Advanced feasibility of endoscopic submucosal dissection for the treatment of gastric tube cancer after esophagectomy

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The incidence of esophageal cancer is increasing worldwide.[1] However, progress in surgical techniques and the development of novel therapeutic modalities such as adjuvant chemoradiation therapy combined with surgery have improved the postoperative survival up to 34% to 51% at 5 years.[2,3] Therefore, long-term survival cases are no longer rare.

Generally, gastric tubes are substituted for the reconstitution after the esophagectomy for the treatment of esophageal cancer.[1,3] In association with the increase in the number of long-term follow-up cases after esophagectomy, the occurrence of secondary malignancies such as adenocarcinoma arising in gastric tubes has been reported.[4-7] Until a decade ago, repeat surgery was considered for the treatment of adenocarcinoma in gastric tubes. However, this did not achieve satisfactory clinical outcomes because of its high operative risks.[6,7] Recently, the use of EMR has been emphasized for treatment in patients with superficial lesions.[6-8] Although the clinical risks of EMR associated with gastric tube cancer (GTC) treatment are significantly lower than those associated with surgery, EMR cannot always be used to resect GTC completely because of its technical limitations regarding the tumor sizes. Therefore, endoscopic submucosal dissection (ESD) is currently used as a therapeutic option for treating GTC. However, ESD for GTC also carries limitations with respect to the anatomical features of gastric tubes, particularly the suture line and staples with the possibility of fibrosis.[9,10] We therefore investigated the feasibility of ESD for the treatment of GTC by evaluating our experience with 15 cases of 16 GTCs, including 4 GTCs located on the suture lines.

Abbreviations: ESD, endoscopic submucosal dissection; GTC, gastric tube cancer; IT, insulated-tip; SCC, squamous cell carcinoma.

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PATIENTS AND METHODS

Patients

We evaluated a total of 22 patients with 23 GTCs at Akita University Graduate School of Medicine between January 2004 and December 2012. All GTCs were adenocarcinomas. The original esophageal tumor in all 22 cases was squamous cell carcinoma (SCC), which was treated by radical esophagectomy with gastric tube reconstitution. Endoscopic observation in detail with biopsy and contrast-enhanced CT revealed that 7 GTCs were unresectable by ESD according to the criteria for the endoscopic curative resection of gastric cancer described in the following. We excluded these 7 GTCs in 7 patients from the analysis. Therefore, we enrolled 16 GTCs in 15 patients in this study.

Method of ESD

Written informed consent was obtained from all patients before ESD. The study was carried out in accordance with the Declaration of Helsinki. During the ESD procedure, patients were sedated via intravenous administration of flunitrazepam under blood pressure, electrocardiograph, and oxygen saturation monitoring. ESD was typically carried out by using a GIF-Q260J endoscope (Olympus, Tokyo, Japan) with a transparent hood (D-201-11804; Olympus) attached to the tip. The electrosurgical generator used for ESD was an ICC 200 device (ERBE, Tübingen, Germany) or VIO300D device (ERBE). After the tumor outline was delineated on chromoendoscopy (Fig. 1A and B), marker dots were circumferentially placed 5 mm outside the tumor margin by using a needle-knife (KD-1L-1; Olympus). Then, a mixture of 30% hyaluronic acid, 70% saline solution, and a small amount of indigo carmine was injected into the submucosa to lift the lesion. The injection was repeated if necessary during ESD to keep the lesion lifted. Then, after performing precutting with a needle-knife, we made a circumferential incision around the lesion with an insulated-tip (IT), diathermic knife (KD-610L or KD-611L; Olympus) outside the marking

