

Oval mucosal opening bloc biopsy after incision and widening by ring thread traction for submucosal tumor

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Abstract

Gastric submucosal tumors (SMTs) less than 2 cm are generally considered benign neoplasms, and endoscopic observation is recommended, but SMTs over 2 cm, 40% of which are gastrointestinal stromal tumors (GISTs), have malignant potential. Although the Japanese Guidelines for GIST recommend partial surgical resection for GIST over 2 cm with malignant potential as well as en bloc large tissue sample to obtain appropriate and large specimens of SMTs, several reports have been published on tissue sampling of SMTs, such as with endoscopic ultrasound sound fine needle aspiration, submucosal tunneling bloc biopsy, and the combination of bite biopsy and endoscopic mucosal resection. Because a simpler, more accurate method is needed for appropriate treatment, we developed oval mucosal opening bloc biopsy after incision and widening by ring thread traction for submucosal tumor (OMOB) approach. OMOB was

simple and enabled us to obtain large samples under direct procedure view as well as allowed us to restore to original mucosa.

Key words: Gastric submucosal tumors; Gastrointestinal stromal tumor; Reversible opening biopsy; Endoscopic ultrasonography; Large sample

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Core tip: Gastric submucosal tumors (SMTs) less than 2 cm are generally considered benign neoplasms, and endoscopic observation is recommended, but SMTs over 2 cm, 40% of which are gastrointestinal stromal tumors (GISTs), have malignant potential. Although partial surgical resection for GIST over 2 cm with malignant potential as well as en bloc large tissue sample to obtain appropriate and large specimen of SMTs is recommended, several reports have been published on tissue sampling of SMTs. Because a simpler, more accurate method is needed for appropriate treatment, we developed oval mucosal opening bloc biopsy after incision and widening by ring thread traction approach.

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INTRODUCTION

Gastric submucosal tumors (SMTs) less than 2 cm are generally considered benign neoplasms, and endoscopic observation is recommended^[1]; however, SMTs over 2 cm, 40% of which are gastrointestinal stromal tumors (GISTs), have malignant potential^[2]. The Japanese Guidelines for GIST over 2 cm with malignant potential recommend removal by partial surgical resection as well as en bloc large tissue sample collection to obtain an accurate diagnosis before surgery^[3]. To obtain appropriate and large specimens of SMTs and diagnose them accurately, there have been several reports related to tissue sampling of SMTs, such as endoscopic ultrasound sound fine needle aspiration (EUS-FNA)^[4,5], submucosal tunneling bloc biopsy (STB)^[6], and the combination of bite biopsy and endoscopic mucosal resection (CB-EMR) by which the crown of SMTs was partially resected by EMR^[7]. Because a simpler, more accurate method is needed for appropriate treatment, we developed oval mucosal opening bloc biopsy after incision and widening by ring thread traction for submucosal tumor (OMOB)

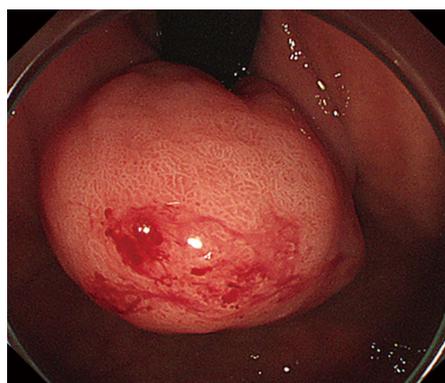


Figure 1 Endoscopic findings of gastric submucosal tumor. A gastric submucosal tumor (30 mm in diameter) is shown in the fornix of the stomach.

approach.

CASE REPORT

A forty-seven-year-old woman was diagnosed with a gastric SMT that was 30 mm in diameter in the fornix (Figure 1). As the tumor located in the fornix where EUS-FNA was unable to puncture its needle due to maximum bended endoscope position and STB was also difficult to create submucosal tunnel under maximum bended endoscope position, it was difficult to obtain sufficient tissue sample of this tumor (Figures 1 and 2A). A 5-10 mm straight incision was made on the top of the SMT by Dual knife (KD-650L, OLYMPUS Co., Tokyo, Japan) (Figures 2B and 3). After a 5-mm ring-shaped thread was delivered by grasping forceps and clipped on the left side mucosa of the incision edge (Figure 2C), second clip was hooked the ring-shaped thread (Figure 2D) and moved to be tied up the left gastric wall.

