Journal of Pediatric Surgery (2005) **40**, 501–504

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Journal of Pediatric Surgery

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The use of a retrievable self-expanding stent in treating childhood benign esophageal strictures

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Index words:
Esophageal stenosis;
Stent;
Child

Abstract

Background/Purpose: Esophageal stenting is a popular form of treatment of esophageal strictures in adults but is not widely used in children. The aim of the current study was to investigate whether esophageal stents could be used safely and effectively in the treatment of esophageal stenosis in children.

Methods: Covered retrievable expandable nitinol stents were placed in 8 children with corrosive esophageal stenosis. The stents were removed 1 to 4 weeks after insertion.

Results: The stents were placed in all patients without complications and were later removed successfully. After stent placement, all patients could take solid food without dysphagia. Stent migration occurred in one patient and so the insertion procedure was repeated to reposition the stent. During the 3-month follow-up period after stent removal, all children could eat satisfactorily. After 6 months, 2 children required balloon dilation (3 times in one and 5 times in the other). The dysphagia score improved in all patients.

Conclusions: The use of the covered retrievable expandable stent is an effective and safe method in treating childhood corrosive esophageal stenosis.

Esophageal stenting is a popular form of treatment of esophageal strictures in adults but is not widely used in children [1,2]. Childhood caustic esophageal strictures are refractory to medical treatment and balloon dilation. Esophageal replacement is a popular procedure, but it carries risks of morbidity and mortality [3-5].

We have been using a retrievable expandable stent in treating childhood *intractable* benign esophageal strictures since 2002. The aim of the present study was to evaluate the effectiveness and safety of the use of this type of stent in children.

1. Materials and methods

Eight children aged between 2 and 12 years (mean age, 8 years) were admitted to our hospital between April and August 2002 after ingesting the following corrosive agents: sodium hydroxide (n = 4), oil of vitriol (n = 2), hydrochloric acid (n = 1), and concentrated hydrogen peroxide (n = 1).

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0022-3468/05/4003-0008$30.00/0
doi:10.1016/j.jpedsurg.2004.11.041

Each patient had a nasogastric tube insertion and was initially given broad-spectrum antibiotics and steroids. Balloon dilation treatment was given under fluoroscopy after 1 month, to 12 mm for 6 months or to 16 mm for 1 year. The balloon dilation was not effective. The 8 patients still displayed dysphagia to liquids, with a dysphagia score of 3 [6].

All patients were given a contrast swallow to locate the site, severity, and length of the strictures (Fig. 1). All the strictures were located in the middle of the thoracic esophagus, and their positions were confirmed by barium swallow.

Retrievable expandable stents were then placed at the middle of the strictures. The stents (Nanjin Microinvasive Co. Ltd. Nanjin, P.R. China), made of nitinol alloy and coated with silicon, ranged from 14 to 20 mm in diameter and from 5 to 10 cm in length. The stents responded to changes in temperature. They were very pliable at low temperatures but firm at body temperature (37°C). Their length and diameter were also smaller at low temperatures than at high temperatures (Fig. 2). They were compressed into a small-caliber introducer system until used.

Intravenous sedation (ketamine, 2 mg/kg) was routinely administered to the patients before the stent placement procedure. A 3-F catheter was inserted through each patient's mouth to the upper end of the stricture. A small amount of water-soluble contrast was injected to locate the stricture, and each patient's skin was marked under fluoroscopy. An exchange guide wire was inserted through the catheter across the stricture into the stomach. A 12-mm balloon was passed over the guide wire for dilation. The stent was then introduced over the guide wire and deployed under fluoroscopic guidance at the middle of the stricture (Fig. 3).

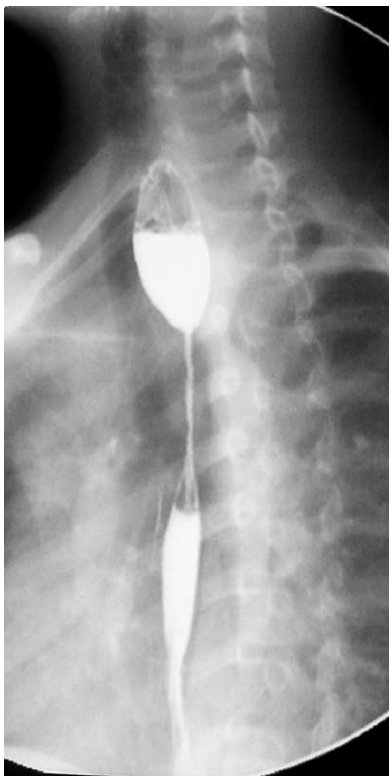

Fig. 1 Barium swallow was performed before stent insertion to identify the site, severity, and length of the stricture.

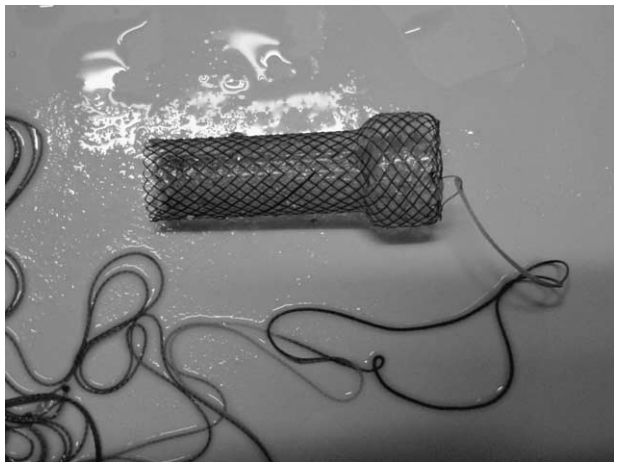

Fig. 2 A nitinol-alloy self-expanding esophageal stent with a string loop at the proximal end (length, 70 mm; diameter, 18 mm).

The stents were removed within 1 to 4 weeks (mean, 13.3 days) after placement, depending on the degree of stricture. Ice water was used under endoscopic guidance to soften the stent for 1 minute. The stent was then pulled out with the help of a string that passed via the string loop at the proximal end of the stent (Fig. 2).

All patients were asked to attend the outpatient clinic once a month for 18 months after the removal of the stent for follow-up tests (routine clinical examinations and esophagography). They were also advised to visit the clinic if dysphagia symptoms recurred.

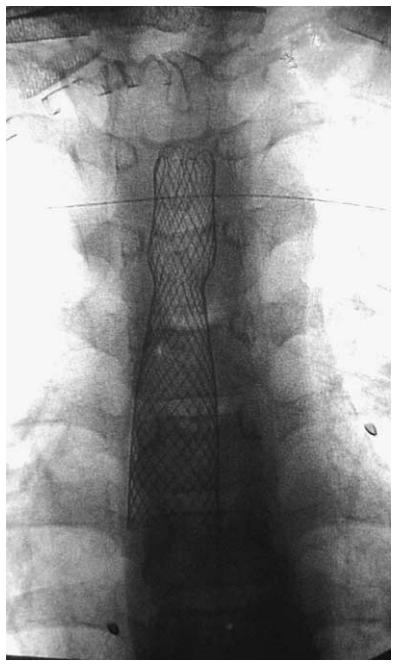

Fig. 3 The stent was inserted at the middle of the stricture.