Endoscopic suturing for closure of endoscopic submucosal dissection defects

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Endoscopic submucosal dissection (ESD) allows for en bloc resection of tumors within the GI tract, typically leaving a large mucosal defect, which can result in postprocedure adverse events such as delayed perforation or bleeding.[1] Different techniques have been described for the closure of mucosal defects after ESD, including the use of a variety of clips (with or without an Endoloop or string) to close these defects, which may reduce the risk of adverse events.[2-5] Endoscopic suturing may be another method to effectively close these defects. Although these methods are not the standard of care for ESD, they represent an area of interest because of their potential in the hands of expert endoscopists to decrease adverse events such as delayed perforation and bleeding and to reduce or eliminate post-ESD hospitalization, thereby reducing costs.[6,7] Limited data are available on the efficacy of endoscopic suturing after ESD, and no standard technique currently exists for this indication; therefore, we aimed to describe and formalize the technique of mucosal endoscopic suturing to close gastric and rectal mucosal defects created from ESD.[8]

ENDOSCOPIC METHODS

Upon completion of the ESD procedure in either the stomach or the rectum, the gastroscope was removed and a double-channel therapeutic gastroscope (Olympus, Tokyo, Japan) was loaded with the OverStitch endoscopic suturing system (Apollo Endosurgery, Austin, Tex, USA). All suturing was performed in the antegrade position. Starting with the edge most distal to the endoscope insertion site (12 o'clock), endoscopic suturing of the ESD defect was initiated. The suturing arm was closed to push the needle and suture through the mucosal and submucosal flap, as opposed to the muscle layer. As has been previously described, the needle holder was then advanced to grab the needle, and the needle holder was then pulled back to remove the needle from the suturing arm.[9] The suturing arm was then opened, which freed the edge of the defect. The suturing arm was then closed, and the needle holder was advanced to place the needle back into the suturing arm. Once this initial flap was grabbed, the endoscope was then moved to the left toward the 10 o'clock position of the defect, repeating the same process of grabbing the tissue. The endoscope was then moved from left to right toward the 2 o'clock position, again grabbing the tissue. Moving then from a right to left position, the tissue at the 8 o'clock position of the defect was grabbed. We then moved from a left to right manner, grabbing the mucosa/submucosa at the 4 o'clock position. Finally, the edge of the defect at the 6 o'clock position, or position most proximal to the endoscope insertion site, was grabbed (Fig. 1). Once these 6 mucosal/submucosal flaps had been sutured together, we deployed the cinching mechanism. This technique of suturing was used to maintain visualization throughout the entire suturing process and to facilitate handling of the endoscope with the suturing system.

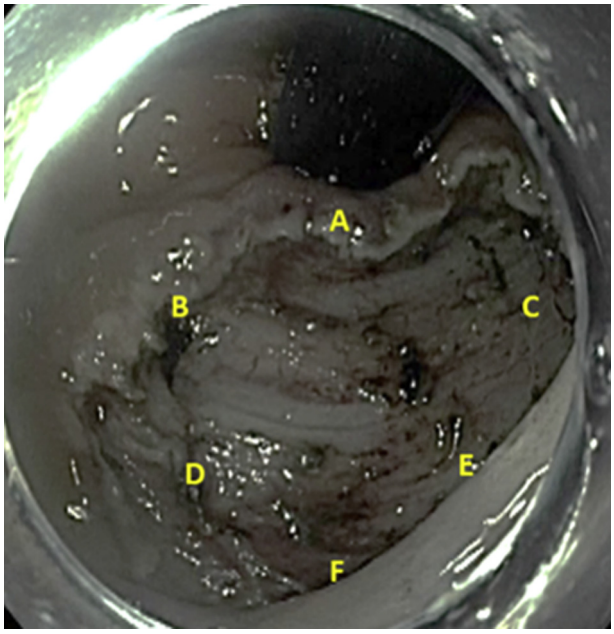

Figure 1. Suturing pattern of endoscopic submucosal dissection defect proceeding from most distal edge (*A*) stepwise to most proximal edge (*F*).

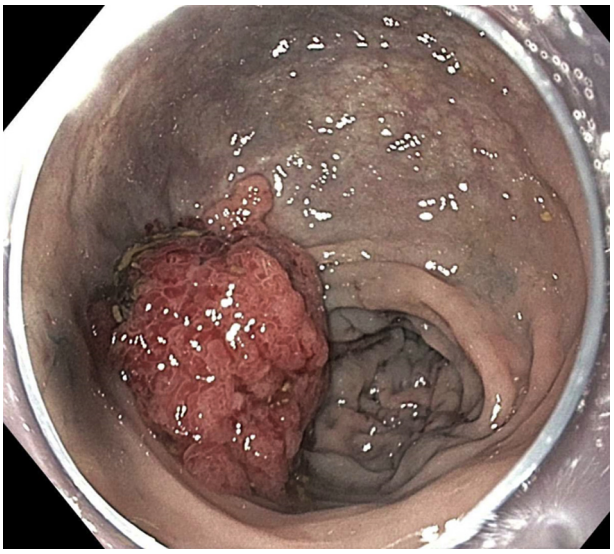

Figure 2. Rectal lesion.

