Endoscopic ampullectomy of a large neuroendocrine tumor using underwater EMR technique

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Neuroendocrine tumors (NETs) arise from the enterochromaffin cells derived from the endoderm.[1,2] GI NETs are a group of well-differentiated tumors, most commonly involving the appendix. NETs of the ampulla of Vater are extremely rare; thus, the natural history of these tumors is not clear. Rarely, they can have distant metastases.[2-4] The standard of care has been complete surgical resection, such as pancreaticoduodenectomy or local surgical excision of the tumor, which has a high morbidity. Hence, endoscopic resection modalities such as endoscopic ampullectomy are increasingly being implemented.[1,5-7] Underwater endoscopic mucosal resection (uwEMR) of flat colorectal polyps has been reported to achieve higher en bloc resection rates without increasing the rate of adverse events.[8] This technique has not been reported for endoscopic ampullectomy. Here, we present a case of successful endoscopic ampullectomy of a large (35 mm) NET using the uwEMR technique.

CASE

A 59-year-old man was incidentally found to have a 35-mm ampullary mass on a routine EGD for dyspepsia.

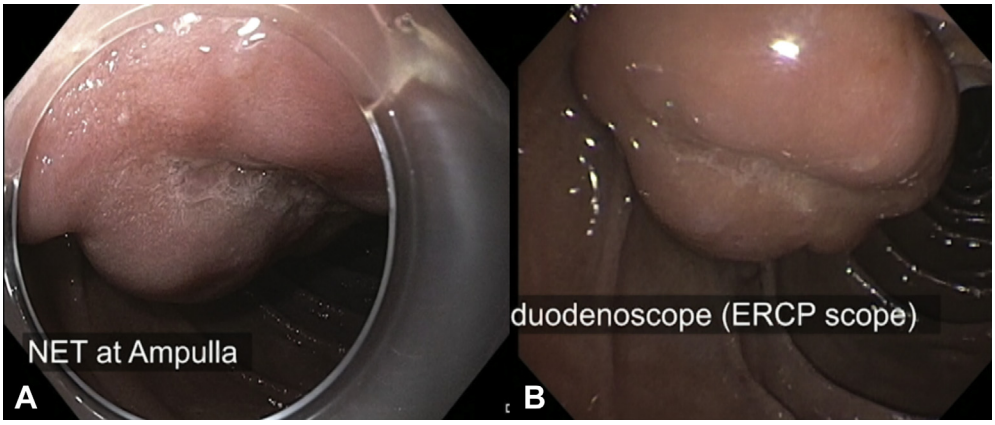

Figure 1. Forward (**A**) and side (**B**) endoscopic views of the ampullary neuroendocrine tumor.

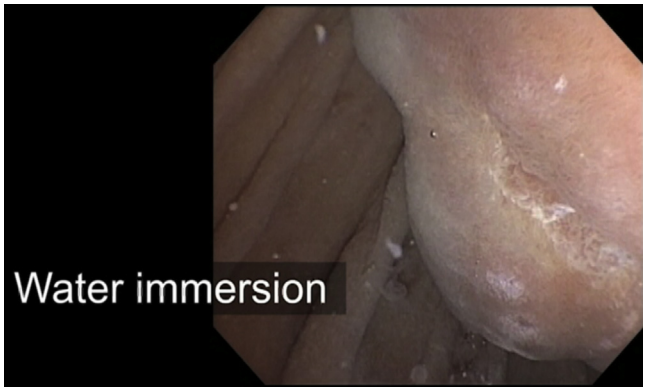

Figure 2. Water immersion with the side-viewing duodenoscope.

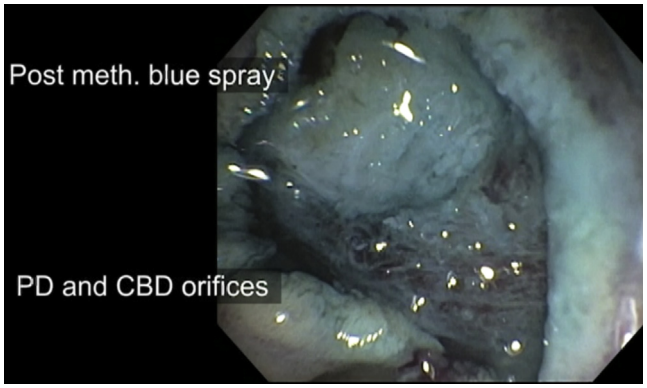

Figure 3. Postresection bed with pancreatic duct (PD) and common bile duct (CBD) orifices.

Biopsy specimens showed a low-grade well-differentiated NET. CT and EUS confirmed no peritumoral lymphadenopathy, no ductal involvement, and no metastatic disease. After discussion of endoscopic and surgical treatment options, the patient elected for endoscopic ampullectomy.

