

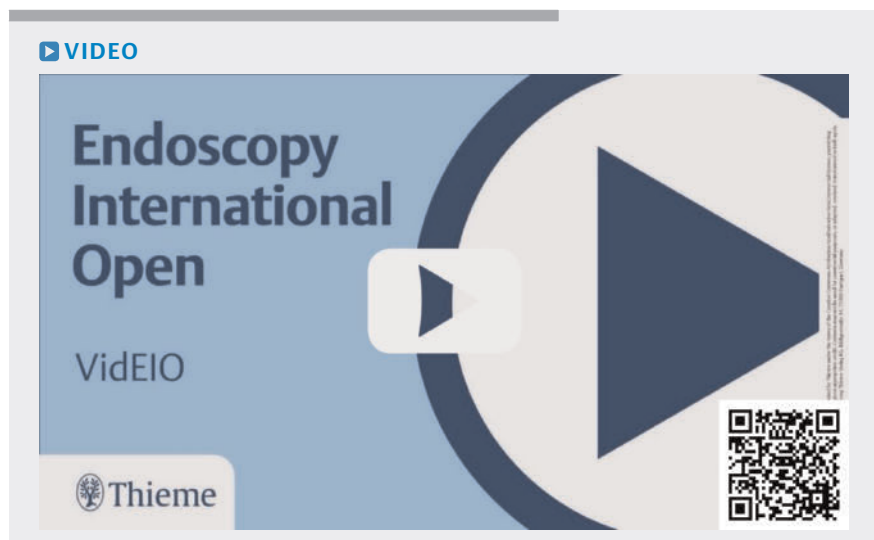
Water pressure method for endoscopic submucosal dissection of a rectal tumor on the gravitational side close to the dentate line ▶

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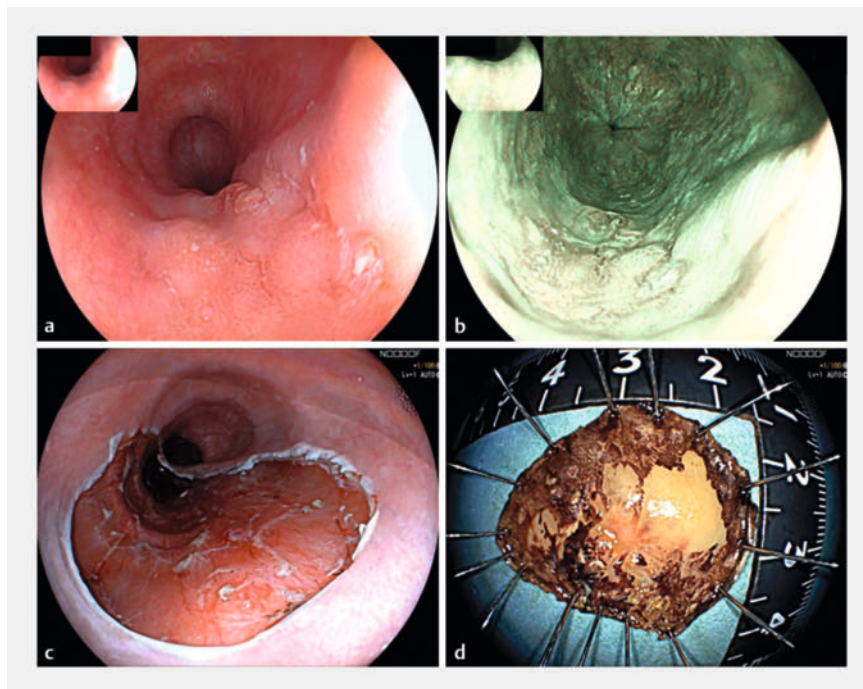
Adequate submucosal exposure and visibility are vital for effective and safe endoscopic submucosal dissection (ESD) [1]. For lesions located on the gravitational side, the mucosal flap tends to collapse as the dissection proceeds which hinders subsequent operation [2]. Position change for gravity assistance is usually preferred in this circumstance, but not always applicable [3]. In this case, we present use of the water pressure method (WPM) to facilitate ESD of a rectal tumor on the gravitational side close to the dentate line (▶ **Video 1**).

