CASE REPORT

Esophageal Leiomyosarcoma Diagnosed by Endoscopic Ultrasound-guided Fine-needle Aspiration Biopsy and Cured with Surgical Resection

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Abstract:
Esophageal leiomyosarcomas are rare. We herein present the case of an 82-year-old patient who underwent upper gastrointestinal endoscopy, which revealed a submucosal tumor of 30 mm in diameter that was in contact with the esophagus. Endoscopic ultrasound-guided fine needle aspiration biopsy was performed and the histopathological findings indicated esophageal leiomyosarcoma. Surgical resection was performed. On histopathological examination, the tumor was found to consist of spindle cells with deep chromatin nuclei. The tumor was finally diagnosed as esophageal leiomyosarcoma. We were able to diagnose early-stage esophageal leiomyosarcoma using endoscopic ultrasound-guided fine-needle aspiration biopsy (EUS-FNA). EUS-FNA is mostly recommended as a diagnostic tool for esophageal submucosal tumors.

Key words: endoscopic ultrasound-guided fine-needle aspiration biopsy, esophageal leiomyosarcoma

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Introduction

Leiomyosarcomas of the esophagus are rare, accounting for approximately 0.1-0.5% of malignant esophageal tumors (1, 2). A preoperative pathological diagnosis is difficult to make because leiomyosarcomas originate from the muscle layers. However, a few previous studies reported on leiomyosarcomas that were diagnosed before treatment. We herein report a case of leiomyosarcoma of the esophagus that was diagnosed by endoscopic ultrasound-guided fine-needle aspiration biopsy (EUS-FNA) and cured by surgical resection.

Case Report

An 82-year-old man visited our hospital due to high fever and epigastric pain. He had been treated for chronic renal failure due to nephrosclerosis. He was a smoker and had a habit of drinking alcohol every day. A laboratory examination revealed liver dysfunction, bilirubinemia, and an increased inflammatory response. The patient’s white blood cell count (WBC) was 9,700/μL and his C-reactive protein (CRP) level was 11.58 (Table).

Abdominal CT revealed a central biliary duct (CBD) stone and a tumor located in the posterior mediastinum. The tumor was approximately 3 cm in size and was in contact with the esophagus (Fig. 1). He was diagnosed with cholangitis caused by a CBD stone and underwent endoscopic sphincterotomy (EST). No adverse events occurred during EST. Esophagoscopy revealed a submucosal tumor of approximately 30 mm in diameter on the posterior side of the lower esophagus, 35 cm from the incisors (Fig. 2). Endoscopic ultrasonography (EUS) revealed a mosaic-echo-patterned tumor of approximately 30 mm in diameter that originated from the muscularis propria (Fig. 3), and rich
vascularity in the tumor was detected in color Doppler mode. The differential diagnoses of submucosal tumors include gastrointestinal stromal tumor (GIST), leiomyoma, and leiomyosarcoma. The EUS findings of leiomyosarcoma include cystic spaces and irregular tumor margins, while the EUS findings of GIST include an inhomogeneous and anechoic or high echo pattern. On the other hand, leiomyomas show a homogenous echoic pattern on EUS (3, 4). Thus, the tumor in our case was considered to be leiomyosarcoma or GIST. EUS-FNA was subsequently performed. A histopathological examination revealed spindle cells with irregular nuclei (Fig. 4), and immunohistochemical staining showed

Table. Laboratory Examination Results on Admission.

| Parameter          | Value                  |
|--------------------|------------------------|
| pH                 | 6.0                    |
| Protein (2+)       | 5.9 g/dL               |
| Glucose (1+)       | 3.1 g/dL               |
| O.B. (1+)          | 2.94 mg/dL             |
| Bilirubin (1+)     | 1.85 mg/dL             |
| Ketone body (-)    | 591 U/L                |
| LD                 | 275 U/L                |
| Complete blood count |                       |
| WBC    | 9,700 /µL              |
| Neu    | 82 %                   |
| Lymph  | 9.2 %                  |
| Eos    | 0.1 %                  |
| RBC    | 366×10^12 /µL          |
| Hb     | 12.4 g/dL              |
| HT     | 34.0 %                 |
| Plt    | 17.6×10^4 /µL          |
| AlkP   | <0.01 IU/mL            |
| AlkA   | <0.1 mIU/mL            |
| Hb    | 0.13 S/CO              |

Alb: albumin, ALT: alanine aminotransferase, AST: aspartate aminotransferase, CK: creatinine kinase, Cl: chloride, CRP: c-reactive protein, Eos: eosinophil, γ-GTP: gamma-glutamyl transpeptidase, Hb: hemoglobin, HBs-Ag: hepatitis B surface-anti, HBs-Ab: hepatitis B surface-antibody, HCV-Ab: hepatitis C virus-antibody, HT: hematocrit, K: potassium, LD: lactate dehydrogenase, lymph: lymphocyte, Na: sodium, Neu: neutrophil, O.B.: occult blood, Plt: platelet, T-bil: total bilirubin, TP: total protein, RBC: red blood cell count, WBC: white blood cell count

