Surgical Technique

# Pylorus- and vagus-nerve-preserving partial gastrectomy (D2 dissection)

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**Abstract:** Pylorus- and vagus nerve-preserving partial gastrectomy is important in improving the prognosis of early gastric cancer surgery, reducing surgical complications and improving the quality of life for such patients. In the present case, pylorus- and vagus nerve-preserving partial gastrectomy was performed using the bipolar electrocautery dissection technique combined with D2 dissection along the lesser sac.

**Key Words:** Gastric cancer; gastrectomy; vagus nerve; pylorus

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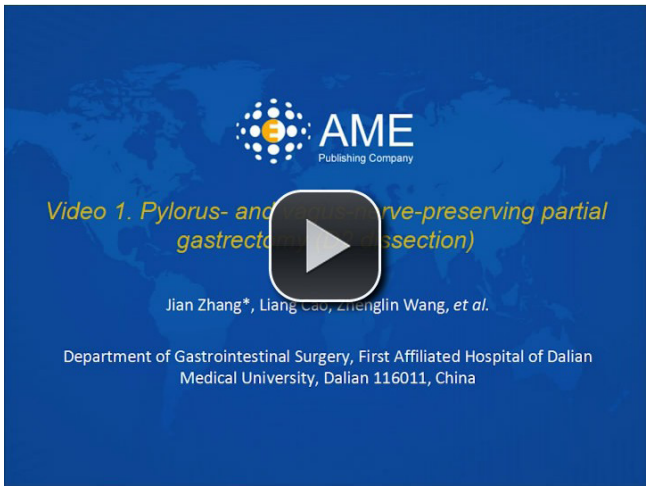
With the development of the management strategies for gastric cancer and continuous assessment of surgical outcomes since the introduction of pylorus-preserving partial gastrectomy (PPG) for treating early gastric cancer (1), pylorus- and vagus nerve-preserving partial gastrectomy, as a successor, has become the standard option for the treatment of early gastric cancer (2,3). The indications include early gastric cancer located in M or SM layer of the M or L region, with the tumor of more than 4.5 cm away from the pylorus and without metastases to stations number 1 and 5 lymph nodes. As the key steps, the perigastric lymph nodes are dissected and the gastric branch of the vagus nerve is transected, while the hepatic branch of anterior vagus nerve and the celiac branch of its posterior trunk and the hepatic plexus, as well as the antral region more than 2.5 cm at the pyloric ring are preserved. In addition to the radical treatment, the advantages of this procedure include rapid postoperative recovery, and decreased incidence of bile reflux, dumping syndrome and cholelithiasis, as well as good gastric emptying (4-6). In the present case, we performed pylorus- and vagus nerve-preserving partial gastrectomy using the bipolar electrocautery dissection technique combined with D2 dissection along the lesser sac.

The patient is a middle-aged man who visited the Department of Gastrointestinal Surgery of the First Affiliated Hospital of Dalian Medical University for upper abdominal pain and discomfort for weeks. Preoperative fiber gastroscopy and endoscopic ultrasound confirmed superficial ulcers of the M region in a diameter of 1.0 cm. Pathology suggested adenocarcinoma, though there was no evidence of upper abdominal metastasis on CT scan. Pylorus- and vagus nerve-preserving partial gastrectomy combined with D2 dissection was performed under general anesthesia.

After the commencement of anesthesia, the patient was placed in a supine position. During the surgery (*Video 1*), a central incision of 2.0 cm was made from the xiphoid of the upper abdominal region to below the umbilicus. Abdominal exploration was then conducted layer by layer to confirm the absence of metastasis and identify the location of the tumor (based on the preoperative titanium clip marker under gastroscopy).

The hepatic branch of the anterior vagus nerve running inside the lesser omentum at the lower edge of the left liver lobe was identified, and the lesser omentum was cut at the foot of the branch. Station number 5 lymph nodes were dissected medial to the right gastric vein inside the hepatoduodenal ligament through to the gastropancreatic fold. The peritoneum was cut on the upper edge of the pancreas to expose the thin mesh- or bundle-shaped nerve




**Video 1** Pylorus- and vagus-nerve-preserving partial gastrectomy (D2 dissection)

plexus on the surface of the common hepatic artery. Station number 8a lymph nodes were dissected anterior to this region through to the abdominal cavity. As the left gastric vein and splenic artery were revealed, station number 11p lymph nodes were dissected along the splenic artery to medial side of the posterior gastric artery while dividing the celiac trunk and dissecting stations number 7 and 9. The yellowish-white celiac branch of the vagus nerve was revealed to the left side of the left gastric artery. The crura and esophageal hiatus were exposed, and the posterior vagus nerve was retracted with suture. Stations number 1 and 3 lymph nodes were dissected along the left gastric artery and its branches, while preserving the ascending branch of the left gastric artery. The anterior vagus nerve was then retracted, and the gastric branch of the left gastric artery and vein and the gastric branch of the vagus nerve were ligated and cut. The right gastric vessels and their branches were transected 3.0 cm from the pylorus. Tissue of the lesser curvature side was thus completely dissected and the vagus nerve was preserved.

The greater omentum was transected 4.0 cm away from the arch near the greater curvature to expose the attachment of the omentum to the mesentery at the right side. The auxiliary colic vein was separated and exposed, and the root of the right gastroepiploic vein was then exposed at the lower edge of the pancreactic head during the separation. Station number 14v lymph nodes along the superior mesenteric vein were dissected, followed by station number 6, to expose the right gastroepiploic artery. The inferior pyloric artery was preserved, and the right gastroepiploic artery and vein were ligated and transected. At the left side, the greater omentum was cut until the lower pole of the spleen to expose the tail of the pancreas. The blood supply to the omentum was preserved, and the left gastroepiploic artery and vein were ligated and cut. Station number 4d lymph nodes were dissected through to the junction of the omental vascular arcade.

As soon as the lesion was identified, the stomach was transected towards the lesser curvature at the greater curvature from the terminal branch of the left gastroepiploic artery with a 100 mm linear stapler. The antrum was transected 3.0 cm away from the pyloric ring with a 100 mm linear stapler, and the partial gastrectomy was completed. A side-to-side anastomosis between the proximal and distal gastric ends was achieved using full-thickness suture. There was no tension and the blood supply was favorable. A nasogastric feeding tube was placed at the distal end of the anastomosis.

After the bleeding was stopped, a drainage tube was placed beneath the liver. The number of instruments and gauze was counted and confirmed, and the abdomen was closed with full-thickness interrupted suture. The patient returned to the ward safely.

The length of operation was 120 min, with bleeding of 30 mL. The patient had flatus on the third postoperative day, and felt epigastric fullness after fluid diet on the fifth day, which was relieved by one fasting day. The patient has been followed up for one year so far. The pathological status of the 20 resected perigastric lymph nodes was IIc PT1N0M0 7th AJCC.

Pylorus- and vagus nerve-preserving partial gastrectomy for early gastric cancer provides significantly satisfying clinical outcomes and postoperative quality of life. It has become one of the standard surgical options of early gastric cancer.

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