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Recurrent dilatation in resistant benign esophageal strictures: timing is significant

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Background/aim: Benign esophageal strictures are frequently encountered pathologies occurring due to various reasons. Repeated dilatations may be needed, particularly in resistant strictures. This study aimed to evaluate patients who underwent repeated dilatations in our clinic due to resistant esophageal strictures.

Materials and methods: Sixteen patients who underwent multiple dilatations in our clinic with the diagnosis of resistant benign esophageal stricture between 2007 and 2014 were studied for age, sex, etiology, symptoms, complications, number of dilatations, and intervals between dilatations. Under general anesthesia, all patients underwent dilatation with Savary-Gilliard bougie dilators with the help of rigid esophagoscopy.

Results: In 10 of the patients, stenosis was cervical, and in others it was in the thoracic esophagus. The mean dilatation performance was 4.4 (range: 3–12). In 9 patients, dilatations were performed when the patients presented with the complaint of dysphagia. Following the initial dilatation performed for dysphagia, 7 patients underwent endoscopy and dilatation 3–5 times with 1-week intervals without waiting for the development of dysphagia symptoms. These patients developed no complications, and no stenting was needed. In 5 patients, restenosis developed despite multiple dilatations, and esophageal stent placement was performed.

Conclusion: Dilatations performed at frequent intervals without waiting for the symptoms of dysphagia can contribute to safer and more effective results in resistant benign esophageal strictures.

Key words: Benign, resistant, esophageal stricture, dilatation

1. Introduction

Benign esophageal strictures (BESs) can occur for various reasons. While they are most commonly encountered at the anastomosis line following an esophagostomy, other causes are radiotherapy, peptic strictures, Schatzki rings, and caustic injuries. The primary treatment for BES is dilatation (1–3).

Dysphagia often regresses following the initial dilatation, but repeated dilatations may be required, especially for resistant strictures (4). Resistant strictures are ongoing, irregular, and curved lesions in a segment longer than 2 cm (5). In addition to multiple dilatations, corticosteroid injections and stent placement might be needed in some cases (6). The patients evaluated in this study underwent repeated dilatations in our clinic due to resistant esophageal strictures.

2. Materials and methods

Sixteen patients with a diagnosis of BES who underwent dilatation due to esophageal stricture in our clinic between 2007 and 2014 were included in this retrospective study. The patients were evaluated for age, sex, etiology, symptoms, complications, number of dilatations, and intervals between dilatations (Table). All of the patients underwent tomography of the neck and thorax and esophageal passage radiography prior to the dilatation procedure (Figures 1a and 1b).

The procedure was performed with a rigid esophagoscope, with the patient in a supine position under general anesthesia. Prior to the dilatation, biopsy samples were taken for malignancy evaluation. Dilatation was planned for the malignancy-negative patients, and stent placement was performed in the malignancy-positive patients, who were then excluded from the study. The dilatations were performed with Savary-Gilliard bougie dilators (Wilson-Cook Medical, USA). After assessing the location and diameter of the stenosis, a radiopaque guide was placed through the esophagoscope under visual guidance by fluoroscopy. Following verification of the guide location, dilatation was performed according to the "rule of threes", starting with the dilator smallest in diameter (7). The diameter of the dilator was increased by

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Table. General characteristics.

Sex	N
Female	4
Male	12
Age	55 (22–76)
Etiology	
Stenosis at anastomosis site	11
Stenosis after RT	5
Dysphagia	16
Location of stenosis	
Cervical	10
Thoracic	6
Number of dilatations	4.4 (1–12)
Length of narrow segment	1.6 cm (0.5–3 cm)
Morbidity	
Perforation	1
BEF	1
Mortality	0

BEF: Bronchoesophageal fistula.

3 mm each time, and the procedure continued until the diameter of the lumen reached 12–15 mm.

Five patients underwent esophageal stenting, and in one patient, a bronchial stent was placed in the left main bronchus (Figure 2). All stent placements were performed with fluoroscopic guidance with the patient under general anesthesia. Esophageal stents were placed through a rigid esophagoscope, and the bronchial stent was placed through a rigid bronchoscope. Fully covered nitinol stents were used in all of the patients requiring stents. One patient received a 12-mm esophageal stent, 2 patients received 10-cm stents, and 2 patients received 8-cm stents. The stent placed in a patient's left main bronchus was 14 × 40 mm.

Figure 2. Bronchial stenting due to bronchoesophageal fistula.

