

Comparison of laparoscopic Heller myotomy and endoscopic balloon dilation in the treatment of achalasia: Effects on quality of life and patient satisfaction

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ABSTRACT

BACKGROUND: Achalasia is a rare neurodegenerative disease of the esophagus that causes impaired esophageal peristalsis and the inability of the lower esophageal sphincter (LES) to relax. This results in symptoms such as dysphagia, regurgitation, chest pain, and weight loss. Among the treatment options, Laparoscopic Heller Myotomy (LHM), Endoscopic Balloon Dilation (EBD), and Peroral Endoscopic Myotomy (POEM) are commonly used methods. The aim of this study was to compare the efficacy and clinical long-term results of LHM and EBD in treating achalasia.

METHODS: Patient records from Bezmialem Vakif University Hospital were reviewed, and 36 patients diagnosed with achalasia who underwent LHM and EBD were included in the study. Patients were evaluated using the Pre-operative Eckardt Score (Pre-ES) for preoperative evaluation, the Post-operative Eckardt Score (Post-ES) for postoperative evaluation, the Achalasia Specific Quality of Life (ASQL) questionnaire, and the Patient Satisfaction Scoring (PSS).

RESULTS: The mean age of the 19 patients who underwent LHM was 49.37 ± 10.48 years. The mean age of the 17 patients who underwent EBD was 59.24 ± 14.39 years. Perioperative complications included esophageal mucosal perforation in one patient in the LHM group, bleeding in three patients (17.64%), and esophageal perforation in one patient (5.88%) in the EBD group. At a mean follow-up of 90 months, gastroesophageal reflux developed in two patients (10.53%) in the LHM group and eight patients (47%) in the EBD group. The Pre-ES was similar in both groups. The Post-ES significantly decreased in the LHM group compared to the EBD group. When ASQL and PSS results were analyzed between the LHM and EBD groups, it was concluded that LHM was more effective than EBD in improving the quality of life and providing patient satisfaction (p -value: 0.001).

CONCLUSION: In light of these findings, it was concluded that LHM is a safer intervention compared to EBD and should be prioritized, considering the low risk of complications, improved quality of life, and high level of satisfaction.

Keywords: Achalasia; endoscopic balloon dilation; laparoscopic Heller myotomy; quality of life; patient satisfaction.

INTRODUCTION

Achalasia is a rare esophageal disorder characterized by the degeneration of the myenteric plexus, leading to impaired esophageal peristalsis and incomplete relaxation of the lower esophageal sphincter (LES).^[1] This results in a constellation of symptoms including dysphagia, regurgitation, nocturnal

cough, recurrent aspiration pneumonia, chest pain, and weight loss. Achalasia has an estimated prevalence of 1 per 100,000 individuals in the Western world.^[2]

Diagnosis of achalasia is established based on a combination of clinical presentation, esophageal manometry, barium esophagogram, esophagogastroduodenoscopy, and esopha-

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geal motility testing.^[3,4] Manometric findings characteristic of achalasia include aperistalsis and impaired LES relaxation.

Treatment options for achalasia include pharmacological therapy, endoscopic procedures, and minimally invasive surgical interventions.^[5] Among minimally invasive approaches, laparoscopic Heller myotomy (LHM), endoscopic balloon dilation (EBD), and peroral endoscopic myotomy (POEM) are the most commonly employed techniques. Peroral endoscopic myotomy has recently gained recognition as an attractive endoscopic treatment modality for achalasia.^[6] Laparoscopic Heller myotomy has remained a mainstay in the treatment of achalasia since its introduction.^[7,8] This procedure involves a myotomy extending at least 6 cm above the gastroesophageal junction and at least 3 cm distal to the gastric cardia, along with Dor fundoplication, following dissection of the phrenoesophageal ligament. Endoscopic balloon dilation, on the other hand, involves controlled disruption of the LES using an air-filled balloon dilator, effectively relieving distal esophageal obstruction and improving dysphagia; however, it is less effective in addressing reflux symptoms.^[9] Notably, a significant proportion of patients treated with EBD require repeat procedures. Compared to EBD, LHM offers a single-session treatment and may provide a more definitive solution for patients' complaints.^[10] The primary aim of achalasia treatment is the elimination of dysphagia while preventing the development of reflux. Reflux can occur following either LHM or EBD. Therefore, LHM is often combined with fundoplication to minimize the risk of reflux.^[11]

There is debate about the initial treatment for achalasia. Therefore, the aim of this study is to contribute to the clarification of this issue by comparing the effectiveness of LHM and EBD procedures in achalasia patients treated at our center, the long-term clinical outcomes, and their effects on quality of life and patient satisfaction.

