

• CLINICAL RESEARCH •

Endoscopic dilation of esophageal stricture without fluoroscopy is safe and effective

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Abstract

AIM: Endoscopic dilation of esophageal strictures is a commonly performed procedure in the management of dysphagia. The procedure is usually done with fluoroscopic guidance. The aim of this study was to assess the use of Tracer guide wire in conjunction with Savary-Gilliard dilators in the dilation of tight esophageal strictures without fluoroscopy.

METHODS: Fifty-five patients with significant dysphagia from strictures due to a variety of causes were dilated endoscopically. The procedure consisted of two parts. First, a guidewire was passed using endoscopic guidance, and then, dilation was performed without fluoroscopy. A modified Tracer wire was employed and was particularly effective in negotiating very tight esophageal strictures, in which the lumen is less than 6 mm. In general, the "Rule of Three" and "2-3 sessions in 10 days, maximum dilation up to 42 French" rules were followed. 401 dilations in a total of 55 patients (malignant strictures 30, benign 25) in 177 sessions were carried out.

RESULTS: The guide wire placement and Savary-Gilliard dilation were successfully performed without fluoroscopy, and improvement of dysphagia was achieved in all patients. Esophageal plastic stent (out diameter 40 French) was placed in five patients with malignant stricture-three of them with tracheo-esophageal fistula.

CONCLUSION: Dilation using Tracer guide wire without fluoroscopy is safe and effective in treatment of even very tight esophageal strictures.

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INTRODUCTION

Dilation of esophageal strictures is a commonly performed procedure used to relieve dysphagia due to malignant or benign stenotic lesions. In clinical practice, fluoroscopy is recommended for monitoring the position of the guide wire and dilator^[1-6]. Some authors, however, believe that fluoroscopy is not necessary for Maloney dilation in chronic esophageal strictures^[7,8]. Recently, Fleischer^[9] and Kadakia^[10] reported that

esophageal dilation with polyvinyl bougies using a marked guide wire without fluoroscopy was safe. The aim of this study to describe our preliminary experience using a modified Tracer guide wire (MTGW) and marked Savary-Gilliard dilators without the use of fluoroscopy.

MATERIALS AND METHODS

Patients

Between September 1994 and February 1996, 55 consecutive patients (40 males, 15 females, from 10 to 80 years old, median age 58 years) with esophageal strictures were referred to our unit for dilation because of persistent or recurrent dysphagia. Whether a stenosis was benign or malignant, stenosis was ascertained using endoscopy and biopsy. There were 25 benign lesions and 30 malignant tumors. The diagnoses are summarized in Table 1. The strictures were classified by us into five grades according to clinical symptoms of dysphagia and endoscopic findings. The grading system is summarized in Table 2. Grade III and grade IV strictures (lumen less than 6 mm) are considered as very tight esophageal strictures (VTES). All of our patients had various degrees of dysphagia. Total of 177 sessions of dilation were performed for 55 patients who had various degrees of dysphagia prior to each session. 28 sessions (15.8 %) of dilation were carried out for grade I strictures, 99 (55.9 %) for grade II and 50 (28.3 %) for VETS. X-ray studies of the geography of the strictures were performed for each case before treatment.

Table 1 The Etiology of esophageal strictures

Malignant	n	Benign	n
Esophageal Cancer		Anastomotic stenosis	13
Upper	3	Postoperative stenosis	2
Middle	11	Caustic stricture	2
Lower	7	Achalasia	5
Esophageal stump ca	5	Esophagitis	2
Anastomotic ca	2	External compression	1
Lung ca	2		
Total	30		25

Table 2 The Classification of esophageal strictures

Grades	Passage (can eat)	Endoscopy* (can pass)	Lumen diameter
0	Normal diet(+)	Standard one(+)	>12mm
I	Solid diet (+)	GIF-XQ/240(+)	9-12mm
II	Half liquid (+)	GIF-XP (+)	6-9mm
III	Liquid diet(+)	GIF-XP (-)	<6mm
IV	Water (+)/(-)	Tracer wire(+)**	<1mm

*Endoscopy: used Olympus endoscope. **Tracer wire (Wilson-Cook Medical Inc.) is 300cm length with markers.

Instruments

Examinations were performed usually with Olympus GIF-XP 20 gastroscope (Olympus Corp, Tokyo, Japan). Dilation was performed with market Savary-Gilliard dilators and a modified Tracer guide wire (0.035", 300 cm length, with markers,) (Wilson-Cook Medical Inc. Winston-Salem, NC. USA).

Technique

If the stricture could be passed with a paediatric endoscope, the guidewire was placed under endoscopic guidance. Thereafter, dilation was performed without fluoroscopy. For very tight esophageal strictures, the Tracer guide wire was used by us as a path-finder and also for Savary-Gilliard dilation without fluoroscopy. The technique is as follows: 1) Under endoscopic guidance, the VTES is approached. The Tracer guide wire is gently inserted through the stricture until the wire has been advanced more than 70 cm (for normal anatomy) without strong resistance having been encountered. (2) Keeping the wire in place, the scope is withdrawn. The scope can be re-inserted alongside the wire. (3) The VTES is dilated over the Tracer wire starting with a 15 French or 21 French dilator using the markers on the wire and also on the dilators for guidance, or under endoscopic control. (4) Post the final dilation with a size 27 French or 33 French, the paediatric gastroscope is passed through the dilated lumen into the stomach.

