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Gastric Adenocarcinoma Resembling Submucosal Tumor: A Case Report

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Manuscript Preparation E
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Patient: Male, 60-year-old
Final Diagnosis: Poorly differentiated adenocarcinoma
Symptoms: Stomach discomfort
Clinical Procedure: —
Specialty: Gastroenterology and Hepatology

Objective: Unusual clinical course

Background: Gastric cancer with features of submucosal tumor (GCSMT) is extremely rare and often manifested as poorly differentiated or undifferentiated types, including poorly differentiated adenocarcinoma and gastric signet ring cell carcinoma, which are more invasive. Because a GCSMT is almost covered by normal mucosa, it is difficult to diagnose by gastroscopy and easy to misdiagnose as a benign submucosal tumor (SMT). We report a case of poorly differentiated gastric adenocarcinoma exhibiting the features of a SMT.

Case Report: The patient was a 60-year-old man with a chief concern of stomach discomfort for nearly 2 months. Gastroscopy revealed a lesion located at the lesser curvature of the stomach. Endoscopic ultrasonography displayed a 2.0×0.8-cm, well-defined, hypoechoic mass arising from the muscular layer in the stomach wall, suggesting a gastrointestinal stromal tumor (GIST). However, pathologic examination of the specimen removed by endoscopic submucosal dissection (ESD) demonstrated poorly differentiated adenocarcinoma. Therefore, subtotal gastrectomy with lymph node dissection was performed.

Conclusions: Based on our clinical experience, the tumor had the typical characteristics of a GIST in gastroscopy and abdominal computed tomography and was considered to be a GIST. However, the pathological examination revealed poorly differentiated gastric cancer, thereby demonstrating the importance of pathology in making final diagnoses in clinical practice. Clinicians often prioritize a diagnosis of GIST in similar cases of SMT; however, the possibility of gastric cancer should also be considered. Additionally, for SMTs of unclear nature, ESD serves as treatment and provides biopsy tissue for definitive pathological diagnosis.

Keywords: Stomach Neoplasms • Gastrointestinal Stromal Tumors • Case Reports

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Introduction

Submucosal tumors (SMTs) are usually asymptomatic and are often discovered incidentally during routine gastroscopy. Gastric SMTs include a diverse array of benign, potentially malignant, and malignant lesions, including gastrointestinal stromal tumors (GISTs), leiomyomas, neuroendocrine tumors, lipomas, granular cell tumors, varices, duplication cysts, heterotopic pancreas, Brunner gland hamartoma, lymphangiomas, and endometriosis [1]. Gastric cancer with features of submucosal tumor (GCSMT) is generally a protuberant lesion covered with normal mucosa and is exceedingly rare, with a prevalence estimated to be as low as 0.1% to 0.62% of all gastric cancers [2].

Case Report

A 60-year-old man presented to our hospital with a chief concern of stomach discomfort for 2 months. He had no history of *Helicobacter pylori* eradication or any antacid medication, such as proton pump inhibitors. On physical examination, the abdomen was soft and flat with no palpable mass or tenderness. No peripheral lymphadenectasis was observed. Five days prior to admission, the patient received a gastroscopy examination. The result showed a tumor 2.0 cm in diameter located at the lesser curvature of the stomach resembling a SMT, chronic atrophic gastrokeratitis with intestinal metaplasia, duodenal bulbtis, and antral ulcer (**Figure 1**). The tumor was covered by normal gastric mucosa. To clarify the nature of the tumor, the patient further underwent an endoscopic ultrasonography (EUS) examination and ^{13}C-urea breath test. The result of ^{13}C-urea breath test was negative. The EUS displayed a 2.0×0.8-cm, well-defined, hypo-echogenic mass arising from the muscular layer in the stomach wall, which strongly suggested a GIST (**Figure 2**). The patient was then admitted to our internal digestive ward for further endoscopic treatment.

His laboratory parameters were normal, including the tumor markers carcinoembryonic antigen (1.94 ng/mL) and carbohydrate antigen 19-9 (0.73 U/mL). The contrast-enhanced computed tomography (CT) scan also demonstrated a well-circumscribed, exophytic, SMT in the lesser curvature of the upper stomach, which was enhanced at the arterial phase (**Figure 3**).