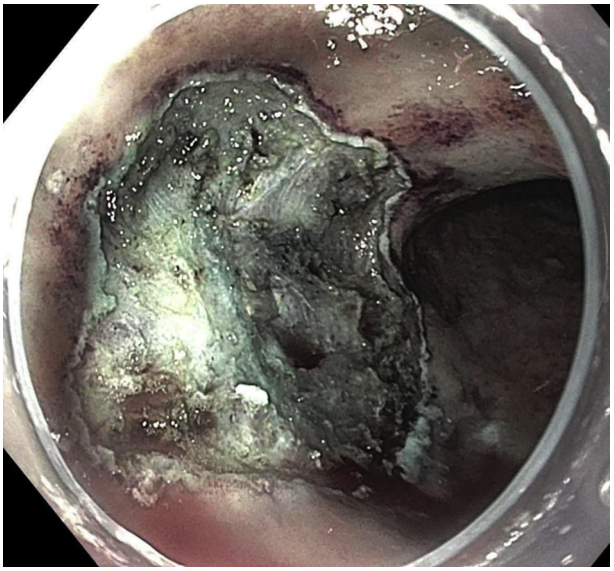

Figure 3. Rectal lesion after endoscopic submucosal dissection.

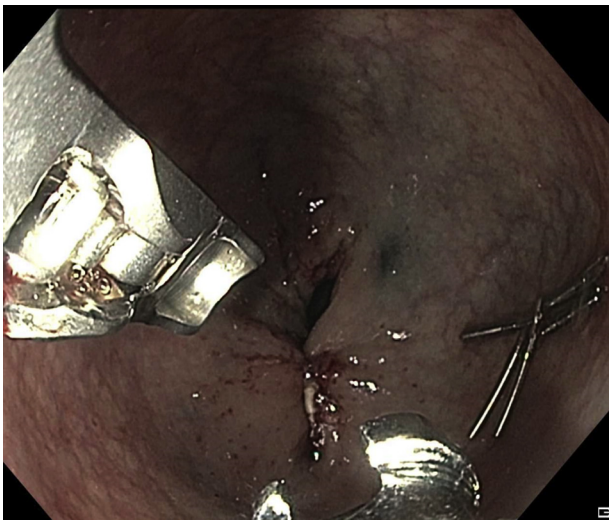

Figure 4. Rectal lesion defect after suturing.

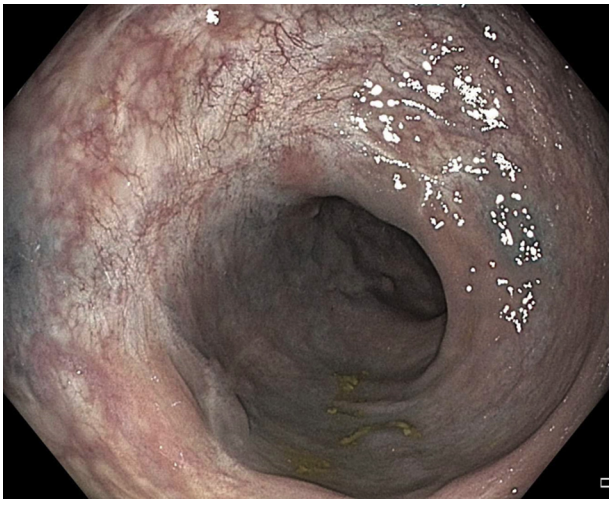

Figure 5. Rectal defect healing seen on surveillance.

RESULTS

In total, we have used this technique successfully in 14 patients, including 4 rectal lesions (Figs. 2-5) and 10 gastric lesions (Figs. 6-9) with a mean lesion size of 3.2 cm (standard deviation 1.9). Pathologic analysis of resection specimens identified neuroendocrine tumors (n = 2), adenocarcinomas (n = 2), tubular adenomas with high-grade dysplasia (n = 2), GI stromal tumors (n = 2), tubulovillous adenoma with high-grade dysplasia (n = 1), villous adenoma (n = 1), fibroma (n = 1), lipoma (n = 1), spindle cell neoplasm (n = 1), and intestinal metaplasia (n = 1). None of the 14 patients had any adverse events, including delayed perforation or bleeding. Furthermore, most patients were able to be discharged the same day without the need for inpatient observation. Healing of mucosal defects after endoscopic suturing did not affect endoscopic surveillance and sampling of the resection scar.