Case report

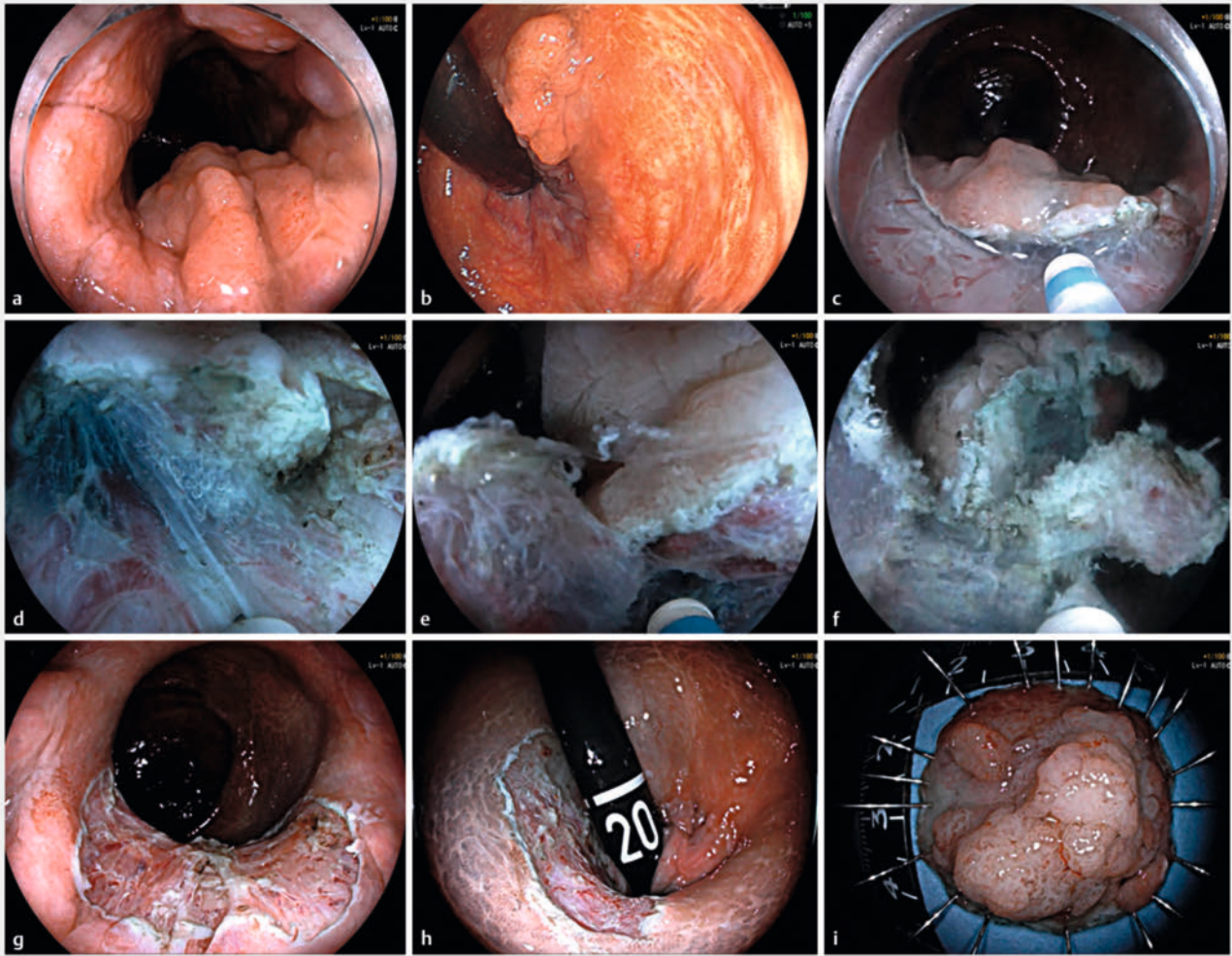
A 62-year-old man was referred with synchronous early esophageal cancer (▶ **Fig. 1a**, ▶ **Fig. 1b**) and a rectal tumor (▶ **Fig. 2a**, ▶ **Fig. 2b**). A strategy of ESD for two lesions at one session was selected. Under general anesthesia with intratracheal intubation, esophageal ESD was completed (▶ **Fig. 1c**, ▶ **Fig. 1d**), followed by rectal ESD. A shallow incision in the mucosa was begun on the anal side. Because the tumor was close to the dentate line, a narrow anal lumen limited endoscopic maneuverability. Furthermore, the mucosal flap collapsed due to gravity (▶ **Fig. 2c**), making dissection difficult within the narrow submucosal space. Given the inconvenience of position change, WPM was adopted. The floating force exerted a natural countertraction against gravity, while active water pressure was appropriately applied as a complement (▶ **Fig. 2d**, ▶ **Fig. 2e**, ▶ **Fig. 2f**). En bloc resection was achieved without major bleeding or perforation (▶ **Fig. 2g**, ▶ **Fig. 2h**, ▶ **Fig. 2i**). Postoperative antibiotics were administered and no adverse events occurred other than transitory fever. Histopathology identified the rectal tumor as a tubular adenoma with high-grade dysplasia and R0 resection (▶ **Fig. 3**).