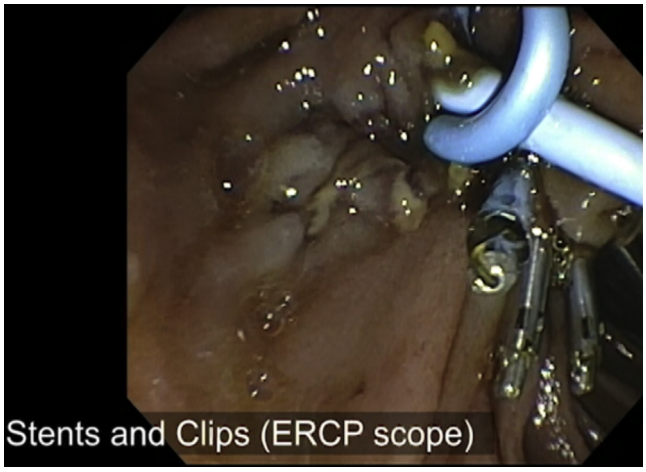

Figure 4. Postresection stent and clips.

TECHNIQUE

Once the lesion was re-identified (Fig. 1), water immersion of the duodenum was performed (Fig. 2). Using a 33-mm stiff round snare, we performed an ampullectomy en bloc with the Endocut-Q setting on an ERBE generator (VIO 300D, ERBE, Marietta, GA, USA). The specimen was grasped with the snare and retrieved with some difficulty in navigating the pyloric channel. Methylene blue diluted with saline solution was sprayed into the submucosal space within the resection defect using a sphincterotome, and no residual NET was identified (Fig. 3). The pancreatic and biliary orifices were identified within the resection defect (Fig. 3). Temporary plastic stents were placed in the pancreatic and bile ducts. Using an EGD endoscope with a distal attachment, we successfully placed endoclips to approximate the resection defect around the stents (Fig. 4).

Pathology results confirmed a 35-mm well-differentiated, grade 1 NET that stained positive for chromogranin A and synaptophysin and had no lymphatic, vascular, or perineural invasion (Figs. 5A, gross; 5B, histopathology). The mitotic rate was low at less than 2 mitoses/2 mm^2, and the Ki 67 index was less than 3%. Resection margins were negative for tumor.

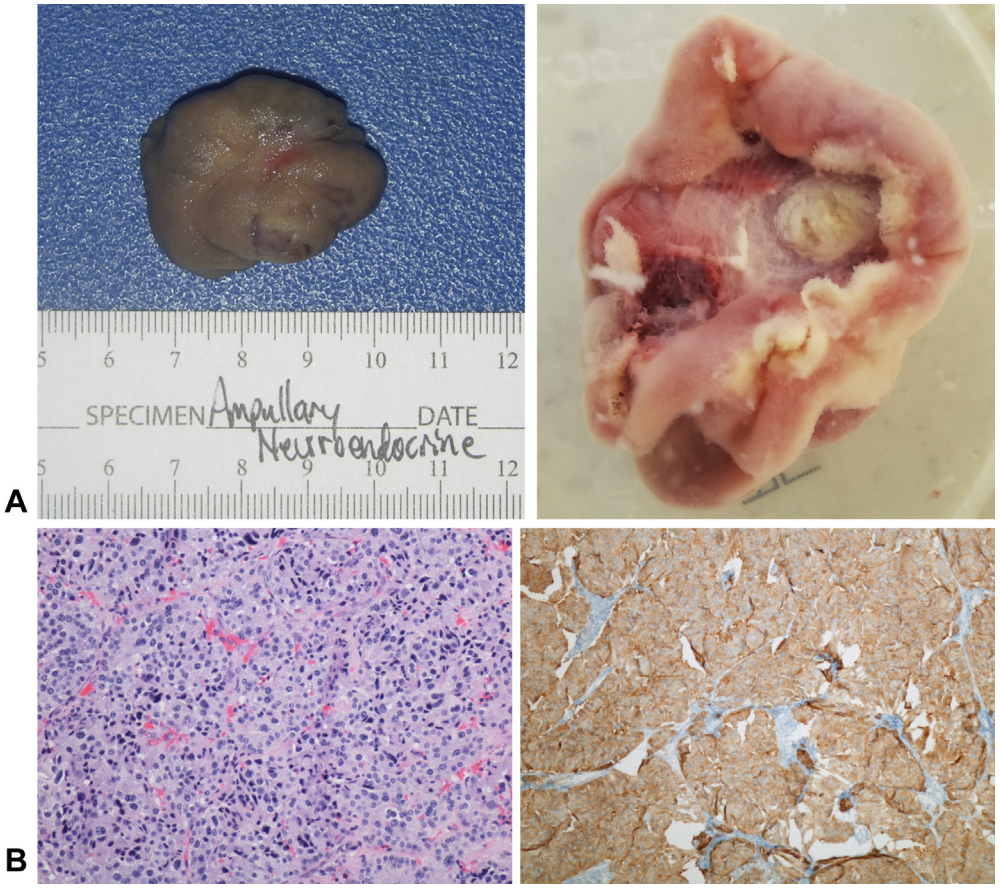

Figure 5. A, Gross view of the specimen (mucosal and submucosal views). **B,** Histopathology testing (hematoxylin and eosin stain and synaptophysin stain).

