



Initial Experience in Target Peroral Endoscopic Submucosal Myotomy Combined with Septotomy for Epiphrenic Diverticulum

Nikola Boyanov^{1,2}, Vladimir Andonov^{3,4}, Katina Shtereva², Katerina Madzharova², Nikolay Stoynov², Desislava Dimitrova², Ivan Yankov^{5,6}

¹ Medical Simulation Training Center at the Research Institute of Medical University of Plovdiv, Plovdiv, Bulgaria

² Department of Gastroenterology, Pulmed University Hospital, Plovdiv, Bulgaria

³ Second Department of Internal Medicine, Medical University of Plovdiv, Plovdiv, Bulgaria

⁴ Department of Gastroenterology, Kaspela University Hospital, Plovdiv, Bulgaria

⁵ Department of Pediatrics and Medical Genetics, Medical University of Plovdiv, Plovdiv, BG

⁶ Department of Pediatric Gastroenterology, St George University Hospital, Plovdiv, Bulgaria

Corresponding author: Katina Shtereva, Pulmed University Hospital, Plovdiv, Bulgaria; Email: katinashtereva@gmail.com; Tel.: +359 890 936 205

Received: 16 Mar 2022 ♦ **Accepted:** 18 Apr 2022 ♦ **Published:** 30 June 2023

Citation: Boyanov N, Andonov V, Shtereva K, Madzharova K, Stoynov N, Dimitrova D, Yankov I. Initial experience in target peroral endoscopic submucosal myotomy combined with septotomy for epiphrenic diverticulum. *Folia Med (Plovdiv)* 2023;65(3):490-494. doi: 10.3897/foimed.65.e83893.

Abstract

The epiphrenic esophageal diverticulum is a rare non-malignant condition that is commonly associated with motility disorders. It would normally be treated surgically, but with the advancement of endoscopy techniques, peroral endoscopic myotomy with septotomy (D-POEM) has shown its benefits in coping with the symptoms. We present a case of a 71-year-old woman with increasing symptoms of dysphagia, weight loss and imaging data showing a large epiphrenic diverticulum. We treated her using peroral endoscopic myotomy combined with septotomy of the diverticular septum. The procedure showed excellent results with reducing the amount of contrast materials retained in it, improving the quality of life of the patient, and increasing her weight. There were minimal adverse events and no perforations or severe adverse effects occurred. D-POEM is a new and rapidly evolving procedure that is proving to be a safe and effective method of treating epiphrenic esophageal diverticulum.

Keywords

dysphagia, D-POEM, endoscopic treatment, full-thickness myotomy

INTRODUCTION

Esophageal diverticulum is a rare condition that is most commonly associated with esophageal motility disorders.^[1] According to its location, it can be divided into the following types: pharyngoesophageal, midesophageal, and epiphrenic diverticula.^[2] The epiphrenic diverticulum typically originates in the distal esophagus, 4-8 cm above the cardia and has estimated incidence of 1:500,000/year.^[3]

Normally, its management implies surgery, with 15% morbidity and 3% mortality rates. In the recent years considering the technological advancement in the field of flexible endoscopy, peroral endoscopic myotomy with septotomy has been shown to be an effective and safer approach for treating esophageal diverticulum.^[4]

We present a case of large epiphrenic diverticulum without achalasia treated with D-POEM.

CASE REPORT

This is the case of a 71-year-old female with a history of breast cancer. The patient is currently on hormone therapy and has other concomitant diseases, including hypertension and thrombophlebitis in the lower extremities. For the past 18 months, she has been complaining of progressive esophageal dysphagia, which alleviates after vomiting. For that period of time, the patient had lost more than 15 kg of her weight.

The symptoms were not influenced by the family doctor's prescriptions, which is why an upper gastrointestinal series was performed, showing evidence of a diverticulum retaining the barium (Fig. 1).

