Health-related quality of life after super minimally invasive surgery and proximal gastrectomy for early-stage adenocarcinoma of the esophagogastric junction: a propensity score-matched study

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To the Editor: Proximal gastrectomy (PG) is the traditional treatment for early-stage adenocarcinoma of the esophagogastric junction (AEG). The new concept of super minimally invasive surgery (SMIS) by endoscopic submucosal dissection (ESD) and endoscopic submucosal tunnel dissection (ESTD) has the same curative effect as traditional surgery, with the advantage of not anatomically changing the digestive tract.[1] With the higher success rate of this therapy, health-related quality of life (HRQoL) has become an important outcome parameter. We aimed to compare differences in HRQoL after SMIS and PG for early-stage AEG to provide a reference for clinical decision-making.

In this single-center retrospective cohort study, SMIS was compared with PG for AEG in terms of post-operative HRQoL. This study was approved by the hospital ethics committee (No. S2017-0). Informed consent was obtained from participants.

We reviewed patients who were hospitalized in the Chinese PLA General Hospital with AEG from January 2010 to December 2019 and received SMIS or PG. Patients diagnosed with T1N0M0 AEG were included, while those diagnosed with double primary cancer, chemotherapy or radiation, and previous gastrointestinal surgery were excluded. Finally, 118 early-stage AEG patients, including 60 SMIS patients and 58 PG patients, were recruited [Supplementary Figure 1, http://links.lww.com/CM9/B224].

Retrospectively collected clinical information included patient and tumor characteristics, surgical details, other treatment variables, predefined complications occurring within 30 days of surgery, and written HRQoL questionnaire responses collected after surgery. Depending on the size of the tumor and conditions surrounding it, surgical options in the SMIS group included ESD or ESTD. PG was performed via laparotomy (without thoracotomy), while transesophageal hiatus and esophagogastric anastomosis were used for proximal subtotal gastrectomy. HRQoL was evaluated using the gastroesophageal reflux disease questionnaire, Pittsburgh Sleep Quality Index, and European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire-OG25.

The χ^2 test, Fisher's exact test, or t test was used to examine differences in baseline values between the two groups. Age, gender, tumor diameter, tumor location, differentiation grade, invasion depth, lymphovascular invasion, and non-fatal adverse events were used as the matching criteria to perform a propensity score matching (PSM) analysis. The propensity score was set to 0.05. The Shapiro–Wilk test was used to test for normal distribution. As none of the transformed HRQoL scores were normally distributed, non-parametric tests were used to examine the impact of the two treatments on HRQoL. Statistical analysis of the data was performed using SPSS version 26.0 software (SPSS, Chicago, IL, USA). Statistical significance was set at $P < 0.05$ (two-sided).

The baseline characteristics of patients are presented in [Supplementary Table 1, http://links.lww.com/CM9/B224]. Sixty SMIS and 58 PG patients were included in the final analysis with a median follow-up of 3 years. No significant differences were found between groups with respect to non-fatal adverse events, recurrence, adjuvant therapy, repeat endoscopy/surgery, or all-cause mortality ($P > 0.05$) [Supplementary Table 2, http://links.lww.com/CM9/B224].

According to the final pathological diagnoses, three lesions (5.0%) were included in the non-curative criteria

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group, including SM1 (<500 μm from the muscularis mucosae) cancer cancer with tumor size >3 cm ($n = 1$) and positive vertical margins in SM1 tumors ($n = 2$). Local tumor recurrence occurred in one patient (1.7%) in the SMIS group because of SM1 cancer with a tumor size >3 cm. Patients with relapse were successfully managed with re-ESD. The cumulative all-cause mortality rates of the SMIS and PG groups were 1.7% (1/60) and 3.4% (2/58), respectively. One patient in the SMIS group died of pancreatic cancer. Two patients in the PG group died of colon cancer and cerebral infarction separately.

The HRQoL scores of the matched cohort are shown in [Supplementary Tables 2 and 3, http://links.lww.com/CM9/B224]. The global health status scores and symptom item function scores of the functional scale in the SMIS group were significantly better than those of the PG group ($P < 0.01$), except for anxiety. Reflux, sleep disturbance, eating in front of others, body image, and trouble talking scores in the PG group were significantly higher than those in the SMIS group ($P < 0.05$) [Supplementary Table 3, http://links.lww.com/CM9/B224].