MATERIALS AND METHODS

Study Design

A retrospective study was conducted by reviewing the patient records of Bezmialem Vakıf University Hospital to identify patients who underwent procedures for achalasia between 2010 and 2023. Patients were divided into two groups based on the treatment modality received: LHM + Dor Fundoplication or EBD.

Patient Selection Criteria

Inclusion Criteria:

- Age \geq 18 years
- Diagnosis of achalasia
- Treatment with LHM + Dor Fundoplication or EBD.

Exclusion Criteria:

- Incomplete follow-up data

- LHM without fundoplication
- Malignancy-related achalasia
- Treatment with modalities other than LHM or EBD.

Ethical Approval

The study was approved by the Ethics Committee of Bezmialem Vakıf University Hospital (2023/106).

Data Collection

Demographic and clinical data were collected from patients' medical records, including age, gender, comorbidities, symptom duration, pre-treatment esophageal manometry findings, treatment details, the Pre-operative Eckardt Score (Pre-ES), and the Post-operative Eckardt Score (Post-ES). Achalasia Symptom Quality of Life Questionnaire (ASQL) and Patient Satisfaction scores were assessed through telephone interviews.

Surgical Procedures

LHM + Dor Fundoplication

After dissection of the phrenoesophageal ligament, a myotomy extending at least 6 cm above the gastroesophageal junction and at least 3 cm distal to the gastric cardia was performed, along with Dor fundoplication.

EBD

Under sedation, esophagogastroduodenoscopy was performed to identify the esophagogastric junction. A pneumatic balloon was inserted and positioned at the esophagogastric junction. Dilatations were performed using a 30 mm balloon. After device removal, careful upper endoscopy was performed to evaluate the patency of the esophagogastric junction.

Outcome Measures

Eckardt Score (ES)

The ES assesses dysphagia, regurgitation, retrosternal pain, and weight loss (Table 1). Each symptom is scored from 0 to 3. The maximum possible ES score is 12, and the lowest score is 0.^[12]

Achalasia Symptom Quality of Life Questionnaire (ASQL)

The ASQL is a 19-item questionnaire that evaluates patients' quality of life before and after treatment for achalasia. The total possible score is 28, with a minimum score of 8. The questionnaire assesses the following aspects of dysphagia, food intake, and overall quality of life:

- Ability to eat and drink various foods
- Frequency of water intake to dislodge stuck food
- Frequency of chest pain during eating
- Impact of chest pain on daily activities
- Eating speed
- Restriction of lifestyle due to achalasia

Table 1. Eckardt Score

Score	Symptoms			
	Weight Loss (kg)	Dysphagia	Retrosternal Pain	Regurgitation
0	None	None	None	None
1	<5	Occasional	Occasional	Occasional
2	5-10	Daily	Daily	Daily
3	>10	Each meal	Each meal	Each meal

- Restriction of food and liquid intake due to treatment
- Overall satisfaction with health after treatment.

Statistical Analysis

Data collected for the purpose of the study were organized in Microsoft Excel. The Student's t-test was used to compare the mean ages of the two groups. Additionally, the Student's t-test, Chi-square test, Fisher's Exact Probability Test, and Odds Ratio were utilized to compare differences between the two groups. The Paired t-test was used to evaluate the quality of life of the patients, and the Mann-Whitney U Test was used to assess the patients' satisfaction status. All P values less than 0.05 were considered statistically significant for the study.

RESULTS

Complications

A total of 36 patients who underwent LHM (n=19) or EBD (n=17) for the treatment of achalasia were included in the study. The mean age of the 19 patients who underwent LHM was 49.37 ± 10.48 years. All of these 19 patients underwent LHM with Dor fundoplication. The procedures were completed laparoscopically in all 19 patients. The mean age of the 17 patients who underwent EBD was 59.24 ± 14.39 years. The Chicago Classification of achalasia type and the percentage treated with LHM were as follows: Type I, n=9 (47% LHM); Type II, n=8 (42% LHM); Type III, n=2 (11% LHM) and the percentage of achalasia type treated with the Chicago Classification and EBD was as follows: Type I, n=10 (59% EBD); Type II, n=7 (41% EBD). Intraoperative esophageal mucosal perforation was observed in one patient in the LHM group, while intraoperative complications were seen in four patients in the EBD group [bleeding in three patients (17.64%), esophageal perforation in one patient (5.88%)] (Table 2). The comparison of complications between the two groups was statistically significant ($p < 0.05$). According to the Fisher Exact Probability Test and Odds Ratio analysis, EBD increased the risk of bleeding and perforation, whereas LHM decreased these risks. In the postoperative follow-up period, gastroesophageal reflux developed in two patients (10.53%) in the LHM group and in eight patients (47.1%) in the EBD group. The comparison of late postoperative complications between the two groups was statistically significant. Since the

