

Single Case

Multiple Esophageal Leiomyoma Presenting with Clinical Dysphagia from Mechanical Obstruction and Motility Disorder

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Keywords

Multiple esophageal leiomyoma · Dysphagia · Endoscopic ultrasound · High-resolution esophageal manometry

Abstract

Esophageal leiomyoma is uncommon. However, this tumor is the most common subepithelial tumor affecting the esophagus, comprising approximately two-thirds of benign esophageal tumors. Leiomyomas of the esophagus rarely cause symptoms when they are single and <5 cm. The mainstay of treatment is esophagectomy for symptomatic patients. A 68-year-old male patient presented with progressive dysphagia for 4 months. The degree of dysphagia and chest discomfort was more severe on solid rather than liquid diet. The CT scan of the chest showed multiple well-defined, submucosal nodules, up to 1.9 cm in diameter located at the middle esophagus. The barium swallow study illustrated multiple, well-defined, smooth, semi-lunar filling defects along the mid to distal esophagus. Meanwhile, esophagogastroduodenoscopy revealed 8 smooth subepithelial masses. Moreover, the radial EUS showed multiple hypoechoic masses arising from the 4th layer, with some of the tumors connected to others as a horseshoe-like shape causing narrowed lumen. Last, high-resolution esophageal manometry revealed ineffective esophageal motility. We report a rare case of numerous esophageal

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leiomyomas which caused dysphagia as a result of both mechanical obstruction and hypomotility disorder. The histopathology confirmed the diagnosis of esophageal leiomyoma. Symptoms improved significantly after lifestyle modifications and adherence to dietary advice on the part of the patient.

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Published by S. Karger AG, Basel

Introduction

Esophageal leiomyoma is uncommon; however, it constitutes the most common benign tumors of the esophagus accounting for 0.4% of esophageal neoplasms and approximately two-thirds of benign esophageal tumors [1]. The majority consists of a solitary intramural lesion, and multiple or diffuse lesions are very rare, accounting for 2.4% of cases according to previous reports [2, 3]. They predominantly affect men aged 20–60 years and are typically located in the middle to lower two-thirds of the esophagus. These mesenchymal tumors originate from smooth muscle cells and rarely cause symptoms when they are singular and <5 cm in size. The most common presenting symptoms of epigastric pain, esophageal dysphagia, and regurgitation tend to correlate with tumor size (usually ≥ 5 cm) [4]. Many of such tumors are found incidentally during endoscopic procedures, and malignant transformation to leiomyosarcoma is very rare [4, 5]. The mainstay treatment depends on symptoms, with esophagectomy or enucleation recommended as the standard treatment in symptomatic patients.

Case Presentation

A 68-year-old male presented with the complaint of dysphagia for 4 months. The degree of dysphagia and chest discomfort was more severe on solid rather than liquid diet. The symptoms improved slightly after he drank some liquid. There was no nasal voice, regurgitation, or aspiration. He had a history of significant weight loss; initial body weight was 60 kg, and weight reduction was 5 kg after he developed symptoms, which was calculated as 8% from the baseline within 4 months. He had been in good health without any problems related to swallowing and denied any family history of esophageal disorder.

On physical examination, he appeared well. Neither his cervical nor his supraclavicular lymph nodes were palpable. The findings regarding his thyroid gland and cervical spine were unremarkable. His abdomen was soft and not tender without any palpable intra-abdominal mass. Finally, there were no abnormal neurological examination findings.

Initial laboratory findings comprised the following: complete blood count: WBC 5600/mm³, PMN 55.8%, Lymph 32.7%, and Eos 4.1%; Hb 11.5 g/dL, Hct 38%, MCV 82.1 fL, and platelet count $276 \times 10^3/\mu\text{L}$. The CT of the chest and abdomen showed 10, smoothly marginated, homogenous, nonenhancing masses in the middle to lower esophagus (shown in Fig. 1). The barium esophagogram illustrated 8, well-defined, smooth, semilunar filling defects along the middle to distal thoracic esophagus (shown in Fig. 2).

