

# Multiple tunneling technique for treatment of rectal circumferential laterally spreading tumor with endoscopic submucosal dissection



Fatih Aslan, MD,<sup>1</sup> Zehra Akpınar, MD,<sup>1</sup> Melek Kucuk, MD,<sup>1</sup> Derya Arslan Yurtlu, MD,<sup>2</sup> Belkis Unsal, MD<sup>1</sup>

Endoscopic submucosal dissection (ESD) is a minimally invasive endoscopic treatment, providing en bloc resection of early malignant lesions. En bloc removal of large colorectal lesions is difficult and requires a long time. We report a successful resection of a circumferential laterally spreading tumor in the colon by colorectal ESD with this new and different technique that we believe is used here for the first time. The procedure was performed in the endoscopy unit while the patient was sedated with spinal anesthesia by an anesthesiologist. To achieve en bloc resection and to benefit from gravity-assisted ESD, our plan was first to open 3 different tunnels from the beginning of the lesion toward the proximal site according to the gravitational behavior and maneuvering of the endoscope, and then to connect the tunnels (Fig. 1). A mixture of sodium hyaluronate, indigo carmine, and epinephrine was preferred for submucosal elevation at the anal site of the lesion, where there was a possibility of fibrosis. For the proximal site of the lesion, a mixture of saline solution, epinephrine, and indigo carmine was preferred for cheaper and easier injection. In total, 280 mL of the saline solution mixture and 20 mL of the sodium hyaluronate mixture were used. During the whole procedure, only the dual knife (regular type) was used, with the current set to dry cut (effect 2, power 30 watt) and swift coagulation (effect 4, power 30 watt) with the Erbe Vio 300D electrocautery unit (Erbe Elektromedizin, Tuebingen, Germany).

## CASE REPORT

Colonoscopic examination of a 68-year-old woman revealed a flat lesion with polypoid features at some areas, starting 2 cm from the anal canal and extending 10 cm proximally (Fig. 2). After ESD, the resected tumor was removed en bloc and measured 151 × 97 mm. The procedure time was 273 minutes (Video 1, available online at [www.VideoGIE.org](http://www.VideoGIE.org)). Intramucosal carcinoma was reported by histopathologic examination, and the lateral and vertical margins were clear. No adverse events occurred during or after the procedure. To prevent stricture formation, triamcinolone 40 mg was locally injected into the residual submucosal areas of the artificial ulcer. The patient was discharged on day 5, with advice to take stool softeners and consume liquid and semisolid foods. Control colonoscopies were performed on the 2nd and 4th weeks and the 3rd and 6th months. During the 3rd-month control colonoscopy, a mild stricture was observed, which made the passage of the standard colonoscope (13.4 mm) to the proximal site difficult. Although the patient was asymptomatic, 1 session of balloon dilation was performed as a preventive measure. Six months later, no residual tissue was seen by control colonoscopy (Figs. 3-5).

## DISCUSSION

The lumen size of the colon is limited, and the wall is thin. With the standard ESD technique, the dissected lesion can