Based on these findings, endoscopic submucosal dissection (ESD) was performed to resect the tumor (**Figure 4**). The resected specimen was 2.0×2.0 cm in size and a gray-white nodule in the submucosa. Histopathologic examination demonstrated poorly differentiated adenocarcinoma, and Epstein-Barr virus infection in the cancer tissue could not be demonstrated (**Figure 5**). Immunohistochemical staining showed positive expression for cytokeratin (CK), CK7 (partial), CK8/18, caudal-type homeobox 2 (CDX-2) (partial), villin, and Ki-67 (approximately 50%), and negative expression for synaptophysin (Syn), thyroid transcription factor-1 (TTF-1), CD56, CD34 (**Figure 5C**). Because no obvious abnormal tissues or cells were found in the mucosa, and the carcinoma was confined to the submucosa, we speculated that there were no mucosal lesions present. Additionally, histological examination did not reveal any characteristic features typically seen in other conditions, such as mucin aggregation in mucinous adenocarcinoma, lymphocyte infiltration in lymphoepithelioma-like carcinoma, or glandular expansion in the submucosa and muscular layer as seen in gastritis cystica profunda. Therefore, the origin of the tumor was not clear. To clarify whether there was metastasis, the patient then underwent positron emission computed tomography (PET-CT), and the result revealed gastric malignancy. Accordingly, subtotal gastrectomy with regional lymph node

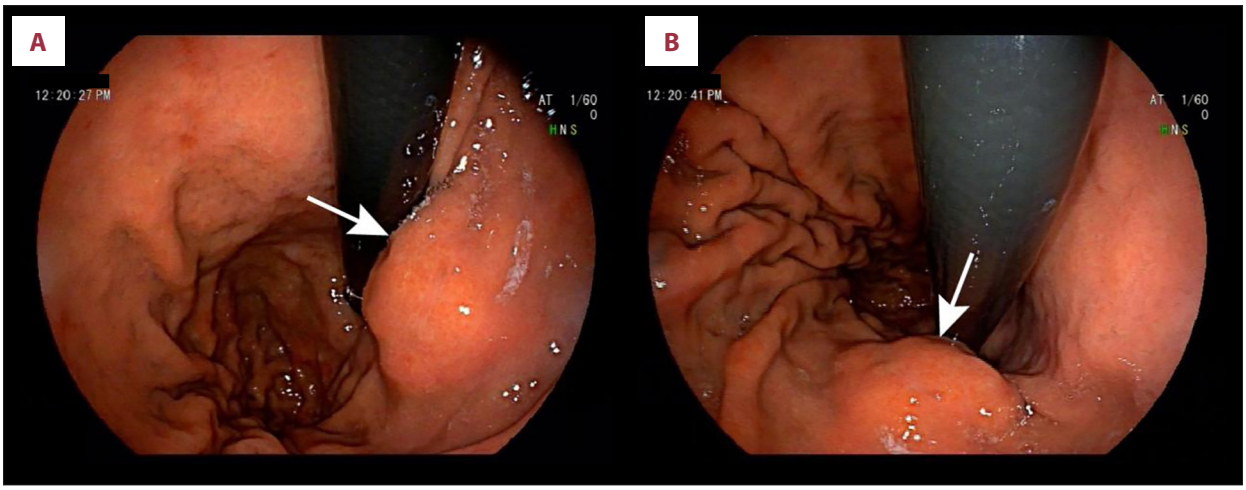

Figure 1. (**A, B**) The upper gastrointestinal endoscopy reveals a prominent lesion, the surface of which was entirely covered by nearly normal gastric mucosa.