The esophagogastroduodenoscopy revealed 8 smooth subepithelial masses varying between 1.0 and 2.0 cm in size, occupying 50% of the esophageal lumen with the minimal residual esophageal diameter of 12 mm, covered with intact mucosa, and located from 25 to 35 cm from incisors (shown in Fig. 3A). The radial endoscopic ultrasonography showed 8 hypoechoic masses varying from 1 to 1.5 cm in size (number >10 lesions), arising from the 4th layer of the esophageal wall without calcification or intramural cystic degeneration, with

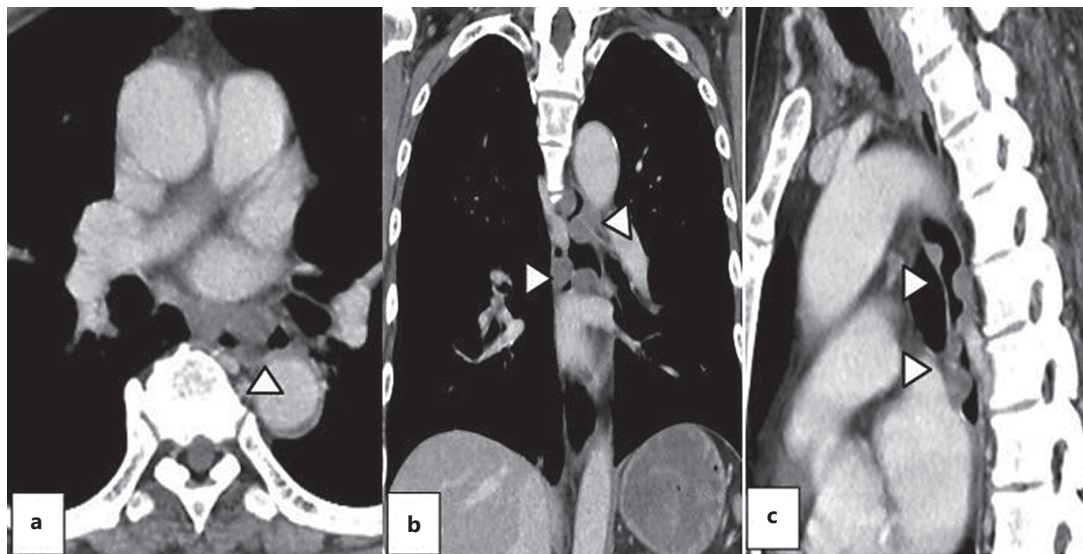


Fig. 1. Contrast-enhanced CT, axial (a), coronal (b), and sagittal (c), showing multiple, smoothly margined, homogeneous, nonenhancing masses (arrowheads) in the middle to lower esophagus.

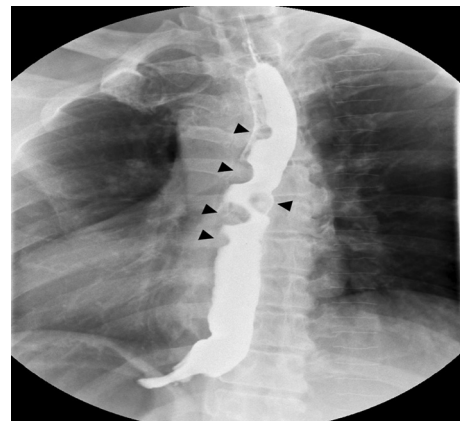


Fig. 2. Barium esophagogram illustrating multiple, well-defined, smooth, semilunar filling defects along the middle to distal thoracic esophagus (arrowheads).

some of the tumors connected to others in a horseshoe-like shape. A fine-needle biopsy was performed (shown in Fig. 3B).

The high-resolution esophageal manometry demonstrated adequate relaxation of the lower esophageal sphincter when swallowing (median integrated relaxation pressure of supine and upright swallows was 8.6 and 7.0 mm Hg, respectively). However, 100% of wet swallows showed weak peristalsis (distal contractile integral [DCI] ranging from 132.4 to 447.8 mm Hg), with a lack of a contraction reserve on the multiple rapid swallow (MRS) phase (MRS-DCI: averaged DCI-wet swallows = 0.4) (shown in Fig. 4). These findings indicated a conclusive diagnosis of ineffective esophageal motility (IEM) according to Chicago classification version 4.0 [6]. The authors attributed this to the effect of the infiltrative tumors in the muscular layer of the middle to distal part of the esophagus.

