Video of Totally Laparoscopic Modified Esophagogastrostomy Using a Spade Shaped Anastomosis Following Proximal Gastrectomy (SPADE Operation)

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Proximal gastrectomy (PG) has been tried as a function-preserving surgery for management of early upper gastric cancer. However, Reflux symptoms and stricture limit its applicability. We designed an anastomosis between the distal part of the posterior esophageal wall and the proximal part of the anterior wall of the stomach to make an anti-reflux mechanism. We named it the SPADE operation owing to its spade-like shape and because it is an acronym for a spade-shaped esophagogastrostomy after PG, which creates a partially duplicated esophagogastric wall. This video illustrates the case of a 74-year-old man diagnosed with early gastric cancer in the high body of the stomach along the greater curvature. We performed a totally laparoscopic proximal gastrectomy and a SPADE operation. He was discharged on the 7th postoperative day with an uneventful postoperative course and resumption of diet without reflux symptoms.

Keywords: Gastric cancer, Surgery, Anastomosis, Proximal gastrectomy, Gastroesophageal reflux

Supplementary video file: This article contains supplementary material (<https://doi.org/10.7602/jmis.2017.20.4.163>).

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INTRODUCTION

Proximal gastrectomy (PG) has been widely accepted as a function-preserving surgery because of the long-term metabolic adverse effects after total gastrectomy.^{1,2} Although several reconstruction techniques have been studied to prevent reflux symptoms following a PG,^{3,4} an optimal reconstruction method has not yet been definitively established.

We designed an anastomosis between the distal part of the posterior esophageal wall and the proximal portion of the anterior wall of the stomach to make an anti-reflux mechanism. We named it a SPADE operation because this anastomosis is

spade shaped and is an acronym of a spade-shaped esophagogastrostomy after PG, which creates a partially duplicated esophagogastric wall. A SPADE operation scores over a PG because it overcomes the drawbacks of the latter—primarily the loss of fundus function, creation of a new sliding esophagogastric junction (EGJ) above the diaphragm, and loss of the angle of His, which are significant physiological changes contributing to the high prevalence and severity of reflux symptoms after a PG. The point at which anastomosis was performed in the abdominal cavity and His angle was formed, without the need for additional procedures, could also help prevent reflux symptoms. The location of the esophagogas-

trostomy is important both from the aspect of blood supply to prevent strictures and leaks but may also influence reflux by creating a pseudofofnix.⁵ The angle of His, which is an acute angle that normally exists between the upward location of the fundus and the EGJ is a key factor in maintaining a natural anti-reflux mechanism.⁶⁻⁸ Key feature of previous simple esophagojejunostomy was EEA stapling anastomosis between esophageal distal end and 3 cm distal to the proximal end of anterior wall of the remnant gastric wall. This anastomosis was performed in the abdominal cavity but did not include the idea of artificial His angle or pseudofofnix formation.

MATERIALS AND METHODS

A 74-year-old man presented with gastric cancer that was detected during evaluation at a National Screening Program. Esophagogastroduodenoscopy showed a 1.5 cm sized type

Ic early gastric cancer (EGC) lesion in the high body of the stomach along the greater curvature, and he was histopathologically diagnosed to have a moderately differentiated adenocarcinoma. Preoperative computed tomography showed no lymph node metastasis. The patient was diagnosed with having cT1N0M0 EGC and a totally laparoscopic proximal gastrectomy (TLPG) was performed.

12 mm balloon trocar was inserted in the umbilicus area and two 12 mm trocars, 5 mm trocars were inserted (Fig. 1). D1+ lymphadenectomy was performed based on the Japanese gastric cancer guidelines. Lymph node stations #4d, #5, #6 and the hepatic branch of the vagus nerve were preserved during the operation. The abdominal esophagus was transected, and the stomach was divided using a linear stapler. After confirming a negative resection margin, an opening was made at 4 cm below the proximal margin in anterior remnant stomach and distal part of the posterior esophageal wall. Both ends of the remnant stomach and esophageal stump were fixed with an interrupted suture to facilitate anastomosis in the abdominal cavity. To suture the mucosal layer of the esophagus securely, we made whole layer one stitch at the middle of esophagus posterior wall and stomach anterior wall. The anastomosis was performed using two 3-0 absorbable continuous barbed sutures. Each continuous suture was performed beginning from the posterior middle stitch to the opposite direction. When completion of anastomosis, spade shape was formed to produce artificial sphincter and His angle, intra-abdominal anastomosis, and pseudofofnix (Fig. 2).

RESULTS

The total operating time was 225 minutes, and the estimated blood loss was 30 ml. Permanent pathology revealed a pT1b-N0M0 lesion. An esophagogastroduodenoscopy performed on the 2nd postoperative day showed no abnormalities such as an ulcer or anastomotic leakage. The patient was discharged on

Fig. 1. Port placement for SPADE operation.

Fig. 2. Illustration of SPADE operation.

the 7th postoperative day without any complications observed during the postoperative period. He was asymptomatic with respect to symptoms of reflux or dumping syndrome at the time of his one month follow-up.

DISCUSSION

We designed the SPADE operation as a reconstructive procedure after a PG to reduce postoperative reflux, and we found that we could achieve the expected theoretical advantage: 1) This technique has benefit in preventing reflux. first reason is location of the anastomosis which is in the abdominal cavity surely, second one is formation of artificial his angle made naturally by this technique, and third one is formation of pseudofovea above the anastomosis line.⁷⁻⁹ 2) Laparoscopic suture was done to confirm the lumen directly and it is known to make less stricture than stapling anastomosis.¹⁰

A disadvantage of the SPADE operation is the need for hand sewing, which is usually more difficult than stapling, particularly in cases of posterior esophageal wall anastomosis because identification of the esophageal mucosa is not easy. Because of this, a SPADE operation requires a longer operative time.

Our study demonstrated that the SPADE operation could reduce reflux symptoms in patients who underwent a PG. We intend to further improve this technique focusing on the finer details. We intend to perform a clinical study to demonstrate its feasibility and clinical utility.

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