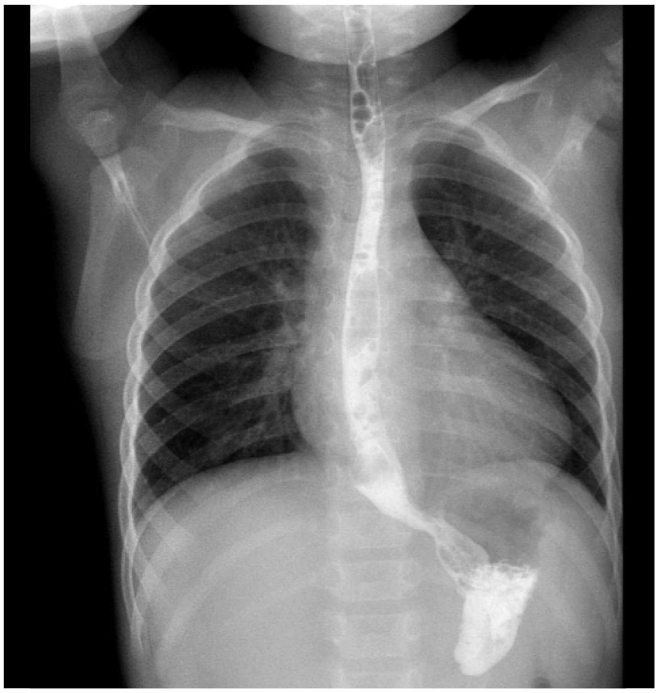

Figure 6. Assessment of esophageal emptying on barium esophagography after peroral endoscopic myotomy.

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