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ORIGINAL ARTICLE

Retrospective Study

Self-expanding metal stent for relieving the stricture after endoscopic injection for esophageal varices

Fu-Long Zhang, Jing Xu, Yu-Hong Jiang, Yuan-Dong Zhu, Yan Shi, Xiao Li, Hai Wang, Chao-Jun Huang, Chun-Hua Zhou, Qun Zhu, Jing-Wen Chen

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Abstract

BACKGROUND

Esophageal stricture is one of the complications after esophageal varices sclerotherapy injection (ESI), and the incidence rate is between 2%-10%.

AIM

To explore the efficacy of self-expanding metal stent (SEMS) for the stricture after endoscopic injection with cyanoacrylate (CYA) and sclerotherapy for esophageal varices.

METHODS

We retrospectively analyzed the efficacy of SEMS to improve the stricture after endoscopic injection with CYA and sclerotherapy for esophageal varices in 4 patients from February 2023 to June 2023.

RESULTS

The strictures were improved in four patients after stenting. The stent was removed after two weeks because of chest pain with embedding into esophageal mucosa in one patient. The stent was removed after one month, however, the stent was reinserted because of the strictures happening again in two patients. The stent was removed after three months, however, the stent was reinserted because of the strictures happening again in one patient. The stent embedded into esophageal mucosa in three patients. There were 3 patients suffered reflux esophagitis, and the acid reflux was relieved by taking hydrotalcite. There was no other complication of esophageal perforation, bleeding from varices or infection.

CONCLUSION

SEMS may relieve the stricture which happened after endoscopic injection with CYA and sclerotherapy for esophageal varices. However, when we should

remove the stent still needs to be explored.

Key Words: Stent; Stricture; Endoscopic injection; Esophageal varices; cyanoacrylate; Sclerotherapy

Core Tip: Esophageal stricture is one of the complications after esophageal varices sclerotherapy injection (ESI), and the incidence rate is between 2%-10%. Esophageal stricture is related to local inflammation, ulceration, and fibrosis caused by multiple ESI. However, there is no report about esophageal stricture after endoscopic injection with cyanoacrylate (CYA) and sclerotherapy for esophageal varices. We want to explore the efficacy of the self-expanding metal stent for the stricture after endoscopic injection with CYA and sclerotherapy for esophageal varices in this article.

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INTRODUCTION

Esophageal stricture is one of the complication after esophageal varices sclerotherapy injection (ESI), and the incidence rate is between 2%-10%[1]. Esophageal stricture is related to local inflammation, ulceration, and fibrosis caused by multiple ESI[2]. However, there is no report about esophageal stricture after endoscopic injection with cyanoacrylate (CYA) and sclerotherapy for esophageal varices. We want to explore the efficacy of the self-expanding metal stent (SEMS) for the stricture after endoscopic injection with CYA and sclerotherapy for esophageal varices in this article.

MATERIALS AND METHODS

We retrospectively analyzed the efficacy of SEMS to improve the stricture after endoscopic injection with CYA and sclerotherapy for esophageal varices in 4 patients from February 2023 to June 2023.

Assessment

Severity of dysphagia was assessed by Stooler grade[3]: Grade 0: Can eat normally; grade I: Can't swallow some solid food; grade II: Can only swallow half liquid food; grade III: Can only swallow liquid food; grade IV: Can't swallow liquid food. The effect was evaluated as follows[4]: Markedly effective: Lumen diameter > 1.2 cm, grade 0 dysphagia, and no recurrence during follow-up; effective: Lumen diameter between 0.6 and 1.1 cm, grade I dysphagia, and no aggravation during follow-up; ineffective: No change in lumen diameter, either no alleviation of dysphagia or aggravation of it. Criteria for the recurrence of the stricture: (1) The severity of the stricture deteriorated once more, reaching grade II-IV; and (2) Standard gastroscope's body is incapable of traversing the esophagus without encountering resistance.

