Peroral Endoscopic Myotomy for Esophageal Achalasia: Technique, Indication, and Outcomes

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KEYWORDS

• Peroral endoscopic myotomy • Esophageal achalasia
• Natural orifice transluminal endoscopic surgery • POEM

The concept of natural orifice transluminal endoscopic surgery (NOTES)[1–3] has inspired endoscopists and endoscopic surgeons to create and establish a novel, less-invasive treatment even for various gastrointestinal (GI) diseases. Esophageal achalasia is a primary target of NOTES. So far, treatments, including Botox injection and pneumatic dilation, have been commonly performed as first-line endoscopic treatments for achalasia.[4,5] If those interventions are ineffective, laparoscopic myotomy is generally indicated as the next step of treatment.[6]

Peroral endoscopic myotomy (POEM) has been developed as an incisionless, minimally invasive endoscopic treatment intending a permanent cure from esophageal achalasia.[7] The concept of endoscopic myotomy was first reported around 3 decades ago,[8] but the direct incision method through the mucosal layer was not considered to be a safe and reliable approach. Pasricha and colleagues[9] recently reported the concept of tunneled submucosal myotomy using a porcine model, which enabled the closure of the mucosal-submucosal opening away from the myotomy site. Sumiyama and colleagues[10] also reported the technical usefulness of submucosal tunneling in the porcine model. Based on these experimental data, a novel method of endoscopic myotomy was developed and established by the present authors.[11]

In this article, the current techniques, applications, and clinical results of POEM are described.

INSTITUTIONAL REVIEW BOARD APPROVAL AND INFORMED CONSENT

The POEM procedure received approval from the Institutional Review Board of Showa University Northern Yokohama Hospital (approval number 0805–02, issued on August 15, 2008). Written informed consent was obtained from all patients. All patients who underwent POEM were registered in the University Hospital Medical Information Network Japan database.

INDICATIONS

All patients with achalasia can be treated by POEM. In the authors' early series, the indication for POEM was limited to the nonsigmoid-type esophagus, but the initial patient feedback to the POEM procedure was better than expected. Based on the authors' initial results, the study was opened to all grades of achalasia. More recently, the indication for POEM was further

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extended to the cases of failed surgical myotomy. Currently, the authors have no exceptions when considering the application of the POEM.

EQUIPMENT USED FOR POEM

A forward-viewing endoscope with an outer diameter of 9.8 mm, which is designed for routine upper GI endoscopy, is used with a transparent distal cap attachment (MH-588; Olympus, Center Valley, PA, USA [**Fig. 1**A]). The cap has an oblique orifice, which extends beyond the distal end of the endoscope for a distance of 1 cm and is essential for entering and maintaining endoscopic visualization within the submucosal space. All equipment, including the endoscope itself, is sterilized using ethylene oxide gas.

A triangle-tip knife (KD-640L; Olympus) is used to dissect the submucosal layer and also to divide circular muscle bundles at the level of the esophagogastric junction (EGJ) (see **Fig. 1**B). The maximum diameter of the triangle-tip knife is 2.6 mm, and it will pass through the working channel of the 9.8 mm endoscope. The authors use an electrosurgical energy generator (VIO 300D, ERBE; Tübingen, Germany) that enables a spray-coagulation mode

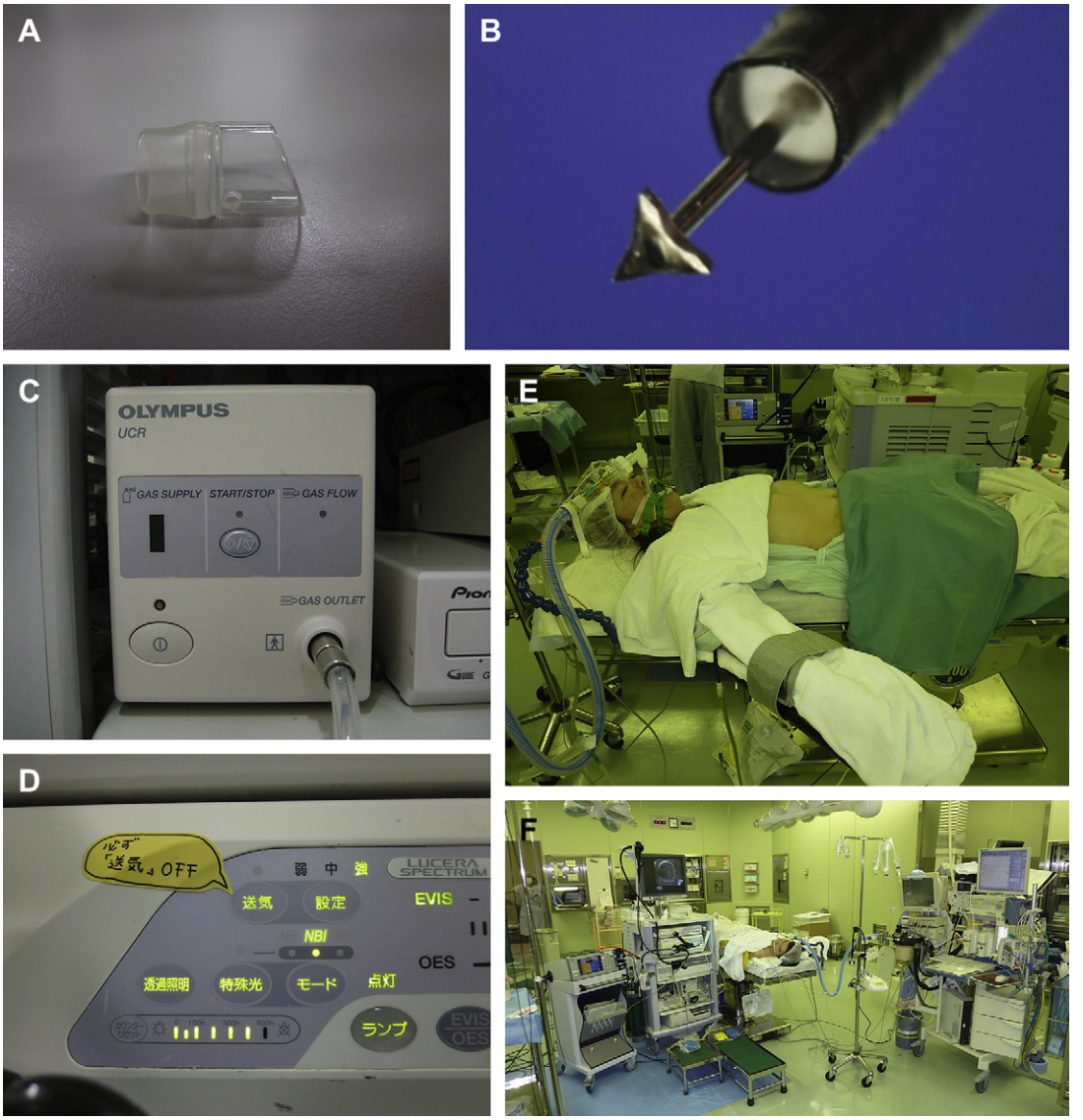

Fig. 1. (*A*) Transparent distal cap attachment. (*B*) Triangle-tip knife. (*C*) CO_2 insufflator (UC; Olympus) with standard tubing. (*D*) The standard endoscopic air pump should be turned off for the duration of the procedure. (*E*, *F*) The upper abdomen is prepared and then checked periodically during the procedure.