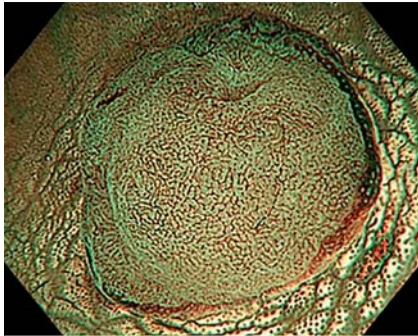
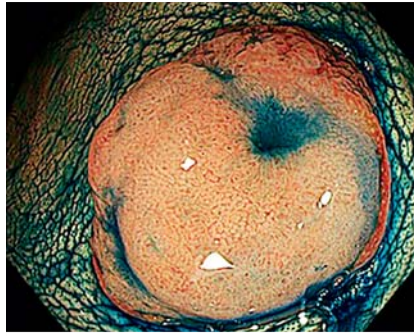


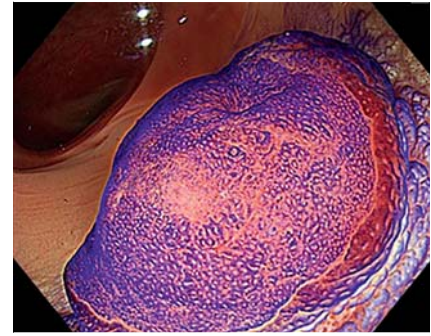
Underwater endoscopic mucosal resection with submucosal injection

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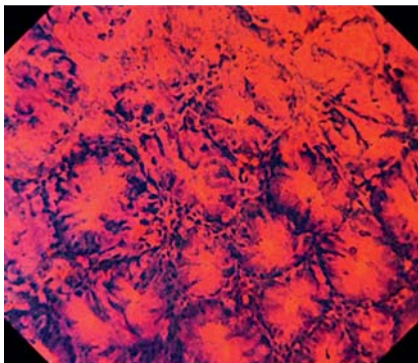
► **Fig. 1** Using magnifying endoscopy with narrow-band imaging, slightly irregular vessel and surface patterns were observed, and the lesion was diagnosed as type 2B by Japan NBI Expert Team classification, suggesting high grade cancer.



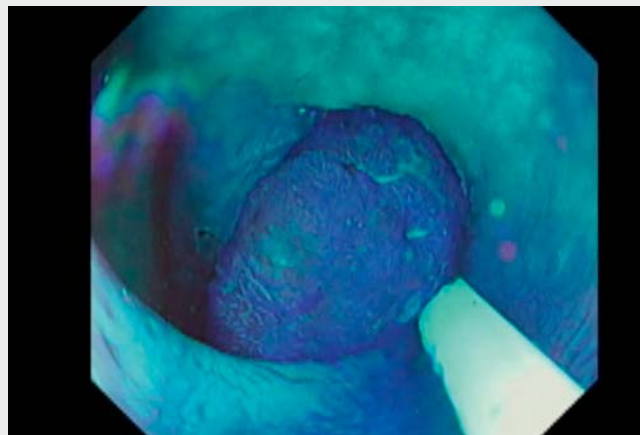
► **Fig. 2** Indigo carmine dye showed the demarcation line of the depression, with central elevation of the depressed area. The diagnosis was a nonpolypoid lesion and the macroscopic appearance was Paris type 0-IIa + IIc.



► **Fig. 3** Magnifying endoscopy with crystal violet staining showed an irregular pit pattern (Vi, noninvasive) in the lesion and type I pit at the margin, suggesting non-polypoid-type early cancer.



► **Fig. 4** Endocytoscopy showed the disordered arrangement of the stained nuclei (EC 3a by EC classification) [5].



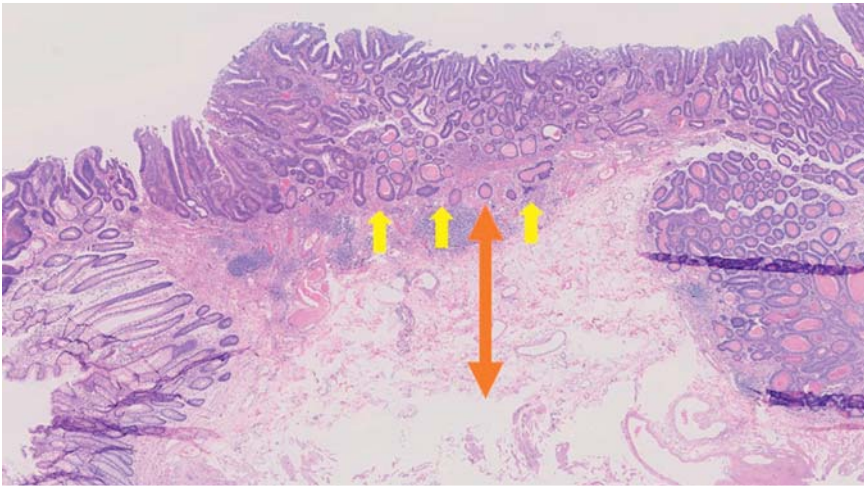
► **Video 1** Underwater endoscopic mucosal resection with submucosal injection.

Underwater endoscopic mucosal resection (UEMR) is rapidly gaining popularity as a treatment that is easier than conventional EMR and endoscopic submucosal dissection (ESD) because submucosal injection is not necessary owing to the floating effect of tissue under water [1, 2]. However, it is currently unclear whether UEMR can ensure deep enough margins for pathological evaluation of early-stage colorectal cancer [3]. We present a case of modified UEMR with submucosal injection after underwater conditions have been established (UIEMR).

The patient was a 33-year-old woman with a 12 mm lesion in the sigmoid colon. On magnifying endoscopy with narrow-band imaging, the lesion was diagnosed as type 2B by Japan NBI Expert Team classification (► **Fig. 1**) [4]. After indigo carmine dye spray, the lesion showed a well-defined depressed area with central elevation (► **Fig. 2**). The diagnosis was a nonpolypoid lesion and macroscopic appearance was Paris type 0-IIa + IIc. Magnifying endoscopy with crystal violet stain-

ing showed type Vi (noninvasive) pit pattern (► **Fig. 3**). Additional endocytoscopic observation showed the disordered arrangement of the stained nuclei as EC 3a (► **Fig. 4**) [5]. Endoscopic diagnosis was an intramucosal to submucosal superficial carcinoma (high grade dysplasia in Western descriptions). We performed UIEMR to achieve R0 resection (► **Video 1**).

UIEMR is UEMR plus submucosal injection as in conventional EMR. In UIEMR, the en-



► **Fig. 5** The small arrows (yellow) indicate the muscularis mucosae, and the large arrows (orange) indicate the distance between the deepest invasive area and the resection margin (hematoxylin and eosin, ×2).

tire lesion is well elevated compared with conventional EMR. The procedure time in the current case was only 6 minutes including water filling, and there were no obvious complications. The histologic diagnosis was intramucosal, well-differentiated, tubular adenocarcinoma (invasion into the muscularis mucosae) and curative resection was achieved (► **Fig. 5**). With underwater conditions, submucosal injection is easy because the submucosal layer becomes thick, and the lift can be maintained. In addition, the distance from the muscularis propria can be secured with additional saline injection, which may be effective in achieving more reliable R0 resection. UIEMR is an effective method of safely performing R0 resection in cases of suspected superficial colorectal cancer.

Endoscopy_UCTN_Code_TTT_1AQ_2AD

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Competing interests

The authors declare that they have no conflict of interest.

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