

D2 plus radical resection combined with perioperative chemotherapy for advanced gastric cancer with pyloric obstruction

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Abstract: A patient with advanced gastric cancer complicated with pyloric obstruction was treated using D2 + radical resection combined with perioperative chemotherapy, and had satisfying outcomes. The perioperative chemotherapy regimen was Taxol and S1 (tegafur, gimeracil, and oteracil). Three cycles of neoadjuvant chemotherapy were delivered before surgery, and three cycles of adjuvant therapy after surgery. PR was achieved after chemotherapy. D2 + dissection of stations 8p, 12b, 12p, 13 and 14v lymph nodes was performed on September 10, 2012.

Key Words: Advanced gastric cancer; pyloric obstruction; D2 + lymph node dissection; perioperative chemotherapy



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D2 lymph node dissection has become the standard surgical approach for advanced gastric cancer (1-3). However, in the case of lower stomach cancer complicated by pyloric obstruction, the lymphatic drainage and pattern of metastases are different due to the anatomical restriction, and a higher rate of metastases into the hepatoduodenal ligament and the posterior area of the pancreatic head are often seen (4). Perioperative chemotherapy can significantly improve the survival of patients (5,6). This video describes the procedure of D2 + radical resection combined with perioperative chemotherapy for a patient with lower gastric cancer complicated by pyloric obstruction, as follows. The treatment was successful.

A 53-year-old woman was admitted on June 3, 2012 due to “upper abdominal fullness with dull pain for 3 months, with intermittent nausea and vomiting for 10 days.” Gastroscopy suggested a huge, solid ulcer at the antrum close to the pylorus, involving the pylorus and resulting in pyloric stenosis. Endoscopic biopsies suggested poorly

differentiated adenocarcinoma of the gastric antrum. CT: huge tumor in the antrum, considered as gastric antral carcinoma, infiltrating through the serosa with metastases to multiple lymph nodes surrounding the stomach and superior area of the pancreas. Tumor markers: CA199 402.15 U/mL. Clinical diagnoses: cancer of the gastric antrum involving the pylorus, complicated by partial pyloric obstruction, staging T4aN2M0. Three cycles of preoperative chemotherapy were delivered on June 9, July 2 and July 28, 2012, using the regimen of Taxol 240 mg/dL and S1 60 mg bid po d1-14, repeated for three weeks. After the chemotherapy courses, the CT scan suggested significantly reduced volume of the antral tumor, and lymph nodes around the stomach and the pancreas were not as obvious as before. PR was achieved following chemotherapy. Radical gastrectomy with D2 + lymph dissection was performed under general anesthesia for the distal gastric cancer resection on September 10, 2012.

During the surgery (*Video 1*), the patient was placed



Video 1 D2 plus radical resection combined with perioperative chemotherapy for advanced gastric cancer with pyloric obstruction

in a supine position. Following general anesthesia, a middle upper abdominal incision of 3 cm was made from the xiphoid down to the umbilicus. The wound was well protected, and abdominal exploration was conducted to confirm that there were no peritoneal and liver metastases. A piece of gauze was gently padded posterior to the pancreas to prevent tearing. Kocher's separation: the peritoneum was divided at the lateral border of the duodenum and the duodenum was freed. The incision continued downwards to the hepatic flexure of the colon to expand the surgical field. Sharp dissection was performed along the posterior region of the duodenum and the pancreas to reveal the inferior vena cava, the beginning part of the left renal vein, and the right ovarian vein. The anterior lobe of the transverse mesocolon and the pancreatic capsule were completely separated to the hepatic flexure of colon on the right side and to the lower pole of the spleen on the left side, so that the omental bursa could be completely removed.

The lymph nodes in the inferior area to the pylorus were dissected along the course of the middle colon vein towards its root, and the superior mesenteric vein (SMV) anatomy, as well as the gastrointestinal vein trunk and accessory right colic vein, was freed from the inferior region of the pancreatic neck. The station 14v lymph nodes were dissected around the SMV. The separation continued towards the pylorus to free the right gastroepiploic vein and the anterior superior pancreaticoduodenal vein. The structure of the gastrointestinal vein trunk formed jointly by the right gastroepiploic vein, anterior superior pancreaticoduodenal vein and accessory right colic vein was

clearly visible. The right gastroepiploic vein was ligated and cut before its junction with the pancreaticoduodenal vein. The gastroduodenal artery was isolated at the junction of the duodenum and the pancreatic head. The separation continued towards the pylorus to free the right gastroepiploic artery, which was then ligated and cut at the root. The inferior pyloric artery from the gastroduodenal artery was then separated. The inferior pyloric artery was ligated and cut, and the lower edge of the duodenum and the pylorus was completely denuded to for the complete dissection of the station number 6 lymph nodes.

