Conventional versus traction-assisted endoscopic submucosal dissection for gastric neoplasms: a multicenter, randomized controlled trial (with video)

Masao Yoshida, MD,[1] Kohei Takizawa, MD,[1] Sho Suzuki, MD, PhD,[2,3] Yoshiki Koike, MD,[4] Satoru Nonaka, MD, PhD,[5] Yasushi Yamasaki, MD, PhD,[6] Takeyoshi Minagawa, MD,[7] Chiko Sato, MD,[8] Chihiro Takeuchi, MD,[9] Ko Watanabe, MD, PhD,[10] Hiromitsu Kanzaki, MD, PhD,[11] Hiroyuki Morimoto, MD,[12] Takafumi Yano, MD,[13] Kosuke Sudo, MD,[14] Keita Mori, PhD,[15] Takuji Gotoda, MD, PhD, FACG, FASGE, FRCP,[3] Hiroyuki Ono, MD, PhD,[1] on behalf of the CONNECT-G Study Group

Shizuoka, Akita, Miyagi, Tokyo, Osaka, Hokkaido, Kanagawa, Fukushima, Okayama, Chiba, Saitama, Japan

Background and Aims: The aim of this study was to clarify whether dental floss clip (DFC) traction improves the technical outcomes of endoscopic submucosal dissection (ESD).

Methods: A superiority, randomized control trial was conducted at 14 institutions across Japan. Patients with single gastric neoplasm meeting the indications of the Japanese guidelines for gastric treatment were enrolled and assigned to receive conventional ESD or DFC traction-assisted ESD (DFC-ESD). Randomization was performed according to a computer-generated random sequence with stratification by institution, tumor location, tumor size, and operator experience. The primary endpoint was ESD procedure time, defined as the time from the start of the submucosal injection to the end of the tumor removal procedure.

Results: Between July 2015 and September 2016, 640 patients underwent randomization. Of these, 316 patients who underwent conventional ESD and 319 patients who underwent DFC-ESD were included in our analysis. The mean ESD procedure time was 60.7 and 58.1 minutes for conventional ESD and DFC-ESD, respectively ($P = .45$). Perforation was less frequent in the DFC-ESD group (2.2% vs .3%, $P = .04$). For lesions located in the greater curvature of the upper or middle stomach, the mean procedure time was significantly shorter in the DFC-ESD group (104.1 vs 57.2 minutes, $P = .01$).

Conclusions: Our findings suggest that DFC-ESD does not result in shorter procedure time in the overall patient population, but it can reduce the risk of perforation. When selectively applied to lesions located in the greater curvature of the upper or middle stomach, DFC-ESD provides a remarkable reduction in procedure time. (Gastrointest Endosc 2018;87:1231-40.)

Abbreviations: ESD, endoscopic submucosal dissection; DFC, dental floss clip; DFC-ESD, DFC traction-assisted ESD.

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This video can be viewed directly from the GIE website or by using the QR code and your mobile device. Download a free QR code scanner by searching "QR Scanner" in your mobile device's app store.

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Current affiliations: Division of Endoscopy, Shizuoka Cancer Center, Shizuoka, Japan (1), Department of Gastroenterology, Yuri-Kumiai General Hospital, Akita, Japan (2), Division of Gastroenterology and Hepatology, Department of Medicine, Nihon University School of Medicine, Tokyo, Japan (3), Department of Gastroenterology, Sendai City Medical Center, Sendai, Japan (4), Endoscopy Division, National Cancer Center Hospital, Tokyo, Japan (5), Department of Gastrointestinal Oncology, Osaka Medical Center for Cancer and Cardiovascular Diseases, Osaka, Japan (6), Department of Gastroenterology, Tonan Hospital, Hokkaido, Japan (7), Division of Endoscopy, Yokohama City University Medical Center, Yokohama, Japan (8), Department of Gastroenterology, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan (9), Department of Endoscopy, Fukushima Medical University Hospital, Fukushima, Japan (10), Department of Gastroenterology and Hepatology, Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences, Okayama, Japan (11), Department of Gastroenterology and Endoscopy,

