

GERD Questionnaire (GERD-Q) Score as Outcome Parameter of Anterior Vs. Posterior Peroral Endoscopic Myotomy in Achalasia Patient

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ABSTRACT

Achalasia is an esophageal motility disorder which is characterized by relaxation failure of the lower esophageal sphincter and absence of distal esophageal peristalsis. The prevalence rate of achalasia is 10 cases per 100,000 population with dysphagia, regurgitation, chest pain, and weight loss as the main clinical manifestations. Target of treatment for achalasia is a decreased resting pressure in the lower esophageal sphincter and this can be achieved using peroral endoscopic myotomy (POEM). POEM can be performed using two therapeutic approaches: anterior and posterior. Complication that often occurs after POEM is gastroesophageal reflux disease (GERD). GERD leads to symptoms and/or structural damage that affects the patient's quality of life. The GERD questionnaire (GERD-Q) is a sensitive and non-invasive screening tool for diagnosing GERD. Based on the result analysis of this research that was conducted to assess the outcome of anterior and posterior POEM with the GERD-Q score parameter, there was no significant difference in scores between the anterior and posterior approaches.

Keywords: *Gastroesophageal reflux disease questionnaire (GERD-Q) score, peroral endoscopic myotomy (POEM), achalasia*

ABSTRAK

Akalasia adalah gangguan motilitas esofagus yang ditandai dengan kegagalan relaksasi sfingter esofagus bawah dan tidak adanya peristaltik distal esofagus. Angka prevalensi akalasia berkisar 10 kasus/100.000 penduduk dengan manifestasi klinis berupa disfagia, regurgitasi, nyeri dada dan penurunan berat badan. Target tatalaksana akalasia adalah penurunan tekanan istirahat pada sfingter esofagus bawah dan dapat dicapai salah satunya dengan cara peroral endoscopic myotomy (POEM). POEM dapat dilakukan dengan menggunakan dua pendekatan terapi yaitu secara anterior dan posterior. Salah satu komplikasi yang sering terjadi pasca POEM adalah gastroesophageal refluks disease (GERD). GERD dapat menyebabkan gejala dan/atau kerusakan struktural yang memengaruhi kualitas hidup penderitanya. Kuesioner GERD (GERD-Q) merupakan alat skrining yang sensitif dan non-invasif untuk mendiagnosis GERD. Berdasarkan hasil analisis penelitian yang dilakukan untuk menilai luaran dari POEM anterior dan posterior dengan parameter skor GERD-Q tidak didapatkan perbedaan skor secara signifikan antara pendekatan anterior dan posterior.

Kata kunci: *Gastroesophageal reflux disease questionnaire (GERD-Q) score, peroral endoscopic myotomy (POEM), achalasia*

INTRODUCTION

Achalasia is a rare primary esophageal motility disorder which is characterized by relaxation failure of the lower esophageal sphincter and absence of distal esophageal peristalsis. In 2013, the number of hospitalized patients with achalasia as a primary diagnosis or secondary diagnosis was 16,850 patients. This was an increase compared to 1997 which had as many as 7,690 patients.¹ Data from the Gastroentero-hepatology Division, Department of Internal Medicine, Faculty of Medicine, University of Indonesia at Rumah Sakit Cipto Mangunkusumo (RSCM) found 48 cases of achalasia reported in a period of 5 years, from 1984 to 1988, most of which were in the same age group.²

Several therapeutic options focus on reducing the pressure gradient across the lower esophageal sphincter, and their current treatments are pharmacologic, endoscopic, and surgical therapy.³ Peroral Endoscopic Myotomy (POEM) is a treatment of choice for the treatment of achalasia, even of those that were previously unsuccessful from post- laparoscopic surgical myotomy. POEM can be performed with an anterior or posterior approach depending on operator preference.⁴

One of the most common complications of POEM is the occurrence of gastroesophageal reflux disease (GERD). GERD can occur within 1 to 8 months after POEM. The GERD questionnaire (GERD-Q) is a sensitive and non-invasive screening tool for diagnosing GERD.⁵ This article aims to compare the outcomes of anterior and posterior POEM approaches using the GERD-Q score parameter.