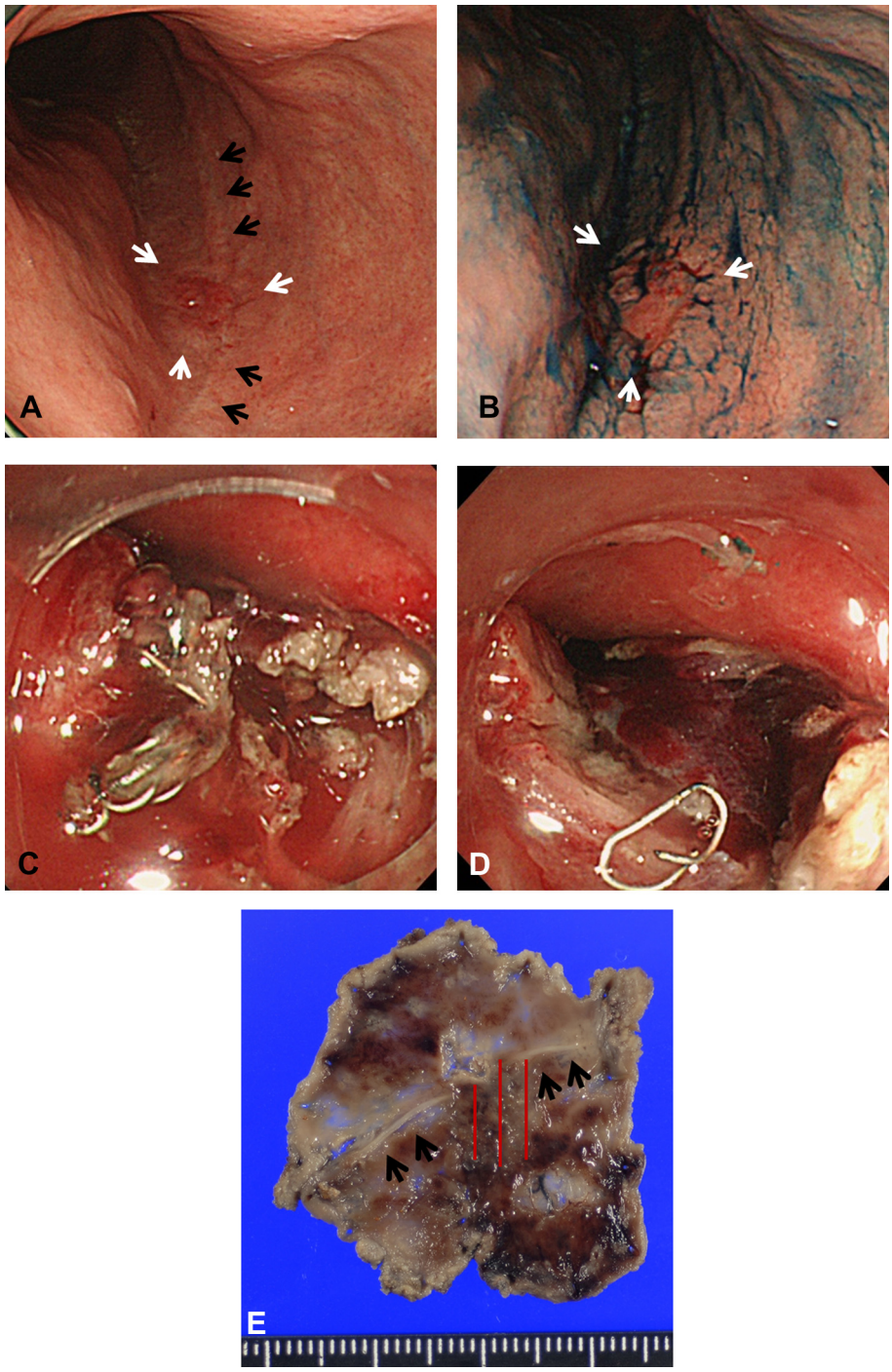

Figure 1. Endoscopic submucosal dissection procedure for treating gastric tube cancer (GTC) localized on the suture line (case 10). **A, B,** Endscopy revealed a 0-IIc type GTC localized on the suture line. The *white arrows* indicate the GTC, and the *black arrows* indicate the suture line. **B,** Chromoendoscopy with indigo carmine of the same lesion. **C, D,** When metallic staples in the suture line disturbed the ability to perform submucosal dissection (**C**), they were removed with a hook knife (**D**). **E,** En bloc resection was achieved, with negative margins. The *red lines* indicate the cancerous lesion, and the *black arrows* indicate the suture line.

spots, with a sufficient distance remaining outside the marking spots to allow for the submucosal fibrosis caused by the gastric tube creation. Finally, submucosal dissection was carried out with an IT knife, concomitantly using hemostatic instruments, such as the Coagrasper (Olympus), to treat hemorrhage. When the tissue was too hard to cut with the IT knife because of the presence of submucosal fibrosis along the suture line accompanied by staples created during the previous surgery for esophageal SCC, a needle-knife or hook knife (KD-620QR; Olympus) was