



Operative Techniques

Peroral endoscopic myotomy for treatment of achalasia in children and adolescents[☆]Chenjie Li, Yuyong Tan, Xuehong Wang, Deliang Liu^{*}

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ABSTRACT

Background: Peroral endoscopic myotomy (POEM) is a novel endoscopic technique for treatment of achalasia (AC) and has shown exciting results in adults. However, little is known about the safety and efficacy of POEM in children and adolescents. Herein we report our preliminary results of POEM for children and adolescents with AC.

Methods: POEM was performed in 9 consecutive patients with AC, whose age ranged from 10 to 17 years. After submucosal injection, a submucosal tunnel was created. Endoscopic myotomy of muscle bundles was then achieved under direct vision. The mucosal entry was closed by several clips. A validated clinical symptom score (Eckardt score), LES pressure, esophageal diameters and procedure-related complications were used to evaluate the outcomes.

Results: All 9 patients underwent POEM successfully. Mean operation time was 56.7 minutes. Mean myotomy length was 8.3 cm. Among them, 4 patients underwent circular myotomy and 5 underwent full-thickness myotomy. Symptoms remitted in all of the cases during a follow-up of 3–30 months, Eckardt score was significantly reduced (preoperation vs postoperation, 7.0 ± 1.9 vs 0.8 ± 0.8 , $P < 0.05$). Mean LES pressure decreased from 26.8 mm Hg to 9.1 mm Hg. Mean diameter of esophagus was dramatically decreased (preoperation vs postoperation, 50.6 ± 4.9 mm vs 29.6 ± 3.7 mm, $P < 0.05$). No serious complications related to POEM were encountered.

Conclusions: Our initial experience suggests that POEM is a safe and effective method for treatment of achalasia in children and adolescents. Further evaluation and long-term data are mandatory for a more confirmed conclusion.

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Achalasia (AC) is an esophageal motility disorder, characterized by aperistalsis of the esophageal body and impaired lower esophageal sphincter (LES) relaxation [1]. It is a rare disease in the pediatric population, with an estimate incidence of 0.11/100 000 children annually, and less than 5% of patients with symptoms present under the age of 15 [2,3]. Clinical symptoms of AC in children include dysphagia, chest pain, regurgitation, and atypical symptoms such as recurrent pneumonia, nocturnal cough, aspiration, and feeding difficulties, which impair severely the patients' quality of life and adequate food intake, even result in growth retardation [4]. Thus it is of vital importance to receive a proper treatment.

Current treatment modalities for AC in children include endoscopic and surgical therapy. Surgery such as laparoscopic Heller myotomy (LHM) is the most definitive and successful treatment of choice [5–7].

However, it is still an invasive procedure, and often accompanied by complications such as perforation, esophageal reflux, stricture, etc. [8].

Peroral endoscopic myotomy (POEM) is a novel technique for treatment of AC, and has shown exciting results in clinical studies [9–11]. However, most of these researches are limited in adults; little is known about POEM in children and adolescents. Our aim is to examine the safety and efficacy of POEM in children and adolescents and report our preliminary experience in this pilot study.

1. Patients and methods

1.1. Patients

From October 2011 to March 2014, 9 consecutive young patients with AC underwent POEM procedure at our department. There were 4 males and 5 females with a mean age of 14.1 (range 10–17) (Table 1). Achalasia was diagnosed by established methods, on the basis of symptoms, esophageal manometry, esophagogastroduodenoscopy (EGD) and barium esophagram. The study was approved by the ethics committee of the Second XiangYa Hospital of Central South University. Informed operative consent was obtained from all patients' parents before the procedure was performed. All of them were informed of possible adverse events and other possible treatment options.

Abbreviations: POEM, peroral endoscopic myotomy; AC, achalasia; LES, lower esophageal sphincter; LHM, laparoscopic Heller myotomy; EGD, esophagogastroduodenoscopy; PPI, proton pump inhibitors; EGJ, esophagogastric junction.

[☆] POEM for achalasia in children and adolescents

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Table 1
Demographics, clinical and operative data of the 9 children/adolescents treated with POEM.

Case	Sex/Age of diagnosis	Duration symptoms, mo	Submucosal tunnel length, cm	Myotomy length, cm	Mode of myotomy	Operative time, min	Complications	Eckardt score		LES pressure, mm Hg		Diameter of esophagus, mm		Follow-up, mo	
								Before	After	Before	After	Before	After		
1	F/17	60	13	9	Circular myotomy	65	None	7	1	N/A	N/A	58	32	30	
2	F/16	48	12	9	Circular myotomy	105	None	10	1	N/A	N/A	56	35	30	
3	M/15	30	12	9	Circular myotomy	55	None	9	2	N/A	N/A	50	33	24	
4	M/14	32	11	8	Circular myotomy	50	None	7	1	N/A	N/A	51	31	24	
5	M/15	6	12	9	Full-thickness	55	None	4	0	N/A	N/A	45	26	15	
6	F/15	26	12	9	Full-thickness	40	Esophagitis	8	2	N/A	N/A	54	31	12	
7	F/10	12	9	7	Full-thickness	50	Chest subcutaneous emphysema	7	0	30.8	10.5	50	28	6	
8	F/13	12	10	7	Full-thickness	45	None	6	0	25.6	9.6	43	24	3	
9	M/12	12	11	8	Full-thickness	45	None	5	0	23.9	7.3	48	26	3	
Mean	14.1	26.4	11.3	8.3		56.7		7	0.8	26.8	9.1	50.6	29.6	16.3	
								$P < 0.05$				$P < 0.05$			

N/A: not available.