Postoperatively, all of the patients underwent cervical, thoracic, and abdominal radiographs. Patients suspected of having complications underwent cervical and thorax computed tomography examinations with an orally administered low-density contrast agent.

3. Results

Four of the patients were female and 12 were male. The mean age was 55 (range: 22–76) years. Five patients had

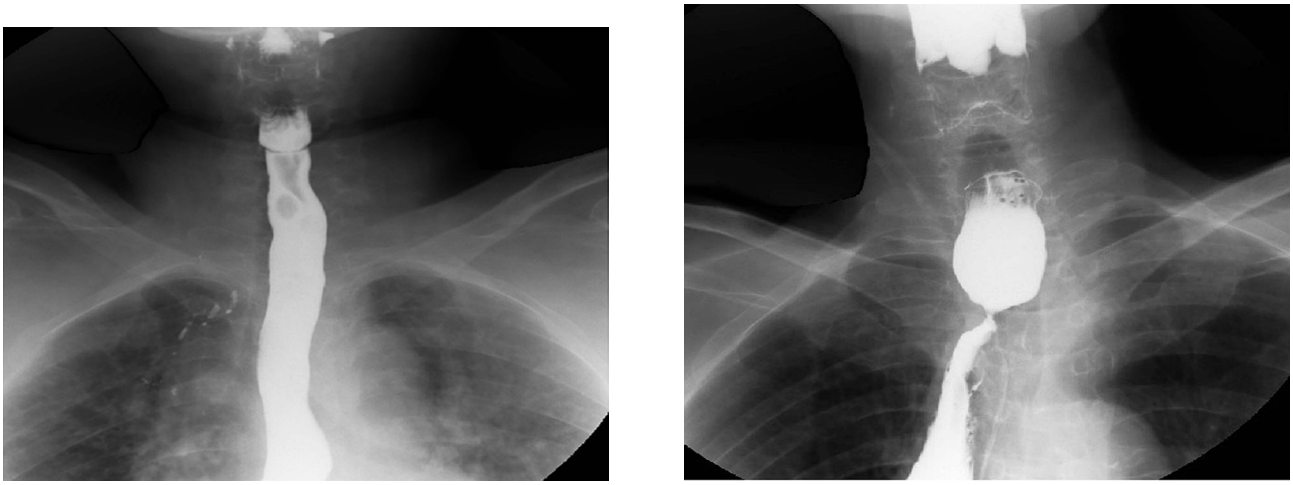

Figure 1. Esophageal passage radiographic images of the patients with BES.

strictures secondary to the radiotherapy (RT) due to laryngeal cancer, and 11 patients had strictures at the anastomosis line following resection of the esophagus. Esophageal resections were performed due to tumor in 10 patients; in one patient, the procedure was performed due to caustic esophagitis that developed after a suicide attempt. The main symptom in all of the patients was dysphagia. Weight loss (n = 5), aspiration (n = 3), and chest pain (n = 3) were the other encountered symptoms.

In 9 patients, dilatation was performed when the patients presented with a complaint of dysphagia. In 7 patients, after initial dilatation, endoscopy and dilatations were performed 3 to 5 times in 1-week intervals before the development of dysphagia due to restenosis (Figures 3a and 3b).

The stenosis was found in the cervical esophagus of 10 patients (5 patients: stenosis at anastomosis line, and 5 patients: stenosis secondary to the RT) and in the thoracic esophagus of the rest. Stenosis was less than 5 mm in all patients. The mean length of the narrow segment measured with contrast esophagography was 1.6 cm (range: 0.5–3 cm). The mean dilatation number was 4.4 (range: 3–12). All of the patients underwent Savary-Gilliard bougie dilation.

Esophageal stenting was performed in 5 patients who developed restenosis despite multiple dilatations. Due to the dilatations, one patient developed esophageal perforation, which healed spontaneously. One patient had a bronchoesophageal fistula, so the stent was placed in the left main bronchus.

Patients who underwent dilatation frequently before the symptoms occurred developed no complications. No dilatation was needed during the 6-month follow-up period.

4. Discussion

Benign esophageal strictures develop due to collagen storage and formation of fibrous tissues that are induced with the chronic inflammation or ulceration of the esophagus (8). In recent studies, the risk factors for BES have been listed as benign anastomotic stricture, anastomotic leakage, tissue ischemia in a gastric tube, stapler use instead of hand-sewn anastomosis, recurrent tumors, cardiac disease, and diabetes (3–9). Williams et al. (10) reported that, in their study, all of the patients who developed postoperative anastomosis leakage and/or who received neoadjuvant chemotherapy developed symptomatic stenosis requiring dilatation.

