

The Evaluation of Endoscopic Balloon Dilatation Treatment for Benign Gastric Outlet Obstruction

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Abstract- Balloon dilatation of stricture is one of the new treatment methods among patients with gastric outlet obstruction (GOO). However, the prevalence and underlying etiologies of GOO in various populations are different. The goal of the present study was to determine the effectiveness of endoscopic balloon dilatation and factors that would affect its success rate patients with benign etiology for GOO. Forty-five patients with the symptoms of benign GOO were randomly selected. Gastric outlet was delineated using double channel videoendoscopy. The information of initial balloon dilatation was collected from recorded files. Balloon dilatation was repeated during the mean follow up of 9.9 ± 5.8 months. The severity of gastric pain was measured immediately before balloon dilatation and one month after procedure and was rated on a 10 cm visual analogue scale. The mean age of patients was 43.7 ± 18.1 years and 86.7% of them were men. Furthermore, 71.1% were *H. pylori* positive. Response rate to endoscopic balloon dilatation was 80% and 8 patients underwent surgical resection. Weight loss was more frequent in non-responding group. The pain severity was significantly reduced more in responding subjects. No meaningful relationships were found between the responses to balloon dilatation and positive *H. pylori* and cigarette smoking. Endoscopic balloon dilatation is safe and effective for most patients with benign gastric outlet obstruction and has favorable long-term outcome.

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Key words: Gastric outlet obstruction (GOO), Endoscopic balloon dilatation, Endoscopy

Introduction

Gastric outlet obstruction (GOO) is the clinical and pathophysiological consequence of benign or malignant diseases that its mechanism depends upon these underlying etiologies. The incidence of GOO has been reported to be less than 5% in patients with Peptic ulcer disease (PUD), which is the leading benign cause of the problem. However, its incidence in patients with peripancreatic malignancy as the most common malignant etiology has been reported as 15-20% (1). Balloon dilatation of stricture especially in chronic benign strictures is one of the most effective treatment methods among these patients. Published series using this technique reported success rates over 76% after multiple dilatations (2). However, although the risk is small, patients undergoing endoscopic treatment with balloon dilatation can be at risk for some complications such as perforation. Furthermore, weight loss, epigastric pain, nausea, vomiting, early satiety, bloating, and anorexia may commonly occur after this procedure (3). In addition, according to

this fact that the *H. pylori* infection can be an important underlying etiology for GOO, patients who were treated with balloon dilatation, without treatment of *H. pylori* infection, have a higher rate of failure and recurrent obstruction (4).

Therefore, to achieve satisfactory results monitoring of the patients who were treated with balloon dilatation is necessary. Also, according to the different prevalence of underlying etiologies of GOO, especially *H. pylori* infection in various populations, assessment of main predicting factors of long term outcome is necessary. The goal of the present study was to review a series of patients with benign etiology for GOO who were treated with balloon dilatation via endoscopy, and also to evaluate the effectiveness of this procedure and factors that would affect its success rate.

Patients and Methods

In a prospective clinical trial study, 45 patients were randomly selected from patients with symptoms of be-

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nign GOO who were referred to endoscopy ward of Imam-Khomeini Hospital between 2002 and 2006. Patients with active ulcers, malignant underlying diseases (according to the pathological reports in patients' records), or coagulopathy were excluded. Clinical information was collected by reviewing patient records. Approval to review the patients' records without informed consent was obtained from Hospital's investigational review board. The patients' demographic characteristics and clinical manifestations during the primary admission to hospital were collected. Then, patients were invited for follow up. The mean follow up duration was 9.9 ± 5.8 months (ranged 6 to 20 months). During this period balloon dilatation was repeated. Before the procedure, written and verbal informed consents were obtained from each patient. Local anesthesia was provided with benzocaine 20% oral spray. Conscious sedation was obtained with 1 to 4 mg of intravenous midazolam hydrochloride. Immediately prior to balloon dilatation, double channel videoendoscopy was performed in all patients to delineate the gastric outlet for planning the procedure. The Through the scope (TTS) balloon with the diameter of 8 to 18 millimeter was carefully advanced across the strictured gastric outlet. The balloon was kept inflated for 1–3 minutes. In all cases, the required pressures never exceeded 3 atm. The maximum pressure recommended by the manufacturer of the catheter. Pressure was monitored with an in-line pressure gauge. Each dilation procedure consisted of two to three inflations of the balloon. The balloon was deflated for a 1-minute interval between inflations. Following the final dilation, the balloon was fully deflated. Patients were monitored in recovery room for 4 to 6 hours. Patients were firstly visited weekly and then monthly during the follow up period. Patient's response to treatment was defined as the relief of obstructive symptoms and endoscope advance