The left gastroepiploic artery was separated, ligated and cut from the lower pole of the spleen, followed by dissection of the station number 4sb lymph nodes. The fascia over the upper edge of the pancreas was opened to reveal the splenic artery, for the dissection of the station number 11p lymph nodes. It should be noted that there were several curves along the splenic artery to the splenic hilum, especially the largest one of 3 to 4 cm to the root, which was hidden behind the pancreas with lymph nodes inside that should not be omitted. After dissection of the station number 11p lymph nodes, the separation was continued towards the left diaphragmatic muscle to dissect the lymph nodes to the left of the celiac artery.

The stomach was flipped down to the inferior side, and the anterior peritoneum of the hepatoduodenal ligament was opened. The proper hepatic artery and the right gastric artery were divided, and the latter was ligated and cut at the root. The station number 5 lymph nodes were dissected. The supraduodenal vessels were transected, and the upper edge of the duodenal bulb was completely denuded. The duodenum was transected 3 cm below the pylorus (with a Tyco 60 mm linear stapler), with the duodenal stumps closed with reinforced stitching.

Denuding and dissection of the hepatoduodenal ligament: the lymph nodes surrounding the proper hepatic artery (number 12a) were dissected, and the artery was retracted with retraction bands to divide the left and right hepatic arteries. Since the hepatic branch and plexus of the vagus nerve were completely removed, there would be an extremely high risk of cholecystitis and gallstones after surgery, so gallbladder was removed as well. The common bile duct was separated, and the surrounding lymph nodes were dissected (number 12b). Caution was made to protect the supplying vessels to the common bile duct. The portal vein to the posterior area was separated, and the surrounding lymph nodes (number 12p) were dissected.

Dissection of lymph nodes posterior to the pancreatic

head (number 13): these lymph nodes often attached closely to the pancreatic head in a flat shape. An electrocautery was required in the sharp separation, with caution to avoid the retroduodenal artery. In some cases, these lymph nodes would be closely adhesive to that small artery, so it could be separated first to prevent bleeding. The stations number 13, 12b and 12p were pushed to the right through the Winslow's hole and retracted from the left side of the hepatoduodenal ligament. These lymph nodes were then separated along the common hepatic artery and the upper edge of the splenic vein towards the celiac trunk. The stations number 8a and 8p were dissected en bloc. The coronary vein was divided from the posterior region close to the root of the common hepatic artery, and then ligated and transected. The lymph nodes to the right of the celiac artery (number 9) were then dissected along the plane of the right crus of the diaphragm. The left gastric artery was denuded from the periphery, ligated and cut at the root, and station number 7 lymph nodes were dissected. The separation was continued along the right crus of the diaphragm towards the cardia to dissect the lymph nodes on its right and posterior side (number 1). The greater and lesser curvatures of the stomach were denuded using Ligasure (Tyco, energy platform), and the stations number 3 and 4d lymph nodes were dissected. The stomach was then transected 5 cm from the upper edge of the tumor with a Tyco 100 mm linear stapler, and 2/3 of the distal stomach was removed together with the lymph nodes.

Reconstruction: Billroth II gastrojejunostomy (Tyco 25 mm circular stapler) was performed in combination with Braun's anastomosis.

The whole operation lasted 2 hours and 50 minutes, with intraoperative blood loss of 100 mL and no blood transfusion. The patient was able to ambulate four days after surgery. Liquid diet was prescribed on the 5th day, and semi-liquid diet was prescribed on the 7th day. The patient was discharged eight days after surgery. Postoperative pathology: chronic inflammation with ulceration in the mucosa of the posterior wall of the antrum, with a small

amount of degenerated adenocarcinoma with interstitial fibrosis in the mucosal and serosal layers; lymph nodes 0/36 (subcomplete remission).

Three cycles of adjuvant chemotherapy were delivered on October 26, November 22 and December 16, 2012 after surgery, using the regimen of Taxol 240 mg/dL and S1 60 mg bid po d1-14, repeated for three weeks. No sign of recurrence was observed during the nine months of postoperative follow-up. The tumor marker CA199 has remained at a low level.

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