The patient was placed under general anesthesia in a supine position. The gastroscope used was Olympus GIF-2TH180 (Tokyo, Japan) covered on the distal end with Olympus Soft Cap. The precise location of the diverticulum was determined. The diverticulum was situated

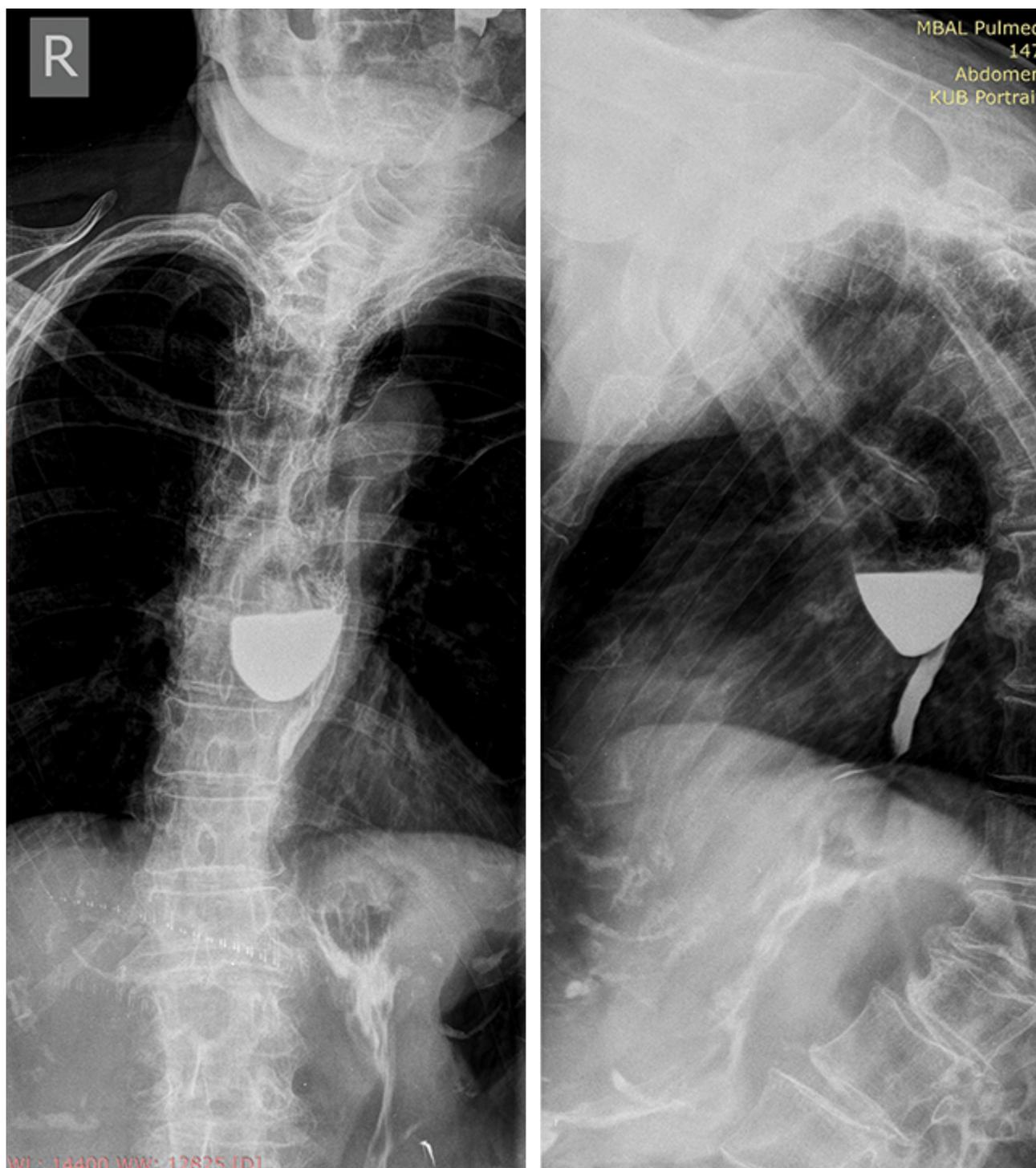


Figure 1. Pre-procedural upper gastrointestinal series.

8 cm above the gastro-esophageal junction (GEJ) and was 38×42×55 mm in size. It was located on the posterior wall of the esophagus.

