Endoscopic submucosal dissection for large laterally spreading tumors involving the ileocecal valve and terminal ileum

Gustavo Kishimoto, Yutaka Saito, Hajime Takisawa, Haruhisa Suzuki, Taku Sakamoto, Takeshi Nakajima, Takahisa Matsuda

Case Report

A 76-year-old woman was referred to our hospital for endoscopic treatment of a neoplastic lesion located at the...
Kishimoto G et al. ESD for large ileocecal LSTs

Figure 1 Pre-treatment endoscopic evaluation. A: Close view of the cecum revealed a 70 mm I s + II a, LST granular type (LST-G) lesion; B: Clearly delineated margin of the LST-G lesion after 0.4% indigo-carmine dye spraying; C: Magnification view of the I s component of the I s + II a (LST-G); D: Spreading confirmation of the tumor through the ileocecal valve to the terminal ileum.

Figure 2 Procedure. A: Endoscopic view through the distal attachment showing dissection with insulation-tip knife; B: Carefully check for bleeding throughout the ileocecal region; C: The ulcer bed of ileum after en-bloc endoscopic submucosal dissection; D: Stereomicroscopic view presenting the resected specimen, which pathology reported as a I s + II a intramucosal cancer with tumor-free margins of 70 mm in diameter.

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conscious sedation\textsuperscript{[13]}. Following the injection of glycerol and sodium hyaluronate solution into the sm layer\textsuperscript{[4,13]}, a circumferential incision was made using a B-Knife. The thickened sm layer was then dissected (oral to anal) across the ileocecal valve using both the B-Knife and IT-Knife. Finally, hemostasis was carefully checked throughout the ileocecal region (Figure 2B and C). The procedure took 150 min and neither perforation nor delayed bleeding was recognized. Hospitalization lasted four days with no further complications. Histopathology disclosed that the 70 mm resected specimen was an intramucosal cancer with tumor-free margins (Figure 2D). Although some retraction of the ileocecal valve could be observed, follow-up examinations after 6 mo revealed no residual tumor or recurrence (Figure 3A and B).

**DISCUSSION**

In the present report, en-bloc resection was successfully achieved by ESD using B-Knife and IT-Knife, despite the difficult location involving the ileocecal valve and terminal ileum and the large size of the lesion. IT-Knife, a developed insulation-tipped monopolar electrosurgical knife for removing large gastric lesions en-bloc, is not widely accepted in the colorectum because of its technical difficulty and the risk of complications, such as perforation and bleeding. On the other hand, a bipolar current minimizes the damage to deeper tissues. Thus, the current flow characteristics of the B-Knife reduce the vertical damage and risk of perforation demonstrating its utility for ileocecal ESDs\textsuperscript{[9,10]}. Another important consideration was patient discomfort with air insufflation in long procedures. The supply of air can easily flow into the ileum causing painful distension even in EMRs for cecal lesions. In an earlier study aimed at reducing abdominal discomfort using CO\textsubscript{2} in colorectal ESDs, we demonstrated the advantages and safety of CO\textsubscript{2} compared to conventional air\textsuperscript{[14]}. This factor was evident in the present case. Although a large amount of CO\textsubscript{2} was supplied to the ileum, only a small amount of midazolam (4 mg in both cases) was required for intra-operative sedation.

Considering the indications for colorectal ESD, we generally recommend ESD for LST-non granular type lesions > 20 mm and planned piecemeal EMR for LST-Gs M < 40 mm\textsuperscript{[9]}. In these four cases, we decided to perform ESD because of the LST-Gs large size, their location at the ileocecal valve and terminal ileum spreading, the probability of sm infiltration, and an increased likelihood of incomplete resections and recurrence.

**Limitations**

In our institution, we have performed colorectal ESD using a B-Knife and an IT-Knife in 500 cases. Among of these 500 ESDs, large LST involving the ileocecal valve were only 4 cases, including the presented case. Based on our experience, lesions should be limited at most to 1 or 2 cm into the ileum and not circumferential. If the extension is more than 2 cm or circumferential, ESD would be very difficult and hazardous, so laparoscopy-assisted colectomy should be recommended. The reported case extended 1.5 cm into the ileum, making the most challenging one. Compared with conventional EMR\textsuperscript{[10]}, however, the longer procedure time for colorectal ESDs is still a problem. Nevertheless, we are improving our learning curve and using newly developed devices to reduce the length of the procedure and associated complications in order to increase the widespread use of colorectal ESD.

In conclusion, we successfully performed ESD in large LST-G involving the ileocecal valve and terminal ileum using a B-Knife and an IT-Knife with CO\textsubscript{2} insufflation.

