



Subpyloric tunneling endoscopic submucosal dissection: a novel technique for safe and successful removal of a challenging duodenal submucosal lesion

Ahmad Najdat Bazarbashi, MD, Phillip S. Ge, MD, Kelly E. Hathorn, MD, Christopher C. Thompson, MD, MHES, Hiroyuki Aihara, MD, PhD

Owing to their anatomic location, submucosal lesions in the proximal duodenal bulb can be challenging to resect by EMR. Here, we present a novel endoscopic submucosal dissection (ESD) technique for successful removal of a duodenal submucosal lesion (Video 1, available online at www.VideoGIE.org).

A 75-year-old man presented with an 8-mm submucosal lesion in the proximal duodenal bulb, immediately distal to the pylorus (Fig. 1). The lesion had previously been incompletely resected with EMR, with pathologic analysis revealing a well-differentiated neuroendocrine tumor. A second resection attempt by the use of EMR with ligation failed, and the patient was thus referred for ESD.

Because of the location of the lesion, a subpyloric tunneling (SPT) technique was developed to facilitate ESD. A 2-cm mucosal incision with use of a needle-type ESD knife (DualKnife; Olympus America, Center Valley, Pa, USA) was created along the greater curve of the gastric antrum approximately 3 to 4 cm proximal to the pylorus. The submucosal space was entered, and a submucosal tunnel was created extending to the pylorus. A partial py-

loromyotomy was performed with a hook-shaped ESD knife (HookKnife; Olympus America) to gain entry across the pyloric channel (Fig. 2). The submucosal tunnel was extended into the proximal duodenal bulb, followed by submucosal dissection underneath the lesion with a 3-mm needle-type ESD knife (Flush Knife; Fujifilm, Stamford, Conn, USA), which allows needle tip visualization for safe dissection (Fig. 3). After completion of submucosal dissection, a circumferential mucosal incision was performed to remove the lesion in en bloc fashion (Figs. 4 to 6). The resection defect was closed with an endoscopic suturing device (Overstitch; Apollo Endosurgery, Austin, Tex, USA), and the tunnel entry site was closed with standard endoscopic clips. The total procedure time was 2 hours and 1 minute. The patient was discharged the same day without any adverse events. Final pathologic examination showed a well-differentiated neuroendocrine tumor, with negative lateral and deep margins (Fig. 7). Repeat endoscopy at 6 months revealed a well-healed scar in the duodenal bulb and gastric antrum, and examination of biopsy specimens had negative results (Fig. 8).

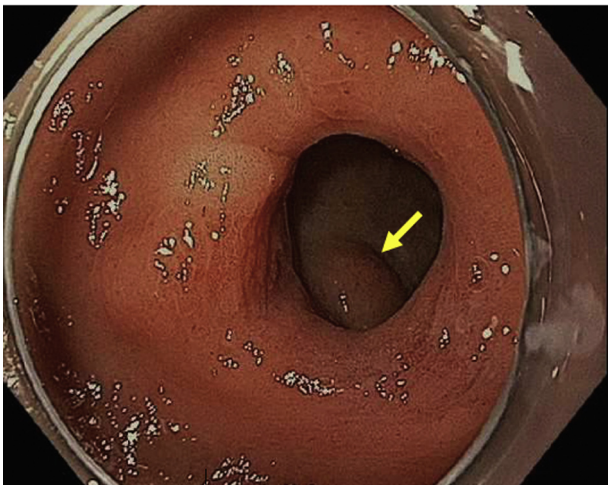


Figure 1. Endoscopic appearance of a subepithelial lesion in the anterior wall of the duodenal bulb, immediately behind the pylorus (yellow arrow).

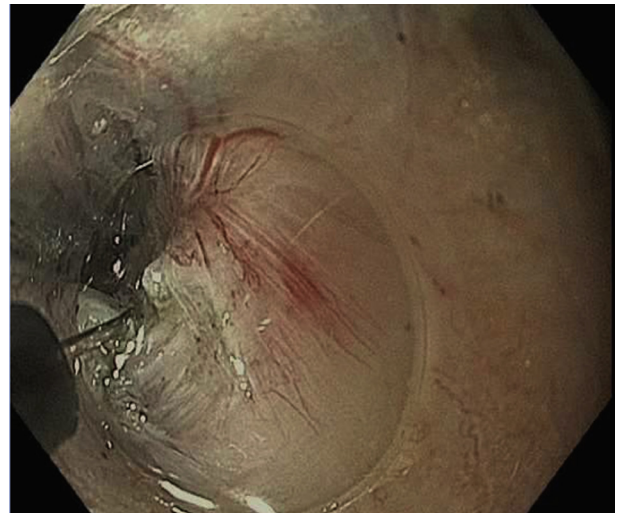


Figure 2. Partial pyloromyotomy to gain entry across the pyloric channel and allow extension of the submucosal tunnel into the duodenal bulb.