The procedure started 3 cm upwards from the proximal end of the diverticulum. A solution of Gelofusine, adrenaline, and indigo carmine was introduced in the submucosal space through a 25 G Olympus injection needle. A 2-cm incision in the mucosa was made. Dissection of both sides of the proximal end of the diverticulum was performed using the Olympus Triangular Tip knife. From that point to two centimeters distally of the GEJ, a submucosal tunnel was created with the utmost care so as not to damage the mucosa or the serosa. Myotomy of the distal septum of the diverticulum and full-thickness myotomy of the muscle layer of the esophagus 3 cm below the diverticulum was performed. The initial incision was then closed using four EZ clips. After close examination, a laceration of the mucosa was found, which was treated with additional EZ clips. Carbon dioxide insufflation was used during the procedure.

One day after the procedure, new upper gastrointestinal series were ordered, this time using Urografin instead of barium. It showed that the diverticulum retained a minimal amount of contrast (**Fig. 2**) The adverse events of the D-PO-EM were subcutaneous emphysema and retrosternal pain that faded within two days. No severe adverse effects were

reported. We did perform a control radiography and gastroscopy three months after the procedure with excellent results. By this time, the patient had no symptoms of dysphagia and had gained 10 kg in weight.

DISCUSSION

The epiphrenic esophageal diverticulum (EED) is a rare condition that results from functional or mechanical obstruction, or a combination of both.^[5] However, recent studies have reported that more than 75% of epiphrenic diverticula occur concomitantly with esophageal motility disorders.^[6] Since we could not prove the presence of a motility disorder, we did not perform dissection of the lower esophageal sphincter (LES) after the septotomy. Available data is not conclusive on whether the operator must choose between septotomy or myotomy or both should be performed in such cases.^[7]

Previously, EEDs were treated surgically using open or laparoscopic diverticulectomy with distal myotomy, mostly combined with an anterior partial fundoplication.^[8] Nowadays, indications for surgical treatment are considered to be continued growth of the diverticulum, the presence of symptoms, and concomitant malignancy in

