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Evaluation of Proximal Gastric Vagotomy During a 10-Year Period

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ABSTRACT

BACKGROUND AND OBJECTIVE: Peptic ulcer is one of the most common gastrointestinal diseases. Among the three recommended surgical methods for this problem, highly selective vagotomy with less than 0.5% mortality rate, has the fewest side effects. Due to absence of documented reports, this study aims to investigate the risk factors and promote prognosis in patients undergoing proximal vagotomy during a 10-year period.

METHODS: Highly selective vagotomy was performed in 45 patients during 10 years. Endoscopy was carried out three to six months after surgery. Thereafter, endoscopy results and the patients' symptoms such as abdominal pain, bleeding, gastric outlet obstruction, weight gain or loss, patients' demographics, and the reason for referral were gathered and analyzed.

FINDINGS: Generally, 36 out of 45 patients were male (80%), and the mean age of the patients was 39.29±11.51 years. Among these patients, 40 (88%) suffered from obstruction and in 40 (88%) of them, no signs were detected during reexamination. Marginal ulcers were observed in two (4.4%) patients and a new duodenal ulcer was observed in one (2.2%) of the participants. The final diagnosis for two patients (2.2%) who underwent surgery due to obstruction was cancer.

CONCLUSION: Our study shows that highly selective vagotomy has low side effects and rate of recurrence, and in spite of negative biopsy results for elderly patients, the likelihood of cancer must be considered.

KEY WORDS: *Peptic ulcer, Highly selective vagotomy, Recurrence, Side effects*.

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Introduction

Peptic ulcer, with prevalence rate of 2% and cumulative incidence rate of 10%, is one of the most common gastrointestinal diseases (1, 2). This disease, whether acute or chronic, is caused by the imbalance between mucosal barrier and acid damage in the gastric mucosa or duodenum (3, 4). Most duodenal and gastric ulcers are caused by Helicobacter pylori (H. pylori) infection and consumption of nonsteroidal anti-inflammatory drug (NSAID). Acid suppression is the first-line treatment for gastric and duodenal ulcers, which prevents its recurrence (2).

The most common symptom of this gastric ulcer is epigastric abdominal pain that is not usually spread to other areas, its other symptoms include nausea, weight loss, anemia, and positive fecal occult blood test (FOBT). In young patients suffering from dyspepsia and epigastric pain, treatment can be initiated by proton pump inhibitor (PPI) without performing diagnostic tests. All the symptomatic patients aged over 45 should be scheduled for endoscopy. Radiographic evaluation with contrast medium can also be beneficial.

Moreover, biopsy must be performed from all peptic ulcers. Complementary tests for H. pylori infection may be required, as well (2). Three of the most common adverse effects of peptic ulcer in order of prevalence are bleeding, gastrointestinal perforation, and obstruction. The first-line treatment for peptic ulcers is administration of proton-pump inhibitors (5, 6). Those patients taking aspirin or NASIDs must receive PPI or histamine receptor inhibitors simultaneously at high doses. If H. pylori infection is confirmed, the patient must be treated with one of the approved therapeutic regimens (7). If the result of H. pylori testing is negative, but symptomatic relief is not observed, anti-H. pylori therapy is recommended. However, it should be borne in mind that false negative H. pylori tests are common (2).

If causes of ulcer (H. pylori or taking aspirin and NSAIDs) are eliminated, PPI can be discontinued after three months. The risk of ulcer recurrence in the past was reduced by definitive surgical treatment to attenuate acid, while today, it is replaced with H. pylori eradication and PPI (8-11). The indications for surgery in peptic ulcer are bleeding, gastrointestinal perforation, obstruction, and no response to treatment. In patients with peptic ulcer or gastric outlet obstruction, the likelihood of cancer must be considered. Nowadays, most patients undergoing surgery for their peptic ulcer require a simple procedure to heal their bleeding wound or to repair gastrointestinal perforation or distal gastrectomy. Highly selective vagotomy is not performed in all surgery centers. Formerly, the majority of patients were treated by one of the three methods of highly selective vagotomy, and vagotomy and drainage, and distal gastrectomy. The lowest rate of recurrence and the highest rate of morbidity belong to vagotomy and distal gastrectomy compared to other methods. Highly selective vagatomy is a low-risk method with low morbidity rate and side effects (2, 3).

In this procedure, the nerve supply to the proximal stomach is cut off (where most of parietal cells are located and nerve supply to the antrum, pylorus, and abdominal viscera is maintained). In so doing, gastric acid secretion is reduced by approximately 75% and the gastrointestinal side effects are diminished, as well (3). Given the scarcity of documented reports, this study was conducted during a 10-year period to determine the risk factors and promote prognosis in patients undergoing proximal vagotomy.

