



RESEARCH ARTICLE

RISK FACTORS FOR REFRACTORY BENIGN ESOPHAGEAL STRICTURES

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Abstract

Background: The management of patients with refractory benign esophageal stricture is time-consuming and challenging. Dilation is the classic treatment for esophageal strictures, expressed primarily as dysphagia, which can significantly impair quality of life. Our objective is to report the results of dilatation, as well as the different risk factors of refractory benign esophageal strictures.

Methods: This is a single-center retrospective study. Thirty-three patients with benign esophageal strictures were treated by dilation between 2016 and 2021. Refractory stenosis was defined as the inability to maintain esophageal caliber at 14 mm diameter over 5 dilatation sessions, or the inability to maintain satisfactory luminal diameter for 4 weeks once a 14 mm diameter was achieved.

Results: 12 patients had refractory strictures. All patients had dysphagia. After univariate analysis, refractory strictures were associated with the presence of a peptic stenosis ($p=0.002$) and dilatations of caliber less than 16 mm ($p=0.012$), after multivariate analysis only peptic stenosis was associated with refractory stenosis ($p=0.034$).

Conclusion: In our series, refractory stenosis was present in 38.7%. Peptic stenosis was statistically significantly associated with refractory esophageal stenosis.

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Introduction:-

Benign esophageal strictures are a common problem in endoscopy, is related to the fibrotic narrowing of the esophageal lumen, but also to the development of underlying motor disorders, causing dysphagia. It can significantly impair the quality of life.¹

Previously, peptic stenosis represented the vast majority, but since the advent of proton pump inhibitors, their frequency has been halved to the benefit of anastomotic², caustic, post endoscopic resection and radiation stenosis which are now the most numerous³. Other etiologies are much rarer and account for between 2 and 5% of cases depending on the series⁴.

The benign esophageal strictures can be treated successfully by endoscopic dilation (ED), which is generally performed with a session of step wise bougie or balloon dilations⁵.

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Treatment can usually be performed endoscopically to alleviate dysphagia without complications or recurrences, but refractory benign strictures, when several endoscopic dilations fail, are still a challenge for the endoscopist. This refractory stenosis represents a minority of patients and occur in conditions with well-defined risk factors.

The aim of our study was to assess the risk factors associated with refractory strictures.

Materials and Methods:-

This is a retrospective descriptive and analytical study of 33 patients with benign esophageal strictures who underwent esophageal dilatation between 2016 and 2021. All patient had benign esophageal stricture with dysphagia, we divided them into simple strictures (short < 2cm, concentric, straight and allow the passage of a normal diameter endoscope) and complex (tight, often impassable and long (> 2cm)). The dilatation was performed using wire-guided bougies or balloon dilators, with fluoroscopic guidance. The success was defined by increasing luminal diameter and clinical resolution (even partial) of dysphagia.

Refractory (or recurrent) structures was defined as the inability to maintain esophageal caliber at 14 mm diameter over 5 dilatation sessions, or the inability to maintain satisfactory luminal diameter for 4 weeks once a 14 mm diameter was achieved.

The data collected were the demographic and stricture characteristics, type and etiology of stricture, location of the stricture, success, technique and size of dilations and refractory strictures.

Statistical analysis

The IBM SPSS statistics version 21 software was used for statistical analysis.

Results were expressed as means ($\pm$ standard deviations [SD]), medians

(Interquartile range [IQR] or 95% confidence intervals [CI], when appropriate), headcount (%) with 95% confidence intervals (CI). A p value of <0.05 was considered statistically significant.

Results:-

33 patients underwent dilatation for benign esophageal strictures, all patients had dysphagia and 45.5% had chronic gastroesophageal reflux disease (GERD). Demographic characteristics, the etiology, complexity and location of the strictures are shown in Table 1.

Table 1:- Demographic and stricture characteristics.

Characteristics	N= 33
Sex [#]	
Female	11(33.3)
Male	22(66.7)
Age at diagnosis (yr)*	55 [30–64]
Stricture's etiology [#]	
Anastomotic	3(9.4)
Peptic	16(50)
Achalasia	10(31.3)
Caustic	1(3.1)
Schatzki rings	2(6.3)
Stricture's complexity [#]	
Simple	25(78,1)
Complex	7(21.9)
Strictures location [#]	
Cervical esophagus	6 (18.8)
Thoracic	5 (15.6)
Abdominal	21 (65.6)

*Expressed as median [IQR]

[#] Expressed as number (percentage)

78.8% (n=26) of the strictures were dilated by balloon and 21.2% (n=7) by bougies with a mean dilatation caliber of 18.8 ± 6.8 mm. The mean number of dilatations was 3 ± 1.79 .

The mean time between dilatations was 3.2 ± 1.3 weeks.

38.7% of our patients had refractory strictures. The refractory strictures were not influenced by sex ($p=0.919$), age ($p=0.567$), or by anastomotic stricture's ($p=0.841$), but was associated with dilatations of caliber less than 16 mm ($p=0.012$) and peptic stricture's ($p=0.002$). In the multivariate analysis, only peptic strictures ($p=0.034$) was associated with refractory strictures. (Table 2)

Table 2:- Risk factors associated with refractory strictures in the univariate and multivariate analysis.

