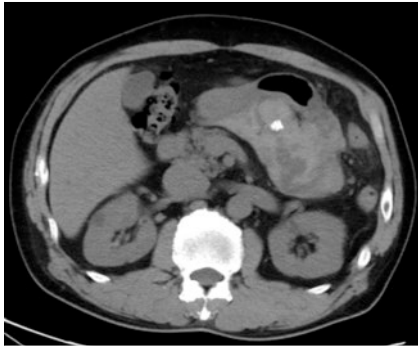


Contrast-enhanced endoscopic ultrasound-guided fine-needle aspiration for a gastric submucosal tumor with surrounding hemorrhage

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► **Fig. 1** Computed tomography image showing a tumor connected with the gastric wall, with possible perigastric hemorrhage.



► **Fig. 2** Endoscopic ultrasound image showing that the tumor connected with the gastric wall could not be detected because of hemorrhage around the stomach.

Endoscopic ultrasound-guided fine-needle aspiration (EUS-FNA) represents a useful and less invasive procedure for procuring pathological specimens from lesions located either in proximity to or within the gastrointestinal wall [1,2]. Contrast-enhanced EUS (CE-EUS) is known to be advantageous for differential diagnosis in various types of tumors, as it provides real-time blood flow images [3]. In this report, we present a patient with a gastric submucosal tumor associated with hemorrhage, in whom CE-EUS-guided FNA (CE-EUS-FNA) had a pivotal role in precisely identifying the lesion and facilitating accurate FNA.



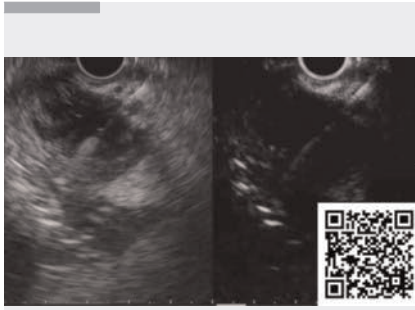
► **Fig. 3** Contrast-enhanced endoscopic ultrasound images showing the 20-mm tumor (arrows), which was connected with the gastric wall.



► **Fig. 4** Contrast-enhanced endoscopic ultrasound images showing fine-needle biopsy (FNB), with a 22-gauge FNB needle, being successfully and accurately performed for the tumor.

A 60-year-old man initially presented with abdominal pain. A computed tomography scan revealed the presence of a tumor on the gastric wall, with possible perigastric hemorrhage (► **Fig. 1**). Subse-

quently EUS-FNA was attempted on the gastric lesion, but EUS failed to detect the tumor because of the hemorrhage surrounding the stomach (► **Fig. 2**). Consequently, CE-EUS was performed,



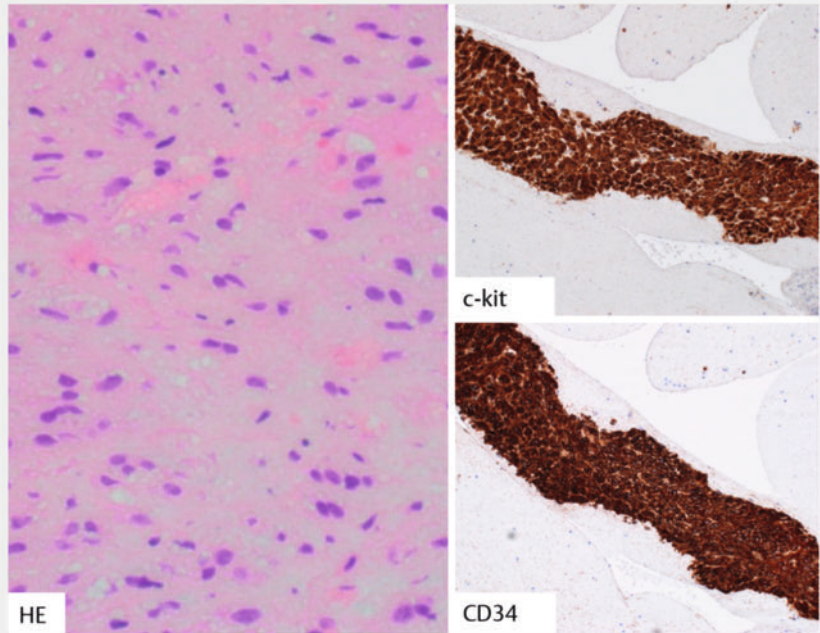
▶ **Video 1** Contrast-enhanced endoscopic ultrasound-guided fine needle aspiration was performed for a submucosal tumor with surrounding hemorrhage.

enabling the identification of a 20-mm tumor that was contiguous with the gastric wall (▶ **Fig. 3**). Subsequent CE-EUS-FNA using a 22-gauge fine-needle biopsy (FNB) needle was performed successfully and precisely (▶ **Fig. 4**; ▶ **Video 1**). No adverse events related to the procedure were recognized.

Pathological examination of the obtained specimens revealed tumor cells characterized by spindle-shaped nuclei with positivity for c-kit and CD34 (▶ **Fig. 5**). These findings were consistent with a diagnosis of gastrointestinal stromal tumor (GIST). Given the presence of intra-abdominal hemorrhage, surgical resection was undertaken following neoadjuvant therapy involving imatinib. The final pathological examination confirmed the diagnosis of a GIST.

Recent studies regarding CE-EUS-FNA for pancreatic lesions have not conclusively demonstrated its superior diagnostic capabilities over B-mode-based EUS-FNA [4, 5]. In this case, however, CE-EUS enabled us to detect the tumor precisely and subsequently to perform precise needle puncture based on real-time perfusion imaging. CE-EUS-FNA could be useful in cases where lesion detection is interfered with by confounding factors such as hemorrhage.

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▶ **Fig. 5** Pathological appearance of the specimen showing tumor cells with spindle-shaped nuclei on hematoxylin and eosin (H&E) staining, and positivity on immunohistochemistry with c-kit (+) and CD34 (+), consistent with a diagnosis of gastrointestinal stromal tumor (GIST).

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Conflict of Interest

The authors declare that they have no conflict of interest.

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