**Figure 1.** Computed tomography showed wall thickening of the esophagus (arrowheads).

**Figure 2.** Endoscopy showed a submucosal tumor in the esophagus, with no mucosal change.

**Figure 3.** Endoscopic ultrasonography (frequency, 7.5 MHz) showed that the submucosal tumor located in the muscularis propria (arrowheads) had a heterogeneous appearance and rich vascularity.
that the tumor cells were positive for caldesmon, desmin, and α-smooth muscle actin (α-SMA), but negative for c-kit, CD34, S-100, and anti-pan cytokeratin antibody (AE1/AE3). The Ki-67 index was 50-60% (Fig. 5). The histopathological findings indicated an esophageal leiomyosarcoma. Surgical resection revealed a tumor of 35×30 mm in size that was white and light pink in color (Fig. 6). A histopathological examination revealed that the tumor consisted of spindle cells with deep chromatin nuclei. The immunohistochemistry findings of the surgically resected tumor were in line with the EUS-FNA findings. The patient was finally diagnosed with an esophageal leiomyosarcoma.

**Discussion**

We reported a case in which esophageal sarcoma could be diagnosed by EUS-FNA. Malignant mesenchymal lesions are classified into eight pathologic diagnoses. Leiomyosarcomas are reported to account for up 8.4% of malignant mesenchymal lesions (5). Esophageal leiomyosarcomas are the most common malignant sarcomas. Suzuki et al. reported that esophageal leiomyosarcomas are extremely rare, with a reported incidence rate of 0.17% among all resected esophageal malignant tumors (6). The preoperative diagnosis of esophageal leiomyosarcomas is very rare; only 20-30% of esophageal leiomyosarcomas are diagnosed before surgery. This is a rare case of an esophageal leiomyosarcoma that was diagnosed by EUS-FNA before surgical resection. To date approximately 200 cases of leiomyosarcomas of the esophagus have been reported (2, 7-11). However, only two cases were diagnosed before treatment by EUS-FNA (12, 13). The tumor sizes in those cases were 14.5 cm and 9 cm, respectively. However, the tumor in our case was 3.5 cm in size, and was smaller than the tumors in the two other cases. Our case is the first report to describe the diagnosis of a leiomyosarcoma of the esophagus of <4 cm in size by EUS-FNA. EUS-FNA is a useful method for diagnosing gastrointestinal submucosal tumors (4) in general. The accuracy rate of EUS-FNA in the diagnosis of gastrointestinal submucosal tumors in the esophagus was reported to be 52.3-100% (14, 15), while that in the stomach was reported to be 92.2-92.7% (16, 17). EUS-FNA is considered a safe procedure, with an adverse event rate of 0.5%. There is only one reported case of patient who developed streptococcal sepsis with high fever and abdominal pain after EUS-
The principal symptoms of esophageal leiomyosarcomas include dysphagia, body weight loss, difficulty in swallowing food, cough, upper gastrointestinal hemorrhage, emesis, epigastric pain, and back pain (8, 11, 22, 23). The mean tumor size of esophageal leiomyosarcomas was previously reported to be 86.5 mm (11, 24, 25) and the development of symptoms was considered to be associated with an enlarged tumor that occupying the esophageal lumen. Although the patient had epigastric pain due to a CBD stone, no symptoms related to the esophageal tumor were recognized due to the small size of the tumor. The rate of recurrence in patients with leiomyosarcoma is reported to be 39-64% (2, 10, 11), and the sites of recurrence are reported to include the liver, lungs, and brain (2). The 5-year overall survival rate is reported to be 35-58% (2, 11, 26). The 5-year overall survival rate of patients with stage I and II diseases was reported to be 90-96.15% (20, 21). On the other hand, the procedure requires ESD technique, and the severe adverse events such as a pneumomediastinum and bleeding were reported (21).

In conclusion, the prognosis of early-stage esophageal leiomyosarcoma is relatively good, and EUS-FNA is mostly recommended as a diagnostic tool for esophageal submucosal tumors.

The authors state that they have no Conflict of Interest (COI).