The same procedures were performed on the right side of the incision mucosa (Figure 4) making a straight incision like an oval-shaped incision (Figure 5). With more insufflation, both ring threads expanded the oval incision to a round-shaped incision from which the tumor capsule was clearly recognized (Figure 6). An approximately 5 mm incision of the tumor capsule by Dual knife made it possible to confirm the tumor itself which had abundant tumor vessels (Figures 2E and 6). A 5-mm piece of tumor tissue was obtained by cutting the tumor surface with a Dual knife. After both sides of the ring threads were detached, the opened mucosa was closed by hemoclips to restore it back to the original mucosa (Figures 2F and 7). The total procedure time was only 10 min, and there were no complications, such as bleeding or perforation. The histological result was gastrointestinal stromal tumor. Three weeks after this new bloc biopsy, the incised mucosa was completely recovered with a linear scar. Laparoscopy and endoscopy cooperative

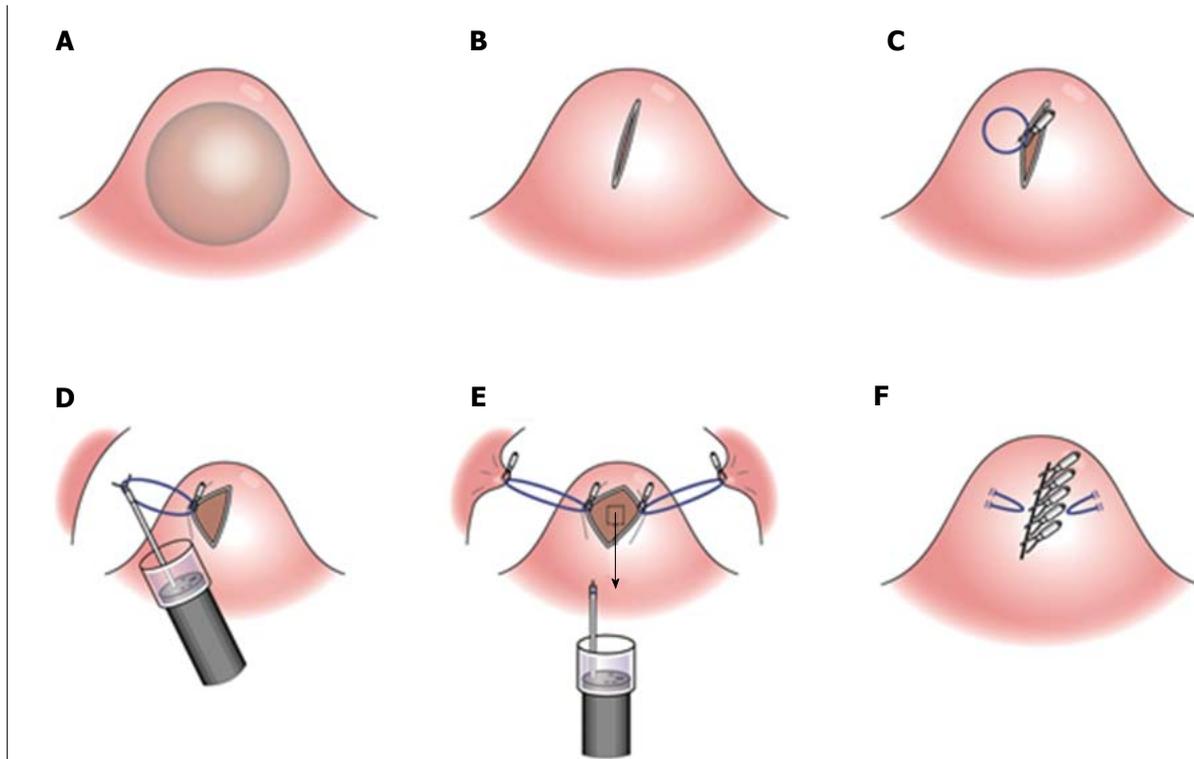


Figure 2 Oval mucosal opening bloc biopsy after incision and widening by ring thread traction. A: A gastric submucosal tumor (SMT) (30 mm in diameter) is shown in the fornix of the stomach; B: A 5-10 mm incision on the top of SMT was made; C: After a 5-mm ring-shaped thread was delivered by grasping forceps; D: Second clip was hooked the ring-shaped thread and moved to be tied up the left gastric wall; E: The same procedures were performed on the right side of the incision mucosa and made a straight incision like an oval-shaped incision; F: After both sides of the ring threads were detached, the opened mucosa was closed by hemoclips to restore it back to the original mucosa.