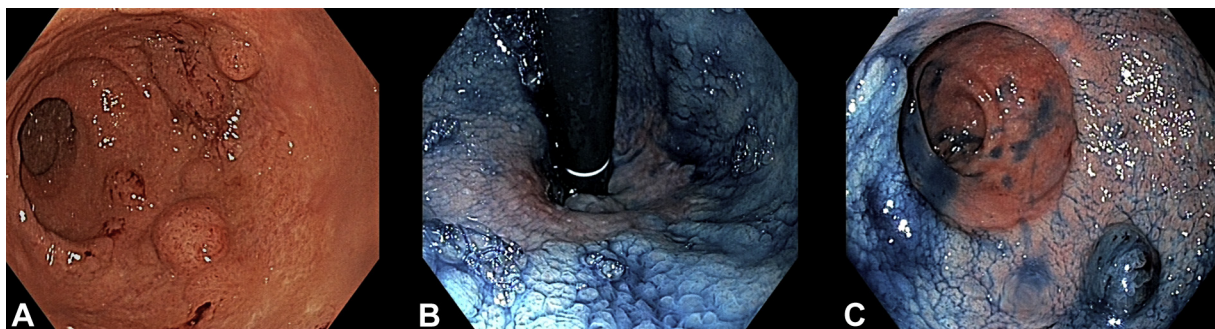
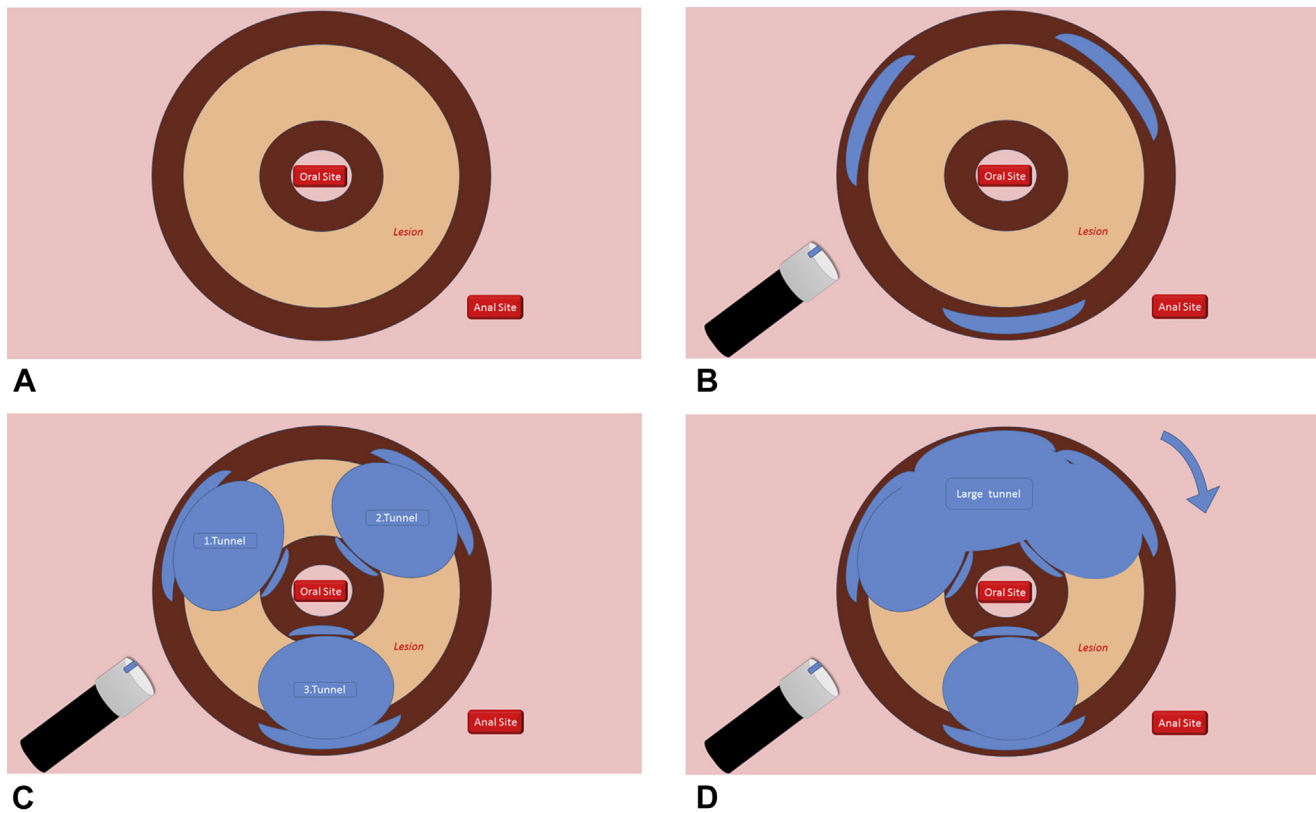
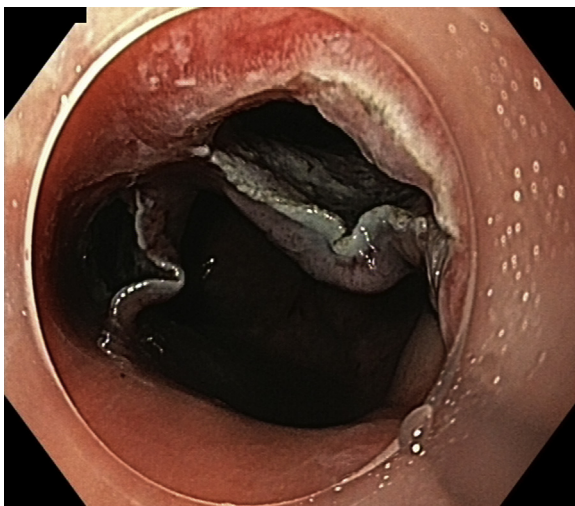


Figure 1. A-C, Endoscopic views of the laterally spreading tumor.

Written transcript of the video audio is available online at [www.VideoGIE.org](http://www.VideoGIE.org).



