



Name of Journal: *World Journal of Gastroenterology*

Manuscript Type: CASE REPORT

Safe and large bloc biopsy for submucosal tumor with reversible mucosa opened by a hinged double doors method

Mori H *et al.* Reversible hinged double doors opening biopsy

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Author Contributions: Mori H was responsible for devising the research and writing the manuscript. Guan Yu, Kobara H, Nishiyama N, Kobayashi N and Goda Y participated equally in the work. Prof. Masaki T provided a critical revision of the manuscript for intellectual content and was responsible for final approval of the manuscript.

Institutional review board statement:

This study was approved by the ethics committees of Kagawa University Hospital (approval No. 51), and it is in accordance with the Declaration of Helsinki.

Informed consent statement:

Patients were provided verbal and written informed consent.

Conflict-of-interest statement:

All authors declare that they have no conflicts of interest, and no corporate financing was received.

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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 (EUS-FNA), submucosal tunneling bloc biopsy (STB), and the combination of bite biopsy and endoscopic mucosal resection (CB-EMR). Because a simpler, more accurate method is needed for appropriate treatment, we developed a reversible hinged double doors opening biopsy (R-HDD) approach. R-HDD was simple and enabled us to obtain large samples under direct procedure view without false negatives as well as allowed us to restore to original mucosa without bleeding or tumor cell dissemination.

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

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 a reversible hinged double doors opening biopsy (R-HDD) approach.



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 a reversible hinged double doors opening biopsy (R-HDD) 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). EUS-FNA and TBB were impossible due to the tumor's location. A 1-cm incision was made on the top of the SMT (Figure 2). After clipping a 5-mm ring-shaped thread on the left side mucosa of the incision edge, the other side of this ring thread was hooked and pulled to the posterior wall of the stomach (Figure 3). The same procedures were performed on the right side of the incision mucosa with a straight incision like an oval-shaped incision (Figure 4). With more insufflation, both ring threads expanded the oval incision to a round-shaped incision from which the

tumor capsule was clearly recognized. An approximately 7 mm cut of the tumor capsule by Dual knife (KD-650L, OLYMPUS Co., Tokyo, Japan) made it possible to confirm the tumor itself had abundant tumor vessels (Figure 5). 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 (Figure 6). The total procedure time was only 10 minutes, 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 surgery (LECS) was successfully performed, and the histological finding of the GIST was low risk in accordance with Fletcher's classification.

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 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].

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, R-HDD enable us to perform en bloc large tissue sampling without complications, such as bleeding, for GIST with rich vessels. R-HDD 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 R-HDD. 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]. 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 R-HDD.

In conclusion, R-HDD was simple and enabled us to obtain a large sample under the direct procedure view without false negatives; it also allowed us to restore to the original mucosa without bleeding or tumor cell dissemination.

ACKNOWLEDGMENTS

We thank Prof. Dr. Makoto Oryu for providing technical and editorial assistance.