chi-square test, Fisher's Exact Probability Test, and $p < 0.05$ indicated a statistically significant difference in the incidence of reflux between LHM and EBD procedures, the incidence of reflux was lower in the LHM group compared to the EBD group. These findings suggest that EBD has a higher risk of both intraoperative and postoperative complications.

Preoperative Symptom

Both groups reported similar symptoms before surgery. The most common symptom was dysphagia, which was present in 34 of the 36 patients (LHM: 17, EBD: 17). When asked about their primary symptom, 17 patients (89.47%) in the LHM group had dysphagia, four patients (21%) had regurgitation, one patient (5.26%) had chest pain, and six patients (31.58%) had weight loss. In the EBD group, all 17 patients (100%) had dysphagia, six patients (35.29%) had regurgitation, three patients (17.65%) had chest pain, and six patients (35.29%) had weight loss (Table 3). Gastroesophageal reflux symptoms were not present in either group.

Postoperative Outcomes

The mean follow-up period was 89.1 ± 43.19 months for the LHM group and 90.28 ± 34.5 months for the EBD group. Preoperative Eckardt Scores were not different between the two groups (Student's T-Test: LHM: 4.84, EBD: 4.68, p-value: 0.341). Postoperative Eckardt Scores were significantly lower in the LHM group compared to the EBD group.

Quality of Life and Patient Satisfaction

When comparing the results of the Achalasia Symptom Quality of Life Questionnaire and patient satisfaction between the LHM and EBD groups, it was concluded that LHM was more effective than EBD in improving patients' quality of life and achieving patient satisfaction (p-value: 0.001).

Table 2. Intraoperative and postoperative complications

Complication	LHM (n=19)	EBD (n=17)
Bleeding	0	3 (17.64%)
Perforation	1 (5.26%)	1 (5.88%)
Reflux	2 (10.53%)	8 (47.1%)

Table 3. Preoperative symptoms

Symptom	LHM (n=19)	EBD (n=17)	Total (n=36)
Dysphagia	17 (89.47%)	17 (100%)	34 (94.74%)
Regurgitation	4 (21.05%)	6 (35.29%)	10 (27.78%)
Chest Pain	1 (5.26%)	3 (17.65%)	4 (11.11%)
Weight Loss	6 (31.58%)	6 (35.29%)	12 (33.33%)

DISCUSSION

Achalasia is a rare neurodegenerative disorder characterized by the loss of inhibitory neurons in the myenteric plexus, which is responsible for normalizing esophageal peristalsis and LES relaxation.^[13]

While pharmacologic agents can be used in the treatment of achalasia, minimally invasive interventions such as LHM, EBD, and POEM are also commonly used.^[14] In our study, LHM and EBD methods were applied and ASQL long-term results of 36 patients included in the study were compared to determine the most appropriate treatment approach for achalasia.

The Eckardt Score is used to evaluate the prevalence of achalasia symptoms, to monitor how the symptoms of patients change over time, and to evaluate the effectiveness of treatment.^[15] In our study, when the Pre-ES, which was used to evaluate the symptoms of the patients before the procedure, was calculated, it was found to be similar in both groups. In the post-procedure period, it was concluded that Post-ES decreased significantly in the LHM group compared to the EBD group.

Although the relief of symptoms after the intervention is the main goal, achieving this success rate under safe conditions should also be a primary goal. This approach guides the selection of the method with the fewest complications that may occur during and after the intervention.^[16] As in our study, many studies have reported that LHM has a lower complication rate compared to EBD. These complications are frequently observed as bleeding and esophageal perforation.^[17] In our study, one patient in the LHM group experienced esophageal mucosal complications in the early period (5.26%), while bleeding was observed in three patients (17.65%) and esophageal perforation in one patient (5.88%) in the EBD group, which was statistically significant. This indicates that LHM should be the first choice in the treatment of achalasia.

