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A Case of Gastrointestinal Stromal Tumor That Underwent Endoscopic Ultrasound-Guided Aspiration with a 25-Gauge Biopsy Needle

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Keywords
KIT · CD117 · CD34 · Ki-67 · Color Doppler · Submucosal tumor

Abstract
Endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) is performed to obtain specimens for pathological analysis. For this procedure, 19-gauge (19G), 22-guage (22G), and 25-guage (25G) needles are available. The needles are classified into aspiration type and biopsy type. A 56-year-old woman underwent upper gastrointestinal endoscopy that showed a 38-mm-diameter submucosal tumor. The elevated lesion was diagnosed as a submucosal tumor of the stomach. Contrast-enhanced computed tomography showed a low-density area on the luminal surface of the gastric wall, which was covered with a thin layer of gastric mucosa. EUS showed a hypoechoic lesion in the submucosal layer. Color Doppler image showed a pulsating vascular signal extending into the center of the hypoechoic lesion from the periphery. EUS-FNA was performed with a 25G biopsy needle. The specimen tissue consisted of

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spindle-shaped cells. The cells were positive for CD117 and CD34. The submucosal tumor was diagnosed as a gastrointestinal stromal tumor.

Introduction

Gastrointestinal stromal tumor (GIST) is a gastric submucosal tumor (SMT), originating from the interstitial cells of Cajal. Around 40% of GISTs occur in the stomach. Gastric GIST is treated with surgery, including laparoscopy, endoscopic mucosal resection, or endoscopic submucosal dissection, and imatinib is also used for the treatment of GIST [1].

For appropriate treatment, prompt and precise diagnosis of GIST is essential. There are several markers that are useful for the diagnosis of GIST, such as CD34, CD117, and Ki-67 [2]. KIT gene mutation is a feature of GIST, and patients with GIST, along with KIT gene mutation, have a poor prognosis [3]. CD34, a marker of hematopoietic progenitor cells, is expressed in GIST [2]. Ki-67 is involved in cell proliferation, and its high expression correlates with poor prognosis of GIST. To exert the above analysis, a sampling of specimens is important.

Endoscopic ultrasound (EUS) is useful for the morphological investigation of gastric GIST [4]. Contrast-enhanced EUS provides more information for the evaluation of gastric SMT [5]. EUS-guided fine needle aspiration (EUS-FNA) enables histological evaluation, leading to the pathological diagnosis of gastric GIST [6]. EUS-FNA has the potential of diagnosing GIST at molecular levels [7]. There are three sizes of needles available for this procedure: 19-gauge (19G), 22-guage (22G), and 25-guage (25G) [8]. Based on the method of specimen collection, the needles are classified into aspiration type and biopsy type [8]. Aspiration needles are used to acquire specimens by aspirating tissues into the lumen of the outer sheath, while biopsy needles are used to cut specimens that are aspirated into the lumen of the needle [9].

Here, we report a case of gastric GIST diagnosed with specimens obtained by EUS-FNA with a 25G biopsy needle.

Case Presentation

A 56-year old woman underwent screening with upper gastrointestinal endoscopy (GIF-XRQ260; Olympus, Tokyo, Japan). Endoscopy showed an elevated gastric mucosa (fig. 1a). The elevated lesion was covered with normal gastric mucosa. The diameter of the elevated lesion was 38 mm. The elevated lesion was diagnosed as a submucosal tumor of the stomach. Contrast-enhanced computed tomography (SOMATOM Emotion 16; SIEMENS, Munich, Germany) was performed for further analysis of the submucosal tumor (fig. 1b). A low-density area was seen on the luminal surface of the stomach. The low-density area was covered with a thin layer of gastric mucosa.

For further investigation of the submucosal tumor, EUS was performed (GF-UCT260; Olympus). A hypoechoic lesion with a clear margin was seen (fig. 2a). The low-echo lesion existed in the submucosal layer. Color Doppler image showed a pulsating vascular signal extending into the center of the low-echo lesion from the periphery. EUS-FNA was performed for pathological evaluation of the submucosal tumor with a 25G biopsy needle (ECHO-HD-25c, Cook Medical Inc., Bloomington, Ind., USA) (fig. 2B). EUS-FNA was completed safely without any complications.

A fragment of tissue was obtained from the clot and was stained using hematoxylin and eosin (fig. 3a). The tissue specimen consisted of spindle-shaped cells. There was a possibility that these spindle-shaped cells were gastrointestinal stromal tumor or leiomyoma cells. Immunostaining was performed for pathological diagnosis. No signal was observed on immunostaining with antit-S100, a marker of nerve cells (fig. 3B) or anti-α smooth muscle actin, a marker of smooth muscle cells (fig. 3c). Approximately 3% of the cells were positive for Ki-67 (fig. 3d). The cells were strongly positive for anti-CD34 (fig. 3e) and anti-CD117 (fig. 3f). The submucosal tumor was diagnosed as GIST. The case was referred to another hospital for treatment.