The histopathology study revealed a spindle cell tumor. Immunohistochemistry results were positive for SMA and desmin but negative for C-kit, which confirmed the diagnosis of esophageal leiomyoma (shown in Fig. 5). The patient was advised to undergo several lifestyle modifications, especially concerning his diet, and was informed of how his symptoms would

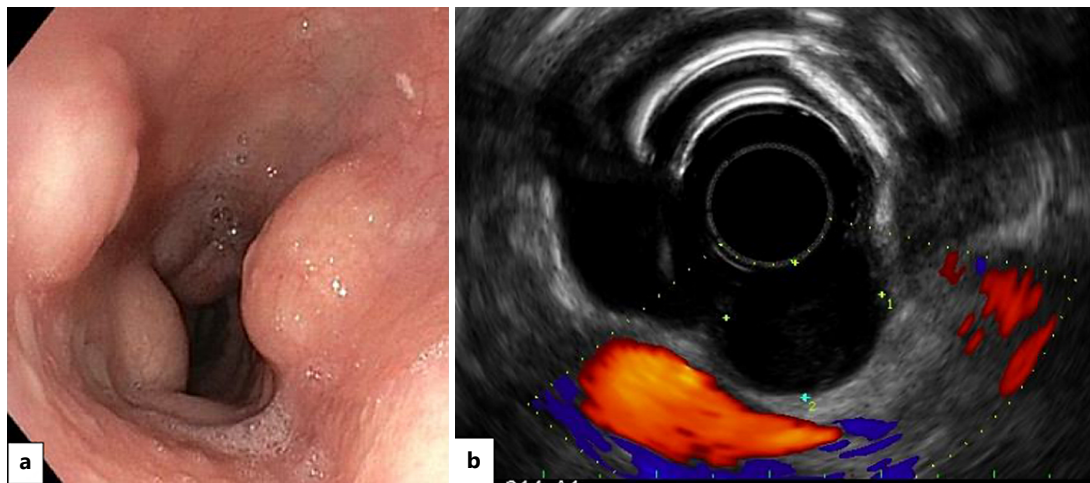


Fig. 3. EGD (**a**) showing 8 smooth subepithelial masses varying between 1.0 and 2.0 cm in size, which occupied 50% of the esophageal lumen with the minimal residual esophageal diameter of 12 mm, covered with intact mucosa, and located at 25–35 cm from the incisors. Radial EUS (**b**) showing multiple hypoechoic masses varying 1–1.5 cm in size (number >10 lesions), arising from the 4th layer of the esophageal wall without calcification or intramural cystic degeneration, with some of the tumors connected to others showing horse-shoe-like shape. EGD, esophagogastroduodenoscopy; EUS, endoscopic ultrasonography.

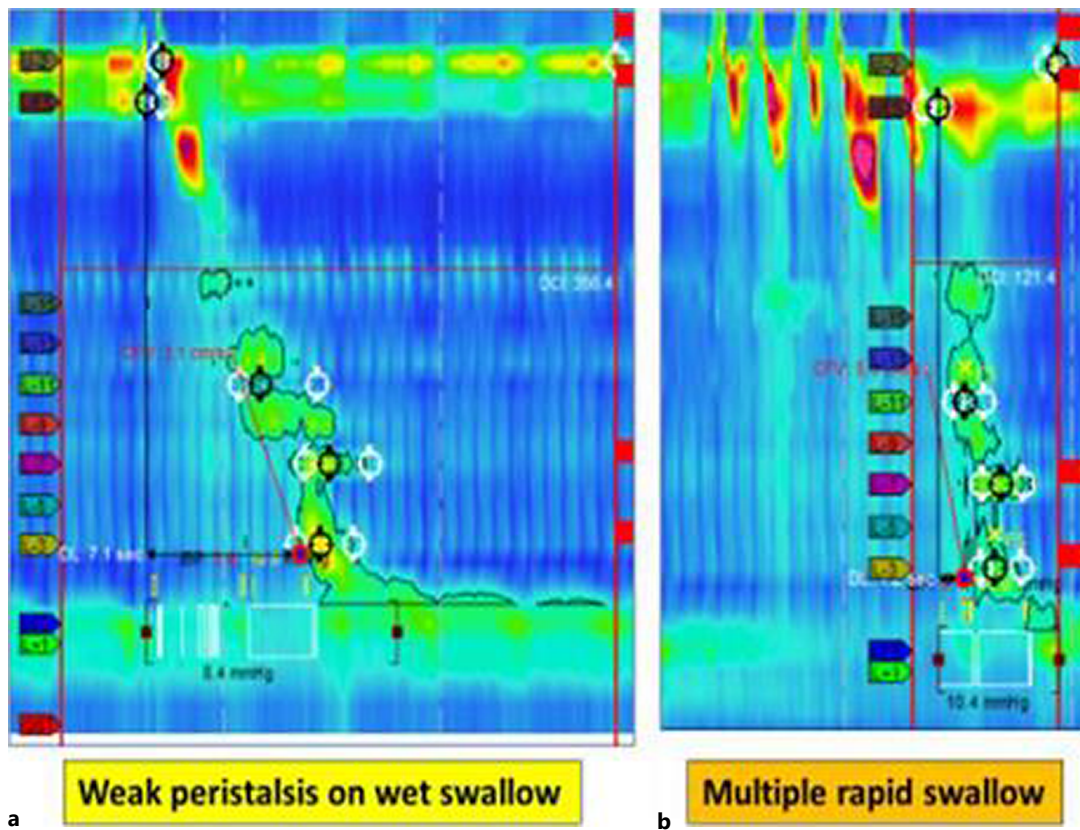


Fig. 4. **a** A weak peristalsis on wet swallow, and **b** the absence of a contraction reserve after MRS. MRS, multiple rapid swallow.

