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A case of gastric glomus tumor resection using laparoscopy endoscopy cooperative surgery (LECS)

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ABSTRACT

INTRODUCTION: Gastric glomus tumors are rare submucosal mesenchymal tumors. Because gastric glomus tumors are submucosal tumors and resemble gastrointestinal stromal tumors (GISTs), preoperative diagnosis is difficult. We present a case of gastric glomus tumor that was removed by laparoscopy endoscopy cooperative surgery (LECS).

CASE PRESENTATION: A 67-year-old female was taken to the emergency room at our hospital due to epigastric pain. An upper gastrointestinal endoscopy revealed a submucosal tumor (SMT) located in the lesser curvature of the upper body of the stomach. Endoscopic ultrasonography revealed an intraluminal hypoechoic tumor located in the third or fourth layer of the stomach wall. Contrast-enhanced computed tomography (CECT) of the abdomen showed a 20-mm, well-enhanced, intraluminal-type tumor located in the lesser curvature of the upper body of the stomach. Laparoscopy endoscopy cooperative surgery (LECS) was performed. Immunohistochemistry revealed the expression of smooth muscle actin and vimentin, but not of keratin, S-100 protein, C-kit, or CD34. The tumor was finally diagnosed as a gastric glomus tumor.

CONCLUSION: Glomus tumors are rare submucosal tumors of the stomach, and they should be considered in the differential diagnosis of gastric submucosal tumors. LECS could be a less invasive and effective method for treatment of gastric glomus tumor.

1. Introduction

This report has been reported in line with the SCARE criteria and cite [1]. Glomus tumors are rare mesenchymal neoplasms arising from the neuromyoarterial canal or glomus body [2–4]. Most glomus tumors are found in peripheral soft tissues and the extremities, and they rarely occur in the gastrointestinal tract. Gastric glomus tumors represent only 1% of all gastrointestinal soft tissue tumors [2–4]. Because gastric glomus tumors are submucosal tumors and resemble gastrointestinal stromal tumors (GISTs), preoperative diagnosis is difficult. We present a case of gastric glomus tumor that was removed by laparoscopy endoscopy cooperative surgery (LECS).

2. Case presentation

A 67-year-old female presented at the emergency room (ER) of our hospital complaining of epigastric pain. Blood examination showed no anemia, and her tumor markers were normal. An upper gastrointestinal endoscopy revealed a submucosal tumor (SMT) with no delle, located in the lesser curvature of the upper body of the stomach (Fig. 1A). When trying to biopsy the tumor, heavy bleeding occurred, and we could not obtain sufficient tissue to make a diagnosis. Endoscopic ultrasonography revealed an intraluminal hypoechoic tumor in the third or fourth layer of the stomach wall (Fig. 1B). Contrast-enhanced computed tomography (CECT) of the abdomen showed a 20-mm, well-enhanced, intraluminal-type tumor located in the lesser curvature of the upper body of the stomach and no swollen lymph nodes (Fig. 2). We suspected a GIST and planned to perform LECS because the tumor was intraluminal and located in the upper body of the stomach. We confirmed the intraluminal tumor location using endoscopy. Blood vessels in proximity to the tumor-excision area were prepared by the laparoscopic team using ultrasonically activated coagulating shears. Then, the endoscopic team marked an appropriate mucosal resection line using a needle knife and dissected the submucosal layer using an insulated tip electrosurgical knife (IT Knife) in the intraluminal stomach. Next, the endoscopic team made a perforation of the stomach wall at the dissection line with a needle knife. Subsequently, the seromuscular layer was dissected along the incision line by the laparoscopic team using the ultrasonically activated