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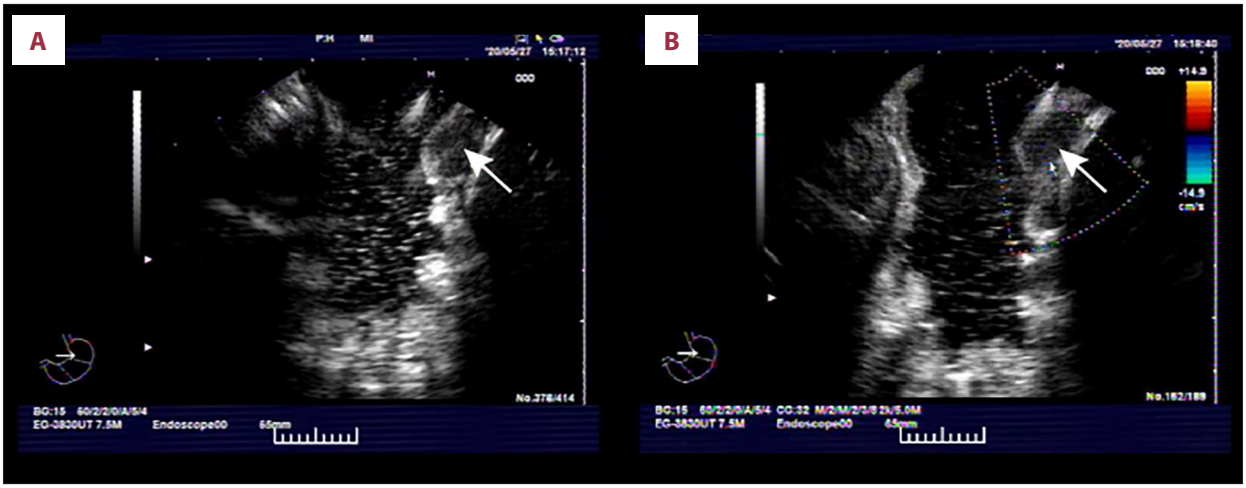

Figure 2. (**A, B**) Endoscopic ultrasonography shows a 2.0×0.8 cm, well-defined, hypoechoic mass arising from the muscular layer in stomach wall.

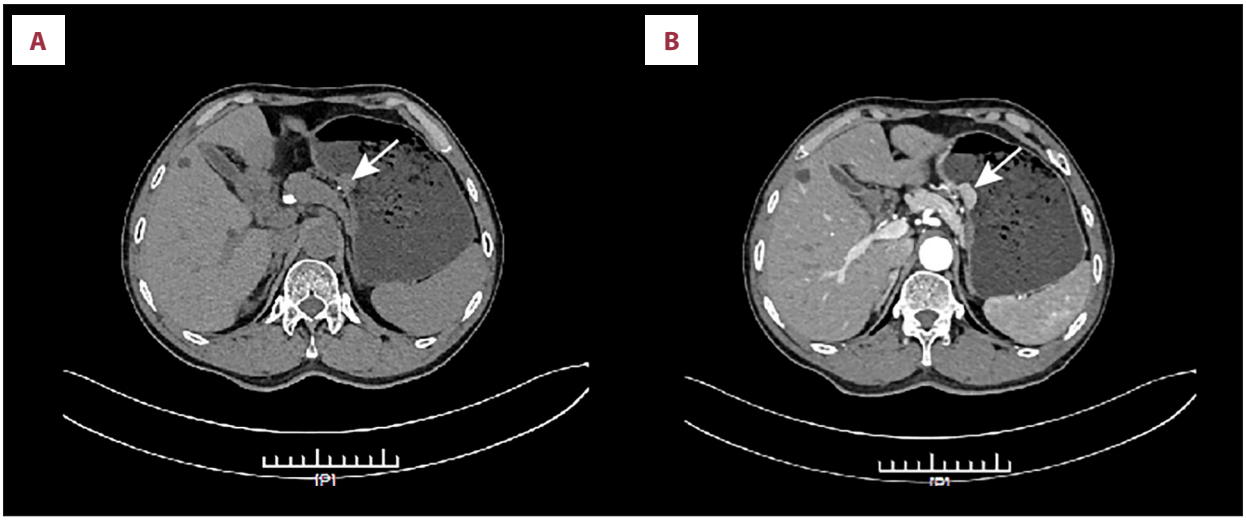

Figure 3. (**A**) Contrast-enhanced computed tomography reveals a well-circumscribed, exophytic, submucosal tumor in the lesser curvature of upper stomach at the venous phase. (**B**) The tumor is shown enhanced at the arterial phase.

dissection was performed. Finally, the postoperative specimen showed firm nodules were palpable in the lesser and greater curvatures of the stomach, and pathology examination confirmed the diagnosis of poorly differentiated adenocarcinoma, with infiltration to the muscular layer. Macroscopic stagings according to the TNM classification was T2N0M0, grade IB [3]. Postoperative pathologic examination revealed the specimen had clear margins, indicating complete resection of the tumor. Moreover, follow-up CT and upper gastrointestinal endoscopy were scheduled for after the surgery.