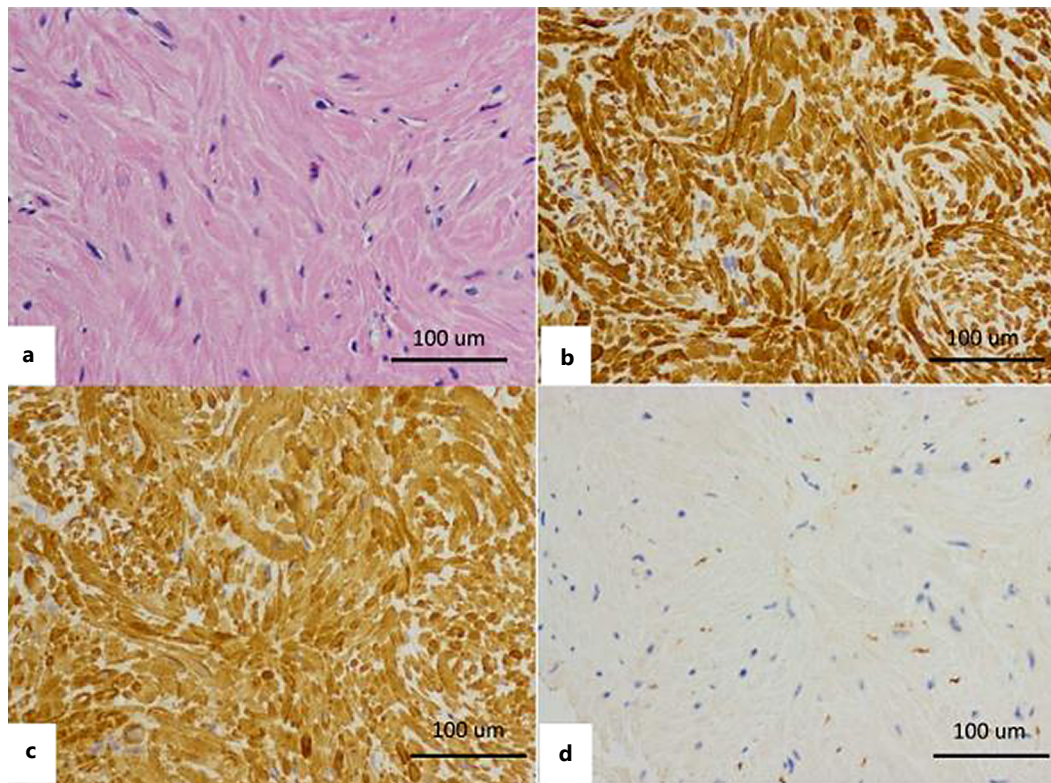


Fig. 5. Histopathological studies from EUS-FNB. **a** H&E stain showing monotonous spindle cells with blunt-ended nuclei and minimal cellular atypia. No mitosis or necrosis is identified. **b** Positive for desmin. **c** Positive for SMA. **d** Negative for C-kit (scale bar, 100 µm). EUS, endoscopic ultrasonography.

be treated in regard to esophagectomy as a treatment option if the tumors progressed in size or the symptoms persisted.

Discussion

Esophageal leiomyoma is uncommon. It is the most common benign tumor of the esophagus accounting for 0.4% of esophageal neoplasms and approximately two-thirds of benign esophageal tumors. About 90% of them are reported to be solitary and intramural lesions, and multiple or diffuse lesions seem to be very rare [7]. These tumors originate from the smooth muscle in the muscular layer of the esophagus. They are located mainly in the middle to distal esophagus and are uncommon in the upper third of the esophagus where the muscular layer consists of predominantly skeletal muscle [8]. Reported incidences in the upper, middle, and lower third of the esophagus are 10%, 40%, and 50%, respectively. Leiomyoma is mainly a solitary tumor; multiple tumors commonly comprise <5 tumors, as identified in 2.4% of reported cases [9]. Furthermore, multiple leiomyoma is difficult to differentiate from diffuse esophageal leiomyomatosis.