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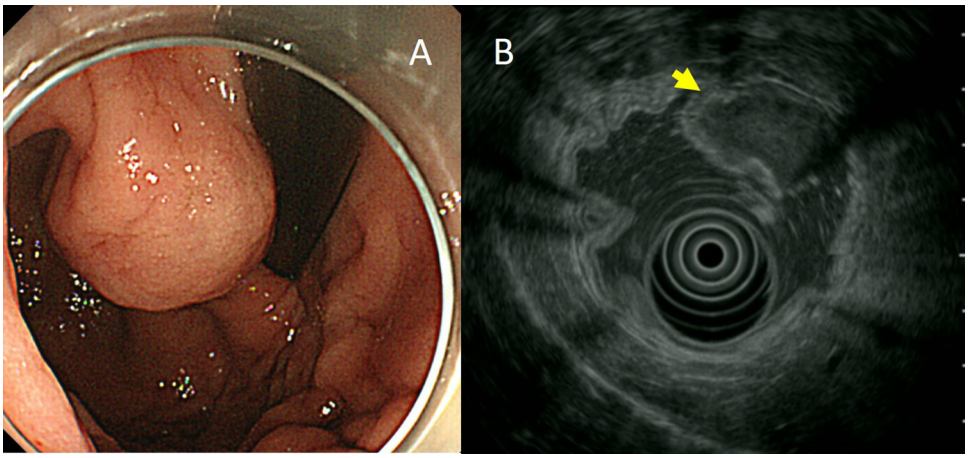

Fig. 1. Upper gastrointestinal endoscopy revealing a submucosal tumor located in the lesser curvature of the upper body of the stomach (A). Endoscopic ultrasonography revealing an intraluminal hypoechoic tumor located in the third or fourth layer of the stomach wall (B).

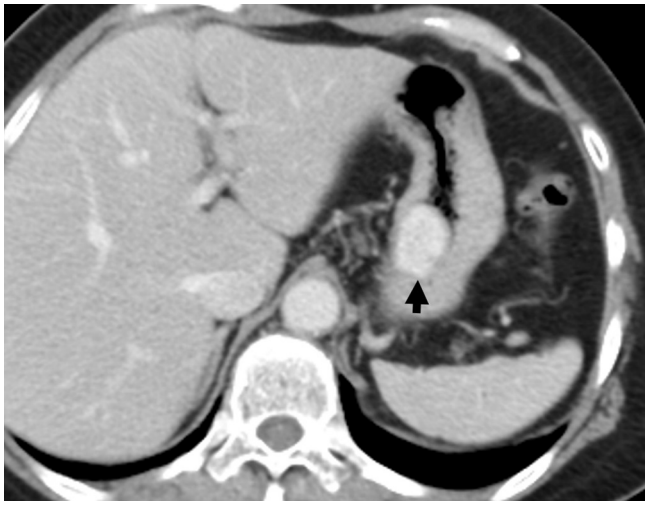

Fig. 2. Contrast-enhanced computed tomography showing a 20-mm, well-enhanced, intraluminal-type tumor located in the lesser curvature of the upper body of the stomach (arrow).

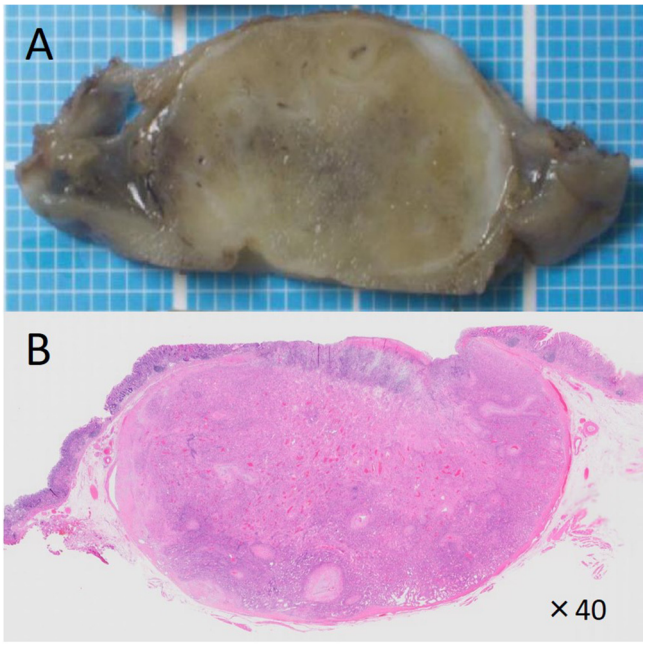

Fig. 3. Gross appearance of the resected tumor. A 20 × 20 mm submucosal mass that was well circumscribed was observed (A). Histopathology revealing a well-circumscribed tumor localized in the submucosal layer (B).