Discussion

EUS-FNA is an established and relatively safe technique, with virtually no complications [10]. There are two types of needles available for EUS-FNA: aspiration type and biopsy type [8]. One major limitation of EUS-FNA with the aspiration needle is that the acquired specimens are sometimes fragmented and not suitable for pathological analysis such as immunostaining [11]. The 19G biopsy needle is used to cut specimens that are aspirated into the lumen of the needle [9]. This 19G biopsy needle in EUS-FNA can obtain enough specimens for pathological analysis compared to a 22G aspiration needle [12]. Potential complications associated with the used of the 19G biopsy needle are bleeding and perforation [13]. Strand et al. [14] compared the 22G aspiration needle and the 22G biopsy needle. They concluded that the 22G biopsy needle is more suitable to obtain enough specimens for pathological analysis. In our case, the 25G biopsy needle was used. The obtained specimens were adequate for pathological investigation including immunostaining without any complications. Our data suggested that the 25G needle was adequate to obtain specimens for pathological analysis. The 22G or 25G aspiration needle is used for gastric SMTs less than 10 mm in size [15]. It was expected that the 25G biopsy needle would be useful to obtain specimens suitable for pathological analysis, with fewer complications even from a small gastric SMT.

In conclusion, it was found that a 25G biopsy needle was suitable for EUS-FNA of gastric GIST.

Statement of Ethics

This report was approved by the National Hospital Organization Shimoshizu Hospital Ethics Committee. It was not assigned as a clinical trial, but was considered a part of daily clinical practice. Written informed consent for this report was obtained from the patient. Patient records were anonymously and retrospectively analyzed. Written informed consent was obtained for upper gastrointestinal endoscopy, contrast-enhanced computed tomography, EUS, and EUS-FNA.

Disclosure Statement

The authors have no conflicts of interest to declare.

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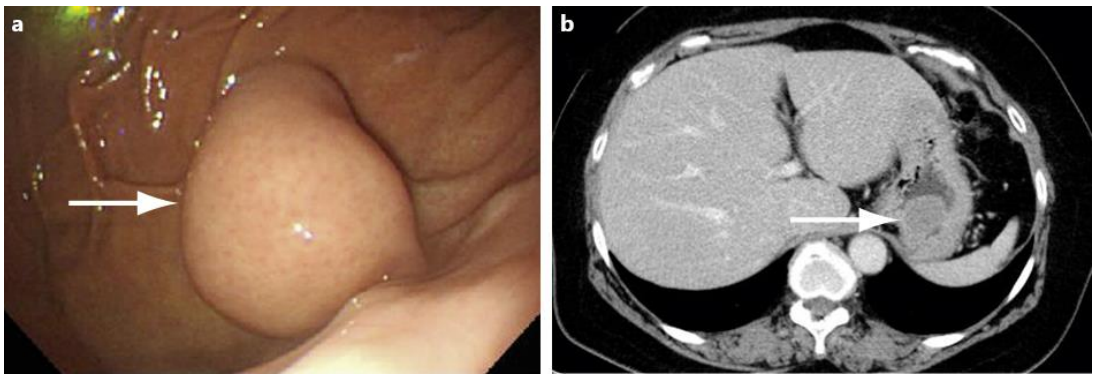

Fig. 1. GIST presenting as a SMT of the stomach. **a** Upper gastrointestinal endoscopy shows a SMT of the stomach, 38 mm in diameter. **b** Contrast-enhanced computed tomography shows a slightly low-density area on the internal surface of the gastric wall compared to that of the adjacent wall.