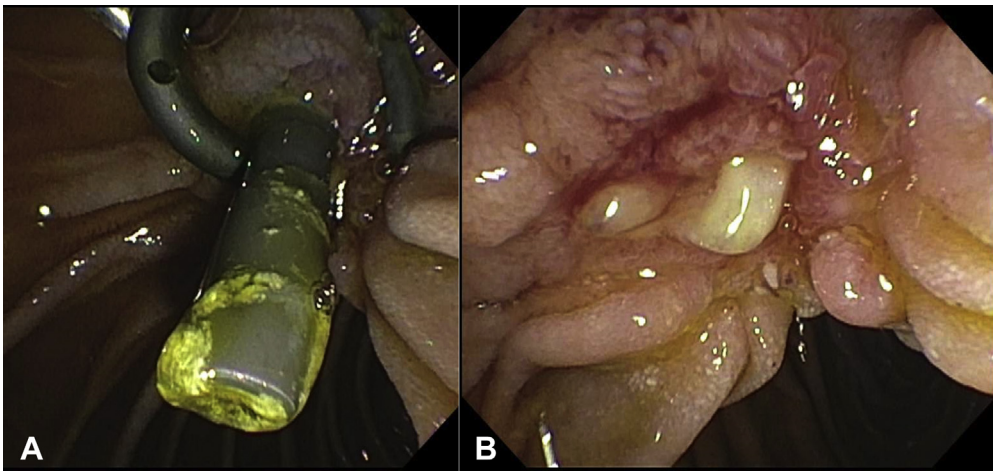

Figure 6. Endoscopic view with (**A**) and without (**B**) stents at 1-month follow-up.

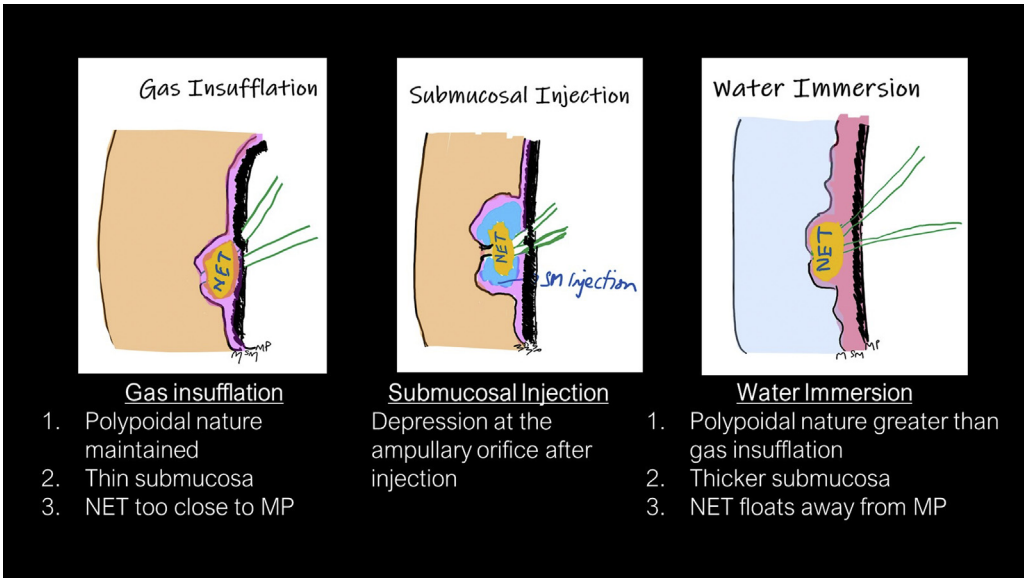

Figure 7. Sketch showing the differences in ampullectomy with gas insufflation, submucosal injection, and water immersion. *NET*, Neuroendocrine tumors; *MP*, muscularis propria.

The patient had no bleeding after the procedure. A follow-up endoscopy was performed to remove the stents after 1 month (Fig. 6). Surveillance was emphasized on follow-up.

DISCUSSION: KEY LEARNING POINTS

The technique of endoscopic ampullectomy is variable among endoscopists. For submucosal lesions, such as in this case, we postulated that air/CO_2 insufflation could potentially make the submucosa thin or taut and prevent an en bloc resection. In addition, submucosal injection may not stay underneath the NET at the ampulla because of the presence of the bile/pancreatic ducts and could potentially prevent submucosal expansion underneath the tumor. On the other hand, water immersion allows for natural mucosal and submucosal in-folding and resection without capturing muscularis propria despite the lack of submucosal fluid injection (Fig. 7). The uwEMR technique has a higher rate of en bloc resection of flat mucosal polyps without increasing the risk of perforation.[8] Hence, the uwEMR technique was chosen for removal of this large ampullary NET. Although this technique can potentially resect submucosal lesions larger than the size of the snare, those with a larger base and involvement of muscularis propria may not be appropriate for uwEMR.

Video 1 (available online at www.VideoGIE.org) demonstrates use of uwEMR technique for resection of ampullary NET and use of a forward-viewing endoscope with a distal attachment to place clips at the ampullectomy site.

DISCLOSURE

All authors disclosed no financial relationships.

Abbreviations: NET, neuroendocrine tumors; uwEMR, underwater endoscopic mucosal resection.

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