Owing to the special anatomical location and pathological type of AEG, the selection of an appropriate surgical mode is a focus of current research. In this study, SMIS and PG did not differ significantly in terms of R0 resection, non-fatal adverse events, or mortality; therefore, HRQoL was an important additional outcome measure. The overall HRQoL of the SMIS group was better than that of the PG group, especially in terms of reflux, symptoms during eating, and sleep quality. We consider this to be the result of the less harmful surgical approach, as the endoscope passes through the natural orifice and does not injure the integrity of the gastrointestinal duct, with relatively few and small post-operative reductions in body functions.

Post-operative HRQoL is mainly influenced by post-operative impairments in body function, such as reflux, swallowing problems, and abdominal discomfort, as well as post-operative pain. The area of most significant difference in HRQoL symptoms between the two groups was reflux [Supplementary Figure 2, http://links.lww.com/CM9/B224]. Reflux after PG is due to surgical resection, which alters the anatomy of the digestive tract, leading to the disruption of anti-reflux mechanisms. In addition, the proportion of patients with post-operative acid reflux in the SMIS group in our study was lower than that previously reported in the normal healthy group.[2] This may be because scar contraction after SMIS increases the pressure of the lower esophageal sphincter, reconstructing the shape of the esophageal valve flap, producing an effect similar to peroral endoscopic cardial constriction, and relieving reflux to a certain extent.[3] The symptoms of swallowing problems and pain after PG are more obvious than those of SMIS, which may be explained by the stenosis of the anastomotic stoma, causing difficulty in feeding. Additionally, the lack of a gastrointestinal pacemaker and severing of the vagus nerve after gastrectomy leads to weakened gastric motility, thus affecting gastric emptying disorders.[4]

The sleep status of the two groups of patients was also investigated; the number of patients with PG combined with sleep disorders was significantly higher. Many reports have shown that direct stimulation of reflux can awaken patients from sleep, while sleep disorders can aggravate reflux symptoms.[5] Long-term sleep disturbance can affect cognitive function and seriously affect quality of life.

The present study had some limitations. First, this was a single-center retrospective study with a selection bias. However, PSM and the use of a validated multidimensional questionnaire minimized both selection and information biases. Second, the follow-up time was relatively short, and the cohort size was relatively small. Therefore, future studies with larger sample sizes are warranted. Third, the pathological findings in the PG group may have underestimated or overestimated the depth of invasion, as the serial section intervals were wider than those in ESD specimens, making it difficult to obtain the precise tumor depth.

In conclusion, by balancing the benefits of organ integrity with the harms of post-operative complications and improvements in post-operative HRQoL, we believe that SMIS can be recommended for the treatment of early AEG. Larger samples and long-term follow-up studies are required to verify this positive trend.

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Conflicts of interest

None.

References

1. Linghu E. A new stage of surgical treatment: super minimally invasive surgery. Chin Med J 2021;135:1–3. doi: 10.1097/CM9.0000000000001534.
2. van der Schaaf M, Derogar M, Lagergren P. Reference values of oesophago-gastric symptoms (EORTC QLQ-OG25) in a population-based setting. Eur J Cancer 2012;48:1602–1607. doi: 10.1016/j.ejca.2011.10.026.
3. Liu X, Li Y, Zhou X, Huang Z, Dai X, Tang J, *et al*. Endoscopic treatment of cardia lesions: the effects on gastroesophageal reflux disease. Ann Palliat Med 2021;10:6669–6677. doi: 10.21037/apm-21-1154.
4. Shen C, Yang H, Zhang B, Chen H, Chen Z, Chen J. Changes of quality of life after gastric tube reconstruction in adenocarcinoma of the esophagogastric junction. Pak J Med Sci 2013;29:1193–1198. doi: 10.12669/pjms.295.3879.
5. Hallit S, Hajj A, Sacre H, Al Karaki G, Malaeb D, Kheir N, *et al*. Impact of sleep disorders and other factors on the quality of life in general population: a cross-sectional study. J Nerv Ment Dis 2019;207:333–339. doi: 10.1097/NMD.0000000000000968.

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