Endoscopic versus surgical resection of GI stromal tumors in the upper GI tract

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Background and Aims: Endoscopic resection has been performed for treatment of GI stromal tumors (GISTs) in the upper GI tract. However, the therapeutic roles of the endoscopic procedure remain debatable. We aimed in this retrospective study to evaluate the feasibility and long-term follow-up results of endoscopic resection of GISTs in the upper GI tract, compared with surgery.

Methods: Between March 2005 and August 2014, 130 cases of GIST in the upper GI tract were resected. We compared baseline characteristics and clinical outcomes including R0 resection rate and recurrence rate between the endoscopy group (n = 90) and surgery group (n = 40).

Results: The most common location of GIST was the stomach body in the endoscopy group, whereas it was the duodenum in the surgery group ($P = .001$). Tumor size was significantly smaller (2.3 vs 5.1 cm; $P < .001$), and procedure time (51.8 ± 36.2 vs 124.6 ± 74.7 minutes; $P < .001$) and hospital stay (3.3 ± 2.4 vs 8.3 ± 5.4 days; $P < .001$) were significantly shorter in the endoscopy group than in the surgery group. The R0 resection rate was 25.6% in the endoscopy group, whereas it was 85.0% in the surgery group ($P = .001$), and 50.0% of resected tumors belonged to a very low–risk group in the endoscopy group, whereas 35.0% and 30.0% belonged to low-risk and high-risk in the surgery group ($P = .001$). However, during 45.5 months of follow-up, the recurrence rate was not significantly different between the 2 groups (2.2% vs 5.0%; $P = .586$).

Conclusions: Endoscopic resection might be an alternative therapeutic modality for GISTs in the upper GI tract in selective cases. (Gastrointest Endosc 2016;83:318-26.)

GI stromal tumor (GIST) is a separate and distinct disease entity of mesenchymal tumors that originate from interstitial cells of Cajal of the GI tract. Currently, diagnosis of GISTs is based on immunohistochemical staining of CD117, a c-kit protein that is positively stained in >90% of cases. CD34, which is expressed in up to 80% of GISTs, also is regarded as a valuable tool for diagnosis.[1] Most GISTs are located in the stomach (50%-60%), followed by small bowel (25%), large bowel (10%), and esophagus (5%), and these tumors can occur even in extraintestinal locations including the omentum and peritoneum.[2] With clinical experiences and technical advances, minimally invasive resection of gastric GISTs is achievable and feasible in laparoscopic surgery. Although current guidelines recommend laparoscopic resection of gastric GISTs <2.0 cm in size,[3,4] recent studies have demonstrated that even

Abbreviations: EFTR, endoscopic full-thickness resection; ESD, endoscopic submucosal dissection; GIST, GI stromal tumor; HPF, high-power field; IT knife, insulated-tipped electrosurgical knife; PPPD, pylorus-preserving pancreaticoduodenectomy; SET, subepithelial tumor; STER, submucosal tunnel endoscopic resection.

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relatively large gastric GISTs ≥2.0 cm in size can be resected safely by using the laparoscopic approach, and long-term outcomes have shown that only a small number of cases recurred (0%-8%) during 36 to 75 months of follow-up.[5-10]

Laparoscopic resection of gastric GISTs facilitates substantial negative margins. However, this procedure carries the risks of injury to the pseudocapsule and a risk of peritoneal seeding during retraction of the tumor through the laparoscopic ports, and the surgical approach can be difficult for gastric GISTs located in the pre-pylorus, esophagogastric junction, or cardia.[11] If GISTs are located in the duodenum, more extensive resection, such as pylorus-preserving pancreaticoduodenectomy (PPPD), might be necessary because of anatomic features.[12,13] Recently, endoscopic resection including EMR or endoscopic submucosal dissection (ESD) has been established as a standard therapeutic method for differentiated intramucosal early gastric cancer or even submucosal early gastric cancer confined to the sm1 layer or an ulcerative lesion <3.0 cm in size, in the absence of lymphovascular invasion.[14] Furthermore, because technical skills have advanced and novel endoscopic procedures such as submucosal tunnel endoscopic resection (STER) and endoscopic full-thickness resection (EFTR) have been developed, curative en bloc endoscopic resection for subepithelial tumors (SET) in the upper GI tract has been reported.[15-19] However, in terms of endoscopic treatment of GIST in the upper GI tract, only a few cases have been included in the previous studies, and their long-term clinical outcomes are unknown.

