Novel approach to endoscopic submucosal dissection of a cecal lesion with nonlifting sign by submucosal fatty tissue with use of selective-regulation high-pressure water-jet method and immersion in saline solution

Felipe Ramos-Zabala, MD, PhD,1,2 Sabina Beg, MD, PhD,3 Marian García-Mayor, MD,1 Adolfo Parra-Blanco, MD, PhD,3 Luis Moreno-Almazán, MD1,2

Salvage treatment for any lesion demonstrating a nonlifting sign after the failure of previous endoscopic resection is perhaps one of the most challenging scenarios in the endoscopic management of colorectal lesions. Although nonlifting makes resection technically challenging, it does not necessarily imply cancerous invasion and preclude endoscopic therapy.1 Endoscopic submucosal dissection (ESD) is an option in such cases but requires sufficient submucosal elevation to reduce the risk of adverse events.

Fibrosis is a factor related to the performance of incomplete dissections.2 In a previous report, we mentioned the relationship between fatty tissue and complex dissection in the right segment of the colon and described that body mass index in patients with submucosal fatty tissue was statistically significantly higher.3 Previous studies have reported the relationship of high body mass index values and fatty tissue in the submucosal layer.4 ESD with saline solution immersion is recommended in submucosal layer situations where fibrosis and fatty tissue are thought to be influential.5 The water-jet hydrodissection technique has been shown to be effective in underwater ESD in saline solution.3 Video 1 (available online at www.VideoGIE.org) shows the case of an ESD of a cecal lesion with nonlifting sign.

The patient was an obese 72-year-old man with a history of a cardiac condition and aspirin therapy, who was referred to our hospital for rescue endoscopic treatment. The previous colonoscopy report showed a large laterally spreading lesion in the cecum with a nonlifting sign, whereby EMR was not possible, including the underwater technique. The biopsy specimens were interpreted as adenoma with high-grade dysplasia. We thought that in this patient with class 2 obesity, submucosal fatty tissue could have a role in the difficulty of elevating the lesion.

Therapeutic endoscopy was performed with the Erbejet 2 hydrodissection system and T-type hybrid Knife (Erbe, Tubingen, Germany), and a retroview colonoscope (Pentax, Tokyo, Japan) with a distal attachment cap (Olympus, Tokyo, Japan). The dissection was performed without interrupting aspirin therapy. After a lesion was carefully inspected (Fig. 1), thermocautery marks were placed around the lesion edge (Fig. 2).

We used the hydrodissection system in a different way. The Erbejet system allows the water-jet to be used with a regulated pressure according to the location in the GI tract.
For the right segment of the colon, pressures within a range of 10 to 15 are best for ESD and to prevent perforation in the thin wall of the cecum. However, for this patient, we used a 30 bar water-jet to lift the tumor. When the submucosa includes fatty tissue, the tensile strength is higher and submucosal elevation is more difficult. The regulation-selective high-pressure water-jet method can overcome the resistance of the submucosa under these conditions without increasing the risk of perforation (Fig. 3).

After a sufficiently high mucosal elevation, we began cutting to expose the submucosa. Fatty tissue and fibrosis in the submucosal layer were identified as causes of the nonlifting sign (Fig. 4). ESD was performed with the use of immersion in saline solution, with the aim of improving endoscopic view. The saline solution prevented the splashing of fat and improved views through a magnifying effect (Fig. 5). Additionally, immersion in saline solution facilitated traction by flotation of the lesion with submucosal fatty tissue (Fig. 6), and it reduced the risk of water intoxication.
We cut the submucosa using the T-type hybrid knife probe mode, including vertically (Fig. 7). The use of the probe mode allowed progressive dissection and provided greater safety while supporting the knife and performing small pulses of pressure. The cutting diameter was 1.5 mm, and the cutting depth was 0.5 mm. The
resection was completed within 153 minutes without adverse events. The resected specimen size was 50 \times 40\,\text{mm}. Histopathologic examination identified a tubular adenoma with intramuscosal adenocarcinoma with an R0 margin and thickness of the submucosal fatty tissue >1000\,\mu\text{m}, which justified the nonlifting sign (Fig. 8).

In conclusion, this case report illustrates that the regulation-selective water-jet method to perform ESD can be a promising technique to remove colorectal polyps with a nonlifting sign by submucosal fatty tissue. A water-jet pressure of 30 bar can be considered appropriate for hydroadissection of lesions with submucosal fatty tissue in the proximal part of the colon. ESD with the use of immersion in saline solution facilitates the mucosal flap floating effect, which improves visualization of the dissection plane. Prospective and comparative studies are needed to evaluate the efficacy and safety of this new combined method for the treatment of colorectal lesions.

DISCLOSURE

All authors disclosed no financial relationships relevant to this publication.

Abbreviation: ESD, endoscopic submucosal dissection.

ACKNOWLEDGMENT

The authors thank the Service of Anesthesiology and Resuscitation and Department of Pathological Anatomy for their invaluable assistance in the development of this case report, and the endoscopy auxiliary staff for collaborating in this endoscopic submucosal dissection.

REFERENCES

1. Kobayashi N, Saito Y, Sano Y, et al. Determining the treatment strategy for colorectal neoplastic lesions: endoscopic assessment or the non-lifting sign for diagnosing invasion depth? Endoscopy 2007;39: 701-5.
2. Kim EK, Han DS, Ro Y, et al. The submucosal fibrosis: what does it mean for colorectal endoscopic submucosal dissection? Intest Res 2016;14: 358-64.
3. Ramos-Zabala F, Alzina A, Vásquez J, et al. Fatty tissue in the submucosal layer: effect on endoscopic submucosal dissection for laterally spreading tumors (LST) in the proximal colon in Western center [abstract]. Gastrointest Endosc 2017;85:AB382.
4. Yoshida N, Naito Y, Hirose R, et al. Risk of lens cloudiness during colorectal endoscopic submucosal dissection and ability of a novel lens cleaner to maintain and restore endoscopic view. Dig Endosc 2015;27: 609-17.
5. Nagata M. Usefulness of underwater endoscopic submucosal dissection in saline solution with a monopolar knife for colorectal tumors. Gastrointest Endosc 2018;87:1345-53.
6. Ramos-Zabala F, García-Mayor M, Domínguez-Pino A, et al. Combination of immersion in saline solution, pocket-creation method, water-jet hydrodissection, and hybrid knife “probe mode” simplifies endoscopic submucosal dissection in giant rectal polyp. VideoGIE 2019;4: 478-80.