Is Pylorus-preserving Gastrectomy Universally Applicable to Early Gastric Cancer of the Mid Stomach?

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Recent advances in endoscopic diagnosis have allowed gastric cancer to be diagnosed early, often in asymptomatic patients.¹ Currently, endoscopic mucosal resection and endoscopic submucosal dissection are accepted as the least invasive procedures when managing early gastric cancer (cT1).¹ An important intermediate option before open gastrectomy is laparoscopic gastrectomy.²

Advanced laparoscopic gastrectomy contributes to both improved esthetics and earlier postoperative recovery.³ However, quality of life is mainly affected by late-postoperative phase complications, such as dumping syndrome and loss in body weight resulting from reduced oral intake. Pylorus-preserving gastrectomy (PPG), with limited stomach resection and lymph node dissection, is an example of function-preserving surgery that can improve late-postoperative phase function.^{1,4} In general, PPG is applicable to patients who were preoperatively diagnosed with cT1N0M0 primary gastric cancer in the middle third of the stomach, when the distal tumor border is ≥ 4 cm away from the pylorus.⁵ During the procedure, infrapyloric vessels are routinely preserved to maintain a suitable blood supply to the pyloric cuff, as is the root of the right gastric artery. Furthermore, the hepatic and pyloric branches of the vagus nerves are routinely preserved.^{5,6}

More recently, laparoscopy-assisted pylorus-preserving gastrectomy (LAPPG) with lymphadenectomy has presented an attractive option. Several groups have indicated that LAPPG is a feasible and reliable procedure with satisfactory postoperative symptoms and functional outcomes.^{5,7} However, the incidence of metastasis in the

preserved regional lymph nodes remains an obstacle to the wider application of the function-preserving surgery. In particular, lymph nodes at the suprapyloric and infrapyloric stations may be incompletely dissected when preserving nerve and arterial branches in either PPG or LAPPG.^{5,6} Therefore, metastatic tumor in residual suprapyloric and infrapyloric lymph nodes may contribute to disease recurrence in patients who undergo PPG.^{6–8} Although several studies have indicated acceptable long-term outcomes and survival rates after both PPG and LAPPG, neither has gained widespread use in standard clinical practice.^{6–9}

Recently, Kim et al. attempted to evaluate the status of micrometastasis in suprapyloric and infrapyloric lymph nodes in early gastric cancers that are located in the mid stomach and managed with PPG.¹⁰ They found that the mean number of collected suprapyloric lymph nodes was significantly lower after PPG than with conventional distal gastrectomy; the findings were not significant for infrapyloric lymph nodes. Moreover, they determined that all metastasis (both macro and micro) to suprapyloric and infrapyloric lymph nodes are essentially very rare and that the long-term survival of patients after PPG was acceptable. They concluded that micrometastasis to the suprapyloric and infrapyloric lymph nodes may be negligible, and that PPG may be a safe procedure for early gastric cancer located in the mid stomach. This study essentially supports earlier work evaluating the oncological reliability of PPG.^{6–9} However, this study should be interpreted with caution because it was retrospective in design and involved a single-center cohort with a relatively small number of patients. Furthermore, the study failed to completely assess the primary tumor location (e.g., lesser curvature side, anterior wall).

When evaluating a surgical procedure in a single-center study, results can be biased by the surgical skill base at that institution. In particular, LAPPG is a technically difficult surgery for inexperienced surgeons, involving precise

lymph node dissection of the suprapyloric and infrapyloric lymph nodes and preservation of delicate nerves and arteries. Therefore, insufficient dissection of the suprapyloric and infrapyloric lymph nodes may be related to disease recurrence in patients undergoing LAPPG regardless of how unlikely micrometastasis actually is at these locations.

As described by Kim et al., the clinical significance of lymph node micrometastasis in gastric cancer remains unknown.^{10,11} However, Yanagita et al. recently assessed the proliferative activity of isolated tumor cells (ITC) and micrometastasis in lymph nodes through immunohistochemistry using Ki-67 monoclonal antibodies in patients with gastric cancer.¹² The study reported proliferative activity in gastric cancer cells in both macrometastasis and micrometastasis and even in some ITCs in lymph nodes. Moreover, other groups have indicated similar results regarding the proliferative activity of micrometastasis and ITC in lymph nodes in gastric cancer.¹³ These results suggest that at the very least, micrometastatic tumor cells could have proliferative activity in lymph nodes. Further data are necessary to assess the clinical significance of micrometastasis to the suprapyloric and infrapyloric lymph nodes in patients with early gastric cancer in the mid stomach.

It is crucial to maintain the balance between quality of life and curability when selecting procedures for patients with early gastric cancer. To approve the LAPPG as the gold standard for patients with early gastric cancer of the middle third of the stomach, further multicenter prospective randomized controlled trials are necessary to compare LAPPG with conventional laparoscopy-assisted distal gastrectomy in terms of long-term survival and postoperative quality of life.

Recently the sentinel node (SN) concept was successfully validated for early gastric cancer through a multicenter prospective trial that mapped SNs using a dual-tracer method with a radioactive colloid and blue dye.¹⁴ Knowing the distribution of sentinel lymphatic basins and the pathological status of SNs could be helpful in decision making. In particular, it would be useful in determining a minimal degree of gastric resection possible and in preventing the universal application of distal or total gastrectomy.¹⁵ Using this method, appropriate indications for LAPPG could be individually determined on the basis of SN status in cases of cT1N0M0 gastric cancer.

Kim et al.¹⁰ have provided a valuable signpost for clinical application of LAPPG. Further exploration may

clarify precisely where function-preserving gastrectomy should be positioned in surgical oncology for early gastric cancer.

CONFLICT OF INTEREST The authors declare no conflict of interest.

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