In general, the "rule of three-dilator size increased step by step and dilation times is no more than three for each session" and "the rule of 2-3 sessions in 10 days, with maximum dilation up to 42 French" were followed. All procedures were performed without intravenous sedation, although local oropharyngeal anesthesia was given.

RESULTS

A total of 401 dilations in 55 patients in 177 sessions was done. The grade of benign and malignant stenosis before dilation was summarized in Table 3. The success rate for both placement of the guide wire and dilation was 100 % without use of fluoroscopy. There were no major complications (Table 4).

Table 3 The grade before dilation (177 sessions / 55 patients)

Grade	Sessions	%
0	0	0
I	28	15.8
II	99	55.9
III & IV	50	28.3

Table 4 Adverse events and complications induced by the guide wire placement or dilation without fluoroscopic control

Complications	n	(%, 401 dilations)
Superficial mucosal tear	3	0.75
Tracheal intubation of Tracer	1	0.25
Severe hemorrhage	0	
Perforation	0	
Sepsis	0	
Death	0	

The Tracer wire was successfully used to pass the VTES. The diameters of Savary-Gilliard dilators employed in this study were 15 French dilators in 3.8 %, 21 Fr. in 14.2 %, 27 Fr. and 33 Fr. dilators in 56.1%, 38 Fr. in 15.7 %, 42 Fr. in 5.9 % and 45 Fr. (only be used for patients with achalasia) in 4.3 %. The average number of dilators per session was 2.7. Esophageal plastic stent (outer diameter 40 Fr., Wilson-Cook Medical Inc. NC.) was placed over the Olympus GIF-XP endoscope for five malignant strictures after being dilated up to 42 Fr. without fluoroscopic guidance. Three of them had strictures associated with tracheo-esophageal fistulae. There were no procedure-induced serious complications such as perforation, bleeding, sepsis and death. One patient with tracheo-esophageal fistula developed a dry cough during insertion of the wire. The wire was withdrawn and then reinserted successful without further event. Superficial mucosal tear was found in one patient with a post-myotomy stricture performed for achalasia (grade II stricture, 4.0 cm on length) after 42 Fr. dilation, and in one patient with an alkali induced corrosive stricture involving the entire length of the esophagus (grade II to III) after 33 Fr. dilation. In both cases the superficial tears healed spontaneously 3-5 days later.

DISCUSSION

Successful esophageal dilation involves both successful placement of the guide wire and dilation. This study demonstrates that Savary-Gilliard dilation can be successful without fluoroscopic control. There were no serious procedure-induced complications. All 55 unselected consecutive patients had significant dysphagia due to different types of esophageal pathology. Symptom relief was achieved in all patients.

The results are similar to that reported by Fleischer in a series of 100 patients and Kadakia in a series of 68 patients. In these two studies, the endoscope could be passed through the stricture in most patients and the tip of the marked Savary-Gilliard wire was placed under endoscopic view. However, the endoscope was impassable in 5 % and 29.4 % respectively. For these cases, fluoroscopy was required. The passage of the marked Savary-Gilliard wire for VTES, especially for malignant ones with tracheo-esophageal fistula and abnormal anatomy of the esophagus, such as angulation and diverticulum, is both difficult and hazardous without the aid of the fluoroscopy. Instead of marked Savary-Gilliard wire, we used the modified Tracer wire. The Tracer wire has a very soft and flexible tip which is considered atraumatic. The wire is hydrophilically coated on its distal 60 cm making it very slippery when wet. It can be passed through the stricture easily without trauma and be coiled in the stomach. Esophageal or stomach perforation could not be induced with the coil-able and atraumatic wire tip. During insertion of the wire, if there is resistance or if the patient starts coughing (which indicates that the wire is inserted into trachea through the fistula), the wire should be withdrawn and reinsertion performed. The proximal part (240 cm) of the wire is Teflon coated making it stiff enough to have a dilator passed over it, and also is marked for control of the procedures. Our study shows that the Tracer wire is very safe as a "path-finder" for VTES. Furthermore, Savary-Gilliard dilation can be performed immediately without exchange to a standard Savary-Gilliard guidewire. This is different from the techniques reported by Ling *et al*^[11] and Mohandas *et al*^[12]. In order to prevent complications, the "rule of three" popularized by Boyce (4) was followed by us. Dilation should be terminated when resistance is encountered during three consecutive dilations. Our experience suggests that in

long (>3.0 cm), subglottic, caustic strictures and in lesions of stump esophagus, the rule should not be employed. We agree that experience can teach how much resistance is significant during dilation. The maximum size of dilator used is a very important factor in avoiding complications. It has been suggested that the maximum size be at most 48 French^[3]. Based on our experiences, we believe that maximum dilation up to 42 French is sufficient for the Chinese population. This guarantees a normal diet and also reduces the risks associated with the procedure. In addition, in anastomotic strictures, the Tracer wire should be used when the endoscope can not be passed. In conclusion, the marked Savary-Gilliard dilator via a marked Tracer guide wire without fluoroscopy is safe and effective. Adequate placement of a guide wire prior to dilation is crucial in achievement of successful dilation.

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