Benign esophageal strictures are divided into 2 groups: simple and complex (or resistant). In simple strictures, the narrow segment is shorter than 2 cm and usually allows the endoscope to pass. One to three dilations are usually enough for treatment. However, in complex/resistant strictures, the narrow segment is longer than 2 cm and curved, and it does not allow the endoscope to pass. Resistant strictures are difficult to treat; symptoms recur within 2 to 4 weeks and multiple dilatations are needed (4,5).

In patients with resistant or complex esophageal strictures, 12%–60% often require recurrent dilatation.

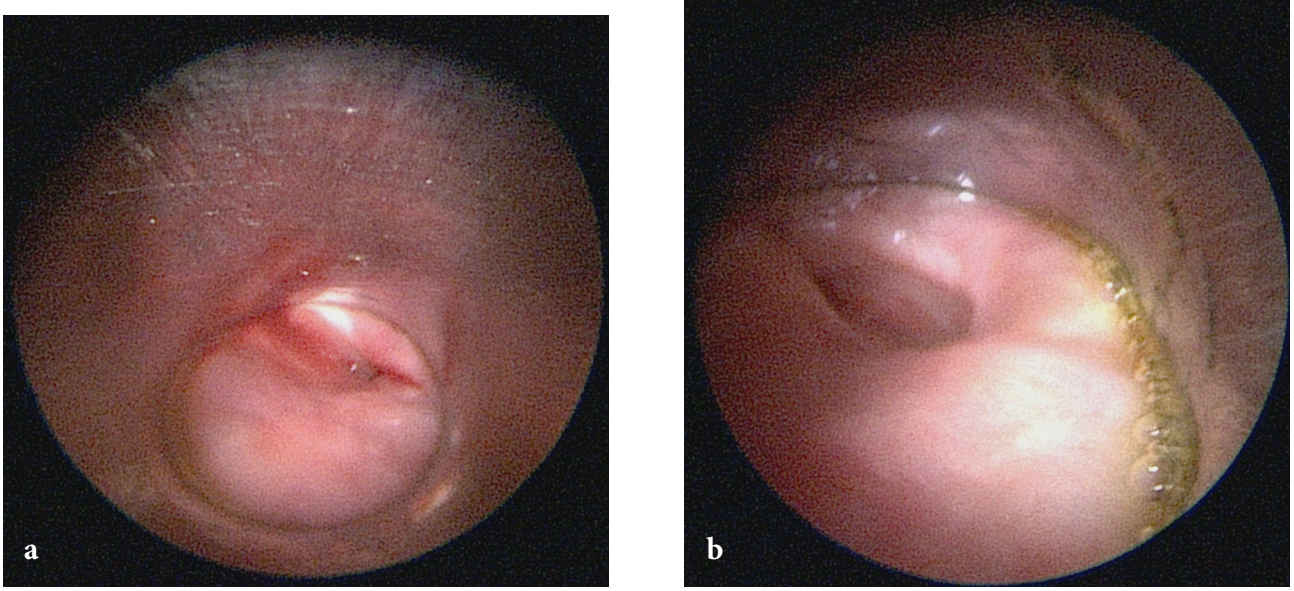

Figure 3. a) The endoscopic image of a patient who underwent dilatations in 1-week intervals, before dilatation. b) The endoscopic image of same patient after 1 week.

Symptomatic anastomotic strictures following esophagectomy mostly develop in the second to third postoperative month. In about one-third of patients, minimal or moderate stenosis is detected endoscopically, and the symptoms are relieved after several dilatations (10). In their studies, Park et al. (11) reported that the likelihood of the need for recurrent dilation is high in strictures that develop within 10 postoperative months, particularly after a McKeown esophagectomy. Similarly, Levy et al. (12) reported that patients who underwent a McKeown esophagectomy developed more anastomotic leakage and stricture than patients who underwent an Ivor–Lewis esophagectomy. Blood supply is poor in a McKeown esophagectomy because the anastomosis is performed in the cervical area; this is thought to be one of the most likely causes of stricture. Another likely cause is adhesion in adjacent tissues due to an anastomotic leak (12). In our study, 6 anastomoses were intrathoracic and performed with a stapler, and 5 were cervical and performed by hand. In 2 patients, the main cause of the stenosis was the cervical anastomotic leak.