Endoscopic treatment

Before endoscopy the patients should been fasting for 12 hours, monitored blood pressure and prepared oxygen and emergency medicines. We should use an endoscope (EG-760R, diameter 9.3 mm, FUJIFILM, Japan) to observe the retention in the esophageal cavity, and we should be alert to residual varices. If a large amount of liquid and/or solid were blocked by stenosis, residues must be removed to expose the stenosis (Figure 1A). When the esophageal stricture exposed entirely, we performed the balloon dilatation (18 mm × 55 mm, Nanjing Minimally Invasive Medical Technology co., Ltd.) to improve stenosis until the endoscope body passes through the stenosis smoothly. If the bleeding was obvious after dilatation, we used the argon plasma coagulation to improve the bleeding. We inserted a covered SEMS (20 mm × 60 mm; Nanjing Minimally Invasive Medical Technology co., Ltd.) (Figure 1B) across the stenosis by a hard wire guarding (Figure 1C). We should be aware of the residual varices, when the SEMS was placed (Figure 1D). On the one hand, the anal side of stent should be passed over cardia (Figure 1E), on the other hand, the oral side of stent should be above the stricture (Figure 1F). And then, the endoscope should be passed through the stent into the stomach to confirm the position of stent been well (Figure 2). Before end of the operation, we should be sure that there was no bleeding from the esophageal varices or the stricture. If the stent embedded into esophageal mucosa after placing, we should clamp the knot of stent and pull with forceps to adjust the SEMS (Figure 3). The effect was evaluated one month after the placement of SEME.

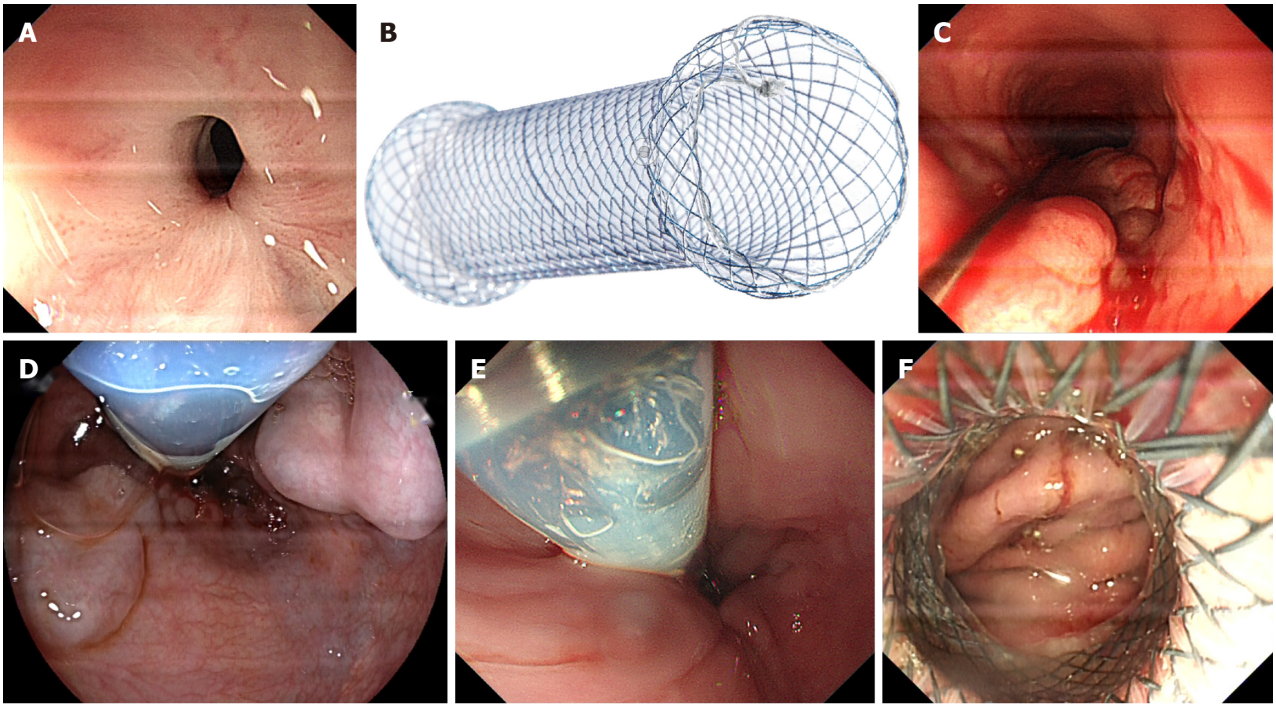

Figure 1 Observing the retention in the esophageal cavity using an endoscope, and we should be alert to residual varices. A: The stricture was exposed under the endoscope; B: This is a semi covered self-expanding metal stent; C: The self-expanding metal stent was passed through the stricture by a hard wire guarding; D: We should be alert to the residual varices, when we were placing the self-expanding metal stent; E: The oral side of stent should be above and near to the stricture; F: The anal side of stent should be passed cardia.