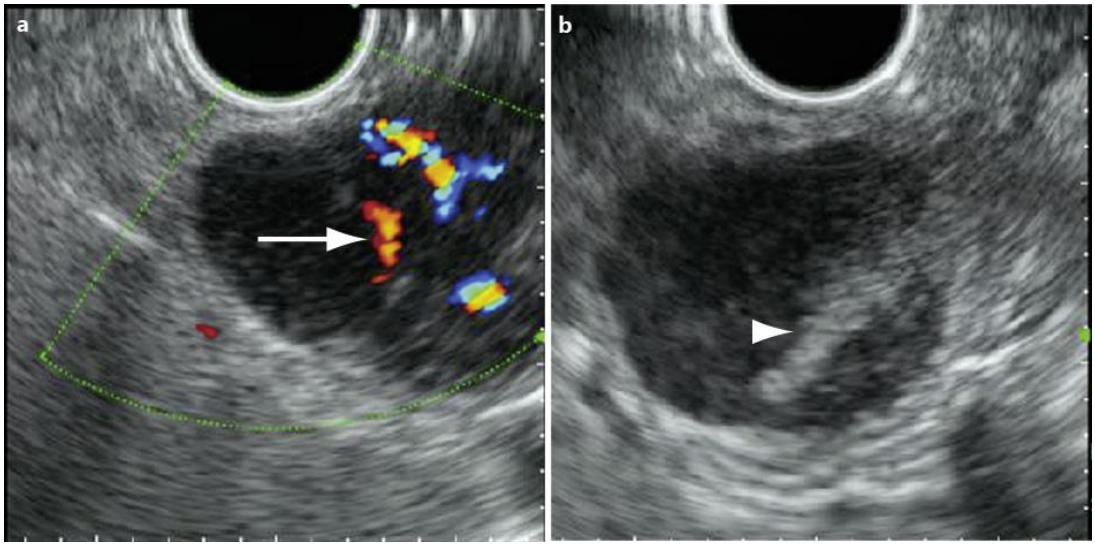

Fig. 2. **a** EUS shows a low-echo lesion, 3.5 cm in diameter. Color Doppler image shows a vascular signal extending into the center (arrow). **b** 22G EUS-FNA was performed (arrowhead).

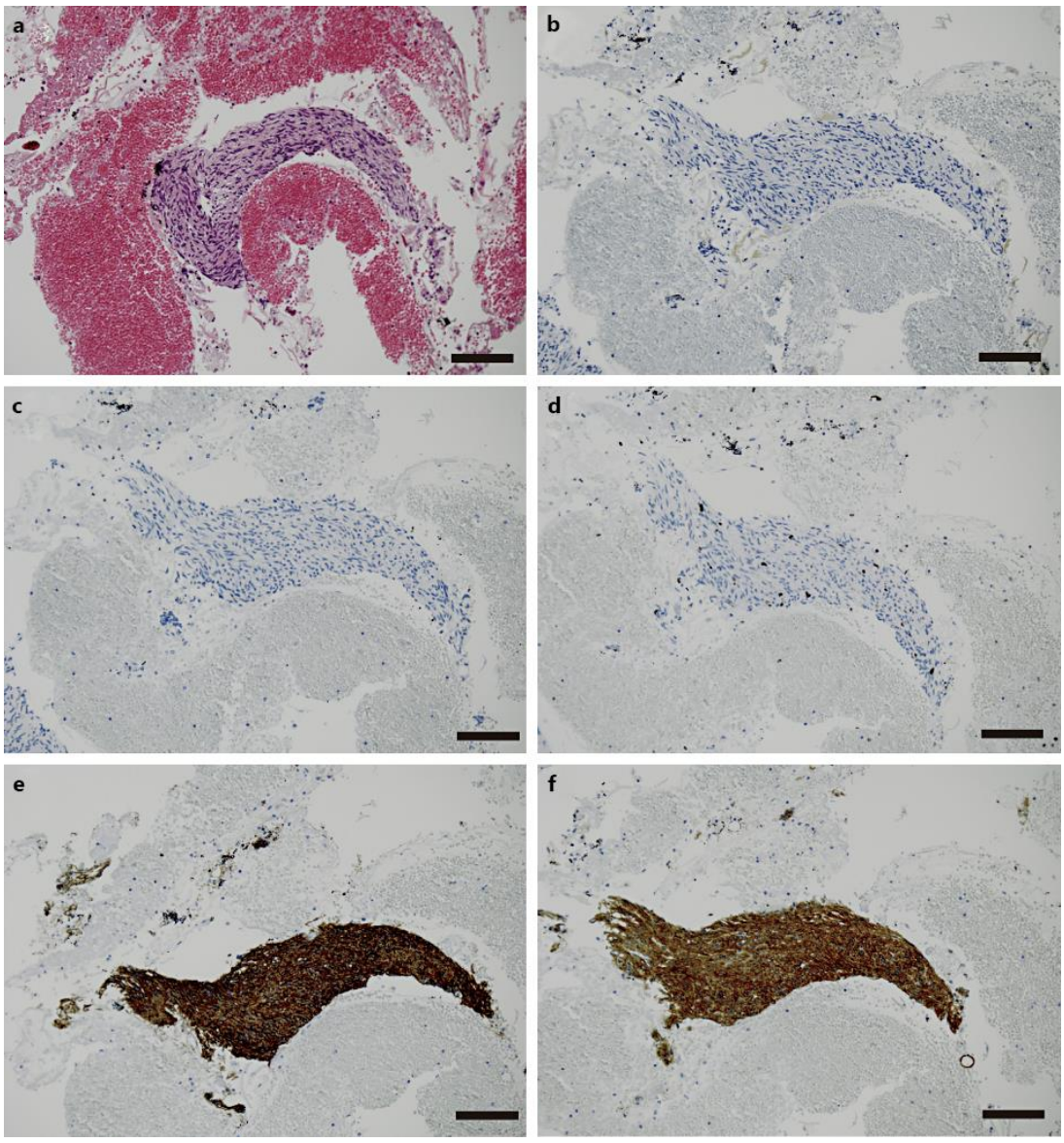

Fig. 3. Histological analysis of EUS-FNA cytology specimens. Hematoxylin and eosin staining (**a**), S100 (**b**), α-smooth muscle actin (**c**), Ki-67 (**d**), CD34 (**e**), CD117 (**f**). Original magnification: ×200. Scale bars = 100 μm.