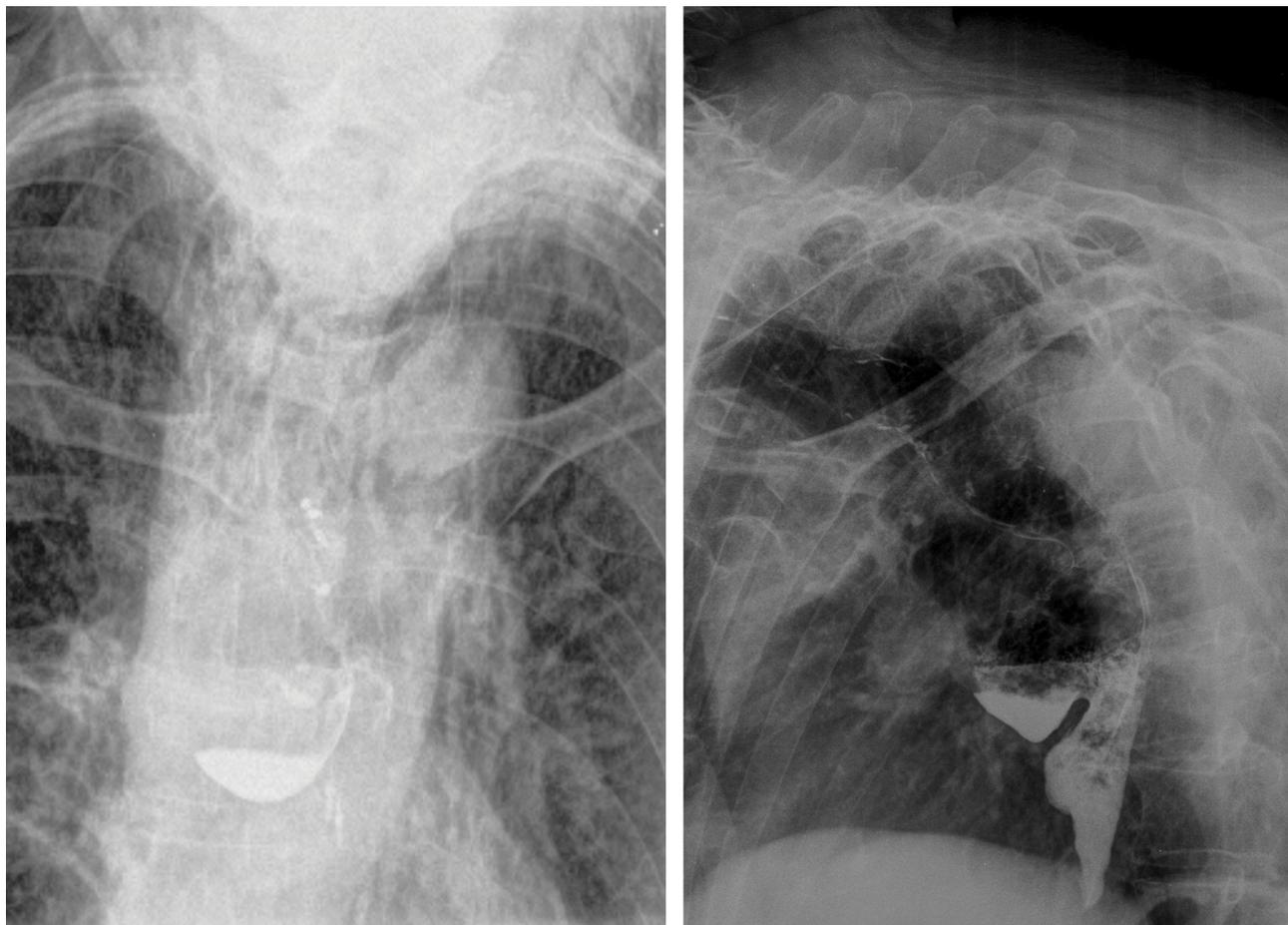


Figure 2. Post-procedural upper gastrointestinal series.

the diverticulum.^[2] Although there is a 0.6% cancer incidence in epiphrenic esophageal diverticula, the malignant process can be easily identified with upper endoscopy.^[9] Since esophageal diverticula are mostly not malignant structures, the main goals of endoscopic treatment are to alleviate the symptoms in patients and enhance their quality of life, and not necessarily remove the structure of the diverticulum.^[2]

The positive outcome of all endoscopic treatments for epiphrenic diverticula, with or without motility disorder present, is assessed in one of three ways: upper gastrointestinal series with barium swallow, Eckardt score, or high-resolution manometry.^[2,10] Analogously to other authors, we used Eckardt score to subjectively measure the result of the procedure and its positive impact on the quality of life of the patient, comparing pre- and post-procedural results (**Table 1**).

Table 1. Eckardt Symptom scoring^[11]

Score	Dysphagia	Regurgitation	Retrosternal pain	Weight loss (kg)
0	None	None	None	None
1	Occasional	Occasional	Occasional	<5
2	Daily	Daily	Daily	5-10
3	Every meal	Every meal	Every meal	>10
	Stage 0	Stage 1	Stage 2	Stage 3
Score	0-1	2-3	4-6	>6
Sum	(Remission)	(Remission)	(Treatment failure)	(Treatment failure)

CONCLUSIONS

We concluded that peroral endoscopic myotomy with septotomy is a relatively safe procedure for treatment of the epiphrenic esophageal diverticulum. It is efficient in pro-

viding better quality of life for the patient. However, since the endoscopic treatments are new and rapidly evolving, long-term follow-up time is required to fully assess its efficiency and clinical outcomes. Multicentric studies on large cohorts of patients must be performed in order to evaluate and compare different endoscopic techniques.

