

Case Report

The Effect of a Proton-pump Inhibitor on Nonerosive Gastroesophageal Reflux Disease : Report of a Case

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ABSTRACT

To assess the effects of a proton-pump inhibitor (PPI) on nonerosive reflux disease (NERD), a 39-year-old man with NERD underwent combined multichannel intraluminal impedance-pH monitoring before and during PPI therapy. The variables examined were the pH < 4 holding time ; the DeMeester score ; the number of episodes per day of liquid acid reflux (LAR), liquid nonacid reflux (LNAR), gas acid reflux (GAR), and nonacid reflux (GNAR) ; and the symptom indexes (SIs). The pH < 4 holding time decreased from 2.7% to 0.1%, and the DeMeester score decreased from 9.0 to 0.9. The number of episodes of LAR decreased from 51 to 7 per day, but that of LNAR increased from 14 to 65 per day. The frequency of neither GAR nor GNAR was affected by PPI therapy. Before PPI therapy, gastroesophageal reflux occurred 36 times per day, and the SIs were LAR, 67% ; LNAR, 8% ; GAR, 0% ; and GNAR, 3%. During PPI therapy, on the other hand, gastroesophageal reflux occurred 35 times per day, and the Symptom indexes (SIs) were LAR, 11% ; LNAR, 71% ; GAR, 0% ; and GNAR, 6%. Treatment with a PPI inhibited LAR but did not affect the number of reflux events. A PPI cannot improve the quality of life of patients with regurgitation because it can only remove acid from the gastric contents.

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Key words : gastroesophageal reflux disease, nonerosive reflux disease, proton-pump inhibitor, nonerosive gastroesophageal reflux disease

INTRODUCTION

Proton-pump inhibitors (PPIs) are the first-line treatment for gastroesophageal reflux disease (GERD), but nonerosive gastroesophageal reflux disease (NERD) is less responsive to PPIs than is erosive GERD¹. Combined multichannel intraluminal impedance-pH monitoring (MII-pH) has become an increasingly important method for evaluating gastroesophageal reflux. In the present study, we used MII-pH to examine the effects of a PPI in a patient

with NERD.

PATIENT AND METHODS

A 39-year-old man with NERD was chosen for this study. He had had regurgitation for more than 8 years and was referred to our hospital. Before and during PPI therapy (30 mg of lansoprazole), MII-pH was performed with a 6-impedance 2-pH catheter (ZAN-BG-44, Sandhill Scientific, Inc., Highlands Ranch, CO, USA). The design of the

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catheter allows the recording of impedance data 3, 5, 7, 9, 15, and 17 cm above the lower esophageal sphincter (LES) and pH data 5 cm above the LES and 10 cm below the LES in the stomach (Fig. 1)². These 6 impedance and 2 pH signals were recorded on a 256-MB compact flash drive with a frequency of 50 Hz. Before data acquisition, the pH probe was calibrated in buffers of pH 4.0 and 7.0. The MII-pH catheter was passed transnasally and positioned such that the pH probe was 5 cm above the manometrically determined upper border of the LES.

After the patient fasted overnight, MII-pH was started.

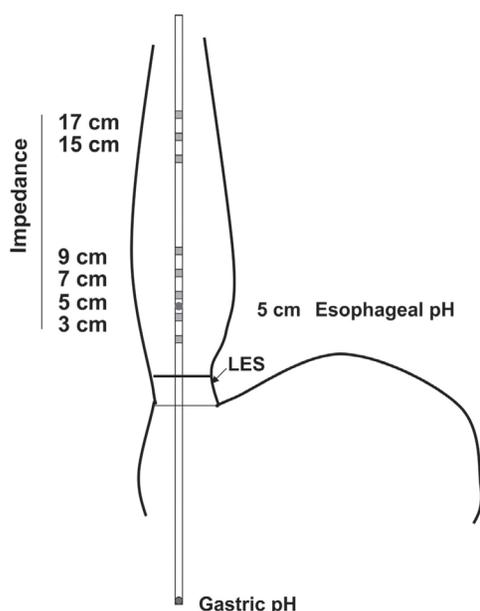


Fig. 1. Diagram of the catheter. The catheter was passed transnasally into the stomach.

