Early adverse events of per-oral endoscopic myotomy CME

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Background and Aims: The recently developed technique of per-oral endoscopic myotomy (POEM) has been shown to be effective for the therapy of esophageal motility disorders. Limited information is available about POEM adverse events (AEs).

Methods: POEM was performed on 241 patients (58% male; mean age, 47.4 ± 16.4 years) under general anesthesia over 61 months. The main outcome was the rate of intra- and post-procedural AEs. Post-procedural checks comprised clinical and laboratory examinations and endoscopy, with further follow-ups performed at 3, 6, and 12 months.

Results: Of the 241 procedures, 238 were successfully completed (mean procedure time, 100.2 ± 39.5 min). Reasons for abortion were excessive submucosal fibrosis preventing submucosal tunneling. Three patients had severe procedural-related AEs (SAE rate, 1.2%); 1 case of pneumothorax required intra-procedural drainage, and 2 patients had delayed SAEs (1 ischemic gastric cardia perforation and 1 hemothorax, both leading to surgery). The overall rate of minor AEs was 31.1%, mainly prolonged intra-procedural bleeding (>15 min hemostasis) and defects of the mucosa overlying the tunnel; none led to clinically relevant signs or symptoms. Patients experiencing any AE had a significantly prolonged hospital stay ($P = .037$) and a trend toward prolonged procedure time ($P = .094$). Neck/upper thoracic emphysema and free abdominal air were noted in 31.5% and 35.7%, respectively (95.3% drained), but without relevant sequelae.

Conclusions: POEM has a low rate of SAEs; minor AEs are more frequent but lack a consistent definition. Therefore, based on our experience and literature analysis, we suggest a classification of AEs for POEM. (Clinical trials registration number: NCT01405417.) (Gastrointest Endosc 2017;85:708-18.)

INTRODUCTION

A new endotherapeutic technique for idiopathic achalasia has recently aroused great interest. Per-oral endoscopic myotomy (POEM) combines a scarless endoscopic approach with the surgical principle of myotomy,[1,2] and several studies from Europe, Asia, and the United States have shown promising early results with mostly smaller patient numbers and limited follow-up.[3-23] POEM appears to be associated with a low rate of adverse events (AEs) and most of these seem to be minor[21,22]; however, one group focusing on this aspect reported pleural effusion and pneumothorax in a substantial number of cases.[24,25] In 2014, with even more limited evidence available, a

Abbreviations: AE, adverse event; CI, confidence interval; CrP, C-reactive protein; EGJ, esophagogastric junction; ESD, endoscopic submucosal dissection; OTSC, over-the-scope clip; POEM, per-oral endoscopic myotomy; SAE, serious adverse event.

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TABLE 1. Patient and procedural data

		Number (%)
Number of patients	241	
Male:female	139:102	
Age (years), mean ± SD (range)	47.4 ± 16.4 (17-87)	
Diagnosis	Idiopathic achalasia	222 (92.1)
	Type I	59 (24.5)
	Type II	129 (53.5)
	Type III	32 (13.3)
	Refused manometry*	2 (0.8)
	EGJ outflow obstruction	2 (0.8)
	Nutcracker esophagus	2 (0.8)
	Jackhammer esophagus	9 (3.7)
	Re-myotomy or elongation after Heller	6 (2.5)
Previous treatment	None	121 (50.2)
	Balloon dilation only	79 (32.8)
	Botox injection only	14 (5.8)
	Both	20 (8.3)
	Heller myotomy	6 (2.5)
	Fundoplication	1 (0.4)
Myotomy length (cm), mean ± SD (range)†	11.6 ± 3.6 (5-21)	
Procedure time (min), mean ± SD (range)‡	100.2 ± 39.5 (30-273)	
Hospitalization after POEM (days), mean ± SD (range)	3.6 ± 1.7 (2-19)	

SD, Standard deviation; *EGJ*, esophagogastric junction; *POEM*, per-oral endoscopic myotomy.
*Clinical, endoscopic, and radiographic appearance corresponded to type I or II.
†n = 231.
‡n = 234.

U.S. group issued statements with regard to performance, efficacy, and AEs of POEM.[26] We use this article to validate intra- and post-procedure AEs with regard to clinical relevance in our patient collective and systematically review the literature on AEs of POEM. Based on both, we suggest a classification of relevant major and minor AEs that could serve as the basis for further studies.

METHODS

POEM was performed on 241 patients (male/female, 139/102; mean age, 47.4 ± 16.4 years) under general anesthesia between 30 June 2010 and 31 July 2015. Details of the indications and procedures are shown in Table 1. Written informed consent was obtained from all patients. The first 2 POEM procedures were carried out under the supervision of Haruhiro Inoue, who had introduced the technique into clinical practice.[2]

Information about AEs during and after POEM occurring immediately and after 3 months was retrospectively analyzed from data that were collected using a uniform approach as described below, partially under study conditions with ethics committee approval (registration numbers PV3725 and PV4133, Ethical Committee of the Hamburg Chamber of Physicians).[3,4,27]

POEM procedures and post-procedure management

POEM and POEM aftercare was performed as previously described[3,4] using general anesthesia, a flexible upper GI endoscope, a triangular tip knife, and CO_2 insufflation. After submucosal access and dissection to create the tunnel down to the cardia, circular muscle fibers were divided over a minimum length of 6 cm in the distal esophagus, whereas the lower esophageal sphincter plus 2 to 3 cm into the gastric cardia was completely cut. The mucosal entry site was closed using standard endoscopic clips.

Upper GI endoscopy (EGD) was performed in 237 of 241 patients (98.3%), a mean of 2.7 ± 1.0 days after POEM; in detail, most on post-procedural day 2 (35.4%, 84 of 237) or day 3 (30.8%, 73 of 237) the remaining patients were monitored endoscopically on day 1 (10.1%, 24 of 237), day 4 (22.8%, 54 of 237), or day 5 (0.8%, 2 of 237). Later follow-ups included clinical symptom assessment at 3, 6, and 12 months and endoscopy with manometry at 3 to 6 months. For this study, later AEs did not