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Figures

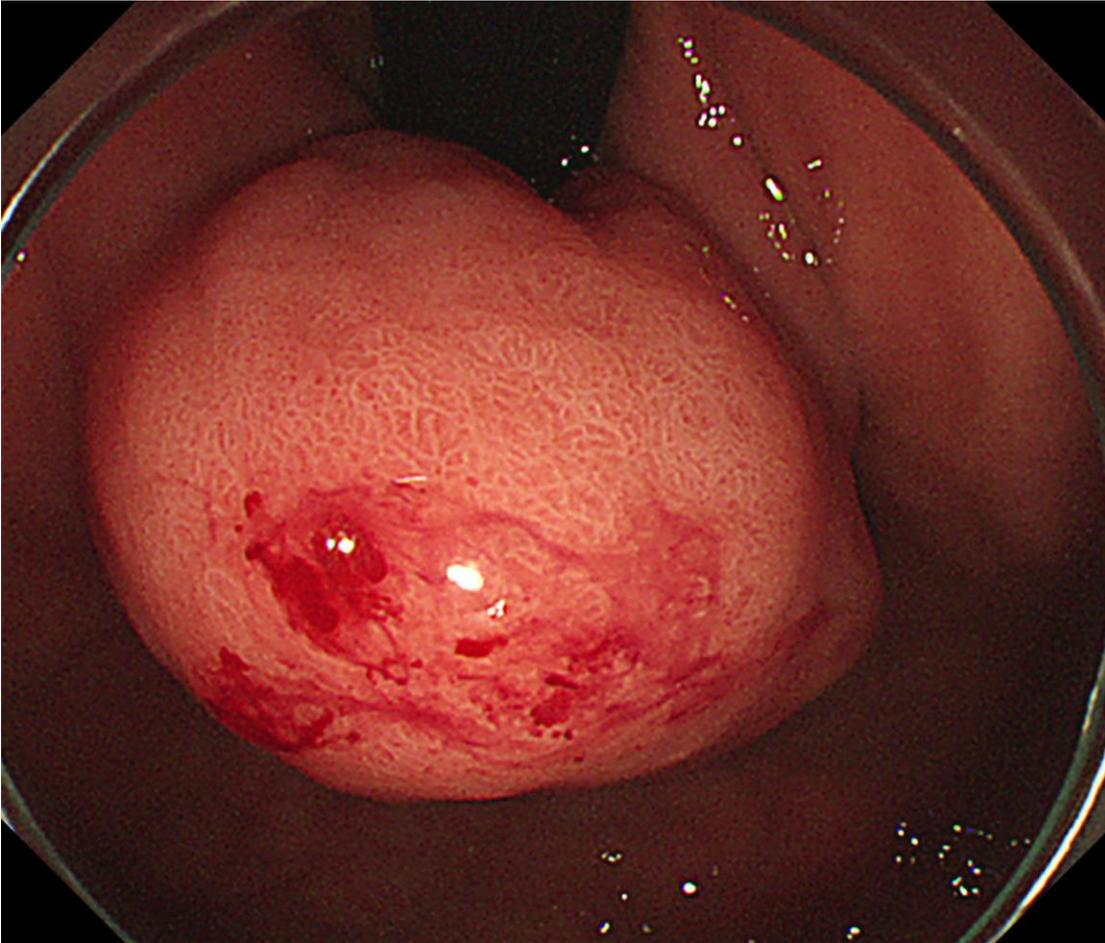


Figure 1 Endoscopic findings of gastric SMT. A gastric SMT (30 mm in diameter) is shown in the fornix of the stomach.