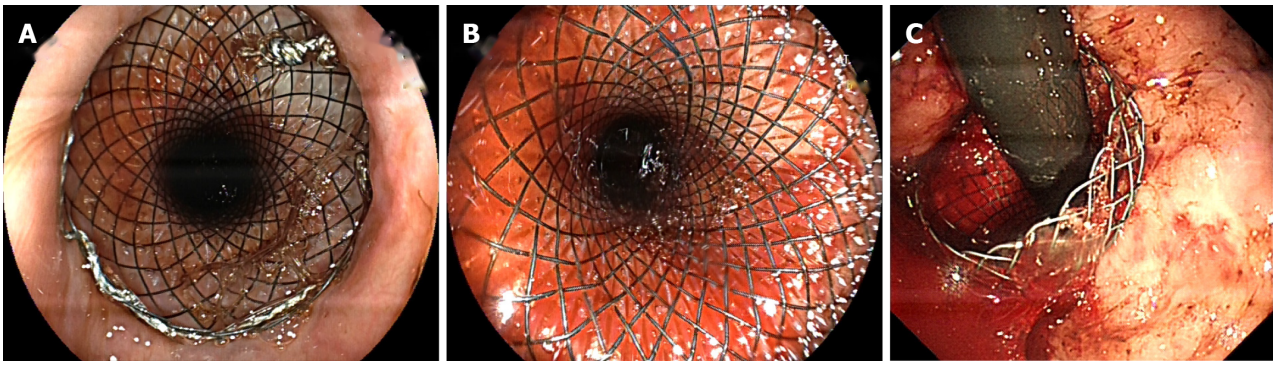

Figure 2 The position of stent. A: After expanding, the oral side of stent was well; B: After expanding, the endoscope was passed through the stent; C: After expanding, the endoscope was passed through stent into the stomach to confirm that anus of stent being well.

RESULTS

General data

Gender: There were 3 males and 1 female. Age: The average age was 47 years. Etiology: There were 3 patients with hepatitis B, 1 patient with alcohol. Child-Pugh: There were 3 patients of grade A, 1 patient of grade B. Hepatocellular carcinoma (HCC): There was 1 patient with HCC. Portal thrombosis: There were 2 patients with portal thrombosis. Hypertension and/or diabetes: There was no patient with hypertension or diabetes. Splenectomy: There was 1 patient suffered splenectomy. The time of endoscopic injection: There were 2 to 4 times of endoscopic injection with CYA and sclerotherapy for esophageal varices. CYA: The average amount of CYA was 2.25 mL. Sclerotherapy: The average amount of lauromacrogol was 56.25 mL (Table 1).

Outcome

The strictures were improved in four patients after stenting. The stent was removed after two weeks because of chest pain with embedding into esophageal mucosa in one patient. The stent was removed after one month, however, the stent was reinserted because of the stricture happening again in two patients. The stent was removed after three months, however, the stent was reinserted because of the stricture happening again in one patient. The stent embedded into esophageal mucosa in three patients, and we adjusted the stent to relieve chest pain. There were 3 patients suffered reflux eso-

Table 1 The background of the patients

Case	1	2	3	4
Sex	Male	Female	Male	Male
Age (year)	39	53	59	39
Etiology	Hepatitis B	Hepatitis B	Alcohol	Hepatitis B
Child-Pugh	A	A	B	A
Portal thrombosis	Positive	Positive	Negative	Negative
Hepatocellular carcinoma	Negative	Negative	Positive	Negative
Splenectomy	Positive	Negative	Negative	Negative
Hypertension/diabetes	Negative	Negative	Negative	Negative
EIE (time)	2	3	4	4
Cyanoacrylate (mL)	3	1	3	2
Sclerotherapy (mL)	50	60	60	55
Balloon dilation (time)	2	5	5	1
Local incision (time)	2	3	1	0
Stooler grade	III	III	III	II
Location of stricture (distance from incisor teeth)	38 cm	36 cm	37 cm	36 cm
Length of stricture	2 cm	3 cm	1 cm	2 cm

EIE: Endoscopic injection with cyanoacrylate and sclerotherapy for esophageal varices; ME: Markedly effective.

phagitis, and the acid reflux was relieved by taking hydrotalcite. There was no other complication of esophageal perforation, bleeding from varices or infection (Table 2).