Discussion

To elucidate the clinical characteristics of GCSMTs, we reviewed 21 cases published in English, including the present case (**Table 1**) [2,4-21]. The cases included 14 male patients (66.67%) and 7 female patients (33.33%), ranging in age from 40 to 81 years, with an average age of 58 years. Five patients (23.81%) had preoperative histological diagnosis established by ESD, and the diagnostic methods mentioned included endoscopic biopsy, endoscopic mucosal resection, ESD, EUS-guided fine needle aspiration (FNA), laparoscopic biopsy, and postoperative biopsy. Histological diagnoses included well-differentiated adenocarcinomas in 19.05% (4/21) of cases, moderately differentiated adenocarcinoma in 4.76% (1/21), poorly differentiated adenocarcinomas in 38.10% (8/21), mucinous adenocarcinomas in 19.05% (4/21), signet ring gastric carcinomas in 9.52% (2/21), and lymphoepithelioma-like gastric carcinomas in 9.52% (2/21). Unexpectedly, more than half of the patients had no obvious clinical symptoms, as their tumors were detected through routine health evaluation.

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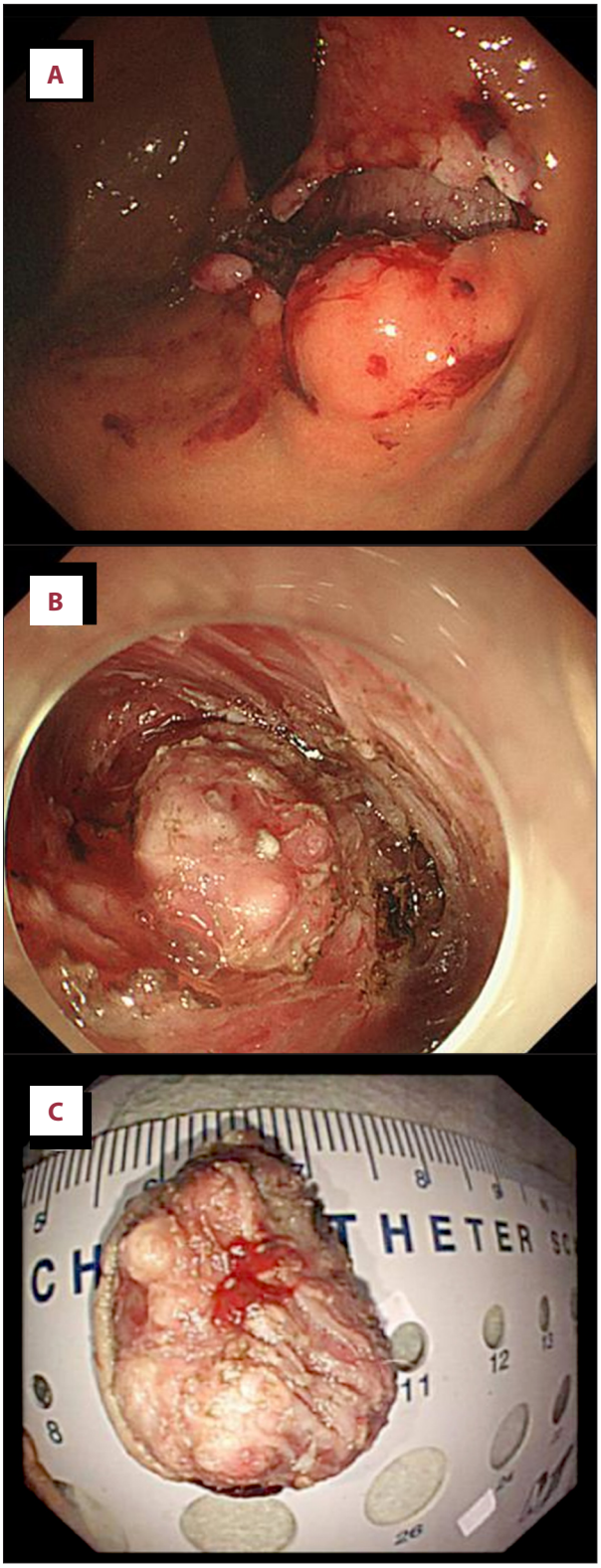

Figure 4. (**A**) The tumor is shown being removed by endoscopic submucosal dissection. (**B**) The tumor was totally removed under endoscopy. (**C**) The resected specimen shows a protruding lesion 2.0 cm in diameter.