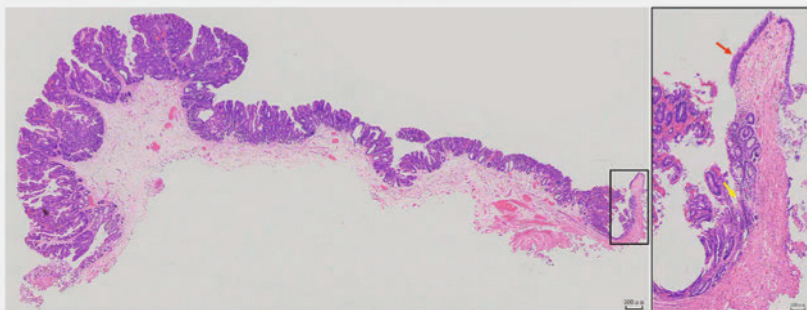
▶ **Video 1** Water pressure method for endoscopic submucosal dissection of a rectal tumor on the gravitational side close to the dentate line.



▶ **Fig. 1** **a** White-light imaging of the esophageal lesion. **b** Blue laser imaging of the esophageal lesion. **c** Endoscopic submucosal dissection was performed smoothly. **d** The resected esophageal specimen, which pathology confirmed was moderate-differentiated esophageal squamous cell carcinoma invading the lamina propria mucosa with R0 resection.



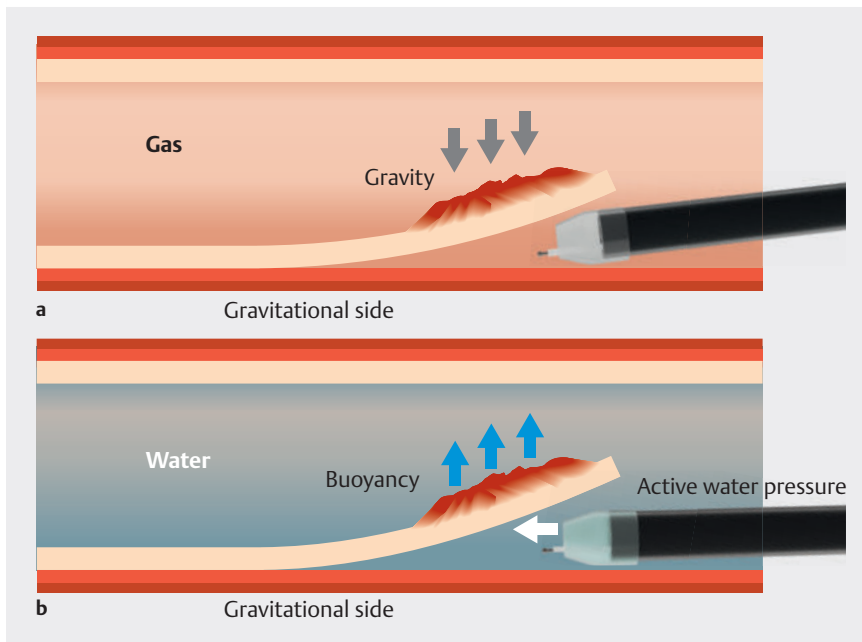
► **Fig. 2** **a** Forward and **b** retroflexed view of colonoscopy revealed a 25-mm protruding lesion (Paris type 0-I_s) in the left wall of the rectum extending close to the dentate line. **c** The collapsed mucosal flap after a C-shape mucosa incision. **d** After applying the water pressure method, buoyancy under water immersion provided a countertraction that better exposed the submucosa. The underwater magnified effect also improved visualization during dissection. **e** The lateral mucosal flap was effectively lifted via active water pressure. **f** Buoyancy was continuous during the whole procedure. **g** Forward view showing a minor inner circular muscle injury. **h** Retroflexed view of the ulcer after resection. **i** Resected rectal specimen.



► **Fig. 3** Histopathology revealed a tubular adenoma with focal high-grade dysplasia with clear vertical and horizontal margins. A stratified squamous epithelium of the anal canal was noted (red arrow), close to the distal margin of the lesion (yellow arrow).

Conclusions

Although various traction techniques have been proposed [4, 5], WPM requires no special devices and is easy to use; therefore, it may be an alternative option to facilitate difficult ESD, especially for lesions on the gravitational side in patients for whom position change is difficult (► **Fig. 4**). Furthermore, WPM could be combined with adjunctive traction devices as needed.



► **Fig. 4** Schematic illustration of the water pressure method to facilitate endoscopic submucosal dissection of a lesion located on the gravitational side. **a** Under conventional gas insufflation, the mucosal flap collapses due to the gravity, leaving insufficient submucosal operation space. **b** With the water pressure method, buoyancy makes the mucosal flap float up against gravity, while active water pressure via water-jet of endoscope is utilized as a complement to lift the mucosal flap that expands submucosal space.

Conflict of Interest

The authors declare that they have no conflict of interest.

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