Fernandes et al. [10] classified diffuse esophageal leiomyomatosis into 2 types. The first type was described as a condition involving a diffuse thickening of the esophageal musculature without any discrete lesion that may be associated with hereditary visceral leiomyomatosis (dominant inherited) and Alport syndrome (eye abnormalities, sensorineural hearing loss, myopia, and nephropathy; X-linked AS) [11, 12]. The diagnosis of diffuse leiomyomatosis type I includes the clinical features of multiple-site tumors as well as genetic testing for Alport

syndrome or type IV collagen mutation (*COL4A5* gene) [13]. The presentation of this type is associated with progressive dysphagia, and both of its radiologic imaging and esophageal manometry findings mimic those of achalasia. In terms of the second type, the lesion consists of many confluent leiomyoma nodules surrounding the esophageal lumen [10].

Here, we report a case of multiple esophageal leiomyoma without clinical syndrome of diffuse esophageal leiomyomatosis. A male patient presented with clinical esophageal dysphagia. The endoscopic ultrasonography showed 8 subepithelial masses arising from the 4th layer of the esophageal wall and some of them connected to others giving the appearance of a horseshoe shape. Histopathology revealed leiomyoma, which was also confirmed by immunohistochemistry. This tumor is commonly an asymptomatic incidental finding. Symptomatic patients, however, present with dysphagia, epigastrium pain, and regurgitation. Dysphagia seems to be present when the tumor has grown >5 cm, regardless of the number of tumors, and usually when it is an intraluminal rather than an intramural growth.

In our case, the cause of dysphagia in this patient was obviously due to mechanical obstruction even though each tumor's size was <5 cm. Meanwhile, the lesions were multiple intramural masses with some of them connected in a horseshoe-like shape causing narrowing of the lumen. On the other hand, that might be superimposed by the effect of IEM. The high-resolution esophageal manometry revealed IEM according to Chicago classification. Therefore, we deduced the motility dysfunction to be the effect of the infiltrative process of the tumors in the muscular layer of the esophagus. We report the first case of this association. However, previous case reports have shown an absence of contractility, esophagogastric junction outflow obstruction, or pseudoachalasia patterns, respectively [14–16]. In addition, no external compression was observed on the CT scan. Our patient had no clinical features of Alport syndrome or any family history of diffuse esophageal leiomyomatosis.

The definitive treatment for symptomatic esophageal leiomyoma is surgical management, that is, esophagectomy. In addition, the ineffective motility disorder can be treated with lifestyle modification or prokinetic agents [17]. After discussing the treatment options with the patient, he opted for supportive treatment as well as lifestyle and diet modification. At the 3-month follow-up, both his symptoms and body weight had improved significantly. However, the patient was also made aware that if the tumors progressed in size or the symptoms persisted, he could consider surgical management.

We report a rare case of numerous esophageal leiomyoma causing dysphagia symptoms due to both mechanical obstruction and motility disorder. The endoscopic ultrasound showed a horseshoe-shaped leiomyoma, and histopathology study confirmed the diagnosis of esophageal leiomyoma. The patient's symptoms improved significantly after some lifestyle modifications and adherence to the dietary advice he received.

Acknowledgments

The authors would like to thank Professor Teerha Piratvisuth, Head of NKC Institute of Gastroenterology and Hepatology, for the support. Moreover, they also thank Mr. Geoffrey Cox, native speaker, for proofreading the English language of the manuscript.

Statement of Ethics

This study protocol was reviewed and approved by the Ethics Committee of the Faculty of Medicine, Prince of Songkla University, Approval No. (REC.64-260-14-3), and written informed consent was obtained from the patient for publication of the details of his medical

case and any accompanying images. This committee adheres to the ethical principles of the Declaration of Helsinki and the International Conference on Harmonization in Good Clinical Practice.

Conflict of Interest Statement

The authors declare they have no conflicts of interest.

Funding Sources

This manuscript did not receive any funding.

Author Contributions

T.W. and T.P. were responsible for the study concept and design, data collection, and drafting of the manuscript. T.W. and T.P. reassessed the contents and English grammar of the manuscript. S.K. performed and collected the data of esophageal manometry. K.C. and S.N. interpreted the radiological imaging, and P.W. collected and reported histopathological data from EUS-FNB. All authors read and approved the final manuscript.

Data Availability Statement

Due to ethical restrictions, the raw data related to this study are available upon request to the corresponding author.

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