During the 24-hour study, the patient was asked to remain in an upright position during the day and to continue normal activity with 3 diary of precise eating times, time spent in the upright and supine positions, and any reflux symptoms, such as heartburn, regurgitation, and chest pain. The variables measured were the pH < 4 holding time, the DeMeester score, the number of episodes of liquid acid reflux (LAR), liquid nonacid reflux (LNAR), gas acid reflux (GAR), gas nonacid reflux (GNAR), and symptom indexes (SIs). In the analysis of the SIs, symptoms associated with acid reflux were separated from those associated with nonacid reflux and symptoms independent of reflux episodes. A separate analysis was performed for the symptoms of regurgitation. An analytic software program (Bioview, Sandhill Scientific, Inc.) was used to calculate the SIs. Symptoms were considered to be related to reflux if they occurred within 5 minutes after the start of a reflux episode. The SIs were defined as the number of symptoms associated with reflux divided by the total number of symptoms.

RESULTS

During PPI therapy the pH < 4 holding time decreased from 2.7% to 0.1%, and the DeMeester score decreased from 9.0 to 0.9 (Table 1). The number of LAR episodes decreased from 51 per day before PPI therapy to 7 per day during PPI therapy. In contrast, the number of LNAR episodes increased from 14 per day before PPI therapy to 65 times a day during PPI therapy. However, the frequency of neither GAR nor GNAR was affected by PPI therapy.

Table 1. pH monitoring & reflux episode activity (Impedance)

| | pH4HT | DM score | LAR | LNAR | All liquid reflux | GAR | GNAR | All reflux |
|---------|-------|----------|-----|------|-------------------|-----|------|------------|
| PPI (-) | 2.7% | 9.0 | 51 | 14 | 65 | 2 | 7 | 74 |
| PPI (+) | 0.1% | 0.9 | 7 | 65 | 72 | 1 | 6 | 79 |

pH4HT; pH<4 holding time, DM score; DeMeester score, LAR; liquid acid reflux, LNAR; liquid non-acid reflux, GAR; gas acid reflux, GNAR; gas non-acid reflux

Table 2. Symptom Index (Impedance) %

| | LAR | LNAR | All reflux-related (Liquid) | GAR | GNAR | All reflux-related (Gas) |
|---------|-----|------|-----------------------------|-----|------|--------------------------|
| PPI (-) | 67 | 8 | 75 | 0 | 3 | 3 |
| PPI (+) | 11 | 71 | 80 | 0 | 6 | 6 |

LAR; liquid acid reflux, LNAR; liquid non-acid reflux, GAR; gas acid reflux, GNAR; gas non-acid reflux

The total number of reflux episodes of all types was 74 per day before PPI therapy and 79 per day during PPI therapy. The SI was $\geq 50\%$ for LAR and for all types of liquid reflux before PPI and for LNAR and for all types of liquid reflux during PPI therapy (Table 2).

DISCUSSION

Recent studies have shown that up to 70% of patients with reflux have typical reflux symptoms in the absence of endoscopically visible esophageal mucosal injuries, making NERD the most common form of GERD^{3,4}. However, NERD is more difficult to treat than reflux esophagitis, even with PPIs, because of the many PPI-resistant cases and various factors other than acid secretion; furthermore a standard treatment strategy has not been established⁵. Iwakiri et al used MII-pH to examine the pathophysiology of PPI-refractory NERD. They found that 2 (15.4%) of 13 patients with PPI-refractory NERD had an SI $\geq 50\%$ for acid reflux and that 5 (38.5%) patients had an SI $\geq 50\%$ for nonacid reflux⁶. Such patients may have hypersensitivity for reflux events.

In the present study, we performed MII-pH twice, before and during PPI therapy, in a patient with regurgitation to examine the effects of a PPI on NERD. Before PPI therapy, the esophageal pH < 4 holding time was normal and episodes of LAR were frequent. Treatment with 30 mg of lansoprazole was started for the acid reflux. Eight week after the start of treatment, the regurgitation had shown no improvement. We performed MII-pH again during PPI therapy. As expected, the frequency of LAR decreased and that of LNAR increased markedly. The total number of reflux events per day was almost unchanged be-

fore and during PPI. Our observations suggest that a PPI cannot protect the esophagus from gastroesophageal reflux because it can only remove acid from the gastric contents.

Treatment with PPIs cannot improve the quality of life of patients who have regurgitation. Antireflux surgery should be considered for such patients.

Authors have no conflict of interest.

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