The main goal is to improve the quality of life of patients with achalasia. This is assessed using quality of life and satisfaction questionnaires. In the quality of life and satisfaction assessment conducted in our study, it was statistically significant that LHM was more effective than EBD. Many studies have reported similar results regarding this situation.^[18]

CONCLUSION

In conclusion, compared to EBD, LHM appears to be effective in the treatment of achalasia in terms of symptom relief, improving quality of life, and patient satisfaction. However, LHM showed a lower complication rate than EBD. It shows that EBD increases the risk of bleeding and perforation, while LHM reduces these risks. In light of these findings, it was concluded that LHM is a safer and preferable intervention compared to EBD, considering the low risk of complications, improved quality of life, and high level of satisfaction. However, more studies with a larger sample size are needed to reach a more definite conclusion.

Ethics Committee Approval: This study was approved by the Bezmialem Vakif University Faculty of Medicine Hospital Ethics Committee (Date: 07.06.2023, Decision No: 2023/106).

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Conflict of Interest: None declared.

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ORİJİNAL ÇALIŞMA - ÖZ

Akalazyada tedavisinde laparoskopik Heller miyotomi ve endoskopik balon dilatasyonunun karşılaştırılması: Yaşam kalitesi ve hasta memnuniyeti üzerine etkileri

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AMAÇ: Akalazyada, özofagusun nadir görülen bir nörodejeneratif hastalığıdır. Özofagus peristaltizminin bozulmasına ve alt özofagus sfinkterinin (LES) gevşeyememesine neden olur. Sonuç olarak da disfaji, regürjitasyon, göğüs ağrısı ve kilo kaybı gibi semptomlara yol açar. Tedavi seçenekleri arasında Laparoskopik Heller Miyotomi (LHM), Endoskopik Balon Dilatasyonu (EBD) ve son zamanlarda kullanım sıklığı artan Peroral Endoskopik Miyotomi (POEM) yaygın olarak kullanılan yöntemlerdir. Bu çalışmanın amacı, akalazyada tedavisinde LHM ve EBD'nin etkinliğini ve klinik uzun dönem sonuçlarını karşılaştırmaktır.

GEREÇ VE YÖNTEM: Bezmialem Vakıf Üniversitesi Hastanesi hasta kayıtları incelenerek akalazyada tanısı konulan ve LHM ve EBD uygulanan 36 hasta çalışmaya alındı. Hastalar preoperatif dönem değerlendirilmesi olarak "İşlem Öncesi Eckardt Skoru (Pre-ES)", postoperatif dönem değerlendirilmesi olarak "İşlem Sonrası Eckardt Skoru (Post-ES)", Akalazyada Spesifik Yaşam Kalitesi (ASQL) anketi ve Hasta Memnuniyeti Skorlaması (HMS) ile değerlendirildi.

BULGULAR: LHM uygulanan 19 hastanın yaş ortalaması 49.37 ± 10.48 idi. EBD uygulanan 17 hastanın yaş ortalaması 59.24 ± 14.39 idi. Perioperatif komplikasyon olarak LHM uygulanan grupta 1 hastada özofagus mukozasında perforasyon, EBD uygulanan grupta 3 hastada kanama (%17.64) ve 1 hastada özofagus perforasyonu (%5.88) görüldü. Ortalama 90 aylık takipte, LHM uygulanan grupta 2 hastada (%10.53) ve EBD uygulanan grupta 8 (%47) hastada gastroözofageal reflü geliştiği görüldü. Her iki grupta Pre-ES benzerdi. Post-ES, LHM uygulanan grupta EBD uygulanan gruba göre anlamlı bir şekilde azaldığı sonucuna ulaşılmıştır. LHM ve EBD grupları arasında ASQL sonuçları ve HMS incelendiğinde, LHM'nin hastaların yaşam kalitelerini arttırmada ve hasta memnuniyeti sağlamada EBD'ye göre daha etkili olduğu sonucuna varılmıştır ($p=0.001$).

SONUÇ: Bu bulgular ışığında, komplikasyon riskinin düşük olması, yaşam kalitesini artırması ve memnuniyet düzeyinin yüksek olması göz önünde bulundurulduğunda LHM, EBD'ye göre daha güvenli ve öncelikli tercih edilmesi gereken bir girişim olduğu sonucuna ulaşılmıştır.

Anahtar sözcükler: Akalazyada; endoskopik balon dilatasyonu; hasta memnuniyeti; laparoskopik Heller miyotomi; yaşam kalitesi.

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