Risk factors	Univariate analysis		Multivariate analysis	
	Odds ratio (95% CI)	P-value	Odds ratio (95% CI)	P-value
Stricture's etiology				
Anastomotic	0.773 (0.062–9.579)	0.841	22.33(1.271–392.18)	0.034
Peptic	41.25(4.032–421.98)	0.002		
Age	0.989 (0.954-1.026)	0.567		
Sex	0.923 (0.198-4.312)	0.919		
Age >45 years	0.333 (0.067-1.652)	0.178		
Dilatation technique				
Balloon	0.563(0.093-3.391)	0.530		
Bougies	1.778(0.295-10.719)	0.530		
Stricture's complexity				
Simple	0.711(0.127-3.993)	0.699		
Complex	1.406(0.250-7.896)	0.699		
<u>Dilatation caliber less than 16mm</u>	0.093(0.015-0.591)	0.012	0.570(0.041-8.026)	0.677
Esophagus stricture's location		0.578		
Cervical	1.667(0.275-10.094)	0.663		
Thoracic	1.600(0.193-13.240)	0.432		
Abdominal	0.538(0.115-2.519)			

Discussion and Conclusions:-

The management of a benign esophageal stricture is a problem encountered frequently by the endoscopist. Dilation of an esophageal stricture is a simple and safe procedure that can be quite satisfying due to the prompt resolution of debilitating symptoms experienced by patients. Most strictures can be treated successfully with endoscopic dilation using bougies or balloons, with a very low rate of serious complications, mainly bleeding and perforation.^{1,6,7}

According to the Kochman criteria, refractory or recurrent strictures are defined as an anatomic restriction because of a cicatricial luminal compromise or fibrosis resulting in clinical symptoms of dysphagia in the absence of endoscopic evidence of inflammation. This may occur as the result of either an inability to successfully remediate the anatomic problem to a diameter of at least 14 mm over five sessions at two-week intervals (refractory); or as a result of an inability to maintain a satisfactory luminal diameter for four weeks once the target diameter of 14 mm has been achieved (recurrent).⁸

The rate of recurrence varies considerably from one series to another as does the length of follow up.⁹

Refractory strictures were identified in 69%, in a series of 74 patients with an anastomotic stricture that had been dilated during a 5-year period (564 dilations; median follow-up period, 8 months)¹⁰. Recurrence strictures occurred

in 33% and 43% were refractory to dilation therapy in a study of 63 patients who underwent 303 dilations for radiation-induced strictures during a 5-year period¹¹.

A more recent meta-analysis including four randomized clinical trials with 342 patients, comparing bougie versus balloon dilations, showed a recurrence rate of dysphagia of 22% at one year in a population of mainly peptic strictures.¹²⁻¹⁴ However, these results are poorer in studies with a larger population and follow-up, with a median number of dilations before resolution of dysphagia of three for peptic stenosis and five for post-surgical or caustic stenosis.

In our study, we evaluated endoscopic dilation risk factors for refractory benign esophageal strictures. In univariate analysis we found that dilation less than 16 mm diameter and peptic strictures was associated with refractory strictures. In multivariate analysis only peptic strictures was risk factor of refractory. Previous retrospective studies that investigated risk factors for refractory strictures so far have shown varying results.¹³⁻¹⁷

A multicenter cohort study of 891 patients who underwent endoscopic dilatation from 2003 to 2018 for benign esophagus stricture, found that dilation up to 16 to 18 mm diameter was associated with fewer dilatation sessions during follow-up.¹⁸ Caustic, peptic, and complex strictures were associated with a greater need for subsequent dilations in a retrospective study of 103 patients.¹⁹

In addition to endoscopic treatment, medical treatment should not be forgotten, particularly proton pump inhibitors, which have been a turning point in the management of peptic strictures and should probably be extended to all types of refractory strictures given its relative safety.

Several studies have shown the superiority of proton pump inhibitors over H2 blockers with a decrease in the number of dilations required and an increase in the dysphagia-free interval for all strictures combined.²⁰

In our study, among the causes of refractory stenosis we find achalasia, which is certainly not found in the literature. However, since we have defined refractory stenosis according to the Kochmann criteria, and since some of our patients with achalasia presented these criteria, we could not fail to mention them.

The limitations of our study include its retrospective nature, with relatively small sample size (33 patients), which may have resulted in poor adjustment for confounding in the multivariate analysis. However, it reflects a group of patients with different etiologies for the strictures and endoscopic factors associated with refractory strictures, adding valuable information to the current knowledge of this condition. In conclusion, our study demonstrates that peptic strictures are associated with refractory benign esophageal strictures with a higher need for subsequent dilations.

Disclosure of conflicts of interest :

There is no conflict of interest.

Funding:

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Ethical issues:

Our study was reviewed by a responsible review committee and the procedures used followed the Declaration of Helsinki as revised in 2013. Our study was done retrospectively for the collection of registry data respecting the anonymity of the patients. Only the number, type of procedures performed and their indications were retained in our study, which is why the institutional review committee explicitly approved the questionable aspects of the study.

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