ACHALASIA CLINICAL MANIFESTATIONS

The most common clinical manifestations of achalasia are regurgitation and dysphagia. Other clinical manifestations include chest pain and weight loss. There are also extraesophageal clinical manifestations such as pulmonary complications. In 75% of patients with achalasia, regurgitation occurs because of retained and undigested food. Dysphagia occurs in 70%-97% of patients with achalasia, whether the food is in solid or liquid form. Chest pain also occurs in nearly 40% of patients with achalasia. Approximately 60% of patients with achalasia also experience weight loss due to consuming a reduced or modified food and poor esophageal emptying. In extraesophageal symptoms such as pulmonary complications, abnormalities in pulmonary function or structure occur in more than half of the patients. This is caused by compression of the trachea due to the dilated esophagus or by repeated aspiration.⁶

PERORAL ENDOSCOPIC MYOTOMY

The goal of treatment for achalasia is to decrease the resting pressure in the lower esophageal sphincter. Until now, a treatment that can control the degenerative process of ganglion cells or restore normal esophageal function have not been found, so a repetition of treatments is needed.⁷ There are several ways to reach the goal of this procedure, such as pharmacological reduction of muscular tone, botulinum toxin injection, oral nitrates, laparoscopic myotomy, pneumatic dilation, and POEM.

POEM was first introduced by Ortega JA in 1980. POEM is a treatment of choice for the treatment of achalasia that was previously unsuccessful from post laparoscopic surgical myotomy.⁴ POEM can also be an alternative treatment for motility disorders such as esophageal spastic disorders which include diffuse esophageal spasm, Jackhammer Esophagus, or Type III Achalasia.⁸

Pre-operative evaluation of achalasia requires several tests to confirm the diagnosis and exclude other conditions. Pre-operative examinations were Barium Swallow or Barium Esophagogram, Esophageal Manometry, and Esophagogastroduodenoscopy.⁹ The POEM technique consists of several steps: mucosal incision, submucosal tunnel creation, myotomy, and closure of the mucosal entry. In the first step, a careful longitudinal incision is made in the submucosal tissue to allow the gastroscop to enter the submucosal space. This longitudinal technique will also facilitates closure with an endoscopic clip. A mucosal incision is made around 10-12 cm proximally to measure the gastroesophageal junction (GEJ). Around 10 mL of a mixture of epinephrine and indigo carmine or methylene blue is used to lift the submucosal bleb so that the mucosa can be incised.⁹

The second step is the creation of a submucosal tunnel. After making the entrance, the endoscope goes into the submucosa and maintains mucosal integrity. Maintaining mucosal integrity is crucial because the mucosa will be the only barrier between the mediastinum and the esophageal lumen after myotomy. Submucosal tunnelling requires identification of the GEJ. Indicators confirming the identification of GEJ include narrowing of the submucosal space, the appearance of small spiral blood vessels or commas in the submucosa, and visualization of the blue gastric cardia intraluminal mucosa.^{9,10} Once the GEJ has been identified, the endoscope should advance approximately 2 to 3 cm past the GEJ.⁹

Myotomy is the third step in POEM, where the circular muscle fiber dissection begins 6 cm above the GEJ and extends to 2-3 cm below the GEJ for a total length of 8-10 cm.^{9,10} Some circular muscle fibers are also divided to maintain the integrity of the longitudinal muscle fibers.¹¹ Selective myotomy of circular muscle fibers is very difficult to obtain and takes a long time. This process becomes difficult due to the nature of the longitudinal muscle fibers which are very thin and brittle.¹¹

Inspection of the submucosal tunnel should be performed before entering the final step of POEM. Several things must be ensured such as endoscopy to see the presence of active bleeding that must be controlled before closure, examination of the esophageal mucosa, and closing of any incidental tears and mucosectomy.