across the stricture point. The severity of gastric pain was measured immediately before balloon dilatation and one month after procedure, and was rated on a 10 cm visual analogue scale (VAS) with "not at all pain" and "extremely pain" as anchors.

In this study, response rate and complications of procedure were assessed and their relationships with patients' criteria, clinical manifestations and *H. pylori* infection were considered.

Results were reported as mean \pm standard deviation (SD) for the quantitative variables and percentages for the categorical variables. The groups were compared using the Student's *t*-test or Mann-Whitney U test for the continuous variables and Chi-square test or Fisher's exact test for categorical variables. P values of 0.05 or less were considered statistically significant. All the statistical analyses were performed using SPSS version 13 (SPSS Inc., Chicago, IL, USA).

Results

The mean age of patients was 43.7 ± 18.1 years and 86.7% of them were men. The mean duration between epigastric discomfort and endoscopy was 6.5 ± 2.2 years. Furthermore, 71.1% were *H. pylori* positive. Response rate to endoscopic balloon dilatation was 80%. Among non-responding subjects, 9 patients were recommended to surgery and among them, 8 patients underwent surgical resection. In one patient, because of the severe deformity and obstruction, perforation of stricture point occurred that resulted in peritonitis after 48 hours. In one patient who was operated, antrum tumor was diagnosed. Also, in another operated subject, final diagnosis during surgery was the superior mesenteric artery syndrome.

Table 1. Comparison of responding and non-responding patients to endoscopic balloon dilatation

<i>Item</i>	<i>Responding group (n=36)</i>	<i>Non-responding group (n=9)</i>	<i>P value</i>
Male gender	82.1	77.8	0.767
Age (year)	44.6 \pm 17.8	42.8 \pm 19.5	0.791
Duration of disease (year)	8.9 \pm 6.9	6.8 \pm 4.2	0.389
Weight loss (Kg)	4.6 \pm 4.2	12.3 \pm 9.9	<0.001
Multiple dilatation	16.7	66.7	0.002
VAS score before treatment	5.3 \pm 3.0	4.7 \pm 2.9	0.592
VAS score after treatment	1.3 \pm 0.6	3.9 \pm 2.3	<0.001
H pylori infection	72.3	66.7	0.740
Anti <i>H. pylori</i> drug consumption	55.6	44.4	0.547
Cigarette smoking	38.9	33.3	0.756

Data are presented as mean \pm SD or percentage

Balloon dilatation was performed once in 73.3% of patients, whereas 15.6% and 11.1% of them underwent dilatation two and three times, respectively.

Comparison of the responding and non-responding patients is shown in Table 1. Two groups were matched for sex, age, and duration of disease. Weight loss was more frequent in non-responding group. The pain severity was similar before balloon dilatation, whereas it was significantly reduced more in responding subjects. No meaningful relationships were found between the responses to balloon dilatation and positive *H. pylori* and cigarette smoking.

Discussion

Several studies revealed that the endoscopic balloon dilation is safe and effective for most patients with benign gastric outlet obstruction and a few patients finally candidate for surgical treatment. Some studies also showed that factors predicting referral for surgery included younger age, need for multiple procedures, technical failure of dilatation, and long duration of treatment course (5).

