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Editorial

Expanding Indications of Gastric Electrical Stimulation

Jung Hwan Oh

Division of Gastroenterology, Department of Internal Medicine, College of Medicine, The Catholic University of Korea, Seoul, Korea

Article: Temporary endoscopic stimulation in gastroparesis-like syndrome
Singh S, McCrary J, Kedar A, et al
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Gastroparesis is a chronic motility disorder that delays, in the absence of mechanical obstruction, the occurrence of gastric emptying. The most common forms come with idiopathic, diabetic, and post-surgical complications. Delayed gastric emptying has been focused on as the main pathophysiologic abnormality manifested by gastroparesis. Other mechanisms, including loss of neuronal nitric oxide synthase and loss of the interstitial cells of Cajal, are coming to be widely recognized.[1] The operative mechanisms of gastric motility are heterogeneous and only incompletely understood. Current medical treatment options are classified as either prokinetics or symptom modulators such as antiemetics.[2] Unfortunately, these have failed to effect any remarkable progress in the last 30 years.

A promising alternative treatment option for medically refractory gastroparesis is gastric electrical stimulation (GES). In the late 1990s, GES-manipulated gastric pacing improved symptoms in patients with gastroparesis and accelerated gastric emptying.[3] Later, in 2003, surgical insertion of a pair of electrodes with subcutaneous positioning of a neurostimulator in the abdominal wall reduced vomiting frequency in gastroparetic patients.[4] Then, in 2005, placement of temporary GES electrodes via both endoscopic and percutaneous endoscopic gastrostomy showed rapid, significant, and sustained symptom improvement in patients with refractory gasroparesis.[5] Apart from gastroparesis, GES will be clinically significant therapy in the treatment for morbid obesity. GES for 6 months improved glucose control, and induced weight loss in obese type 2 diabetes patients.[6] Fecal incontinence, and constipation can be possible clinical applications using electrical stimulation of the gastrointestinal tract.[7]

In this issue of the *Journal of Neurogastroenterology and Motility*, Singh et al[8] report on the effects of temporary GES in gastroparesis-like syndrome (GLS). The aim of their prospective study was to explore the effects of endoscopy-based temporary GES in patients showing symptoms of gastroparesis with non-delayed gastric emptying.

First, the authors tried temporary GES as a therapeutic op-

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*Correspondence: Jung Hwan Oh, MD
Department of Internal Medicine, St. Paul's hospital, College of Medicine, The Catholic University of Korea, 180, Wangsan-ro, Dongdaemun-gu, Seoul 02559, Korea
Tel: +82-2-958-2114, Fax: +82-2-968-7250, E-mail: ojh@catholic.ac.kr
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ORCID: Jung Hwan Oh, http://orcid.org/0000-0002-9274-882X.

tion for patients with GLS. GLS patients can show symptoms of gastroparesis but without delays in gastric emptying.[9] In fact, it is generally known that symptom severity in gastroparesis correlates poorly with the grade of gastric emptying delay. In a study on diabetes and upper-gastrointestinal symptoms, the scintigraphy results showed that 42% of the patients had normal, 36% delayed, and 22% rapid gastric emptying.[10] The benefits of temporary GES relative to permanent GES are fewer side effects such as infection, lead dislodgement, and migration of the device, as well as the ability to predict the treatment effect before committing to permanent GES. Diabetic patients with refractory nausea and vomiting as their predominant symptoms seem to be the best candidates for temporary GES. Unfortunately, an individual's response to temporary GES remains unpredictable.[11] The authors indicated that temporary GES improved nausea, vomiting, and total symptom scores without accelerating gastric emptying. However, they did not consider abdominal pain, another common symptom of gastroparesis, as a parameter after insertion of the temporary GES electrode pair and neurostimulator. Another factor to consider is the temporary placebo effects of GES in this study. Patients' psychiatric history and medication history for anti-psychotic drugs should be considered. In addition, most of the patients (80%) in the study were females, and females typically have a higher probability of having a functional gastrointestinal disorder than males. Second, the authors found that temporary GES improved the symptoms in the patients with rapid gastric emptying by normalizing their gastric emptying, though they could not identify the exact mechanism. For those patients, transient GES is another possible treatment option. Third, the authors demonstrated the prevalence of GLS among their patients. As many as 40% of their patients with refractory nausea and vomiting had GLS. Indeed, gastroparesis appears to be just the tip of a large hidden iceberg.[12] Gastrointestinal symptoms, for example, are common in patients with diabetes.[13] It has been reported that among symptomatic diabetic patients for over 10 years, gastroparesis developed in 5.2% (Type 1 diabetes), 1.0% (Type 2 diabetes), and 0.2% (controls).[14] Meanwhile, in a Korean population-based study, 13% of type 2 diabetic patients showed dyspeptic symptoms.[15] Furthermore, as the incidence rate of diabetes rises, so too with that of gastroparesis.

In summary, the symptoms of gastroparesis and the grade of gastric emptying are not as yet clearly correlated. The study by Singh et al showed that endoscopy-based temporary GES improved the total symptom scores in both non-delayed gastric emptying and delayed gastric emptying patients. With the help of the authors' work, GES is expanding its indications. Temporary GES might be useful in patients with nausea and vomiting who are intolerant to medical treatment despite having non-delayed gastric emptying. It also can provide pivotal information regarding the decision to adopt permanent GES for patients with refractory gastroparesis.

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