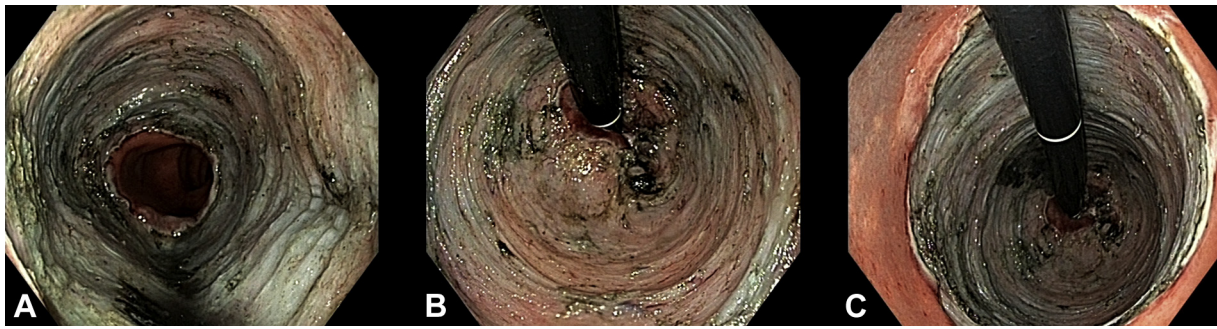
**Figure 2.** Endoscopic submucosal dissection strategy. **A**, Schematic view of the lesion. **B**, Opening the first tunnel from the anal site to the proximal site of the lesion. **C**, Opening 3 different tunnels from the anal site to the proximal site of the lesion. **D**, Joining the tunnels in a sequence.



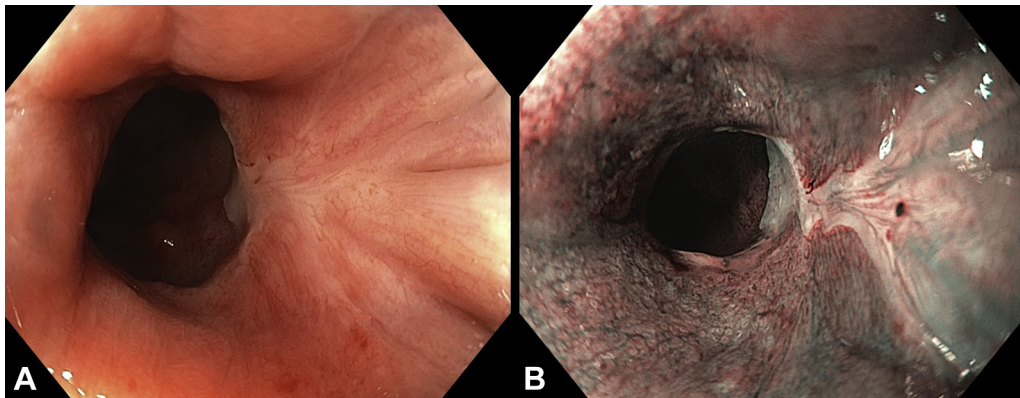
**Figure 3.** Entrances of tunnels at anal site.

completely block the lumen, impair the visibility of the submucosal area, and decrease the maneuvering capacity of the endoscope, and the procedure time may lengthen because of loss of orientation. Multiple tunneling techniques prevent the lesion from falling into the lumen and keep the submucosal area clearly visualized. Because the dissected part is

not mobile, maneuvering with the endoscope is less necessary. The dissection can proceed according to a plan that prevents loss of orientation. Normally, the submucosal area may easily become dirty, and too much use of the hemostatic forceps may be needed because of large vessels and a rich supply of blood with the possibility of bleeding at large lesions. However, with this technique, the main vascular structures are easily reached and isolated, enabling effective homeostasis during the procedure. Additionally, this technique does not require excessive air inflation because insertion of the endoscope into the tunnel itself can help maintain an excellent view. Most ESD procedures, especially in Asian countries, are easily performed with sedative analgesia. However, procedures involving large lesions can be prolonged, markedly increasing the need for and amount of anesthetic agents. Depending on the procedure time, the amount of anesthetic agents may go beyond safe doses. As a result, the success of the procedure may be affected, and the rate of adverse events resulting from anesthesia may increase. In this case, effective and safe spinal anesthesia was performed for 2.5 hours, and the procedure was completed with low-dose sedative analgesia the rest of the time. As a result, given controlled and effective submucosal dissection and homeostasis along with effective use of time, the multiple tunneling technique is an option for en bloc removal of giant circumferential lesions.



**Figure 4. A-C,** Endoscopic views of resected area after the procedure.



**Figure 5. A, B,** Endoscopic views of resected area at the 6th-month control colonoscopy.

## DISCLOSURE

*All authors disclosed no financial relationships relevant to this publication.*

Department of Gastroenterology (1), Department of Anesthesiology and Reanimation (2), IzmirAtaturk Training and Research Hospital, Izmir, Turkey.

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<http://dx.doi.org/10.1016/j.vgie.2016.11.003>