coagulating shears under laparoscopic view. After a circumferential full-thickness resection, the resected specimen was placed in a plastic bag and removed from the umbilical incision. The stomach wall defect was closed with laparoscopic sutures. The gross appearance of the resected tumor showed a 20 × 20-mm submucosal mass that was well circumscribed (Fig. 3A). Histopathology confirmed a well-circumscribed tumor localized in the submucosal layer (Fig. 3B). The tumor was composed of accumulated round and spindle cells, which surrounded the capillary blood vessels (Fig. 4A). Immunohistochemistry revealed the expression of smooth muscle actin (Fig. 4B) and vimentin (Fig. 4C), but not of keratin, S-100 protein, C-kit, or CD34. The tumor was finally diagnosed as a gastric glomus tumor. The postoperative course was good, and the patient was discharged from our hospital 8 days post-surgery. She had no recurrence and no complaints for 2 years after the operation.

3. Discussion

Glomus tumors, first reported by Kay et al. [5], are neoplastic mesenchymal lesions originating from either the neuromyoarterial canal or the glomus body [2–4]. These tumors often occur in peripheral soft tissue and the extremities. In the gastrointestinal tract, glomus tumors are mainly reported in the stomach and resemble GISTs [2–4].

Gastric glomus tumors are more common in females than males (female:male = 3:1), and they most frequently occur in adults between 28 and 79 years of age [6]. Gastric glomus tumors are often found in the antrum and can range in size from 0.8–11 cm [3].

Gastric glomus tumors are usually benign but may rarely undergo malignant transformation. According to the WHO classification, glomus tumors are considered malignant when they exceed 2 cm in size and have histological features such as nuclear atypia, necrosis, and mitotic activity. Malignant glomus tumors are not frequently reported, and recurrence or metastases are very rarely reported. Only three cases of a metastatic glomus tumor in the stomach have been reported (Folpe et al., Miettinen et al. and Sung Eun Song et al. [7–9]).

Patients with these tumors can present with ulcer-like symptoms such as epigastric pain, upper gastrointestinal bleeding and perforation, but some tumors are discovered incidentally with no