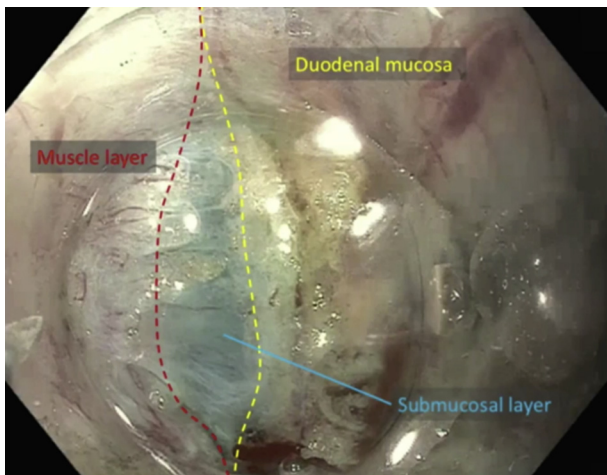


Figure 3. Subpyloric tunneling endoscopic submucosal dissection underneath the lesion in the proximal duodenal bulb.

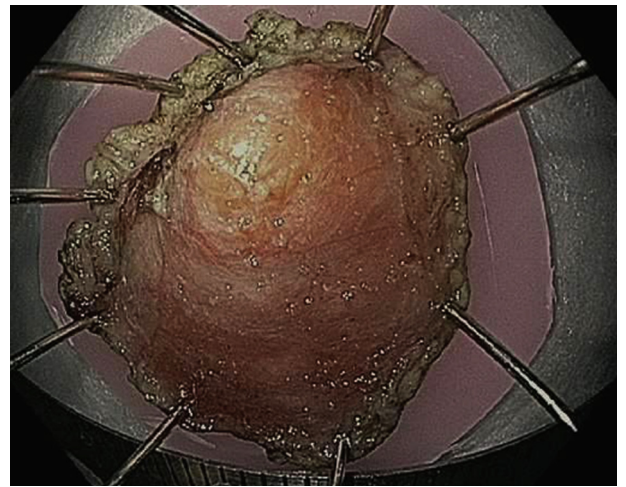


Figure 6. En bloc resection specimen measuring 20 × 20 mm.

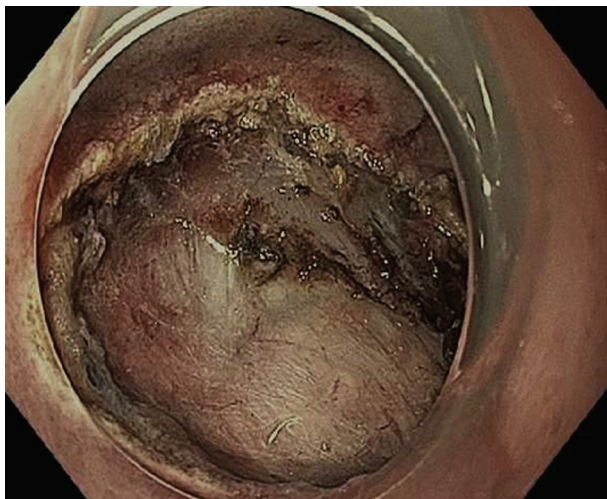


Figure 4. Resection defect after subpyloric tunneling endoscopic submucosal dissection.

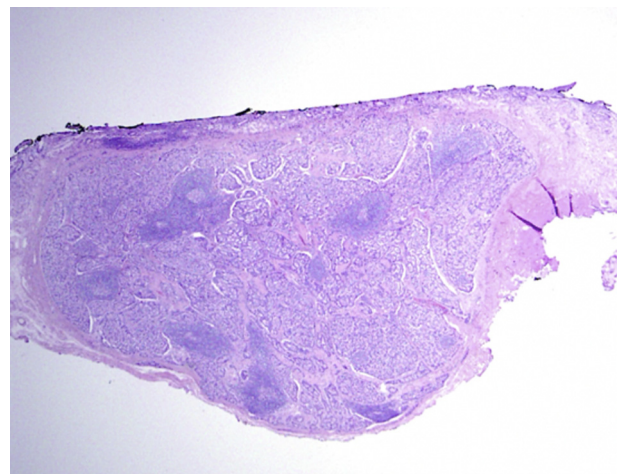


Figure 7. Histopathologic specimen revealing well-differentiated neuroendocrine tumor with negative margins (H&E stain, orig. mag. ×12.5).

