



Commentary on a randomized controlled trial of vagus nerve-preserving distal gastrectomy in early gastric cancer

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The first randomized controlled trial (RCT) of vagal nerve-preserving distal gastrectomy (VPDG) was reported by Kim and colleagues. The study was performed in a single Korean institution (1). This RCT showed several advantages with respect to the postoperative quality of life (QoL). Patients with a diagnosis of early gastric cancer without lymph node metastasis were randomly assigned in a 1:1 ratio to VPDG or conventional distal gastrectomy (CDG). Both the hepatic branch of the anterior vagal nerve and the celiac branch of the posterior vagal nerve were preserved in the VPDG group, while both branches were resected proximally in the CDG group. QoL was assessed by a validated Korean version of the European Organization for Research and Treatment of Cancer QLQ-C30 questionnaire before gastrectomy and 3 and 12 months postoperatively. Scores of diarrhea symptoms and appetite loss were significantly lower in the VPDG group than in the CDG group 3 and 12 months postoperatively. VPDG thus reduced diarrhea and anorexia.

Our retrospective case-controlled studies showed the short-term and long-term advantages of laparoscopic VPDG 1 year and 5 years postoperatively (2,3). In our short-term studies, fewer patients had early dumping syndrome after laparoscopic VPDG than after laparoscopic CDG, although diarrhea symptoms and food intake were similar in the two groups. The outcomes of the RCT were more reliable than those of our previous study, although the RCT had several methodological differences from our previous studies, with the exception of randomization. First, the hepatic and the celiac branches of the vagal nerves were both preserved or

both resected in the RCT (1), whereas the hepatic branch was preserved in all patients of our retrospective studies to clarify the effectiveness of preserving only the celiac branch (2,3). Because the hepatic branch regulates the function of the gallbladder, patients should undergo gastrectomy with preservation of the hepatic branch to prevent postoperative cholecystolithiasis (4). Second, unnecessary D2 lymph node dissection was performed in all patients in the RCT. The treatment guidelines of the Japanese Gastric Cancer Association recommend D1+ lymph node dissection for early gastric cancer without lymph node metastasis (5). Third, the approach of gastrectomy, i.e., laparoscopic or open gastrectomy, was not described in the RCT (1), although the magnified view provided by laparoscopy facilitated recognition of the branches of the vagal nerves in our retrospective studies (2,3). Finally, the reconstruction method after distal gastrectomy was not described in the RCT (1). The reconstruction method or the size of the remnant stomach may have an impact on QoL after distal gastrectomy (6).

Postvagotomy diarrhea is a well-known after-effect that is caused by the rapid entry of fluid, electrolytes, and malabsorbed nutrients into the colon after meals (7). Bile acid diarrhea is often observed in patients after vagotomy. Excessively high bile-acid concentrations in the colon caused by disturbed bile-acid homeostasis can cause diarrhea by affecting electrolyte balance and accelerating large-bowel transit (8). Diarrhea is significantly less frequent after selective vagotomy than truncal vagotomy (9). Moreover, patients who underwent lymph node dissection around the

celiac artery were reported to have a significantly higher incidence of diarrhea than those in whom the dissection was omitted (10). Few patients had severe chronic diarrhea after distal gastrectomy because the celiac ganglions are usually preserved in lymphadenectomy around the celiac artery. In the RCT, patients who underwent CDG had significantly higher diarrhea scores than those who underwent VPDG (1). However, because the diarrhea score associated with CDG was relatively low, diarrhea was not likely to be severe. In our experience, resection of the celiac branch increased the incidence of chronic diarrhea as compared with VPDG, but less than 10% of patients in each group claimed to have diarrhea (3).

Changes in peptides regulating appetite have been reported after gastrectomy with or without vagotomy (11,12). Levels of peptide YY₃₋₃₆, which suppresses appetite by stimulating hypothalamic neuropeptide Y receptors, increased after CDG, but not after VPDG. Ghrelin has several effects on regulation of energy balance, such as promoting appetite signals in the hypothalamus, stimulating gastrointestinal activities such as peristalsis, gastric acid secretion, and pancreatic excretion, and regulating fat metabolism. However, postoperative changes in ghrelin were similar in VPDG and CDG (11). In another study of ghrelin after distal gastrectomy, preservation of the celiac branch was associated with the maintenance of a constant concentration of serum ghrelin as compared with resection of the branch (12). In a study using multichannel electrogastrography, VPDG better preserved myoelectric activity than did CDG in both fasting and fed states (13). However, postoperative symptoms assessed according to the Gastrointestinal Symptom Rating Scale did not significantly differ between VPDG and CDG in that study.

As mentioned above, gallstone formation is one of the comorbidities after CDG. In one study, the incidence of gallstones was remarkably decreased by VPDG (14). Preserving both the celiac and hepatic branches significantly decreased gallstone formation as compared with preserving only the hepatic branch 1 year and 5 years after gastrectomy in our previous study. Gallbladder function is regulated not only by the hepatic branch of the vagal nerve, but also by the retroperitoneal sympathetic and parasympathetic nerves (15). In the RCT, the incidence of gallstone formation did not differ between VPDG and CDG, although ultrasonography was not performed in all patients (1). In addition, the duration of follow-up was too short to evaluate gallstone formation up to several years after gastrectomy.

The surgical technique used to preserve the vagal

nerves is the most important issue. Of course, lymph nodes along the left gastric artery must be completely dissected when preserving the celiac branch. An ultrasonically activated device (USAD) was used to prevent nerve injury in the RCT (1), as well as in our previous study (2,3). The temperature associated with the use of a USAD or the lateral heat spread is lower than that detected when monopolar cautery is performed (16). However, the preserved vagal nerves or the plexus along the artery might be damaged by cavitation associated with the use of a USAD. Traction produced by taping the celiac branch might be useful for preventing nerve injury.

In conclusion, VPDG was associated with a slight but significant improvement in QoL after gastrectomy as compared with CDG. VPDG is recommended for early gastric cancer without lymph node metastasis and can reduce diarrhea, appetite loss, and gallstone formation.

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Footnote

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