엔도플립을 이용하여 내시경적 유문절제술로 치료한 특발성 위마비증
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Idiopathic Gastroparesis Treated with Gastric Peroral Endoscopic Pyloromyotomy Using Endolumenal Functional Lumen Imaging Probe
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Case: A 25-year-old man presented to the emergency clinic with epigastric pain. He was previously very healthy and served as a soldier. He developed abrupt epigastric pain and diarrhea three months prior to his initial visit. A doctor at the local clinic suspected infectious colitis and was prescribed an antibiotic at his first visit; however, there was no symptomatic improvements. He underwent colonoscopy, and intravenous hydrocortisone was prescribed under the impression of ulcerative colitis at the local clinic. This provided mild, transient symptomatic improvement and the patient was able to eat food. However, intermittent abdominal pain and nausea continued, and the patient lost 10 kg of weight during the first month. Later, the patient experienced abdominal pain, fever, and myalgia, and he was then referred to Asan Medical Center. His abdominal computed tomography (CT) scan showed a mild thickening of the gall bladder, but without stone. Under the impression of chronic cholecystitis, he underwent laparoscopic cholecystectomy. However, despite surgery, he still complained of chronic epigastric pain, nausea, and vomiting. He underwent upper endoscopy, which showed normal findings. Despite medical therapy with several prokinetics, including metoclopramide, he still experienced epigastric pain, nausea, and vomiting, resulting in more than 20 kg of weight loss during the last three months. Due to nausea and vomiting, he was unable to keep down any solid food, and required total parenteral nutrition. He was referred to the gastrointestinal (GI) clinic due to continuous abdominal pain, nausea, and vomiting without abnormal laboratory test results, including autoimmune antibodies and other inflammatory makers. To rule out gastric dysmotility disorder, gastric emptying scan (GES) was recommended. However, he was unable to eat the test meal for GES due to severe nausea. Instead of GES, he underwent barium upper GI series, which showed definite delayed barium passage at the pyloric ring (Fig. 1A, B). Electrogastrography revealed a representative image of gastric outlet obstruction (Fig. 2). Under the impression of gastroparesis, including pyloric dysfunction, his first upper endoscopy was reviewed again. The pyloric ring was found to be relatively tight, which did not easily open. His gastroparesis cardinal symptom index (GCSI)
Fig. 1. Upper gastrointestinal series shows a definite delayed barium passage at the pyloric ring (A, B). After gastric peroral endoscopic pyloromyotomy (G-POEM), improved barium passage at the pyloric ring was noted (C, D).

Fig. 2. Electrogastrophy (EGG) shows high amplitude and excessively regular 3-cycles-per-minute patterns (red circle), which are the representative findings of gastric outlet obstruction on EGG.

score was 3.22 at that time. As an empirical treatment, botulinum toxin injection was given. Despite overnight fasting, the patient had lots of food in the stomach. During endoscopic treatment, the pyloric ring was too tight for the endoscope to pass through the duodenum. Therefore, a balloon dilation through-the-scope was performed simultaneously. He had temporary symptomatic improvement, but soon, he experienced aggravated epigastric pain, nausea, and vomiting. Thus, subsequent balloon dilation using a larger size was performed. His GCSI score was significantly improved, up to 1.78, and the patient was discharged. However, three days after discharge, he returned to the emergency room complaining of epigastric pain, nausea, and vomiting, and his GCSI score was aggravated to 2.67. His CT scan showed a severely dilated stomach and proximal small bowel (Fig. 3A). He underwent endoscopic ultrasonography and endolumenal
Fig. 3. Initial computed tomography (CT) scan showed a diffusely dilated stomach and proximal small bowel (A). Follow-up CT scan showed an improved state of dilated stomach (B).

Fig. 4. The endolumenal functional lumen imaging probe (EndoFLIP) showed moderately thickened pyloric muscles, of up to 0.8 mm²/mmHg of decreased distensibility along the pylorus (A). After gastric peroral endoscopic pyloromyotomy (G-POEM), EndoFLIP showed improved distensibility along the pylorus, of up to 5.9 mm²/mmHg (B).

functional lumen imaging probe (EndoFLIP). It showed moderately thickened pyloric muscles and 0.8 mm²/mmHg of decreased distensibility along the pylorus (Fig. 4A). Gastric peroral endoscopic pyloromyotomy (G-POEM) was performed under general anesthesia (Fig. 5). During G-POEM, frozen muscle biopsy was reviewed, which did not show any abnormal findings, such as eosinophilic infiltration. After G-POEM, over 6 cm along the pylorus, his pyloric distensibility was improved, up to 5.9 mm²/mmHg (Fig. 4B). There was no complication or side effect after G-POEM. He showed decreased epigastric pain, nausea, and vomiting. Moreover, he was able to eat solid food and gained 10 kg of weight after G-POEM. His GCSI score improved to 0.89. His follow-up barium upper GI series and CT scan (Fig. 1C, D, and 3B) showed improved barium passage along the pyloric ring. He was discharged and observed via the outpatient clinic. He was able to continue to eat solid foods without nausea or vomiting. However, he still complained of intermittent abdominal pain, but with less ex-
Diagnosis: Idiopathic gastroparesis

Gastroparesis is a syndrome of significantly delayed gastric emptying in the absence of mechanical obstruction and cardinal symptoms, including early satiety, postprandial fullness, nausea, vomiting, bloating, and other upper-abdominal pain. Its pathogenesis has not been fully elucidated to date, and the most common cause has been known to be idiopathic, including post-viral infection; diabetes and postsurgical complications are its other causes. Its mechanisms include impaired gastric accommodation, antral hypomotility with pyloric spasm, duodenal dysmotility, among others. Treatment is medical therapy using prokinetics with metoclopramide. If refractory to medical therapy, non-pharmacologic treatment, including botulinum toxin injection or gastric electrical stimulation, can be attempted; however, this remains to be controversial. Recently, G-POEM has been regarded as an emerging treatment. This case showed symptom improvement with G-POEM after the failure of the botulinum toxin injection and repeated balloon dilation of the pylorus.

EndoFLIP can be used to determine the distensibility of the GI endolumen. A recently published study showed a significantly decreased distensibility in patients with severe gastroparesis, who underwent EndoFLIP. EndoFLIP showed that our patient also had significantly decreased distensibility, which improved after G-POEM.

There are a few case reports of adult eosinophilic gastroenteritis showing abrupt gastric outlet obstruction without manifest eosinophil elevation in the blood test. We also suspected other rare diseases that can be treated medically. Moreover, our patient showed transient symptomatic improvement with intravenous steroid therapy in the local clinic. The frozen biopsy was reviewed during G-POEM, and the final pathologic report showed no specific findings, such as definite eosinophilic infiltration.

Recently, a small number of case series regarding the use of G-POEM in gastroparesis has been published. However, controversy remains on the indication and diagnostic ap-
Our patient had a significantly thickened muscle layer in the pyloric ring, as shown by endoscopic ultrasonography, and significantly decreased distensibility, as shown by EndoFLIP. Moreover, improved distensibility after G-POEM was shown by EndoFLIP. We believe that EndoFLIP has an important role in determining the indication for G-POEM, especially gastroparesis.

REFERENCES