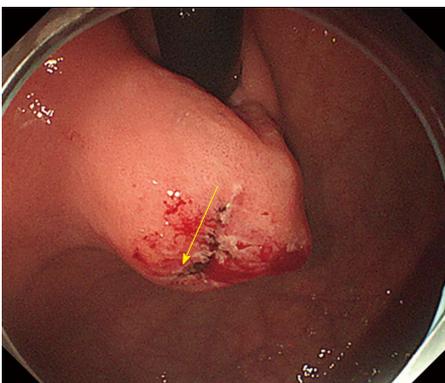


Figure 3 Incision at the top of the submucosal tumor. As endoscopic ultrasound sound fine needle aspiration and submucosal tunneling bloc biopsy were impossible due to the tumor's location, a 5-10 mm incision on the top of submucosal tumor was made (yellow arrow).

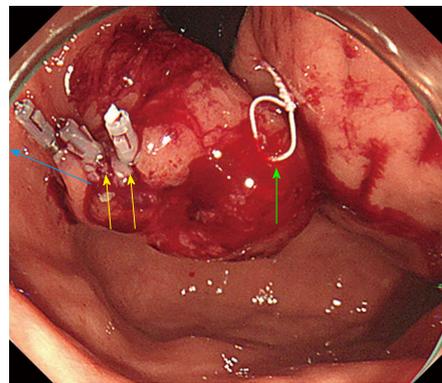


Figure 4 Ring-shaped thread counter traction. After clipping the 5-mm ring-shaped thread on the left side mucosa of the incision edge (yellow arrows), the other side of this ring thread was hooked and pulled to the posterior wall of the stomach (blue arrow). A 2nd white ring thread was placed on the other side of the incision edge (green arrow).

surgery (LECS) was successfully performed, and the histological finding of the GIST was low risk in accordance with Fletcher's classification. An endoscopic image revealed that straight incision on the top of the SMT was completely scarred and closed (yellow ring) (Figure 8) when laparoscopy and endoscopy cooperative surgery (LECS) was performed six week

after oval mucosal opening bloc biopsy.

DISCUSSION

The natural history of 2-5 cm GISTs is unknown. In the Japanese Guidelines of GIST, accurate diagnosis, including the histological grade based on a sufficient

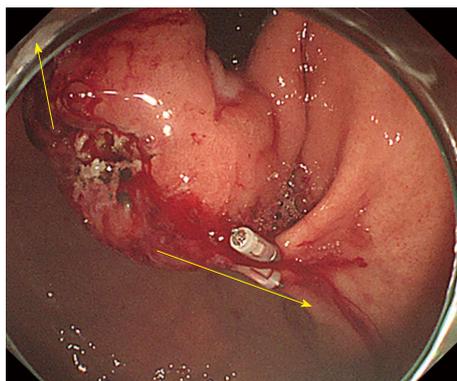


Figure 5 Oval mucosal opening after incision and widening by ring thread traction. The same procedures were performed on both sides of the incision mucosa with a straight incision to an oval shaped incision (yellow arrows).

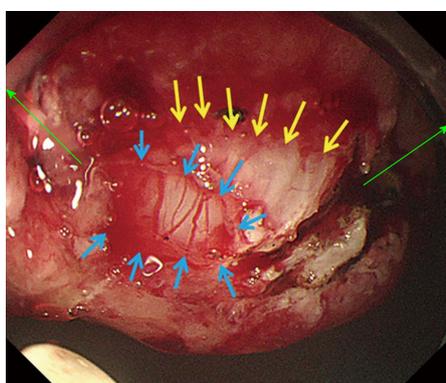


Figure 6 Direct view of capsule and abundant vessels of gastrointestinal stromal tumors. With more insufflation, both ring threads expanded the oval incision to a round shaped incision (green arrows) from which the tumor capsule was clearly recognized. An approximately 7-mm cut of the tumor capsule (yellow arrows) by Dual knife made it possible to confirm the tumor (blue arrows) with abundant tumor vessels.

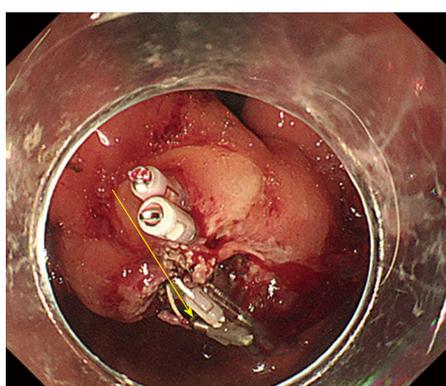


Figure 7 Reversible mucosa closure by hemoclips. After both sides of the ring threads were detached, the opened mucosa was closed by hemoclips to restore it back to the original mucosa (yellow arrow).

tissue sample, is recommended for GIST less than 2 cm, which is growing rapidly, or 2-5 cm GIST rather than endoscopic observation alone^[8].