The final step is closure of the initial mucosal incision with an endoscopic clip.⁹ The first clip is placed just after the distal mucosal incision to create a fold or indentation. If there are concerns about inadequate closure, an esophageal stent may be considered.¹¹

The majority of POEM technique variations are myotomy orientations.¹² The difference between anterior POEM and posterior POEM is based on the position of the procedure. In the anterior POEM, the muscle fibers were cut at one to two o'clock, while the posterior POEM was cut at five o'clock.^{9,12} Anterior myotomy, first reported by Inoue et al, involves POEM at one to two o'clock position with the patient in supine position. The goal is to avoid damage to the angle of His and the sling muscle fibers that lie over the fundus in the greater curvature, which is a natural antireflux. Posterior myotomy, first reported by Renet al, begins with the mucosa incision and submucosal tunnel development at the five to six o'clock position (with the patient in a supine position) with the patient in the left lateral position. This approach allows better blade alignment for performing myotomy, as the passageway for most endoscopes is located above the

five or seven o'clock position. However, the angle of His lies around the eight o'clock position and posterior POEM could theoretically risk damaging the angle of His and disrupting the natural anti-reflux mechanism.³

Theoretically, an anterior approach are associated with a reduced risk of reflux because it preserves the oblique muscle fibers of the Lower Esophageal Sphincter. On the other hand, the posterior approach may lead to a reduced risk of intraprocedural and postprocedural bleeding because it avoids tunnelling through the anterior submucosal layer that stores the direct arterial branches of the left gastric artery.

In a global survey of POEM enrolment centers, seven hospitals performed anterior myotomy, and only two of them performed posterior myotomy. However, it is still unknown which approach is better.

GERD-Q SCORE AS AN INSTRUMENT IN DIAGNOSIS OF GASTROESOPHAGEAL REFLUX DISEASE (GERD)

Gastroesophageal reflux disease (GERD) is defined as an increase in gastric or gastroduodenal contents above the gastroesophageal junction, causing symptoms and/or structural damage and affecting the well-being and quality of life.¹³ One way to diagnose GERD is to use a questionnaire called the GERD-Q. The GERD questionnaire (GERD-Q) is a sensitive, non-invasive, screening tool for diagnosing GERD.³

The GERD-Q consists of six multiple choice questions and eight cut points as positive results. On each question, each given a score of 0-3, the probability of GERD scores on a scale of 0 [lowest probability] to 18 [highest probability]. The questionnaire evaluates the symptoms associated with GERD, their frequency, frequency in days, and their impact on well-being and quality of life. The instrument was a self-assessment questionnaire, and medical personnel only providing assistance if the subject had a question about an item or had doubts about how to answer it, or could not read.¹³

Important: To answer this questionnaire, take only the last 7 days (1 week) into account and answer each question by circle the appropriate response below

Questions	Frequency score for symptoms (points)			
	0 day	1 day	2-3 days	4-7 days
How often did you have a burning feeling behind your breastbone (heartburn)?	0	1	2	3
How often did you have stomach contents (liquid or food) moving upwards to your throat or mouth (regurgitation)?	0	1	2	3
How often did you have have pain in the center of the upper stomach?	3	2	1	0
How often did you have nausea?	3	2	1	0
How often did you have difficulty getting a good night's sleep because of your heartburn and/or regurgitation?	0	1	2	3
How often did you take additional medication for your heartburn and/or regurgitation, other than what the physician told you to take?	0	1	2	3

Figure 1. Gastroesophageal reflux disease (GERD) questionnaire¹³

Table 2. Anterior vs. Posterior peroral endoscopic myotomy (POEM)