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Endoscopic submucosal dissection (ESD) represents an advanced therapeutic technique based on dramatic technologic developments, providing minimal invasiveness and favorable outcomes in patients with superficial GI neoplasms.[1-6] However, the adoption of ESD in routine clinical practice remains limited because of the complex nature and long duration of this procedure.[7] Furthermore, ESD requires considerable expertise, mainly related to accurate recognition of the submucosal layer for dissection. Tumor location has been reported as the most significant factor associated with prolonged operation time for ESD management of gastric neoplasms, with the upper and middle thirds of the stomach representing high-risk locations.[8,9] In the stepwise training protocol of gastric ESD, it is recommended that trainees begin their ESD training on tumors of the lower third of the stomach and gradually take on tumors of the upper and middle thirds of the stomach. Lesions located in the greater curvature of the upper and middle thirds of the stomach are particularly difficult to manage via ESD because they easily sink under the weight of liquid, and the submucosal layer collapses under the weight of the lesion itself, because the ESD procedure does not allow for substantial manipulation of the patient's position.

The traction-assisted approach represents a solution to overcome some of the technical difficulties associated with gastric ESD.[10-17] The clip-with-line traction method is based on the conventional counter-traction method but uses silk thread and a hemoclip, providing several advantages including simplicity, reduced cost, and wide availability.[18,19] Several reports suggested that compared with conventional ESD, traction-assisted ESD using dental floss instead of silk thread was associated with a significantly shorter procedure time without increasing the rate of adverse events.[20,21] However, these studies were retrospective, single-center case series with small sample size and were confounded by substantial selection bias. Although many different techniques for traction-assisted ESD have become available in the last decade, to the best of our knowledge no randomized controlled trial has investigated whether traction-assisted ESD indeed provides technical benefits. Here, we report the final results of a multi-institutional, randomized, controlled trial (CONNECT-G) conducted to establish whether dental floss clip (DFC) traction-assisted ESD (DFC-ESD) improves technical outcomes over those provided by conventional ESD among patients with gastric neoplasms.

METHODS

Study design and setting

CONNECT-G was a multicenter, randomized control trial conducted at 14 cancer centers, medical centers, university hospitals, and general hospitals in Japan and designed to evaluate the impact of DFC traction on the efficacy of ESD for gastric neoplasms. The primary endpoint was ESD procedure time. Additionally, the following predefined secondary endpoints were assessed: ESD procedure time according to the experience of the operator (trainee vs expert), tumor size (≤20 vs >20 mm), location of the lesion, presence of ulcerative findings (positive vs negative), and number of patients treated at the institution (high-volume vs low-volume center); frequency of hemostasis; time to hemostasis; clip slip-off during DFC-ESD; damage to the specimen caused by DFC traction; en bloc resection; inadvertent incision of the specimen; histologic assessment; nature and incidence of adverse events, according to the Common Terminology Criteria for Adverse Events, version 4.0[22]; and outcomes of ESD performed by less-experienced operators (trainees), including self-completion rate, time until handover to the expert, and nature and incidence of adverse events. This study was registered with the University Hospital Medical Information Network Clinical Trials Registry (www.umin.ac.jp/ctr/; identification no. UMIN000018266).

Patients

Eligible patients were ≥20 years of age and had histologically proven gastric adenoma or cancer meeting the absolute or expanded indication for ESD according to the following Japanese guidelines for gastric treatment: (1) clinically diagnosed intramucosal cancer (cT1a) representing intestinal-type adenocarcinoma of any size, without ulcerative findings; (2) cT1a representing intestinal-type adenocarcinoma, ≤30 mm in size, with ulcerative findings; or (3) cT1a representing diffuse-type adenocarcinoma, ≤20 mm in size, without ulcerative findings.[23,24] Additional inclusion criteria were as follows: ESD management of a single tumor; no history of gastrectomy or reconstructive surgery of the gastric tract; Eastern Cooperative Oncology Group performance status ≤2; adequate organ function; and low risk of stenosis after ESD, defined if the predicted incision line of the mucosal layer did not cross the esophagogastric junction or the pylorus ring. Exclusion criteria were as follows: impossible cessation of anticoagulant or antiplatelet medications except for low-dose aspirin; active infection; pregnancy or breastfeeding; severe mental disorder; steroid dependence; myocardial infarction within 6 months or unstable angina pectoris within 3 weeks of indication for ESD; severe respiratory disease requiring continuous oxygen therapy; unstable hypertension; and uncontrollable diabetes mellitus or insulin therapy.

All participants provided written informed consent before enrollment. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (Fortaleza revision) and in compliance with the ethical guidelines for medical and health research involving human subjects in Japan. The trial protocol was approved