REFERENCES

1. Baker ME, Zuccaro Jr G, Achkar E, et al. Esophageal diverticula: patient assessment. *Semin Thorac Cardiovasc Surg* 1999; 1(4):326–36.
2. Sato H, Takeuchi M, Hashimoto S, et al. Esophageal diverticulum: New perspectives in the era of minimally invasive endoscopic treatment. *World J Gastroenterol* 2019; 25(12):1457–64.
3. Zaninotto G, Portale G, Costantini M, et al. Therapeutic strategies for epiphrenic diverticula: systematic review. *World J Surg* 2011; 35(7):1447–53.
4. Basile P, Gonzalez JM, Le Mouel JP, et al. Peroral endoscopic myotomy with septotomy for the treatment of distal esophageal diverticula (D-POEM). *Surg Endosc* 2020; 34(5):2321–5.
5. Soares RV, Montenegro M, Pellegrini CA, et al. Laparoscopy as the initial approach for epiphrenic diverticula. *Surg Endosc* 2011; 25(12):3740–6.
6. Tedesco P, Fisichella PM, Way LW, et al. Cause and treatment of epiphrenic diverticula. *Am J Surg* 2005; 190(6):891–4.
7. Demeter M, Bánovčin Jr P, Ďuriček M, et al. Peroral endoscopic myotomy in achalasia and large epiphrenic diverticulum. *Digestive Endoscopy* 2018; 30:260–2.
8. Feußner H, Hüser N, Wilhelm D, et al. Operative Therapie von Divertikeln der Speiseröhre: Endoskopisch oder offen? [Surgical treatment of esophageal diverticula: Endoscopic or open approach?]. *Chirurg* 2017; 88(3):196–203 (German).
9. Herbella FA, Patti MG. Modern pathophysiology and treatment of esophageal diverticula. *Langenbecks Arch Surg* 2012; 397(1):29–35.
10. Demeter M, Ďuriček M, Vorčák M, et al. S-POEM in treatment of achalasia and esophageal epiphrenic diverticula - single center experience. *Scand J Gastroenterol* 2020; 55(4):509–514.
11. Ward MA, Gitelis M, Patel L, et al. Outcomes in patients with over 1-year follow-up after peroral endoscopic myotomy (POEM). *Surg Endosc* 2017; 31(4):1550–7.

Начальный опыт целевой пероральной эндоскопической подслизистой миотомии в сочетании с септотомией по поводу наддиафрагмального дивертикула

Никола Боянов^{1,2}, Владимир Андонов^{3,4}, Катина Щерева², Катерина Маджарова², Николай Стойнов², Десислава Димитрова², Иван Янков^{5,6}

¹ Медицинский симуляционный учебный центр при Научно-исследовательском институте Медицинского университета – Пловдив, Пловдив, Болгария

² Отделение гастроэнтерологии, УМБАЛ „Палмед“, Пловдив, Болгария

³ Вторая кафедра внутренних болезней, Медицинский университет – Пловдив, Пловдив, Болгария

⁴ Отделение гастроэнтерологии, УМБАЛ „Каспела“, Пловдив, Болгария

⁵ Кафедра педиатрии и медицинской генетики, Медицинский университет – Пловдив, Пловдив, Болгария

⁶ Отделение детской гастроэнтерологии, УМБАЛ „Свети Георги“, Пловдив, Болгария

Адрес для корреспонденции: Катина Щерева, УМБАЛ „Палмед“, Пловдив, Болгария; E-mail: katinashtereva@gmail.com; тел.: +359 890 936 205

Дата получения: 16 марта 2022 ♦ **Дата приемки:** 18 апреля 2022 ♦ **Дата публикации:** 30 июня 2023

Образец цитирования: Boyanov N, Andonov V, Shtereva K, Madzharova K, Stoynov N, Dimitrova D, Yankov I. Initial experience in target peroral endoscopic submucosal myotomy combined with septotomy for epiphrenic diverticulum. Folia Med (Plovdiv) 2023;65(3):490-494. doi: 10.3897/folmed.65.e83893.

Резюме

Наддиафрагмальный дивертикул пищевода является редким незлокачественным заболеванием, которое обычно связано с нарушениями моторики. Обычно это лечится хирургическим путём, но с развитием методов эндоскопии пероральная эндоскопическая миотомия с септотомией (D-РОЕМ) показала свои преимущества в борьбе с симптомами. Мы представляем случай 71-летней женщины с нарастающими симптомами дисфагии, потерей веса и данными визуализации, показывающими большой наддиафрагмальный дивертикул. Мы лечили её с помощью пероральной эндоскопической миотомии в сочетании с септотомией дивертикулярной перегородки. Процедура показала отличные результаты с уменьшением количества удерживаемых в ней контрастных веществ, улучшением качества жизни пациентки, увеличением её веса. Были минимальные побочные эффекты, перфорации или серьёзные побочные эффекты не наблюдались. D-РОЕМ – это новая и быстро развивающаяся процедура, которая зарекомендовала себя как безопасный и эффективный метод лечения наддиафрагмального дивертикула пищевода.

Ключевые слова

дисфагия, D-РОЕМ, эндоскопическое лечение, полнослойная миотомия