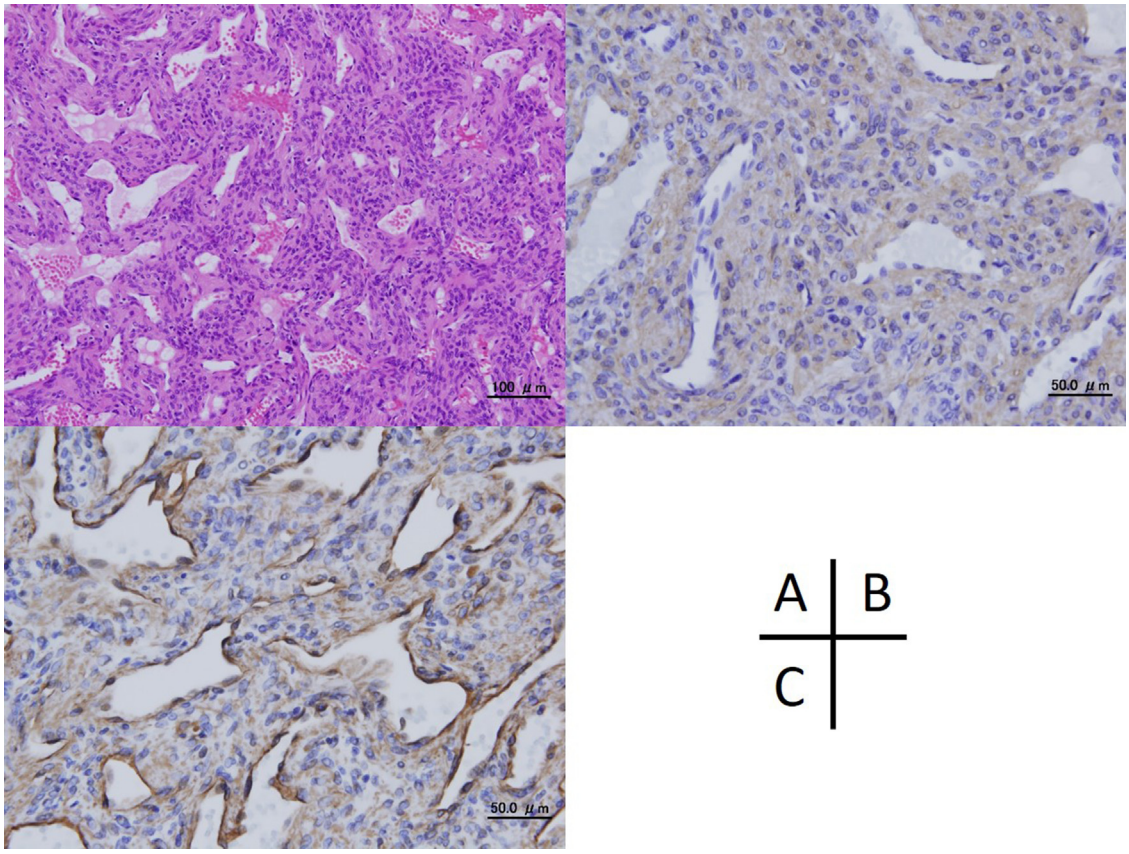

Fig. 4. The tumor was composed of accumulated round and spindle cells surrounding the capillary blood vessels (A). Immunohistochemistry revealed the expression of smooth muscle actin (B) and vimentin (C).

symptoms [2–4,6]. Histological features are important for diagnosing gastric glomus tumors, but it is difficult to biopsy a sufficient specimen from these tumors because of their deep location. Therefore, preoperative diagnosis is difficult.

The other diagnostic modalities for gastric glomus tumors are endoscopic ultrasound (EUS) and CECT. In the current case, upper endoscopy revealed a well-defined submucosal tumor similar to a GIST, and EUS revealed a well-circumscribed hypoechoic mass located in the third or fourth layer of the stomach wall. EUS-guided fine-needle aspiration biopsy (FNA) is an effective modality for gastric glomus tumors [2–4]. Histologically, these tumors are composed of round and uniform glomus cells surrounding capillary vessels. Immunohistochemically, these tumors are positive for smooth muscle actin, vimentin, calponin and collagen type IV and are negative for desmin, S-100 protein, C-kit, and CD34 [2,4]. In our case, we tried to perform a FNA of the tumor but obtained an insufficient specimen because of massive bleeding from the tumor. In enhanced computed tomography, the tumor revealed strong enhancements in the early phase and persistent enhancement in the portal phase. In contrast, enhancement of GISTs generally does not persist in the delayed phase [10,11].

Treatment for gastric glomus tumors may consist of surgical resection as well as laparoscopic surgery, which has been used at increasing frequency [6,12]. LECS is an effective procedure for submucosal tumors, such as glomus tumors and GISTs. The use of LECS was first reported by Hiki et al. in 2008, and the feasibility, safety, and effectiveness of this procedure have been demonstrated [13]. LECS is a particularly good choice for a mass growing in an intraluminal pattern or located near the cardia or the pylorus [13]. In our case, the tumor was small (20×20 mm) and was located in the intraluminal portion of the stomach; therefore, we chose to perform LECS. When searching PubMed, we identified only one prior study describing glomus tumor resection using LECS [12].

4. Conclusion

In conclusion, the current case details the resection of a gastric glomus tumor using LECS. Glomus tumors are rare submucosal tumors of the stomach, and they should be considered in the differential diagnosis of gastric submucosal tumors. Immunohistochemical studies are necessary for the diagnosis of this tumor type, and LECS is an effective treatment option.

Conflicts

There are no conflicts of interest.

Funding

There are no study sponsors or sources of funding.

Ethical approval

No ethics committee approval is required at our institution for a case report involving a single patient.

Consent

Written informed consent was obtained from patient for publication of this case report and accompanying images. A copy of the

written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

1. Taro Aoba wrote the paper and did data collection and interpretation.
2. Takehito Kato, Kazuhiro Hiramatsu, Yoshihisa Shibata, Motoi Yoshihara, Naoya Yamaguchi, and Tadahiro Kamiya reviewed this article and approved.

Registration of research studies

UNI: Researchregistry2855.

Guarantor

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