**REFERENCES**

1. Kashida H, Kudo SE. Early colorectal cancer: concept, diagnosis, and management. *Int J Clin Oncol* 2006; 11: 1-8
2. Saito Y, Fujii T, Kondo H, Mukai H, Yokota T, Kozu T, Saito D. Endoscopic treatment for laterally spreading tumors in the colon. *Endoscopy* 2001; 33: 682-686
3. Uraoka T, Saito Y, Matsuda T, Ikehara H, Gotoda T, Saito D, Fujii T. Endoscopic indications for endoscopic mucosal resection of laterally spreading tumours in the colorectum. *Gut* 2006; 55: 1592-1597
4. Sano Y, Machida H, Fu KI, Ito H, Fujii T. Endoscopic mucosal resection and submucosal dissection method for large colorectal tumors. *Dig Endosc* 2004; 16 (suppl): S93-S96
5. Saito Y, Matsuda T, Kikuchi T, Ikehara H, Uraoka T. Successful endoscopic closures of colonic perforations requiring abdominal decompensation after endoscopic mucosal resection and endoscopic submucosal dissection for early colon cancer. *Dig Endosc* 2004; 19 (Suppl. 1): S34-S39
6. Gotoda T, Kondo H, Ono H, Saito Y, Yamaguchi H, Saito D, Yokota T. A new endoscopic mucosal resection procedure using an insulation-tipped electrosurgical knife for rectal...
flat lesions: report of two cases. Gastrointest Endosc 1999; 50: 560-563
7 Park SY, Jeon SW. Acute intestinal obstruction after endoscopic submucosal dissection: report of a case. Dis Colon Rectum 2008; 51: 1295-1297
8 Sano Y, Fu KL, Saito Y, Doi T, Hanafusa M, Fujiy S, Fujimori T, Ohfusa A. A newly developed bipolar-current needle-knife for endoscopic submucosal dissection of large colorectal tumors. Endoscopy 2006; 38 Suppl 2: E95
9 Saito Y, Uraoka T, Matsuda T, Emura F, Ikehara H, Mashimo Y, Kikuchi T, Fu KL, Sano Y, Saito D. Endoscopic treatment of large superficial colorectal tumors: a case series of 200 endoscopic submucosal dissections (with video). Gastrointest Endosc 2007; 66: 966-973
10 Fujii T, Hasegawa RT, Saitoh Y, Fleischer D, Saito Y, Sano Y, Kato S. Chromoscopy during colonoscopy. Endoscopy 2001; 33: 1036-1041
11 Matsuda T, Fujii T, Saito Y, Nakajima T, Uraoka T, Kobayashi N, Ikehara H, Ikematsu H, Fu KL, Emura F, Ono A, Sano Y, Shimoda T, Fujimori T. Efficacy of the invasive/non-invasive pattern by magnifying chromoendoscopy to estimate the depth of invasion of early colorectal neoplasms. Am J Gastroenterol 2008; 103: 2700-2706
12 Fujii T, Kato S, Saito Y, Kozu T, Matsuda N, Ota A, Gotoda T, ONO H, Sano Y. Diagnostic ability of staging in early colorectal cancer - Comparison with magnifying colonoscopy and endoscopic ultrasonography. Stomach Intestine 2001; 36: 816-827
13 Saito Y, Uraoka T, Matsuda T, Emura F, Ikehara H, Mashimo Y, Kikuchi T, Kozu T, Saito D. A pilot study to assess the safety and efficacy of carbon dioxide insufflation during colorectal endoscopic submucosal dissection with the patient under conscious sedation. Gastrointest Endosc 2007; 65: 537-542
14 Yamamoto H, Kawata H, Sunada K, Sasaki A, Nakazawa K, Miyata T, Sekine Y, Yano T, Satoh K, Ido K, Sugano K. Successful en-bloc resection of large superficial tumors in the stomach and colon using sodium hyaluronate and small-caliber-tip transparent hood. Endoscopy 2003; 35: 690-694
15 Uraoka T, Fujii T, Saito Y, Sumiyoshi T, Emura F, Bhandari P, Matsuda T, Fu KL, Saito D. Effectiveness of glycerol as a submucosal injection for EMR. Gastrointest Endosc 2005; 61: 736-740
16 Tsuchida K, Joh T, Okayama N, Yokoyama Y, Senoo K, Okumura F, Gotob K, Shiraki S, Okayama Y, Itoh M. Ileal adenoma with high-grade dysplasia involving the ileocecal valve treated by endoscopic mucosal resection: a case report. Gastrointest Endosc 2002; 55: 125-128

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