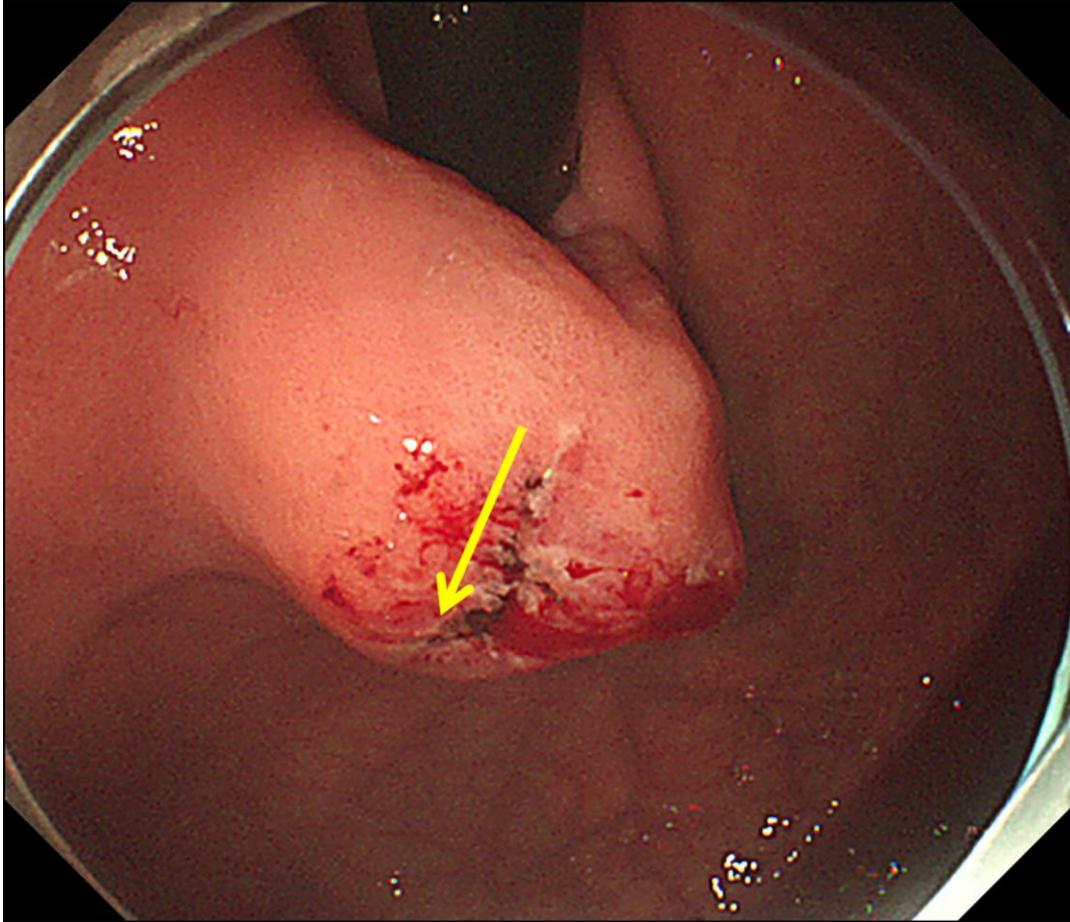


Figure 2 Incision at the top of the SMT. As EUS-FNA and STB were impossible due to the tumor's location, a 1-cm incision on the top of SMT was made (yellow arrow).