DISCUSSION

Patients suffering from liver cirrhosis begin bleeding due to burst esophageal varices, facing a 40 percent risk of succumbing to the initial bleeding incident[5]. The primary therapy for esophageal varices[6] was identified as endoscopic sclerotherapy. Lately, the administration of CYA has been consistently effective in treating esophageal varices, ensuring no return of bleeding[7]. Post endoscopic injection of CYA or sclerotherapy, esophageal varices often lead to complications such as esophageal stricture. Dysphagia stands as the primary indicator of esophageal stricture. International guidelines[8] do not reference the conventional therapy for esophageal narrowing post-ESI.

The primary methods for alleviating the benign esophageal stricture involved balloon dilation and localized incision[9,10]. The primary mechanism of balloon dilation is through the balloon's mechanical tension; conversely, it leads to the tearing of the usual mucosal or muscular layers surrounding the esophagus[11]. A nearby cut must be vigilant for perforation complications, especially when the esophagus's muscularis propria is severed[12]. Nonetheless, neither balloon dilation nor localized incision succeeded in alleviating the stricture in these four patients prior to the application of SEMS. The European Society of Gastrointestinal Endoscopy advised focusing on esophageal stents for benign esophageal strictures, particularly in cases of persistent or repeated benign strictures, noting that the placement of esophageal stents could be advantageous due to their constant enlargement, potentially resulting in changes to the stricture[13]. Inserting a stent prolongs the narrowing of the esophagus, yet it's crucial to be vigilant about potential issues like chest discomfort, reflux esophagitis, displacement or detachment, and the presence of tissue-embedded stents [14,15]. In three cases, the stent was implanted into the esophageal mucosa, and the stent was modified to alleviate chest discomfort. Six months post-removal, the stent was reinserted due to repeated stenosis in three patients. Consequently, an extended period of monitoring is required to ascertain when SEME removal will occur, unless chest pain is the reason.

The advantages of SEMS for esophageal stricture after endoscopic injection for varices were as follow: (1) The symptom of dysphagia would relief immediately after placing the stent; (2) The stent could lead to stricture remodeling for convey foods; (3) The complication of perforation or bleeding was few during or after the endoscopic treatment; (4) The stent could cover residual esophageal varices and reduce the rebleed from varices; and (5) The stent could be adjusted, removed or replaced at any time.

However, there are several limitations of SEMS: (1) When the stent is removed, the patient will suffer from an esophageal stricture again, so when the stent has to be removed, other possibilities need to be explored; (2) The stent may become embedded into the esophageal mucosa, so endoscopy should be performed frequently to observe or adjust the stent; (3) If the stent migrates into the stomach, it should be removed immediately through endoscopy; and (4) Because of

Table 2 The treatment outcome of the patients

Case	1	2	3	4
Effectiveness	ME	ME	ME	ME
Chest-pain	Negative	Negative	Negative	Positive
Reflux esophagitis	Positive	Positive	Positive	Negative
Embedding	Positive	Positive	Positive	Negative
Migration	Negative	Negative	Negative	Negative
Perforation	Negative	Negative	Negative	Negative
Infection	Negative	Negative	Negative	Negative
Varices bleeding	Negative	Negative	Negative	Negative

ME: Markedly effective.