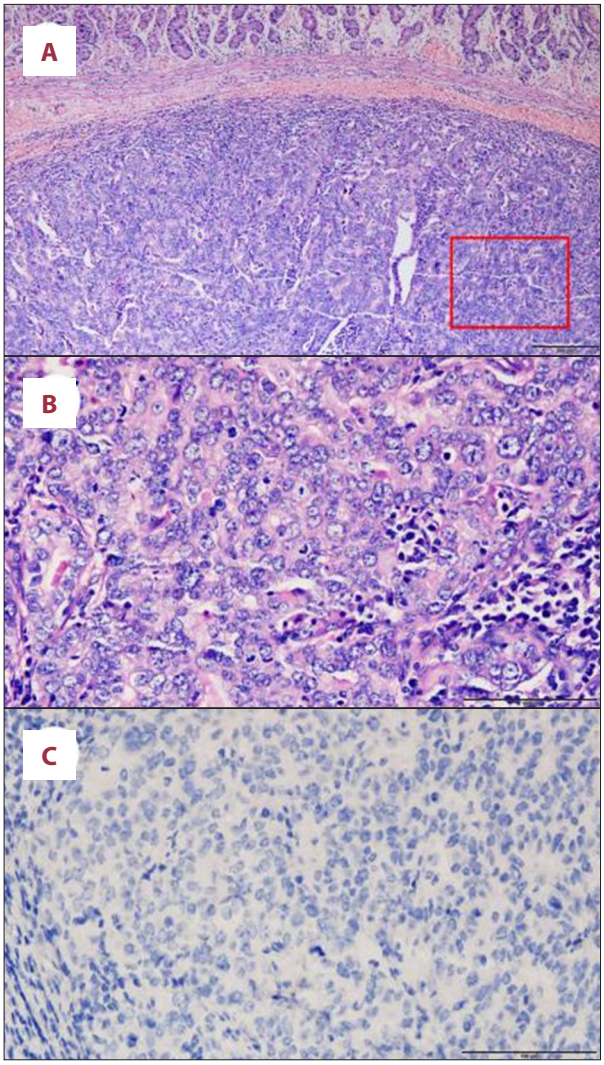

Figure 5. (**A**) Low-power histologic examination revealed most of the cancer cells are covered with noncancerous epithelium (H&E staining, ×100). (**B**) High-power histologic examination shows poorly differentiated adenocarcinoma. The tumor consists of large, polygonal, atypical cell nests (H&E staining, ×400). (**C**) Immunohistochemical staining shows positive expression for cytokeratin (CK), CK7 (partial), CK8/18, caudal-type homeobox 2 (CDX-2) (partial), villin, and Ki-67 (approximately 50%), and negative expression for synaptophysin (Syn), thyroid transcription factor-1 (TTF-1), CD56, CD34, and Epstein-Barr virus in the tumor cells (immunohistochemical staining, ×400).

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Table 1. Previous case reports of gastric cancer with features of submucosal tumor.

Author	Sex	Age	Clinical presentation	Diagnosis	Diagnostic method	Surgery
Umehara [2]	Male	50	Hematemesis	Poorly differentiated adenocarcinoma	Endoscopic biopsy	TG
Ohara [4]	Male	48	Epigastric discomfort	Well differentiated adenocarcinoma	Postoperative biopsy	SG
Kume [5]	Female	49	Epigastric pain	Well differentiated adenocarcinoma	EMR	SG
Fujiyoshi [6]	Female	73	Routine health evaluation	Moderated differentiated adenocarcinoma	Endoscopic biopsy	PG
Takahashi [7]	Male	50	Routine health evaluation	LELC	Laparoscopic biopsy	DG
Teraishi [8]	Male	63	Routine health evaluation	Poorly differentiated adenocarcinoma	Endoscopic biopsy	DG
Ando [9]	Female	65	Anemia and tarry stools	MUC	Laparoscopic biopsy	SG
Kim [10]	Male	66	Dysphagia	MUC	Endoscopic biopsy	TG
Matsumoto [11]	Male	58	Routine health evaluation	Poorly differentiated adenocarcinoma	ESD	Not described
Yoo [12]	Female	40	Routine health evaluation	Signet ring carcinoma	Endoscopic biopsy	TG
Yu [13]	Female	54	Dyspepsia, vomiting	MUC	Laparoscopic biopsy	none
Yu [13]	Female	50	Routine health evaluation	MUC	Postoperative biopsy	TG
Li [14]	Male	44	Paroxysmal epigastric pain	Poorly differentiated adenocarcinoma	ESD	TG
Cha [15]	Male	69	Routine health evaluation	Poorly differentiated adenocarcinoma	Endoscopic biopsy	TG
Yamane [16]	Male	81	Routine health evaluation	Poorly differentiated adenocarcinoma	EUS-FNA and boring biopsy	DG
Lee [17]	Female	64	Routine health evaluation	Signet ring carcinoma	Laparoscopic biopsy	SG
Suenaga [18]	Male	70	Routine health evaluation	Well-differentiated adenocarcinoma	ESD	Laparoscopic TG
Wada [19]	Male	65	Routine health evaluation	Poorly differentiated adenocarcinoma	Endoscopic biopsy	Laparoscopic SG
Imamura T [20]	Male	66	Not described	Well-differentiated adenocarcinoma	Laparoscopic biopsy	Laparoscopic PG
Chen [21]	Male	50	Epigastric discomfort and hematochezia	LELC	ESD	TG
Present case	Male	60	Stomach discomfort	Poorly differentiated adenocarcinoma	ESD	SG