References

1. Almeida JM. Leiomyosarcoma of the esophagus. Chest 81: 761-763, 1982.
2. Rocco G, Trastek VF, Deschamps C, Allen MS, Miller DL, Pairolero PC. Leiomyosarcoma of the esophagus: results of surgical treatment. Ann Thorac Surg 66: 894-896; discussion 7, 1998.
3. Palazzo L, Landi B, Cellier C, Cuillerier E, Roseau G, Barbier JP. Endosonographic features predictive of benign and malignant gastrointestinal stromal cell tumours. Gut 46: 88-92, 2000.
4. Nishida T, Kawai N, Yamaguchi S, Nishida Y. Submucosal tumors: comprehensive guide for the diagnosis and therapy of gastrointestinal submucosal tumors. Dig Endosc 25: 479-489, 2013.
5. Kransdorf MJ. Malignant soft-tissue tumors in a large referral population: distribution of diagnoses by age, sex, and location. AJR Am J Roentgenol 164: 129-134, 1995.
6. Suzuki H, Nagayo T. Primary tumors of the esophagus other than squamous cell carcinoma--histologic classification and statistics in the surgical and autopsied materials in Japan. Int Adv Surg Oncol 3: 73-109, 1980.
7. Camishion RC, Gibbon JH Jr, Templeton JY 3rd. Leiomyosarcoma of the esophagus: review of the literature and report of two cases. Ann Surg 153: 951-956, 1961.
8. Rowley DL, Hill IM. Leiomyosarcoma of the oesophagus presenting as empyema. Br J Surg 68: 112, 1981.
9. Levine MS, Buck JL, Pantongrag-Brown L, Buettow PC, Hallman JR, Sobin LH. Leiomyosarcoma of the esophagus: radiographic findings in 10 patients. AJR Am J Roentgenol 167: 27-32, 1996.
10. Hatch GF 3rd, Wertheimer-Hatch L, Hatch KF, et al. Tumors of the esophagus. World J Surg 24: 401-411, 2000.
11. Zhang BH, Zhang HT, Wang YG. Esophageal leiomyosarcoma: clinical analysis and surgical treatment of 12 cases. Dis Esophagus 7: 547-551, 2014.
12. Stelow EB, Jones DR, Shami VM. Esophageal leiomyosarcoma diagnosed by endoscopic ultrasound-guided fine-needle aspiration. Diagn Cytopathol 35: 167-170, 2007.
13. Ma S, Bu W, Wang L, et al. Radiotherapy treatment of large esophageal leiomyosarcoma: a case report. Oncol Lett 9: 2422-2424, 2015.
14. Baysal B, Masri OA, Eloubeidi MA, Senturk H. The role of EUS and EUS-guided FNA in the management of subepithelial lesions of the esophagus: a large, single-center experience. Endosc Ultrasound 6: 308-316, 2017.
15. Aoki T, Nakamura T, Oshikiri T, et al. Strategy for esophageal non-epithelial tumors based on a retrospective analysis of a single facility. Esophagus 2018 (Epub ahead of print).
16. Niimi K, Goto O, Kawakubo K, et al. Endoscopic ultrasound-guided fine-needle aspiration skill acquisition of gastrointestinal submucosal tumor by trainee endoscopists: a pilot study. Endosc Ultrasound 5: 157-164, 2016.
17. Okasha HH, Naguib M, El Nady M, et al. Role of endoscopic ultrasound and endoscopic-ultrasound-guided fine-needle aspiration in endoscopic biopsy negative gastrointestinal lesions. Endosc Ultrasound 6: 156-161, 2017.
18. Williams DB, Sahai AV, Aabakken L, et al. Endoscopic ultrasound guided fine needle aspiration biopsy: a large single centre experience. Gut 44: 720-726, 1999.
19. Wiersema MJ, Vilmann P, Giovannini M, Chang KJ, Wiersema LM. Endosonography-guided fine-needle aspiration biopsies: diagnostic accuracy and complication assessment. Gastroenterology 112: 1087-1095, 1997.
20. Tae HJ, Lee HL, Lee KN, et al. Deep biopsy via endoscopic submucosal dissection in upper gastrointestinal subepithelial tumors: a prospective study. Endoscopy 46: 845-850, 2014.
21. Lee HL. Advances in the management of upper gastrointestinal subepithelial tumor: pathologic diagnosis using endoscopy without endoscopic ultrasound-guided biopsy. Clin Endosc 49: 216-219, 2016.

22. Koga H, Iida M, Suekane H, et al. Rapidly growing esophageal leiomyosarcoma: case report and review of the literature. Abdom Imaging 20: 15-19, 1995.

23. Jutley RS, Gray RD, MacKenzie JM, Cockburn JS. A leiomyosarcoma of the oesophagus presenting incidentally without dysphagia. Eur J Cardiothorac Surg 21: 127-129, 2002.

24. Ravini M, Torre M, Zanasi G, Vanini M, Camozzi M. Endoscopic diagnosis of leiomyosarcoma of the esophagus, a rare neoplasm. Diagn Ther Endosc 5: 49-52, 1998.

25. Wang WX, Gaurav D, Wen L, et al. Pediatric esophageal leiomyosarcoma: a case report. J Pediatr Surg 46: 1646-1650, 2011.

26. Wu GX, Ituarte PH, Paz IB, Kim J, Raz DJ, Kim JY. A population-based examination of the surgical outcomes for patients with esophageal sarcoma. Ann Surg Oncol 22 (Suppl): S1310-S1317, 2015.

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