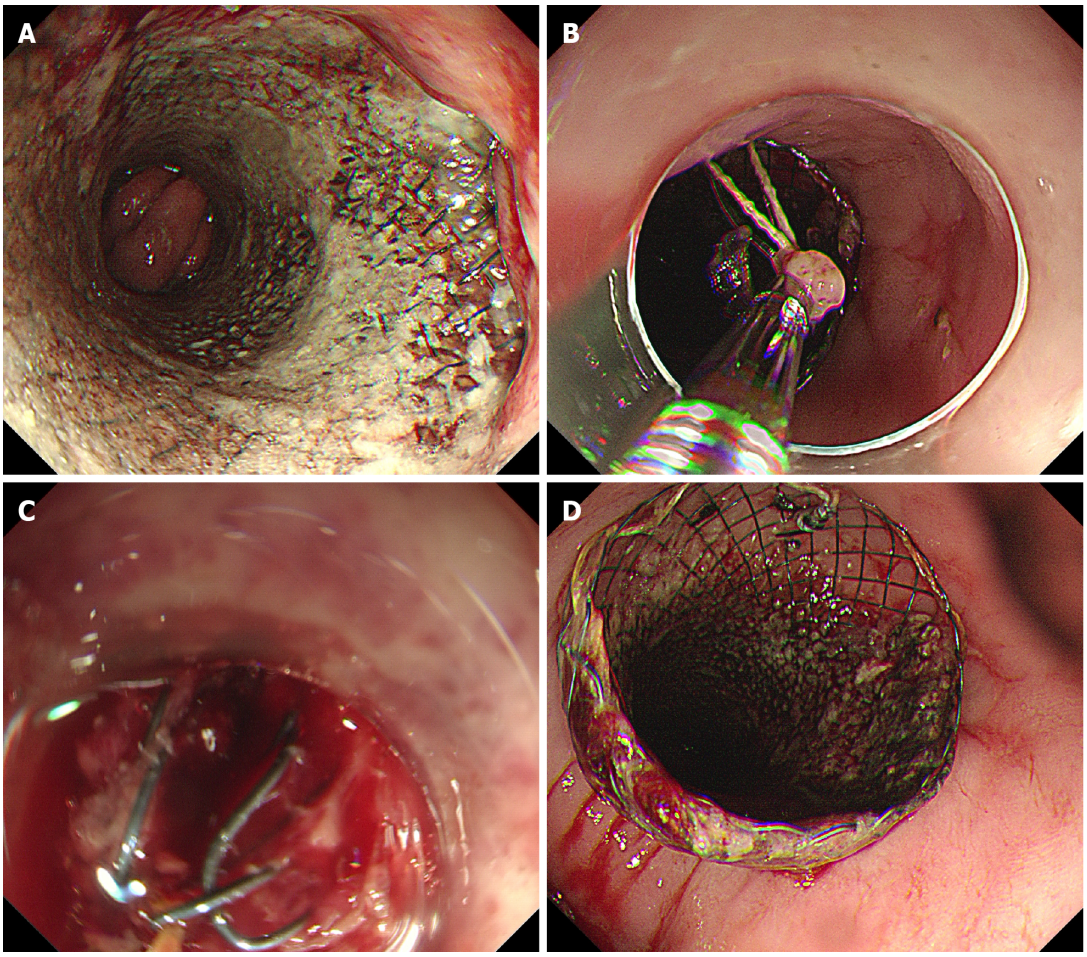

Figure 3 Clamping the knot of stent and pull with forceps to adjust the self-expanding metal stent if the stent embedd into esophageal mucosa after placing. A: After placing for one month, the stent embedd into esophageal mucosa; B: The knot of stent was clamped and pulled with forceps to adjust the self-expanding metal stent; C: The stent was being adjusted with the forceps; D: After adjusting, the position of self-expanding metal stent was well.

only four cases in this study, it is difficult to demonstrate the efficacy of SEMS for the stricture.

CONCLUSION

Stenting may relieve the stenosis which happened after endoscopic injection with CYA and sclerosis for esophageal varices. when we should remove the stent still needs to be explored. However, more cases, multicenter, prospective

controlled studies are still needed to support this.

FOOTNOTES

Author contributions: Zhang FL and Zhu YD conceptualized and designed the research; Xu J, Jiang YH, Shi Y, Li X, Wang H, Huang CJ, Zhou CH, Zhu Q, and Chen JW performed the data collection; Zhang FL analyzed and interpreted the data.

Institutional review board statement: The study protocol conformed to the ethical guidelines of the Declaration of Helsinki and was approved by the ethics review committee of Hangzhou Xixi Hospital (20231031135400003265 9).

Informed consent statement: Written informed consent was obtained from the patient for publication of the research and any accompanying images.

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