LELC – lymphoepithelioma-like carcinoma; MUC – mucinous carcinoma; EMR – endoscopic mucosal resection; ESD – endoscopic submucosal dissection; EUS-FNA – endoscopic ultrasonography-guided fine needle aspiration middle; SG – subtotal gastrectomy; TG – total gastrectomy; PG – proximal gastrectomy.

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GCSMT is a malignant tumor, and its treatment typically requires systemic gastrectomy with en bloc lymphadenectomy, a treatment approach that differs significantly from that used for other SMTs [22]. Preoperative pathologic diagnosis can be helpful in clinical decision-making. However, a preoperative diagnosis is difficult to make, because most GCSMTs are covered with nearly normal mucosa [5]. Many techniques have been used in attempts to obtain adequate samples for tissue diagnosis of SMTs, including EUS-FNA, EUS-guided trucut biopsy (TCB), endoscopic boring biopsy, biopsy after mucosal incision to expose the tumor, endoscopic submucosal tumorectomy, and biopsy after resection of the mucosa [1]. EUS has been used for diagnosis of SMTs for more than a decade and is considered the most accurate procedure for detecting and diagnosing SMTs owing to its high sensitivity and specificity [23]. Although EUS-FNA and EUS-TCB are reliable diagnostic methods for SMTs, their diagnostic accuracy is influenced by many factors, with sampling adequacy and diagnostic rates reported to be 74% to 83% and 71% to 83%, respectively. Additionally, the amount of tissue sample obtained by FNA is small, which increases the number of needle passes [17]. Repeated EUS-FNA can also cause metastasis of malignant tumors. The 5 cases we reviewed, including our case, were diagnosed by ESD, which has a reported diagnosis rate of almost 90% [23] and can not only improve the diagnosis rate but also remove the whole tumor, reducing the possibility of metastasis.

SMTs can be treated with various endoscopic techniques, including endoscopic mucosal resection, endoscopic band ligation, ESD, endoscopic submucosal enucleation, endoscopic full-thickness resection, and endoscopic submucosal tunneling dissection [1]. ESD can be used both to obtain biopsy specimens for pathological diagnosis and for the treatment of SMTs. However, pathological diagnosis is often unavailable before ESD. Of note, once biopsy specimens for diagnosis are obtained through ESD, the patient's treatment plan can change significantly. Therefore, before ESD, it is necessary to fully communicate with patients and inform them of possible follow-up treatment plans.

Conclusions

In our patient, the result of gastroscopy, EUS, and contrast-enhanced CT suggested a GIST; however, with the use of ESD, the final diagnosis was gastric adenocarcinoma. Based on our experience, in cases of potentially malignant SMTs, we suggest that although many examinations – such as serum tumor markers, CT, PET-CT, and EUS – can aid diagnosis, biopsy specimen acquisition should still be performed proactively, because the treatment strategy for GCSMTs is completely different from that for other gastric SMTs. Our case shows that for SMTs of an unclear nature, ESD can not only serve as a treatment but also provide biopsy tissue for pathological diagnosis to aid in making a definitive diagnosis. Finally, since SMTs can be malignant, thorough communication with patients is essential when developing treatment plans.

