



## Water-pocket endoscopic submucosal dissection of an early esophageal adenocarcinoma in a patient with portal hypertension and varices

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The patient is a 65-year-old man with alcohol-related liver disease and chronic obstructive pulmonary disease who was referred for recently diagnosed esophageal adenocarcinoma on a background of varices during screening endoscopy for varices (Fig. 1). EUS demonstrated a hypoechoic mass of 2 cm invading into the deep mucosa (Fig. 2). Two enlarged lymph nodes were noted in the celiac region, but FNA testing was negative for malignancy. Positron emission tomography–CT scan showed localized disease with no distant metastasis. Considering the patient's age and comorbidities, a decision was made to proceed with endoscopic resection using water-pocket endoscopic submucosal dissection (WP-ESD).

### PROCEDURE

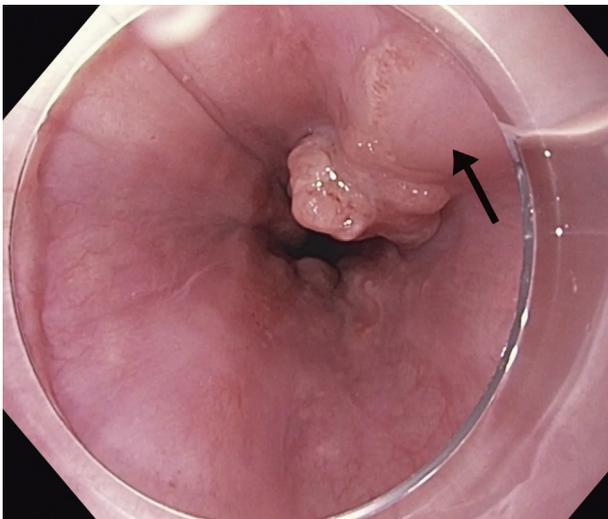
In WP-ESD, dissection was carried out in the submucosa beneath the target lesion within a locally created water pool to create a submucosal tunnel. The lesion then was resected (Fig. 3, Video 1, available online at [www.VideoGIE.org](http://www.VideoGIE.org)).<sup>1-3</sup>

After induction of general anesthesia and endotracheal intubation, the esophageal lesion was identified in the lower esophagus overlying a varix. Thermal marking using

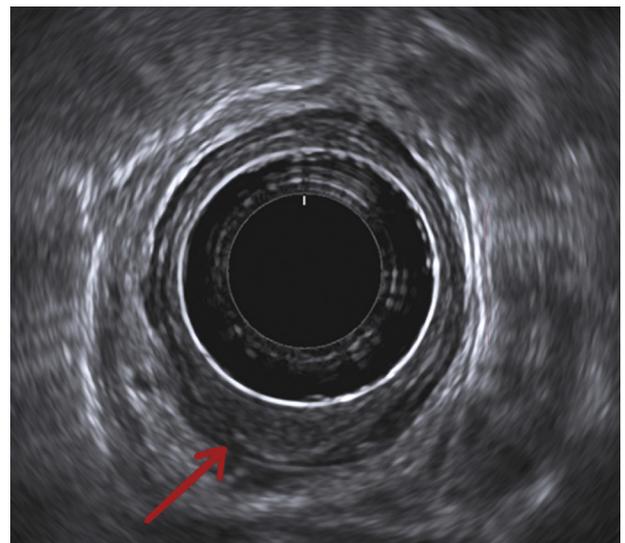
argon plasma coagulation was performed to mark the boundary of the lesion. Coagulation overlying the varix was avoided. A solution of hydroxypropyl methylcellulose with dilute epinephrine and methylene blue was submucosally injected before mucosal incision. A longitudinal mucosotomy was performed 2 cm proximal to the lesion using the HybridKnife T-type (ERBE Elektromedizin, Tübingen, Germany).

Initial bleeding at the mucosotomy site was controlled with the tip of the knife. The cap-fitted waterjet endoscope entered the mucosotomy site, and a submucosal tunnel was created using the HybridKnife. The submucosal space was expanded using the jet function of the HybridKnife with injection of saline solution stained with methylene blue. Dissection of the submucosa was performed under sterile water immersion using the pedal-activated waterjet irrigation function of the endoscope. Water immersion and creation of a water pocket both eliminates electrosurgical smoke that interferes with visualization and magnifies the field of view, allowing excellent identification of submucosal vessels for preemptive coagulation.

