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ORIGINAL ARTICLE

Short-term outcomes of endoscopic submucosal dissection for colorectal neoplasms in a single medical center

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Summary *Background:* Endoscopic submucosal dissection (ESD) is an emerging technique for treating superficial neoplasms of the gastrointestinal tract. Clinical experience of ESD for superficial colorectal neoplasms remains limited in Taiwan. The aim of this study was to assess ESD performed in a series of patients at our hospital and report the results.
Materials and methods: Thirty-three patients who underwent ESD were retrospectively analyzed for tumor size, rate of en bloc resection, complete resection, curative resection, technical results, and complications.
Results: The tumors treated using ESD were situated in the cecum ($n = 6$), ascending colon ($n = 2$), transverse colon ($n = 2$), descending colon ($n = 4$), sigmoid colon ($n = 9$), and rectum ($n = 10$). The median size of the tumors was 30 mm (range, 10—55 mm). The en bloc resection rate was 72.7%, and the complete resection rate was 66.7%. In patients with en bloc resection, the curative resection rate was 87.5%. Histopathological analysis revealed adenoma with low-grade dysplasia ($n = 18$), adenoma with high-grade dysplasia ($n = 7$), and adenocarcinoma ($n = 8$). Five patients experienced perforation, and the overall complication rate was 15.2%. None of these five patients received surgical treatment.

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Conclusion: ESD is a challenging but relatively safe procedure to treat large superficial colorectal neoplasms. However, additional experience is required to achieve higher en bloc resection, complete resection, and curative resection rates.

Introduction

Endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD) have been used for minimally invasive endoscopic removal of benign or early malignant tumors of the gastrointestinal (GI) tract. ESD is a revolutionary procedure enabling en bloc resection of large tumors of the GI tract [1].

ESD has the advantage over EMR in having higher en bloc resection rate for larger early colorectal tumors [2]. However, ESD to treat colorectal tumors is thought to be particularly dangerous and challenging because the walls of the colon are thinner than those of the stomach, and the leakage of fecal material may lead to serious clinical complications. We therefore evaluated the outcomes of colorectal ESD performed at our hospital.

Materials and methods

Inclusion criteria for ESD

We retrospectively analyzed the medical records of patients with colorectal neoplasms from October 2009 to June 2013 at our institution. Thirty-three patients with colorectal neoplasms who underwent ESD were identified and included in this study. Sixteen patients were asymptomatic and received colonoscopic examinations due to positive fecal occult blood test screening, whereas the other seventeen patients visited our outpatient department due to particular GI symptoms or signs.

The patients who underwent ESD were selected on the basis of the following indications for colorectal ESD proposed by Tanaka et al [3]: (1) large (diameter $>$ 20 mm) tumors for which en bloc resection using snare EMR may be challenging, including nongranular-type laterally spreading tumors, tumors with a type Vi pit pattern, carcinomas with suspected minute submucosal infiltration, and large elevated tumors suspected to be carcinomas; (2) mucosal tumors with fibrosis due to biopsy or mucosal prolapse of the tumor; and (3) local residual tumors after endoscopic resection [3].

Each lesion was examined preoperatively with narrow-band imaging, chromoendoscopy, and magnifying colonoscopy. To predict the histopathology and depth of tumor invasion, magnifying colonoscopy was used with narrow-band imaging system to identify the pit pattern through its mucosal surface and capillary vessel. Then, 0.4% of indigo carmine dye was sprayed over the lesion to enhance its surface detail to differentiate invasive or noninvasive tumor.

ESD preparation and equipment

Adequate cleansing of the whole colorectum was conducted before performing endoscopy. We prescribed sodium phosphate solution (Fleet Phosphate-Soda, C.B. Fleet Company, Lynchburg,USA) or polyethylene glycol (Klean-Prep; Helsinn Birex Pharmaceuticals, UK) prior to each procedure to achieve good bowel preparation. The choice of sodium phosphate solution or polyethylene glycol depended on the patient's age, and renal and hepatic function. For patients receiving examination in the morning, the first bottle/package of sodium phosphate solution (Fleet Phosphate-Soda) or polyethylene glycol (Klean-Prep) is given the night prior to examination at 6 PM, and another bottle/package is given the next morning at 5 AM For those receiving examination in the afternoon, the first bottle/package of Fleet Phosphate-Soda or Klean-Prep is given a night prior to examination at 6 PM, and another bottle/package is given the next morning at 9 AM Stool color was assessed prior to colonoscopy by a trained nurse and additional bowel preparation was done when necessary. Intravenous midazolam and meperidine were administered to achieve moderate sedation for the procedure. The patients were treated by two endoscopists (H.-H.Y. and C.-W.Y.) in our hospital (Fig. 1).

The equipment used for ESD included Olympus endoscopes (GIF-Q260JI and GIF-H260Z; Olympus) with distal attachment (D-201-12704; Olympus), dual knife (KD-650U; Olympus), IT Knife-2 (KD-611L; Olympus), and an electrosurgical generator (ESG-100; Olympus). The injection solution to lift up the submucosal layer was composed of 10% glycerin, epinephrine (1:100,000), and indigo carmine. We used a CO_2 insufflation system (UCR; Olympus) to reduce patient discomfort during the ESD procedure.

ESD procedure and technique

The ESD technique was as follows: The circumference of the lesion was first outlined by marking dots with a dual knife (KD-650U; Olympus) with coagulation current of 40 W (forced coagulation, effect 2) created by the electrosurgical generator (ESG-100). The injection solution was then injected into the submucosal layer around the target lesion to lift the lesion upward, and it was separated from the surrounding normal mucosa by incisions around the lesion using the dual knife (KD-650U) with an electrosurgical current of 50 W (pulse-cut-slow mode). After the circumferential mucosal incisions had been made, the submucosal layer was dissected with the IT Knife-2 or dual knife using an electrosurgical current of 40 W (forced coagulation, effect 2). A distal attachment cap was used to create a better