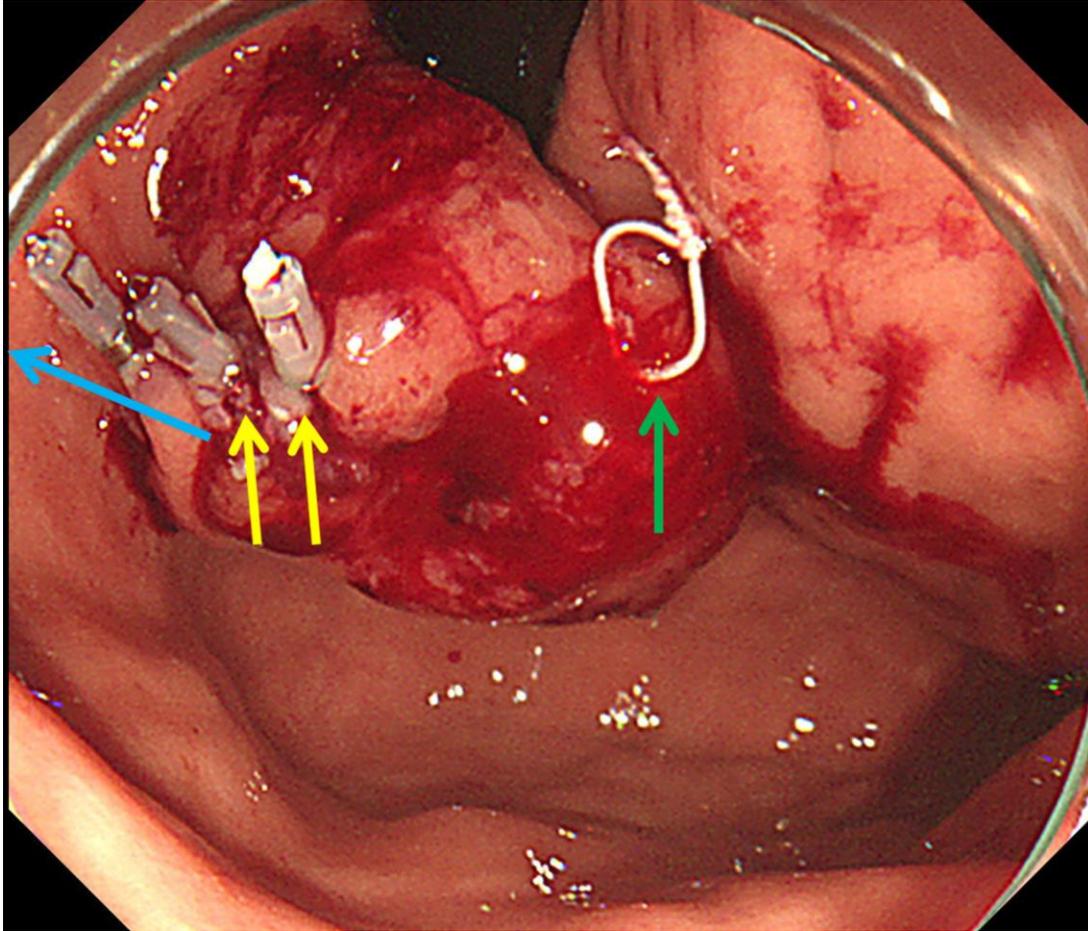


Figure 3 Ring- shaped thread counter traction. After clipping the 5-mm ring-shaped thread on the left side mucosa of the incision edge (yellow arrows), the other side of this ring thread was hooked and pulled to the posterior wall of the stomach (blue arrow). A 2nd white ring thread was placed on the other side of the incision edge (green arrow).