2. Methods

2.1. POEM procedure

Prophylactic intravenous antibiotics and proton pump inhibitors (PPI) were introduced before the procedure (Fig. 1). Peroral endoscopic myotomy was performed under general anesthesia via tracheal

intubation using a standard single-channel endoscopy (GIF-Q260Z; Olympus, Tokyo, Japan) with a transparent cap (D-201-11802, Olympus) attached to the front. Carbon dioxide was used as the air supply from the endoscopy. Other equipment and accessories included a high-frequency generator (ICC 200; ERBE, Tübingen, Germany), an argon plasma coagulation unit (APC300; ERBE), an injection needle (NM-4L-1; Olympus), a hybrid knife (ERBE, Tübingen, Germany), a

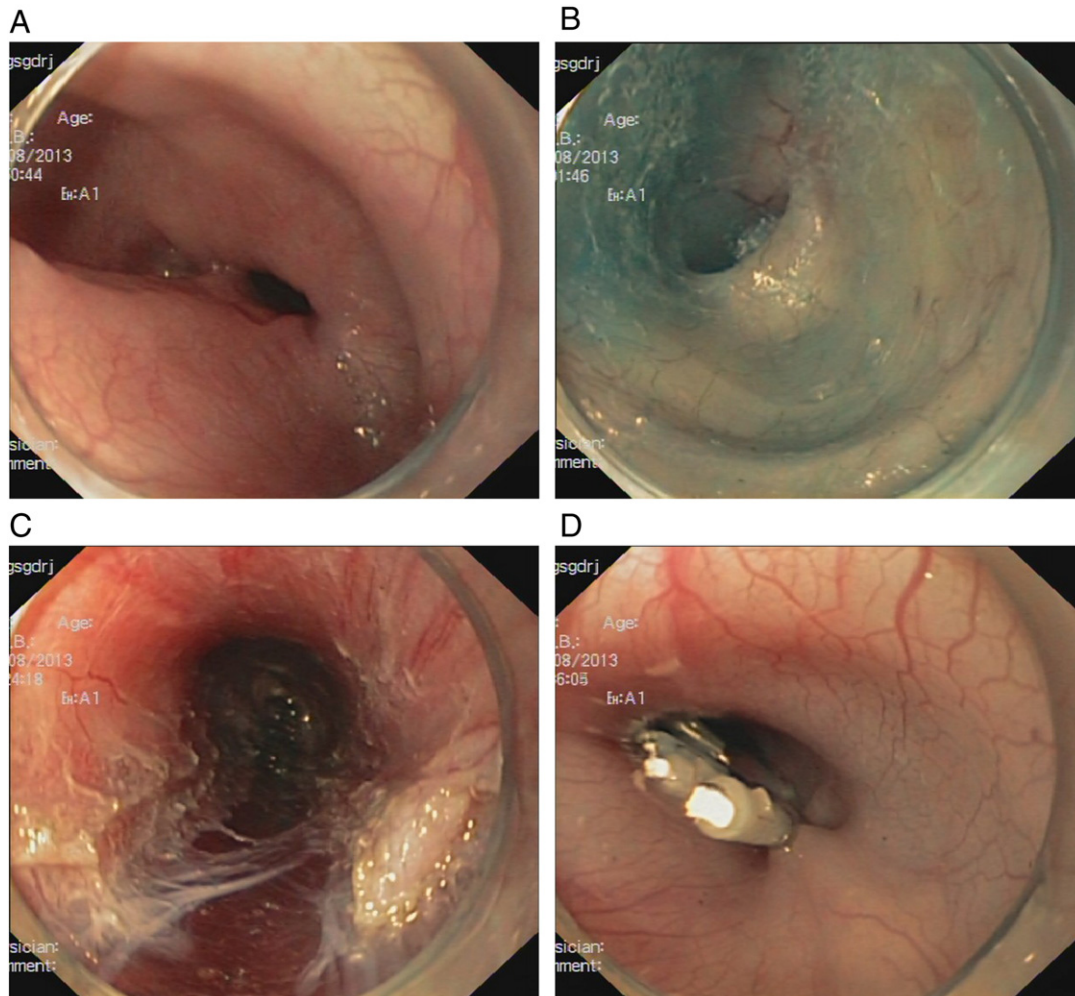


Fig. 1. Procedure of peroral endoscopic myotomy (POEM). A, A dilated and distorted esophagus lumen was noted. B, Submucosal tunnel, we could see the profile of circular muscle. C, full-thickness myotomy was performed about 3 cm above EGJ and 3 cm below EGJ. D, Several metal clips were applied to close mucosal entry.

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