Methods

This cross-sectional study was performed on patients with peptic ulcer, who suffered from obstructive complications, bleeding, or perforation and underwent highly selective vagotomy. The procedure was carried out for 45 patients by a single surgical team. All the patients were followed up after the surgery and were scheduled for endoscopy three to six months post-operation. In patients with gastric outlet obstruction (40) whose problems were diagnosed by gastroscopy and gastrography, highly selective vagotomy and gastrojejunostomy were performed. Three patients with bleeding in posterior duodenal ulceration, underwent highly selective vagotomy after closing the bleeding wound and gastroduodenostomy. Two patients with perforation of duodenal ulcer, who were referred to hospital less than six hours after onset of pain, underwent highly selective vagotomy after closing the wound and putting omentum on it. The endoscopy results and patients' symptoms such as abdominal pain, bleeding, gastric outlet obstruction, weight gain or loss, demographic information such as age and gender, and the reason for referral were gathered using a questionnaire. In cases of recurrent ulcer, gastrin level was also measured. Finally, to analyze the data, t-test and Chi-square were performed,

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using SPSS version 17 and $p<0.05$ was considered statistically significant.

Results

In this study, 45 patients with mean age of 39±9.35 years (age range: 20- 75 years) underwent highly selective vagotomy. A total of 36 (80%) patients were male, and 40 (88.8%) of the patients complained of obstruction, three (6.6%) of bleeding, and two (4.4%) of perforation. Moreover, 40 (88.8%) patients were asymptomatic, two (4.4%) patients were referred due to weight loss, and three of them (6.6%) complained of abdominal pain. All the patients underwent endoscopy 6-12 months after the surgery, 35 (77.7%) of whom fully recovered (table 1). In two patients with gastric outlet obstruction who underwent highly selective vagotomy and gastrojejunostomy, marginal ulcers were observed in follow-ups. In one of the two patients who underwent surgery due to perforation, a new ulcer was observed in the posterior part of duodenum, which was considered as recurrence.

Two of these three patients were female and two were male but no significant relationship was observed between gender and recurrence. In addition, there was not a significant association between obstruction, as the initial manifestation, and recurrence. However, there was a significant link between recurrence and peptic ulcer perforation as the initial manifestation ($p=0.047$). The mean age of the three patients with ulcer recurrence was 33±7.51 years and 40.3±11.8 years for the other patients. According to our findings, no significant relationship was noted between age and ulcer recurrence. Serum gastrin level was within the normal range in all the three cases of recurrence.

Table 1. Endoscopy results 6-12 months post-operation

Results of endoscopy	No(%)
Full recovery	35(77.7)
Erythema of the antrum	5(11.1)
Marginal ulcer and posterior duodenal ulcer	3(6.6)
Cancer	2(4.4)

Recurrence did not happen in those three patients who underwent surgery due to bleeding. Out of 40 patients with gastric outlet obstruction symptoms, 38 gained weight for about 4-10 kg (mean: 5.5±0.9 kg) during six months. In two patients who continued losing weight, the main reason for obstruction was gastric cancer.

Discussion

In the current study, ulcer recurrence was observed in endoscopy of three (6.6%) patients six months after surgery. Recurrence happened due to marginal gastrojejunal ulcer, active ulcer, or appearance of new ulcers. These findings are in line with those of the study by Goarey et al., who performed highly selective vagotomy on 509 patients during a 12-year period, and the rate of recurrence was 7%. Recurrence rate in the study by Rossi-RL et al. was 13.7% (seven patients), which is higher than recurrence rate in our study (13). Mortality rate in our study was 0%, while in the study by Johnston it was 3%, which is lower than mortality rate of vagotomy with drainage (0.8%) or gastrectomy with or without vagotomy (1%) (14).

Rate of recurrence in the study by Rishko was reported to be about 2%, which is lower than the rate in our study (15). Post-operative side effects included bleeding, infection, unintentional gastric perforation, diarrhea, and dumping syndrome, which were not observed in any of our patients, and only three (6.6%) cases had abdominal pain, two (4.4%) of whom also complained of continuous weight loss. In these two cases, tumor was detected in the second endoscopy and samples were confirmed by biopsy. Comparison of the cancer patients at different ages showed that there is a direct relationship between advancing age and likelihood of malignancy.

Since peptic ulcer surgery by proximal gastric vagotomy has lower recurrence rate and side effects, this procedure should be considered in treating patients. Despite negative preoperative biopsies in older patients, resection and intraoperative pathology consultation should be considered.

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