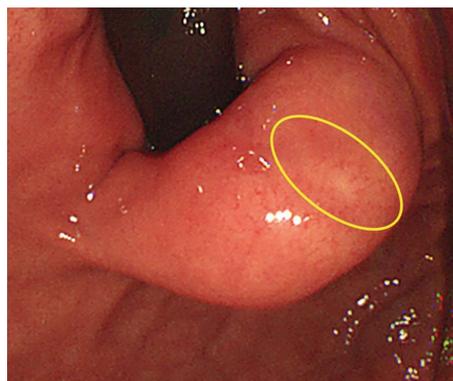


Figure 8 A mucosal incision six week after oval mucosal opening bloc biopsy. An endoscopic image revealed that straight incision on the top of the submucosal tumor was completely scarred and closed (yellow ring) when laparoscopy and endoscopy cooperative surgery was performed six week after oval mucosal opening bloc biopsy.

EUS-FNA is very useful for accurate diagnosis for SMTs since it was reported in 1992^[9]. Its diagnostic sensitivity for GIST is very high at approximately 70% and the specificity is approximately 85%^[10]. On the other hand, EUS-FNA does not always obtain sufficient tissue by needle sample for one of the grading factors of malignancy, such as the mitotic count under a 50 high power microscope field. The diagnostic rate for EUS-FNA was approximately 60% as the obtained samples were too small to pathologically diagnose the mitotic counts^[11]. The combination of bite biopsy and endoscopic mucosal resection (CB-EMR) using a snare to cut the top of SMTs enabled us to obtain a large bloc specimen. However, the bleeding rate was very high at approximately 50%-60% from the snare resection site^[12]. Bleeding after snare resection occurred due to a large mucosal defect at approximately 15-20 mm in diameter. Compared to CB-EMR, OMOB enable us to perform en bloc large tissue sampling without complications, such as bleeding, for GIST with rich vessels. OMOB consists of a 1-cm linear incision to round shaped excision using ring threads that expand with insufflation. After obtaining large bloc tissue, coagulation of bleeding vessels is performed followed by closure of the opening mucosa. Closure and recovery of mucosal incision is an important point of OMOB. STB using the ESD technique is another way to obtain a large tissue sample of GIST. As STB was safely performed using flexible endoscopic knives, only ESD experts could perform STB. It is difficult for ordinary endoscopists to perform STB^[13], because making appropriate size and location of mucosal incision suitable for creating submucosal tunnel was very difficult for ESD beginner. And creating submucosal tunnel to correct direction and adjusting correct depth of submucosal dissection within the submucosal tunnel were more difficult than conventional gastric

ESD. Another disadvantage of STB is the creation of a submucosal tunnel that leaves an extra 1-cm tunnel scar outside of the GIST. This extra linear scar makes the surgical margin of LECS larger than that of OMOB.

In conclusion, OMOB was simple and enabled us to obtain a large sample under the direct procedure view; it also allowed us to restore to the original mucosa.

COMMENTS

Case characteristics

A forty-seven-year-old woman was diagnosed with a gastric submucosal tumor (SMT) that was 30 mm in diameter in the fornix.

Clinical diagnosis

The tumor located in the fornix was considered as gastric submucosal tumor.

Differential diagnosis

Gastrointestinal stromal tumor (GIST), leiomyoma, schwannoma, leiomyosarcoma, malignant lymphoma, ectopic pancreas and lipoma.

Laboratory diagnosis

All labs were within normal limits.

Imaging diagnosis

Esophagogastroduodenoscopy showed gastric SMT 30 mm in diameter in the fornix.

Pathological diagnosis

The histopathological finding of the SMT was low risk GIST in accordance with Fletcher's classification.

Treatment

Complete surgical excision of lesion.

Related reports

Several reports have been published on tissue sampling of SMTs, such as with endoscopic ultrasound sound fine needle (EUS-FNA) aspiration, submucosal tunneling bloc biopsy, and the combination of bite biopsy and endoscopic mucosal resection.

Term explanation

Oval mucosal opening bloc biopsy by ring thread traction for submucosal tumor is new method for diagnosis of gastric SMT.

Experiences and lessons

Development of oval mucosal opening bloc biopsy after incision and widening by ring thread traction for submucosal tumor (OMOB) approach was useful for simpler, more accurate method for appropriate treatment of gastric SMT.

Peer-review

This case report presented a new biopsy method for GIST of the stomach. The authors demonstrate clearly that "reversible hinged double doors method" is useful to obtain large tissue sample. This method may certainly be of use for tough case even if we use EUS-FNA. This manuscript is well-written in terms of language and seems to be informative to the readers.

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