In our study, 71.1% of patients were *H. pylori* positive. In a study by Cherian *et al.* (2007), *H. pylori* infection was the main initial etiologic assessment for GOO in 52.2% of studied patients and other etiologies included aspirin or non-steroidal anti-inflammatory drugs, *H. pylori*, and idiopathic (6). Kochhar *et al.* (2004) also found that peptic ulcer was the most frequent etiology in 47.8% of patients, whereas other etiologies were including corrosive-induced in 30.4% and chronic pancreatitis in other patients (7). Peptic ulcer disease especially secondary to *H. pylori* infection has a major role in the pathogenesis of GOO; however, some recent studies have shown that the causes of GOO have changed from peptic ulcer disease to malignant diseases (8). In Ham *et al.* (2001) study, the main causative disease was gastric or duodenal malignancy in 56.8% (8). Therefore, it seems that the patients' references for the treatment of GOO via endoscopic balloon dilatation will be gradually increased. In addition, although we found no relationship between *H. pylori* infection and long-term outcome of endoscopic balloon dilatation, some other investigations showed this relation. Boylan *et al.* (1999) indicated that the eradication of *Helicobacter pylori* was associated with successful relief of obstruction without surgery and long-term success will be improved by elimination of *H. pylori* infection (5). Gibson *et al.* (2000) also found that the patients with *H. pylori* negative GOO resulting from peptic ulcer disease should be strongly

considered for an early, definitive, acid-reducing surgical procedure (9). In Lam *et al.* (2004) and Yusuf *et al.* (2006) studies, eradication of *H. pylori* infection was also associated with fewer ulcer complications after balloon dilatation and eradication of this infection at the time of balloon dilation ensured higher long-term success rates (2, 10).

In our study, response rate to endoscopic balloon dilatation was 80% and only 20% of patients were recommended to surgery. Also, the procedure complication was found in one patient as perforation. The results of success and failure rates of GOO balloon dilatation were different. In the study of Boylan *et al.* (1999), 30% of patients had relief of obstruction by initial dilatation and one-third of patients eventually required surgery (5). In Cherian *et al.* (2007) study, endoscopic remission was confirmed in all studied patients (6). Also, In DiSario *et al.* (1994) study, 80% of patients achieved sustained symptom relief and dilation failed in 13% of patients with long duodenal strictures. In their study, 6.7% of patients suffered perforation (3). In a study by Griffin *et al.* (1989), similar to our and DiSario *et al.* (1994) studies, the success rate of balloon dilatation was 80% (11). However, Kuwada and Alexander (1995) revealed that the patients who have undergone endoscopic balloon dilation of nonmalignant pyloric stenosis have a high recurrence rate of symptomatic gastric outlet obstruction in long-term follow up (12). Furthermore, Misra *et al.* (1996) showed that the balloon dilation resulted in short-term symptomatic relief in the majority of patients, however, in the long-run, about half of the patients could be expected to experience a recurrence of symptoms, requiring further endoscopic or surgical treatment (13). Totally, according to the different studies results, the success rate of GOO balloon dilatation is generally estimated between 67% and 92% (14-16).

Finally, it seems that several factors can influence the response rate of GOO balloon dilatation. We found a positive relationship between weight loss and response to endoscopic balloon dilatation. Similarly, in Gibson *et al.* (2000) study, weight loss had also this role (9). However, other important factors have been showed to affect the success rate such as the underlying etiology of GOO (7, 8) and the number of courses of endoscopic balloon dilation (10, 14). Further investigations need to identify other possible factors that influence the long-term outcome of endoscopic balloon dilatation in patients with GOO. In conclusion, similar to the previous studies and according to the present study, *H. pylori* infection is the main initial etiologic assessment for GOO. Furthermore, response rate to endoscopic balloon dilatation in these

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patients is high and the procedure complications were found in a few patients in long-term follow up. Therefore, it can be concluded that endoscopic balloon dilation is safe and effective for most patients with benign gastric outlet obstruction and has favorable long-term outcome.

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