Author, year	Study design	Location	Study period (duration)	Sample size	Achalasia subtype	Intervention dose	Age mean	Outcome
Ramchandani et al, 2018	RCT	Hyderabad	2015-2016	60	Type 1,2,3, post PBD, post BTI (mostly type 3, as many as 70%)	Peroral, endoscopic myotomy (POEM)	Anterior myotomy: 38 ± 13.35 Posterior myotomy: 43.9 ± 15.7	Anterior group: 5.46 ± 4.12 P value: 0.63 Posterior group: 5.93 ± 3.00 P value: 0.63
Khashab et al, 2020	RCT	Asia, Europe, and United States	January 2015 – November 2017	150	Type 1,2,3 (mostly type 2)	Peroral, endoscopic myotomy (POEM)	Anterior: 54 (32-66) Posterior: 51 (36-62)	Anterior group: 6 Posterior group: 6
Tan et al, 2018	RCT	Changsha, China	October 2015 – December 2016	63	Type 1,2,3 (mostly type 2)	Peroral, endoscopic myotomy (POEM)	Anterior myotomy: 45.8 ± 12.2 Posterior myotomy: 42.4 ± 13.3	Anterior group: 4.00 ± 3.45 P value: 0.569 Posterior group: 3.83 ± 2.90 P value: 0.569
Ichkhanian et al, 2021	RCT	Asia, Europe, and United States	January 2015 – November 2016 (recruitment) 1 year follow up and contacted again at 2 years post randomization to assess clinical success	111	Type 1,2,3 (mostly type 2)	Peroral, endoscopic myotomy (POEM)	Anterior POEM: 52.3 (21) Posterior POEM: 51.2 (18)	Anterior group: 6-8 interquartile range with p value 0.08 Posterior group: 6-8 interquartile range with p value 0.08

RCT: randomized controlled trial

ANTERIOR VS POSTERIOR PERORAL ENDOSCOPIC MYOTOMY THROUGH THE GERD-Q SCORE ASSESSMENT

POEM has become a worldwide achalasia therapy that uses two approaches: anterior and posterior. Based on a research by Khashab et al in 2020 involving 150 people who underwent anterior and posterior POEM procedures at random, results of the GERD-Q scores between the anterior and posterior groups were not significantly different. The GERD-Q score was assessed at 3, 6, and 12 months after POEM with an average GERD-Q score of 6 for each group, both anterior and posterior groups.¹⁴ This study shows similar results to the recent research conducted by Ichkhanian et al in 2021 which involved 111 patients of which 54 underwent anterior POEM procedures and 57 underwent posterior POEM procedures as measured by GERD-Q scores after 1 year. The results showed that the GERD-Q scores were similar in the two groups, i.e. interquartile range of 6-8 with a p-value of 0.08.¹⁵ However, slightly different results were obtained from research by Ramchandani et al in 2018 involving 60 patients which was divided into two groups and underwent anterior and posterior POEM procedures. The GERD-Q score assessment after 3 months of undergoing the POEM procedure in the two groups showed that the results were not too different from the posterior group, showing a slightly higher GERD-Q score with an average of 5.93 ± 3.00 and 5.46 ± 4.12 in the anterior group with p-value of 0.63.¹⁶ The higher score that was obtained in patients with posterior POEM presumably caused by cutting clasp and sling fibers at the gastrointestinal junction on the posterior approach. However, this is still a presumption and needs to be proven with other larger multicenter studies. Different results were shown in research by Tan et al. in 2018 involving 63 patients who underwent the POEM procedure and showed a higher average GERD-Q score with the anterior approach, that is 4.00 ± 3.45 , while in the posterior group the average score was 3.83 ± 2.90 with a p-value of 0.569.³ Based on the results of the analysis conducted to assess the outcome of POEM with an anterior and posterior approach with a GERD-Q score, there was no significant difference in scores between the anterior and posterior approaches. Therefore, it is not possible to determine which approach is better to be chosen and requires another multicenter study.

CONCLUSION

Based on several studies, there was no significant difference in results between groups with anterior and posterior POEM. The differences that were obtained from research by Tan et al in 2018 and Khashab et al in 2020 were not able to explain why differences in GERD-Q scores could occur in anterior and posterior POEM, so a recommendation for the best POEM approach between the two existing approaches could not be made.

The journals are good in terms of the writing procedure and the content of the abstract, because the author can provide a comprehensive overview of research activities regarding the comparison between anterior and posterior POEM in achalasia patients. In addition, the selection of the type of RCT research can strengthen the efficacy of the interventions carried out and provide results that not only answer, but ensure that there is no bias from either the research subjects, observers, or researchers.

Large-scale research studies are needed for more significant results because the results between anterior and posterior POEM in several journals that had been studied have not found significant results.

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