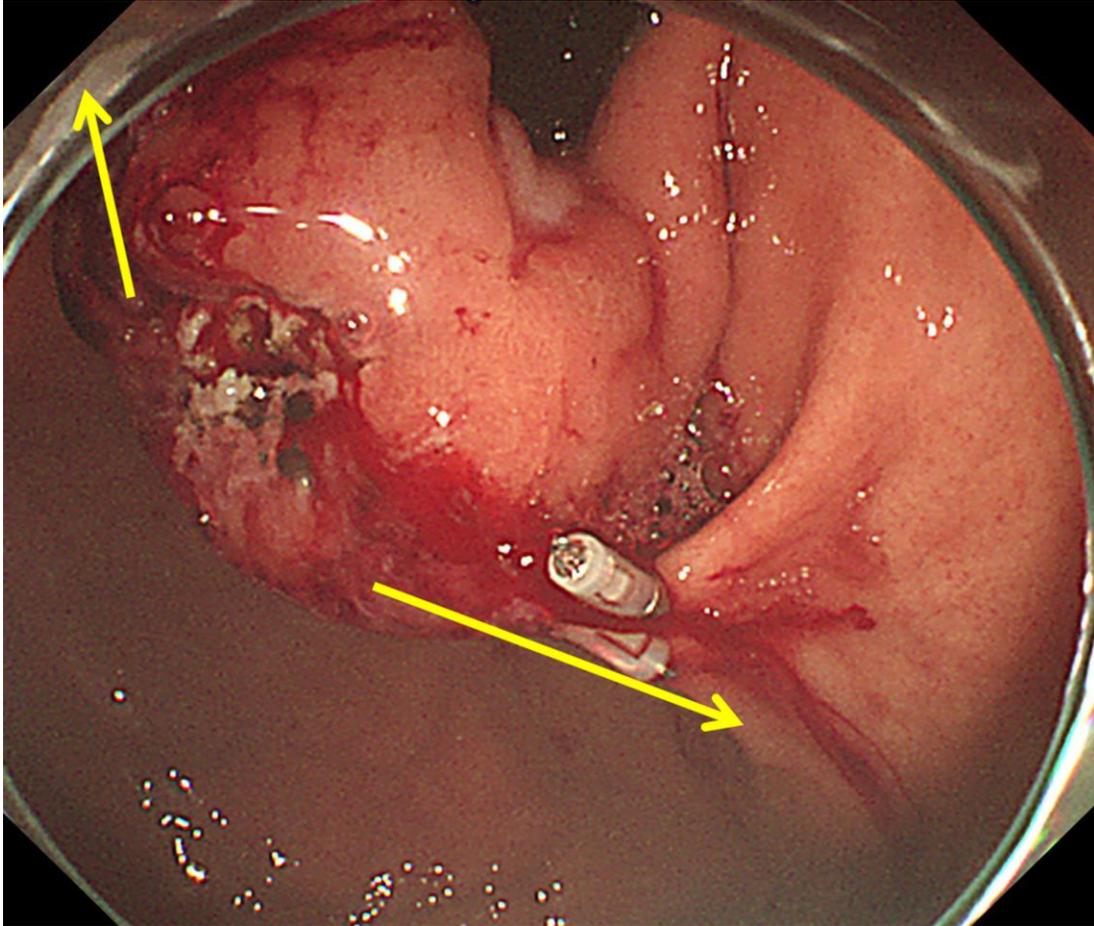


Figure 4 Hinged double doors open using the ring- shaped thread. The same procedures were performed on both sides of the incision mucosa with a straight incision to an oval shaped incision (yellow arrows).

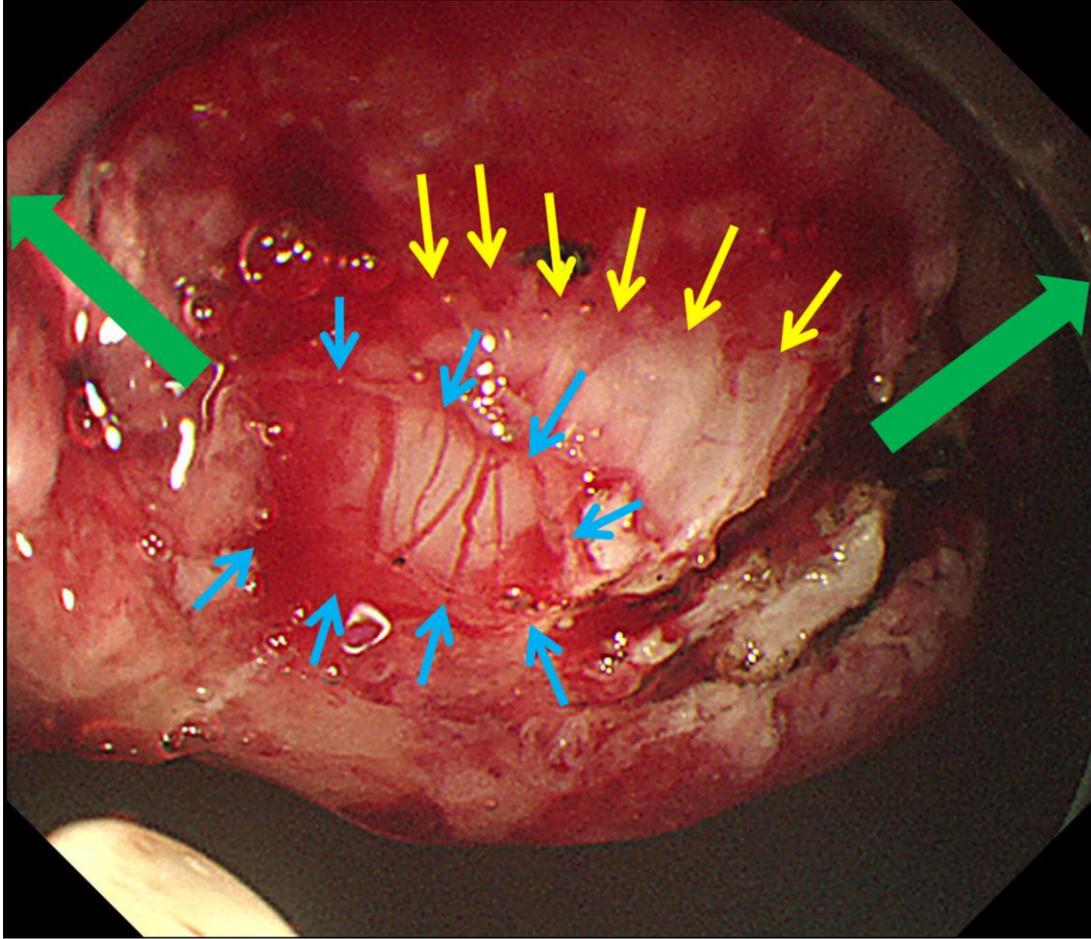


Figure 5 Direct view of capsule and abundant vessels of GIST. With more insufflation, both ring threads expanded the oval incision to a round shaped incision (green arrows) from which the tumor capsule was clearly recognized. An approximately 7-mm cut of the tumor capsule (yellow arrows) by Dual knife made it possible to confirm the tumor (blue arrows) with abundant tumor vessels.