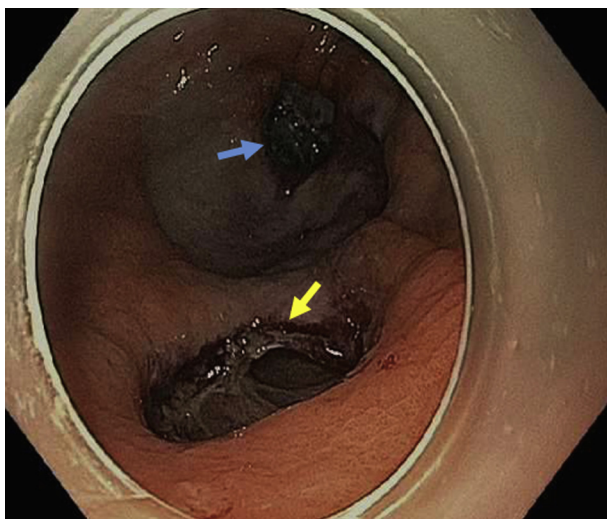


Figure 5. Endoscopic view revealing the entrance of the subpyloric tunnel (yellow arrow) and resection defect in the duodenal bulb (blue arrow).

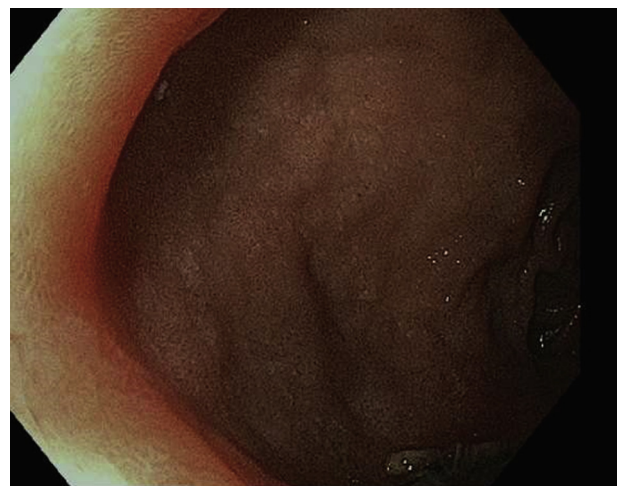


Figure 8. Well-healed resection scar with no evidence of recurrence at 6-month follow-up visit.

Duodenal submucosal lesions are typically resected with EMR with ligation or cap-assisted EMR.¹ Endoscopic full-thickness resection has been previously described²; however, this was not feasible in this case because of the proximity of the lesion to the pylorus. Finally, this case was not amenable to submucosal tunneling endoscopic resection because neuroendocrine tumors of the small intestine originate from the mucosal layer.³

ESD allows for en bloc resection with controlled margins and therefore is useful when EMR is unsuccessful or when there is a recurrent tumor.⁴ In the present case, owing to the location, initial submucosal entry in the duodenal bulb appeared to be extremely challenging. Therefore, SPT-ESD was developed as a strategy to first complete the submucosal dissection underneath the lesion through a submucosal tunnel originating from the gastric antrum, followed by a circumferential mucosal incision to complete the resection. Although techniques for subepithelial lesion resection at the gastric cardia have been described,⁵ this case is unique in that dissection occurred beneath the pylorus in the submucosal plane to access the duodenal bulb. Despite the need to perform a limited pyloromyotomy to gain access into the proximal duodenum, our patient did not experience symptoms of reflux, pyloric stenosis, or rapid gastric emptying at the 6-month follow-up visit.

In conclusion, SPT-ESD is a novel endoscopic technique that allows for the safe and effective resection of submucosal lesions in the proximal duodenal bulb that would otherwise be inaccessible for either EMR or conventional ESD.

DISCLOSURE

Dr Thompson is a consultant for Olympus America, Apollo Endosurgery, and Boston Scientific. Dr Aihara is a consultant for Fujifilm Medical Systems, Boston Scientific, and Olympus America. All other authors disclosed no financial relationships relevant to this publication.

Abbreviations: ESD, endoscopic submucosal dissection; SPT, subpyloric tunneling.

REFERENCES

1. Kim TW, Kim GH, Park DY, et al. Endoscopic resection for duodenal subepithelial tumors: a single-center experience. *Surg Endosc* 2017;31:1936-46.
2. Bauder M, Schmidt A, Caca K. Endoscopic full-thickness resection of duodenal lesions: a retrospective analysis of 20 FTRD cases. *United European Gastroenterol J* 2018;6:1015-21.
3. Lundqvist M, Wilander E. A study of the histopathogenesis of carcinoid tumors of the small intestine and appendix. *Cancer* 1987;60:201-6.
4. Ge P, Thompson C, Aihara H. Successful removal of duodenal submucosal tumors with endoscopic submucosal dissection. *VideoGIE* 2018;3:275-8.
5. Lu J, Cheng M, Jiao T, et al. Transcardiac tunneling technique for endoscopic submucosal dissection of gastric fundus tumors arising from the muscularis propria. *Endoscopy* 2014;46:888-92.

Division of Gastroenterology, Hepatology and Endoscopy, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts, USA.

Copyright © 2019 American Society for Gastrointestinal Endoscopy. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.vgje.2019.03.019>