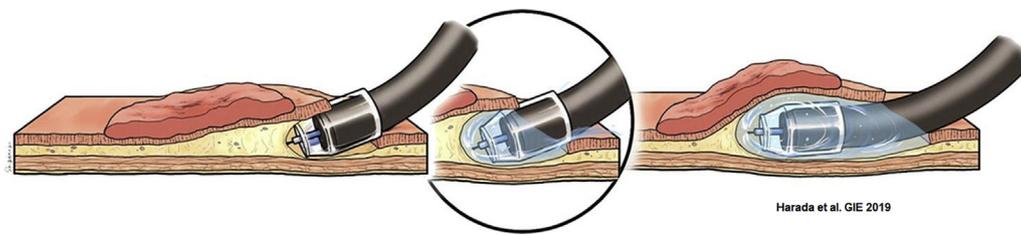
Throughout the submucosal tunneling process, several small and larger vessels were encountered. Fluid expansion



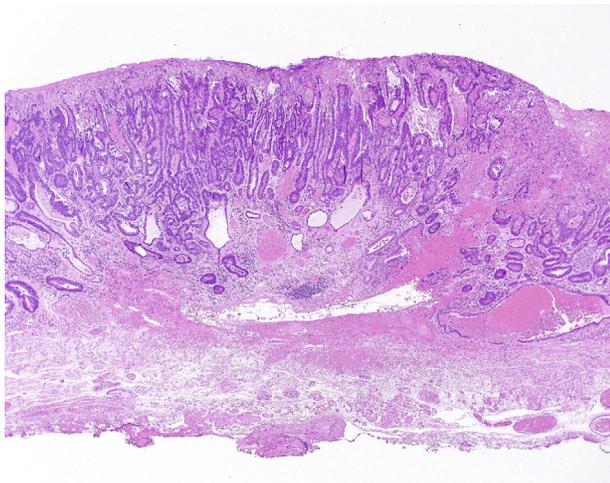
**Figure 1.** Lesion is seen overlying a varix on endoscopy (arrow).



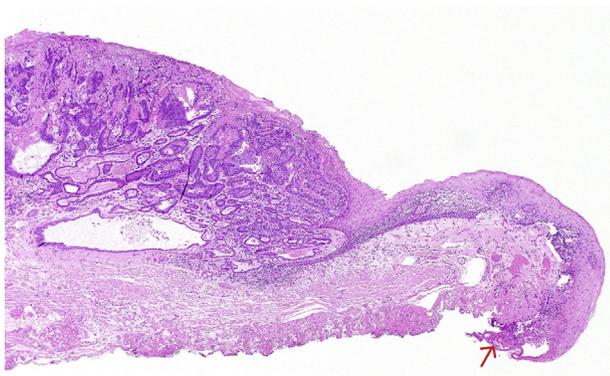
**Figure 2.** Endoscopic ultrasound shows a hypoechoic mass invading into the deep mucosa (red arrow).



**Figure 3.** Illustration showing dissection in the submucosa under the target lesion within a locally created water pool to create a submucosal tunnel.



**Figure 4.** Low-power view showing intramucosal adenocarcinoma arising in a background of low- and high-grade dysplasia (H&E, orig. mag.  $\times 40$ ).



**Figure 5.** Low power showing uninvolved lateral resection margin (arrow) (H&E, orig. mag.  $\times 40$ ).

of the submucosal space and use of the water-pocket technique enabled stretching and thinning of these vessels to permit coagulation and sectioning using the HybridKnife on the forced coagulation setting. Bleeding points were readily identified under water immersion and controlled with the electro-surgical knife. The water-pocket submucosal tunneling procedure was extended approximately 1 cm beyond the distal end of the neoplasm.

Once the submucosal tunneling was completed, the lateral boundaries of the lesion were incised using the Clutch-Cutter knife (DP2618DT; Fujifilm Corporation, To-

kyo, Japan) until the distal margin of the lesion was reached. The Clutch-Cutter is a rotatable scissor-type electro-surgical knife that allows efficient resection of the mucosal flap at the lesion boundary. After lateral incision of the mucosal margins, the lesion remained on a small distal pedicle; varices were visualized under the surface of the neoplasm.

Additional submucosal fluid was injected, followed by careful dissection of the pedicle using the Clutch-Cutter knife. Once the tissue was grasped by the knife, coagulation current was applied to seal the vessels, followed by cutting current to section the tissue. The entire lesion was resected en bloc without immediate adverse events. The resected specimen (measuring  $3.7 \times 2.2$  cm) was grasped with the Clutch-Cutter knife and removed for histopathology. The resection bed was clean and dry. This procedure took 1 hour and 10 minutes to complete, and the patient was admitted overnight for observation. He was discharged after an uneventful stay. No delayed bleeding was reported.

## OUTCOME

Histopathology examination showed intramucosal adenocarcinoma with negative margins and no lymphovascular invasion (Figs. 4 and 5). Several case reports have demonstrated the safety and feasibility of conventional ESD for superficial esophageal cancer in patients with cirrhosis and esophageal varices.<sup>4,6</sup> WP-ESD provides better visualization than the air insufflation method and allows hemostasis to be secured before the tumor is resected endoscopically. WP-ESD is feasible and safe for the resection of early esophageal cancer in the setting of varices when performed by endoscopists with expertise in endoscopic submucosal dissection.

## DISCLOSURE

*Dr Song is a consultant for Olympus and Boston Scientific. Dr Iyer has received research funding from Exact Sciences, Pentax Medical, and Medtronic and is a consultant for Medtronic, Pentax Medical, and Symple Surgical. All other authors disclosed no financial relationships.*

*Abbreviation: WP-ESD, water-pocket endoscopic submucosal dissection.*

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