Patient Consent

Permission could not be obtained from the patient or relatives; therefore, we took responsibility for the anonymization of the patient and removed patient's name and other identifying information from figures.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

References:

1. Guo J, Liu Z, Sun S, et al. Endosonography-assisted diagnosis and therapy of gastrointestinal submucosal tumors. Endosc Ultrasound. 2013;2(3):125-33
2. Umehara Y, Kimura T, Okubo T, et al. Gastric carcinoma resembling submucosal tumor. Gastric Cancer. 1999;2(3):191-93
3. Japanese Gastric Cancer Association. Japanese classification of gastric carcinoma: 3rd English edition. Gastric Cancer. 2011;14(2):101-12
4. Ohara N, Tominaga O, Uchiyama M, et al. A case of advanced gastric cancer resembling submucosal tumor of the stomach. Jpn J Clin Oncol. 1997;27(6):423-26
5. Kume K, Yoshikawa I, Yamazaki M, et al. A case of gastric cancer with features of submucosal tumor. Gastrointest Endosc. 2001;53(2):247-49
6. Fujiyoshi A, Kawamura M, Ishitsuka S. Gastric adenocarcinoma mimicking a submucosal tumor: Case report. Gastrointest Endosc. 2003;58(4):633-35
7. Takahashi T, Otani Y, Yoshida M, et al. Gastric cancer mimicking a submucosal tumor diagnosed by laparoscopic excision biopsy. J Laparoendosc Adv Surg Tech A. 2005;15(1):51-56
8. Teraishi F, Uno F, Kagawa S, et al. Advanced gastric adenocarcinoma mimicking a submucosal tumor. Endoscopy. 2007;39(Suppl. 1):E191-E92
9. Ando H, Morinaga N, Shitara Y, et al. Gastric cancer with features of submucosal tumor: A case report. Hepatogastroenterology. 2008;55(84):1146-49
10. Kim KY, Kim GH, Heo J, et al. Submucosal tumor-like mucinous gastric adenocarcinoma showing mucin waterfall. Gastrointest Endosc. 2009;69(3 Pt 1):564-65
11. Matsumoto T, Shimeno N, Imai Y, et al. Gastric carcinoma with lymphoid stroma resembling a hypoechoic submucosal tumor. Gastrointest Endosc. 2013;78(1):164-65
12. Yoo CH, Park SJ, Park MI, et al. Submucosal tumor-like early-stage mucinous gastric carcinoma: A case study. Korean J Gastroenterol. 2013;62(2):122-25
13. Yu BC, Lee WK. Two cases of mucinous adenocarcinoma of the stomach mistaken as submucosal tumor. J Korean Surg Soc. 2013;84(2):118-22
14. Li L, Lian J, Tseng Y, et al. Early gastric cancer presenting as a submucosal tumor. Clin Gastroenterol Hepatol. 2016;14(12):e145-e46
15. Cha HJ, Kim K, Kim M, et al. Concurrent gastric adenocarcinoma of fundic gland type and carcinoma with lymphoid stroma: A rare case report. Case Rep Gastroenterol. 2016;10(2):292-301

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

16. Yamane H, Ishida M, Banzai S, et al. Advanced gastric cancer with features of a submucosal tumor diagnosed by endoscopic ultrasound-guided fine needle aspiration and boring biopsy preoperatively: A case report and literature review. Int J Surg Case Rep. 2019;55:223-26
17. Lee J, Oh SJ. Signet ring cell carcinoma mimicking gastric gastrointestinal stromal tumor: A case report. Case Rep Oncol. 2020;13(2):538-43
18. Suenaga K, Matsumoto S, Lefor AK, et al. Preoperative diagnosis of a gastric extremely well-differentiated adenocarcinoma: A case report. Int J Surg Case Rep. 2020;73:319-23
19. Wada K, Tazawa H, Komo T, et al. Gastric adenocarcinoma appearance in leiomyoma: A case report. Int J Surg Case Rep. 2020;71:327-30
20. Imamura T, Komatsu S, Ichikawa D, et al. Gastric carcinoma originating from the heterotopic submucosal gastric gland treated by laparoscopy and endoscopy cooperative surgery. World J Gastrointest Oncol. 2015;7(8):118-22
21. Chen M, Yin L, Yao Y, et al. Lymphoepithelioma-like gastric carcinoma in a patient with rectal laterally spreading tumor: A case report. Oncol Lett. 2016;11(4):2491-96
22. Japanese Gastric Cancer Association. Japanese gastric cancer treatment guidelines 2014 (ver. 4). Gastric Cancer. 2017;20(1):1-19
23. Alkhatib AA, Faigel DO. Endoscopic ultrasonography-guided diagnosis of subepithelial tumors. Gastrointest Endosc Clin N Am. 2012;22(2):187-205

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