



Successful diagnosis and endoscopic submucosal dissection of a gastric gastrointestinal stromal tumor originating from the submucosal layer

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A 77-year-old man was introduced to our institution because of a slow-growing gastric subepithelial tumor (SET). Esophagogastroduodenoscopy revealed an SET approximately 2 cm in size in the fundus of the stomach, which was covered with normal smooth mucosa (Fig. 1A). EUS using a 20-MHz miniature probe (UM-3R; Olympus, Tokyo, Japan) showed a uniform hypoechoic lesion, 21.4 mm in size, in the third layer of the stomach wall (Fig. 1B). The hypoechoic fourth layer was intact and could be observed below the tumor (Fig. 1C). EUS-FNA was performed (EG-580UT; Fujifilm, Tokyo, Japan) with 22-gauge Acquire EUS FNB needle (Boston Scientific, Marlborough, Mass). The tumor tissue consisted of low-mitotic spindle-shaped cells that were c-kit and CD34 positive but negative for SMA and S100. The SET was thus diagnosed as a gastrointestinal stromal tumor (GIST) originating from the submucosal layer. We planned to resect the tumor with endoscopic submucosal dissection (ESD).

The ESD was performed using a DualKnife J (Olympus) through a multibending endoscope (GIF-2TQ260M; Olympus), and an ST hood Short Type (Fujifilm) was attached to the tip of the endoscope. First, hyaluronic acid solution was injected into the submucosal layer at the anal side of the tumor, and mucosal incision and submucosal dissection then were initiated. Importantly, mucosal incision was not expanded until a stable view of the submucosal layer beneath the tumor was obtained. Af-

ter that, the submucosal layer between the tumor and the muscularis propria layer was carefully dissected. Finally, the GIST was successfully resected en bloc with ESD in 150 minutes; the GIST was 22 mm in size (Fig. 2A and B). The post-ESD ulcer was not endoscopically closed because there was no damage to the muscularis propria, and prophylactic antibiotics were administered for 1 day.

In the microscopic findings, the resected SET originated in the submucosal layer, was covered with a thin layer, and had negative horizontal and vertical margins (Fig. 3A). The final pathological diagnosis was GIST with positive c-KIT (Fig. 3B) and positive CD34 (Fig. 3C). The risk classification was low risk (mitosis: 1-2 mitoses present per 50 high-power fields; MIB-1 index: 4.3%) based on a modified Fletcher classification,¹ and the magnified image also confirmed negative vertical margin with the presence of a thin layer beneath the tumor (Fig. 3D). The patient was discharged without any adverse events on postoperative day 4. No recurrence has been observed on follow-up endoscopy and CT scan after 1 year.

GISTs are thought to originate from interstitial cells of Cajal, which are located in the myenteric plexus of the gastrointestinal tract and regulate peristalsis.² Hence, a GIST commonly originates from the muscularis propria layer and rarely from muscularis mucosae.³ However, a GIST originating from the submucosal layer is extremely rare. In the present case, the resected tumor was located

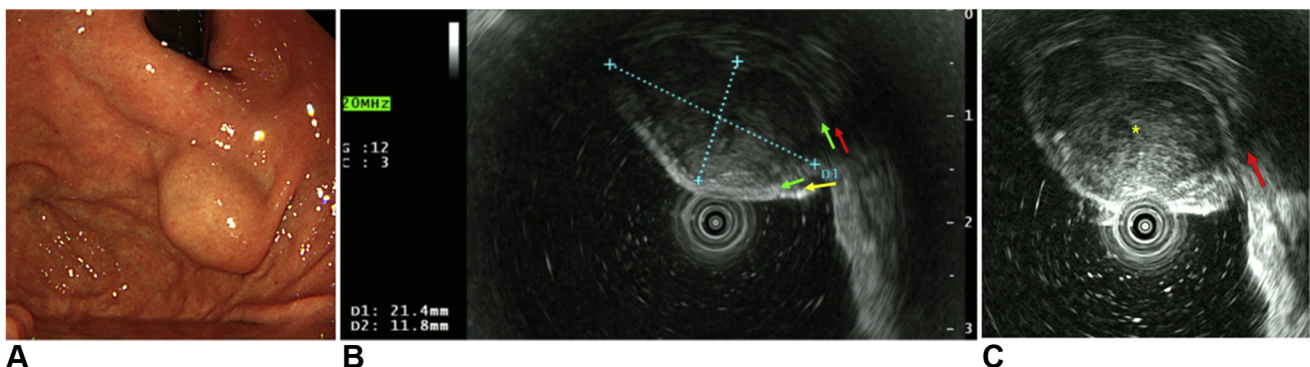


Figure 1. Gastric subepithelial tumor. (A) Endoscopic image shows a subepithelial tumor around 2 cm in size, which was present in the fornix of the stomach. (B, C) Endoscopic ultrasonography showed a hypoechoic lesion in the third layer in the stomach wall. The fourth layer was intact below the low echoic lesion. Yellow arrow, the second layer of the stomach; green arrow, the third layer of the stomach; red arrow, the fourth layer of the stomach; asterisk, tumor.