The present study was undertaken to evaluate the feasibility and safety of endoscopic resection of GISTs in the upper GI tract compared with surgical resection. The study included a consecutive series of 130 GISTs in the upper GI tract, and their clinical outcomes and long-term follow-up data were examined.

PATIENTS AND METHODS

Study design and patients

A total of 130 patients underwent therapeutic resection for SETs located in the upper GI tract and were confirmed as having GISTs by histopathologic evaluation between March 2005 and August 2014. The series included 90 patients treated by endoscopic procedures (endoscopy group) and 40 patients treated by surgery (surgical group). Clinical characteristics and outcomes were retrospectively assessed. All patients underwent preprocedure EGD and EUS to estimate the largest tumor diameter, location, appearance, consistency, mobility, extent, echogenicity, and the layer of origin by using a radial-scanning echoendoscope (GIF-UM 130; Olympus Optical Co Ltd, Tokyo, Japan) or a 7.5F catheter probe (UM-3R; Olympus). A preprocedure CT scan was acquired in 62 of 90 patients in the endoscopy group (68.9%) and in all 40 patients in the surgery group (100%). All patients provided informed consent before participation. The study was approved by the institutional review board of Korea University Guro Hospital.

Endoscopic procedures

ESD or EMR was performed by using upper GI endoscopy (Olympus GIF-Q260J). All procedures were performed by an endoscopist (J.J.P.), who had already experienced more than 300 cases of ESD for epithelial or subepithelial lesions in the esophagus or stomach. Patients were sedated with propofol (1.0 mg/kg) or midazolam (0.035 mg/kg), with cardiorespiratory functions monitored closely during the procedure. ESD was performed by using a standard method (Figs. 1, 2).[17] Lesion boundaries were identified and marked by using needle coagulation or argon plasma coagulation connected to an electrosurgical generator (Erbe ICC 200W; Erbe Elektromedizin GmbH, Tübingen, Germany). After injection of a 0.9% saline solution mixed with epinephrine (dilution rate 1:10,000) and indigo carmine dye into the submucosal layer, an initial incision was made about 3 to 5 mm from the regular mucosal layer in a regular interval by using a needle-knife (KD-IL-1; Olympus). Submucosal dissection was done with a needle-knife or insulated-tipped electrosurgical knife (IT knife) (KD-610L; Olympus). For EMR or polypectomy, the aforementioned solution of epinephrine diluted in saline solution and indigo carmine dye was injected into the submucosal layer to raise the lesion sufficiently, and the lesions were removed by using a snare (12U-1; Olympus). After removal, coagulation of all visible vessels was performed by using a forceps Coagrasper (Olympus America, Center Valley, Pa) or argon plasma coagulation.

STER and EFTR procedures were performed according to previously suggested protocols. In the STER procedure, a mucosal incision was made to gain entry to the submucosal area, and a submucosal tunnel was created 5.0 cm proximal to the SET until the tumor was visible with an endoscope. After exposure of the SET, complete dissection of the tumor was carefully performed by using an IT knife along the margin. After dissection, the mucosal entry site was closed with standard hemostatic clips (HX-610-90; Olympus).[19] In the EFTR procedure, a circumferential incision around the tumor was made to approach the muscularis propria layer, a perforation was made to allow incision into the serosal layer, and the tumor, including the muscularis propria and serosal layers, was removed by using a snare. After resection, the perforated gastric wall was closed by using standard hemostatic clips.[20]

Surgical procedures

Laparoscopic or open-wedge resection was performed according to standard procedural methods.[21] Briefly, in the laparoscopic wedge approach, the first trocar was placed in the midline near the umbilicus, 2 other ports were inserted in the right and left flanks, and the forth trocar was used to facilitate correct exposure of the surgical fields. Open laparoscopic resection was performed, with