In patients admitted with BES, the most common symptom and the main indication for dilatation is dysphagia. Dysphagia related to the esophageal stricture usually occurs when eating solid food. In general, the patients have no problem swallowing liquids (5). Dysphagia is followed by chest pain, regurgitation, malnutrition, and pulmonary aspiration (13). Due to the fact that endoscopy allows for both exploration and biopsy, it is recommended as the first choice in patients over the age of 40 years who present with dysphagia and/or odynophagia and complain about weight loss (1–14). Dysphagia was the most common symptom in our series as well. Except for the patients who underwent dilatation in 1-week intervals before the recurrence of symptoms, the dysphagia scores before each dilatation were found to be higher than the previous scores. In addition, our patients were evaluated pathologically by endoscopy to differentiate benign strictures and recurrent cancers from malign strictures excluded from the study.

The first dilatation reported in the literature was performed in the 17th century using a whale bone (15). Although various dilators have been developed, the ones used today are tungsten-filled Maloney dilators, wire-guided polyvinyl Savary-Gilliard dilators, and balloon dilators passed through an endoscope. Savary-Gilliard and balloon dilators are the most preferred. As no guide wire is used in Maloney dilators, they have a high complication rate, especially when dilating a complex stricture (13).

While only radial strength is applied in balloon dilatations, radial and longitudinal strengths are applied together in bougie dilatations; thus, more effective dilatations can be achieved in a shorter time. Furthermore, we think that in resistant strictures it is difficult to pass to the distal point, due to the rigid structure in the stenosis area, and effective, adequate, and safe dilatation cannot be achieved with only radial and one-point flexural strength (16). However, in dilatations performed with bougie dilators, starting from the smallest size and gradually increasing the diameter by 3 mm keeps the complication risk at the lowest level (7). In our series, all dilatations were performed with bougie dilators, and the desired results were achieved with low complication rates, particularly in patients who underwent dilatation before the recurrence of dysphagia.

The first thing to do before starting dilatation is to identify the diameter of the esophagus lumen at the stricture site in order to determine the suitable dilator. After placing the dilator into the stenosis site, a radiopaque guide is passed through the dilator and dilatation continues by gradually increasing the diameter of the dilator in 3-mm increments, according to the "rule of three". Thus, perforation risk is minimized (7). The most effective dilatation is achieved when the lumen diameter is increased to 12–15 mm. In 90% of patients, a 12-mm esophagus diameter is enough to relieve the symptoms (17). Using proton pump inhibitors along with dilatation is another practice that improves the effectiveness of the procedure (1).

In our series, we aimed for 12–15 mm dilatation in all of the patients, which was reached easily by the second or third dilatation in patients who underwent dilatations in 1-week intervals. One of the patients with stenosis secondary to RT developed pneumothorax secondary to the esophagus perforation; the perforation healed spontaneously.

Stenting is rarely indicated in the treatment of BES. If stenting is not performed, particularly in patients with long survival periods, complications such as perforation, ulceration, and stent migration are often encountered (18). However, some studies have reported high success rates in the temporary application of covered stents in recurrent and resistant BESs (4). Pressure on the esophageal mucosa could cause granulation tissue at the proximal and distal points of the stent; this complication occurs 3 times less with fully covered stents than with half-covered stents. Granulation tissue develops in 2 to 6 weeks and leads to recurrent dysphagia. Migration of the stent to the proximal point of the stenosis is another frequently encountered complication (19). In 5 patients who underwent dilatation after the onset of dysphagia symptoms, a fully covered nitinol stent was placed following the repeated dilatations. However, none of the patients without dysphagia symptoms who underwent dilatation needed stenting.

The most commonly encountered complications in dilatation of BES are perforation, hemorrhage, aspiration, and pneumothorax. Perforation risk after dilatation

has been reported to be 0.1%–0.4%. Perforation risk is higher in complex strictures and in dilatation of strictures secondary to RT (8). In our series, the patient with perforation developed cervical stenosis secondary to the RT received due to larynx cancer. One of the most important factors in perforation risk is the experience of the endoscopist. It has been reported in the literature that an endoscopist who has performed less than 500 upper GI endoscopies has a perforation rate 4 times higher than a more experienced endoscopist. The chance of perforation in intraabdominal and intrathoracic strictures is significantly higher than that of cervical strictures (8). In our clinic, all patients who undergo dilatation are followed with postoperative radiographic examinations (direct lung and cervical radiographs and computed tomography) for the possibility of a perforation.

In resistant, benign esophageal strictures, bougie dilatation with fluoroscopy guidance should be the first choice, due to its easy application and low complication rates. Dilatations performed at frequent intervals without waiting for dysphagia symptoms can contribute to safer and more effective results.

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