CONCLUSIONS

In summary, this video (Video 1, available online at www.VideoGIE.org) shows the step-by-step process of

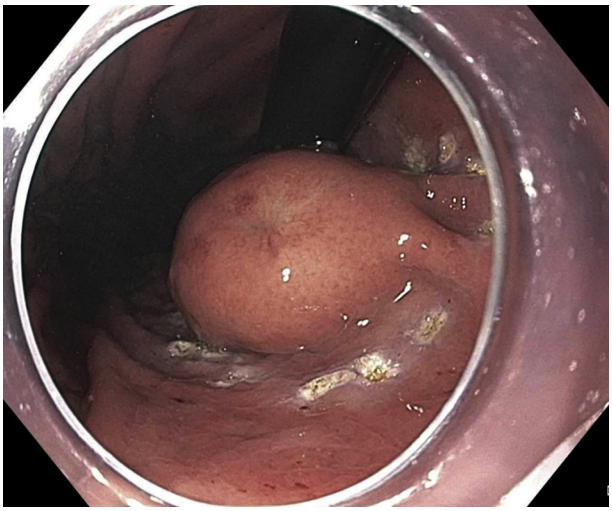

Figure 6. Gastric lesion.

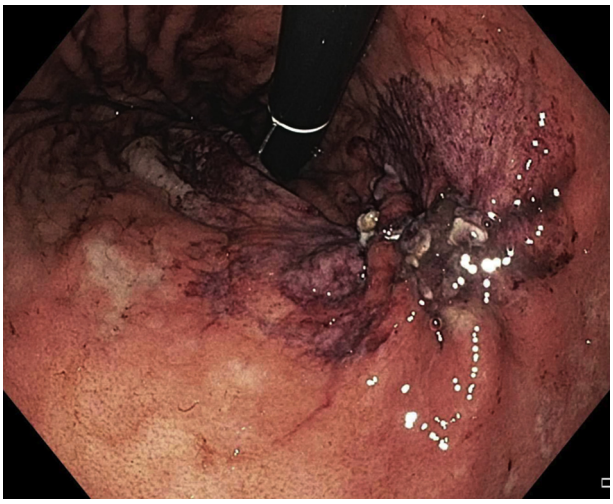

Figure 8. Gastric lesion defect after suturing.

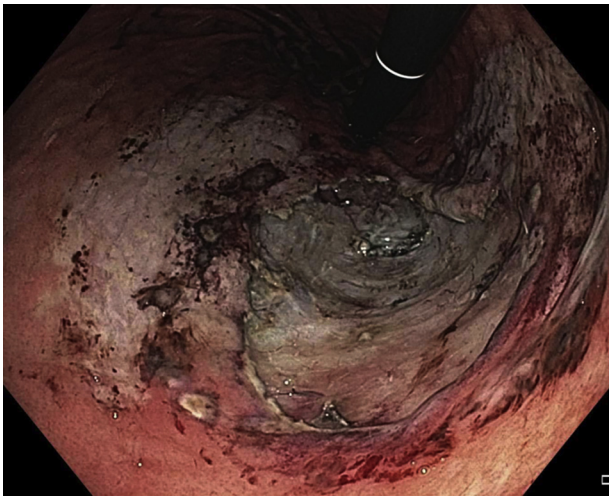

Figure 7. Gastric lesion after endoscopic submucosal dissection.

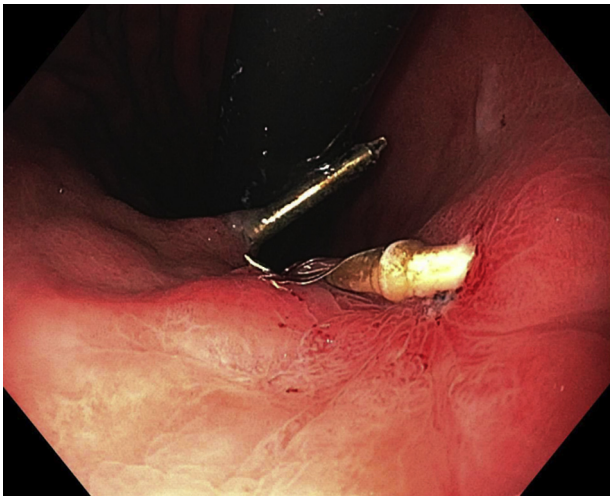

Figure 9. Gastric defect healing on surveillance.

using endoscopic suturing for closure of a post-ESD rectal defect. Endoscopic suturing offers another effective method to close mucosal defects after rectal and gastric ESD. Future studies should examine whether closure by endoscopic suturing can help prevent adverse events such as delayed bleeding or perforation.

DISCLOSURE

Dr Wani is a consultant for Boston Scientific and Medtronic. Dr Kaltenbach is a consultant for Olympus. Dr Soetikno is a consultant for Olympus. Dr Hammad is a consultant for Medtronic. The other author disclosed no financial relationships relevant to this publication.

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Abbreviation: ESD, endoscopic submucosal dissection.

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