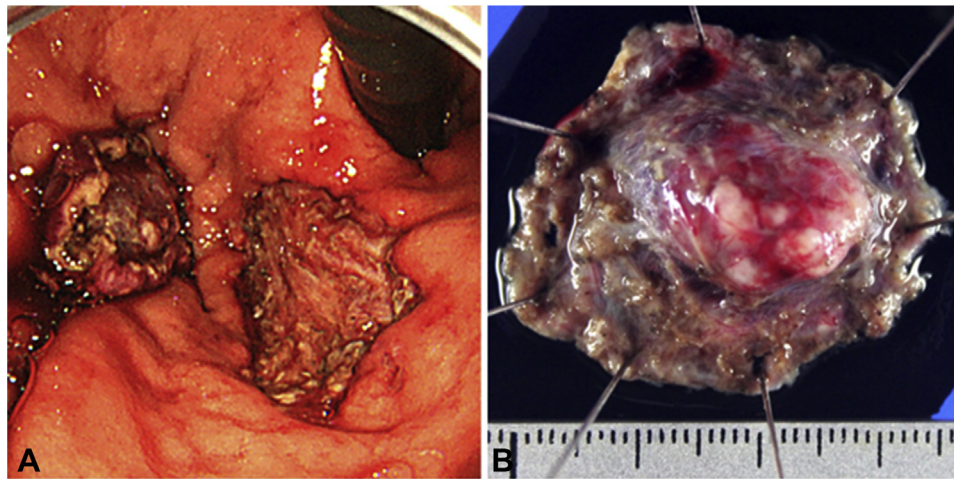


Figure 2. Endoscopic submucosal dissection. **(A)** Endoscopic image post-endoscopic submucosal dissection (ESD). The stomach gastrointestinal stromal tumor was successfully resected en bloc with ESD. No adverse events occurred during ESD. **(B)** Reverse view of the resected tumor. The subepithelial tumor (SET) was successfully removed with a thin capsule. The resected SET was 22 mm in size.

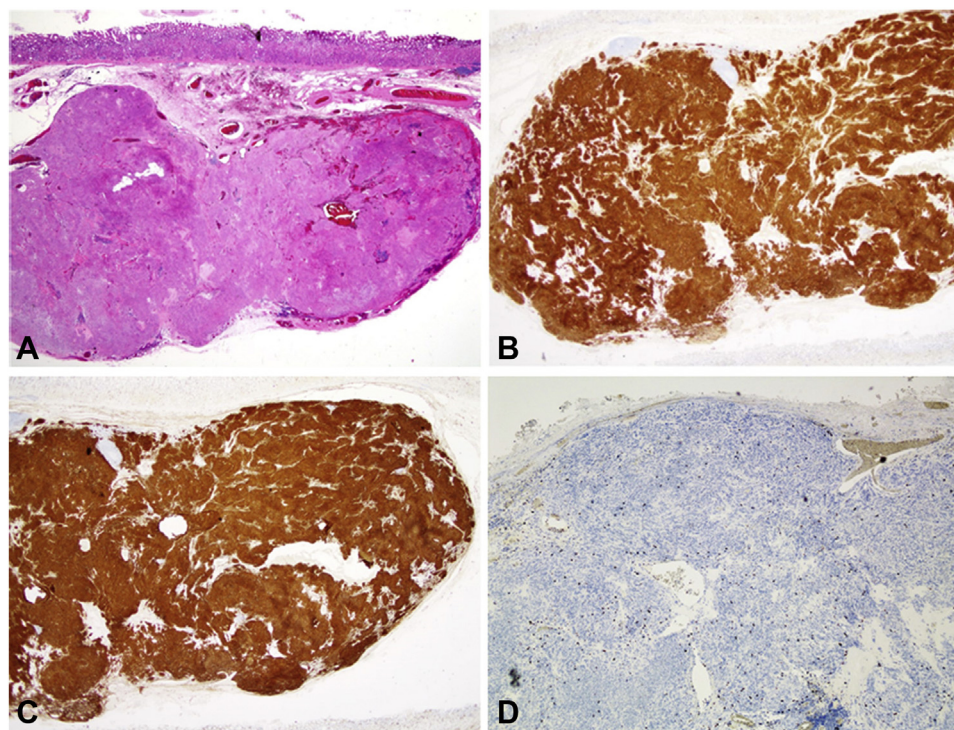


Figure 3. Pathological diagnosis of the resected tumor. **(A)** Microscopic image of the resected tumor. Hematoxylin–eosin staining (orig. mag. $\times 1$). **(B)** c-KIT staining (orig. mag. $\times 1$). **(C)** CD34 staining (orig. mag. $\times 1$). **(D)** MIB-1 staining (orig. mag. $\times 4$).

in the submucosal layer and was connected to neither muscularis propria nor muscularis mucosae. Although exact elucidation is difficult, the origin of this GIST is thought to be aberrant interstitial cells of Cajal in the submucosal layer.

The standard treatment for a localized GIST is surgical resection,⁴ whereas a recently developed alternative option is endoscopic full-thickness resection.⁵ However, ESD is applicable for a GIST limited to muscularis

mucosae and the submucosal layer, as in the present case. ESD is less invasive than surgery and endoscopic full-thickness resection, and it can achieve complete non-exposure to the abdominal cavity without any special materials. Precise diagnosis of tumor localization is thus important to select an optimal therapy for GIST. However, ESD for a GIST should be limited to experienced endoscopists to avoid accidental perforation because it requires a more delicate technique compared to standard ESD.

Although there is no consensus on routine follow-up for low-risk GISTs, we will plan annual endoscopy and CT scan every 6 months for 5 years.⁴

We made an accurate diagnosis pre-ESD with EUS and performed a successful en bloc resection with ESD (Video 1, available online at www.giejournal.org).

DISCLOSURE

All authors disclosed no financial relationships.

Abbreviations: ESD, endoscopic submucosal dissection; GIST, gastrointestinal stromal tumor; SET, subepithelial tumor.

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