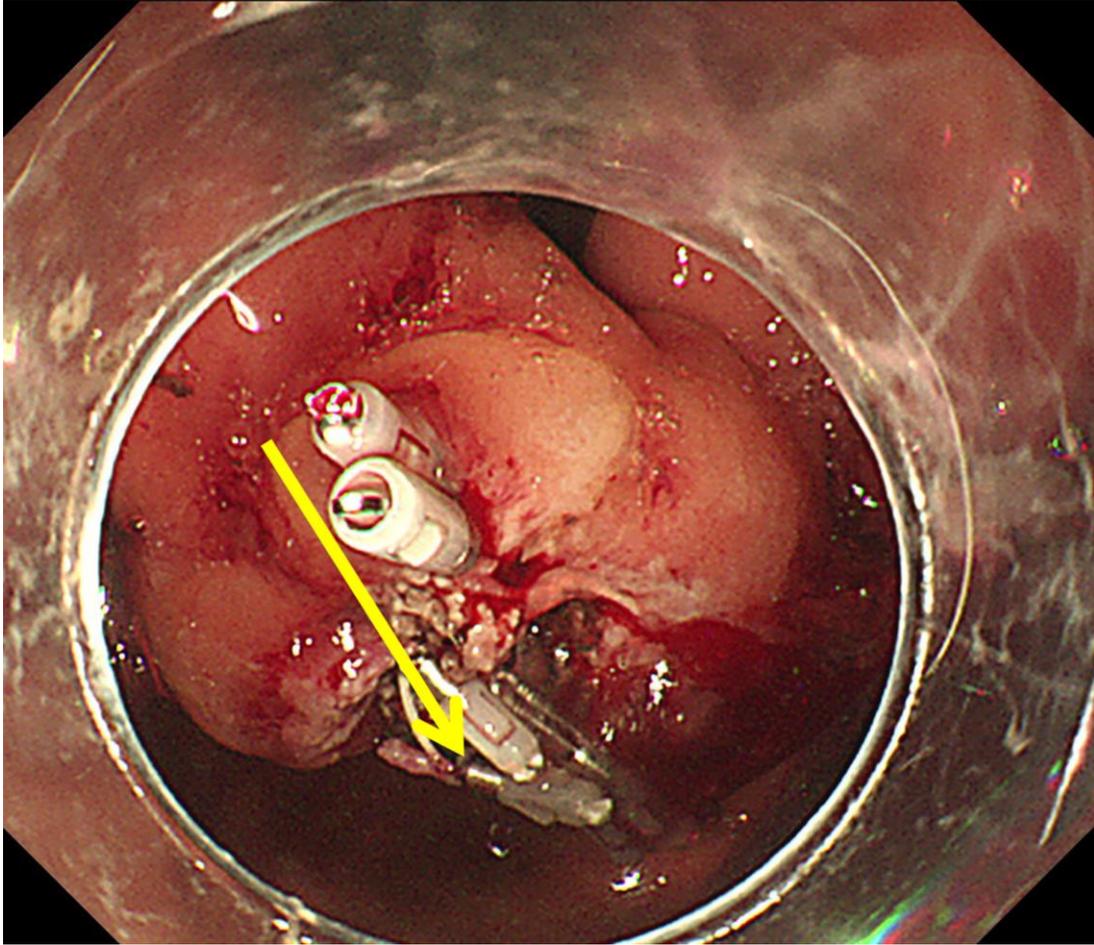


Figure 6 Reversible mucosa closure by hemoclips. After both sides of the ring threads were detached, the opened mucosa was closed by hemoclips to restore it back to the original mucosa (yellow arrow).