



Digestive Endoscopy

Clinical outcomes of endoscopic submucosal dissection (ESD) for treating early gastric cancer: Comparison with endoscopic mucosal resection after circumferential precutting (EMR-P)

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Abstract

Background. To achieve en bloc resection for large lesions, endoscopic mucosal resection after circumferential precutting and endoscopic submucosal dissection techniques have been developed.

Aim. To compare endoscopic submucosal dissection with endoscopic mucosal resection after circumferential precutting in terms of the clinical efficacy and safety.

Patients and methods. 346 consecutive patients underwent their first endoscopic mucosal resection after circumferential precutting (103 patients) or endoscopic submucosal dissection (243 patients) for early gastric cancer and their clinical outcomes were compared.

Results. For early gastric cancer ≥ 20 mm endoscopic submucosal dissection group demonstrated significantly higher en bloc resection and en bloc plus R0 resection rate compared with endoscopic mucosal resection after circumferential precutting group. For early gastric cancer with size of 10–19 mm, endoscopic submucosal dissection group also showed significantly higher en bloc resection rate. For early gastric cancer < 20 mm, however, en bloc plus R0 resection rate for endoscopic mucosal resection after circumferential precutting group was comparable to that for endoscopic submucosal dissection group. In case of R0 resection of intramucosal differentiated cancer, neither group showed local recurrence during the median 29 and 17 months of follow-up. Two groups did not show significant difference in the bleeding or perforation rates.

Conclusion. For early gastric cancer < 20 mm endoscopic mucosal resection after circumferential precutting may be considered as an alternative choice to endoscopic submucosal dissection. However, for early gastric cancer ≥ 20 mm endoscopic submucosal dissection should be considered as the first choice for treating early gastric cancer.

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1. Introduction

Endoscopic mucosal resection (EMR) has become a standard treatment for selected cases of early gastric cancer (EGC) because of its minimal invasiveness and excellent long-term survival comparable to surgical resection [1–5].

When performing EMR, en bloc resection is desirable for a successful treatment outcome, as an accurate and reliable histopathological evaluation is occasionally difficult to achieve for a piecemeal resection. An inaccurate histopathological assessment for the completeness of resection can result in an inaccurate decision for further treatment and, ultimately, local tumour recurrence [6,7].

When using a conventional technique such as a strip biopsy, EMR has been limited to small (typically < 2.0 cm) lesions because a trial of the resection for larger lesions

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may result in piecemeal resections [8,9]. To achieve en bloc resection for larger lesions, EMR after circumferential precutting (EMR-P) [10–15], and more recently, endoscopic submucosal dissection (ESD) method have been developed [16–25]. EMR-P method, in which lesions are resected using a snare after circumferential precutting, allows en bloc resection of the lesion with a maximal diameter of 2–3 cm [10,26]. This limitation is mainly due to the difficulty in ensnaring a large lesion even after successful circumferential precutting [12,14]. In contrast to conventional EMR and EMR-P, ESD method is considered to allow en bloc resection regardless of tumour size, because the submucosa beneath the lesion is dissected directly by an electrosurgical knife without using a snare [7,17,18]. However, ESD method usually requires long procedure time and learning curve [19]. In addition, it is also thought that the ESD method may cause complications such as bleeding and perforation more frequently than conventional EMR or EMR-P [7,17,18,21]. There have been several studies comparing the treatment outcomes of ESD and conventional EMR for treating EGC [20,21,27]. To date, however, advantages and disadvantages of ESD compared with EMR-P are unknown.

The aim of this study was to compare ESD with EMR-P in terms of the clinical efficacy and safety on treating EGC.

2. Patients and methods

2.1. Patients

All the patients who underwent their first EMR-P (103 lesions, 103 patients) or ESD (243 lesions, 243 patients) for EGC in our institution from July 2003 to June 2006 were enrolled consecutively. From July 2003 to December 2004, the first half period of the present study, 32 cases (29.6%) of ESD and 76 cases (70.4%) of EMR-P were performed. During this period ESD technique was introduced into our institution and ESD was mainly performed for the lesion located at the antrum or the angle where the procedure is relatively easy to perform (28 cases (87.5%) for the antrum or angle, 4 cases (12.5%) for the lower body) [15,19,28]. All lesions located at the mid or high body were resected using EMR-P (57 cases (75.0%) for the antrum or angle, 12 cases (15.8%) for the lower body, 7 cases (9.2%) for the mid or high body) in this period. From January 2005 to June 2006, the second half period of the present study, 211 cases (88.7%) were resected using ESD and only 27 cases (11.3%) were resected using EMR-P. During this period most cases of EMR-P were performed for the cases initially diagnosed as adenoma, not EGC, by forceps biopsy prior to the procedure (6/27, 22.2%) or for the small lesions (lesion size ≤ 10 mm on endoscopic findings; 17/27, 63.0%). All the patients enrolled provided written informed consent for the procedures. Two experienced endoscopists (JJ Kim and JH Lee) performed all the procedures.

The indications for EMR were as follows: (1) tumour regarded as an intramucosal lesion on endoscopic finding [29]; (2) well or moderately differentiated histology on biopsy performed before ESD or EMR-P; (3) < 2 cm in diameter for an elevated lesion and < 1 cm for a flat or depressed lesion on endoscopic finding; (4) no evidence of ulcer or ulcer scar on endoscopic finding; and (5) no lymph node involvement or distant metastasis on abdominal computed tomography (CT). However, EMR-P or ESD were performed for 28 patients who did not meet these indications. These cases included patients that were diagnosed to have adenoma, not EGC, by forceps biopsy prior to the procedure and patients who refused to undergo surgery or had severe comorbidity that made them unsuitable as candidates for surgery. Endoscopic ultrasonography was not performed before the procedures, because of its limited accuracy on predicting the depth of tumour invasion [1,7,17,30–32].

2.2. Techniques of endoscopic resections

2.2.1. EMR-P (Fig. 1)

There have been several reports describing EMR-P [10–15]. Among them, the technique we used here was almost the same as Choi et al. have previously described [15]. After identifying the target lesion, marking dots were made circumferentially at approximately 5 mm lateral to the margin of the lesion using a needle knife (KD-1L-1; Olympus Optical Co., Tokyo, Japan, or Needle papillotome; MTW Endoscopy, Wesel, Germany). After marking, a submucosal injection of saline with epinephrine mixed with indigocarmine was performed around the lesion to lift it off the muscle layer. Then, an initial incision of mucosa was made with the needle knife to allow insertion of the tip of the knife into the submucosa. After the initial incision, a circumferential mucosal incision was performed outside the marking dots to separate the lesion from the surrounding non-neoplastic mucosa. This step was done using the electrosurgical knife such as needle, Flex (KD-630L; Olympus) or insulated-tipped (IT) knife (KD-610L; Olympus) with a high-frequency generator (Erbotom ICC 200; ERBE Elektromedizin Ltd., Tübingen, Germany). After the circumferential incision, an additional submucosal injection of saline with epinephrine mixed with indigocarmine was performed beneath the lesion. Finally, the adequately raised lesion was ensnared using snare (SD-9U-1 or SD-12U-1; Olympus) and removed in the same fashion as with the standard snare polypectomy technique.

2.2.2. ESD (Fig. 2)

ESD procedure was the same as EMR-P method until the step of circumferential mucosal incision and additional submucosal injection. After these steps were completed, the submucosal connective tissue just beneath the lesion was directly dissected using an electrosurgical knife such as needle, Flex or IT knife [17,18].

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