Laparoscopic Pyloroplasty

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7.1 Clinical History

The patient is a 26-year-old woman with cystic fibrosis who began complaining of progressive heartburn and regurgitation soon after her bilateral lung transplantation. Her evaluation included these findings:

- Barium swallow: normal anatomy
- Endoscopy: severe esophagitis, Los Angeles grade C
- Esophageal manometry: normal peristalsis and normal resting pressure and relaxation of the lower esophageal sphincter
- Esophageal pH monitoring: pathologic amount of gastroesophageal reflux, with a DeMeester score of 78 (normal <14.7)
- Gastric emptying scan: severely delayed emptying; only 6 % of the tracer exited the stomach over 4 h

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7.2 Operation

7.2.1 Preoperative Evaluation

All patients who are potential candidates for laparoscopic surgical correction of gastroesophageal reflux disease (GERD) undergo a preoperative assessment that includes a symptomatic evaluation, a barium swallow, an upper endoscopy, and a gastric emptying nuclear scan, when indicated. Because gastroparesis has been shown to be implicated in the pathogenesis of GERD and is associated with aspiration and allograft compromise, we prefer to perform a pyloroplasty at the time of laparoscopic antireflux surgery in the lung transplant patient with objectively identified GERD and symptomatic, severe gastric atony (which we define as <10 % of radiolabeled gastric contents emptied into the small bowel within 90 min) and failure to respond to prokinetic agents.

7.2.2 Operative Planning

Before induction, the patient is positioned with a beanbag on the operative table. Pneumatic compression stockings are always used as prophylaxis against deep vein thrombosis. Preoperative antibiotics are administered prior to skin incisions. A Foley catheter is usually inserted. When a laparoscopic pyloroplasty is planned, the patient is asked to maintain a liquid diet for the preceding 2–3 days. Even if the patient has electively fasted for more than 8 h prior to the procedure, a totally empty state can never be guaranteed, especially in those with gastric atony. Therefore, the anesthesiologist performs a rapid sequence intubation technique to quickly secure the airway. Further measures are also employed to diminish gastric volume and increase the pH of gastric fluid. After intubation, the beanbag is inflated and the lower extremities are placed in stirrups, and the surgeon stands between them. The abdomen is then prepped and draped and the patient is positioned in steep reverse Trendelenburg.

7.2.3 Port Placement

Figure 7.1 shows the position of the operative ports in order of placement when performing a laparoscopic Nissen fundoplication: (1) optical port, 14 cm below the xiphoid process; (2) left working port, below the left costal margin in the midclavicular line; (3) epigastric port for the Nathanson retractor; (4) right working port, below the right costal margin in the midclavicular line; (5) assisting port, on the left anterior axillary line at the level of the optical port. Figure 7.2 shows the port placement and rearrangement for a pyloroplasty. Port 6 is placed at the right midclavicular line at the level of the transverse umbilical line. This port holds an 11-mm optical trocar. Port 1 is then converted to a working port. Finally, a 5-mm working port (Port 7) is placed at the right anterior axillary line, triangulating with Port 1 for combined manipulation of the suturing instruments. Special attention must be given to proper port placement, because if the ports are placed too high, the angle of suturing becomes too wide and suturing becomes difficult.

7.2.4 Pyloroplasty Procedure

Once the pylorus is identified, electrocautery is employed to score the anterior surface of the pylorus and the first portion of the duodenum (Fig. 7.3). The pylorus is then entered and a 5-cm longitudinal enterotomy is carried distally in the duodenum and proximally in the antrum with the hook cautery or Ligasure™ (Fig. 7.3). Anchoring sutures are placed at the top and bottom of the enterotomy with interrupted 2-0 silk stitches with a V-20 needle and intracorporeally. To prevent incorporation of the posterior wall of the pylorus during closure, a rolled piece of Gelfoam (created by placing 2-0 silk ties at both ends) is introduced into the lumen of the pylorus (Fig. 7.4) and left in place to later dissolve. The longitudinal enterotomy is then closed transversely in a single layer over the Gelfoam roll with interrupted 2-0 silk sutures, which are placed a few millimeters apart, starting from the ends and progressing towards the middle (Fig. 7.5). These sutures are tied intracorporeally (Fig. 7.6). A Maryland dissector is then used to assess for gaps between the sutures, and simple 2-0 silk stitches are placed where appropriate. Finally, two metallic clips are placed on the top and the bottom of the pyloroplasty to help in locating the pyloroplasty on a subsequent barium swallow.

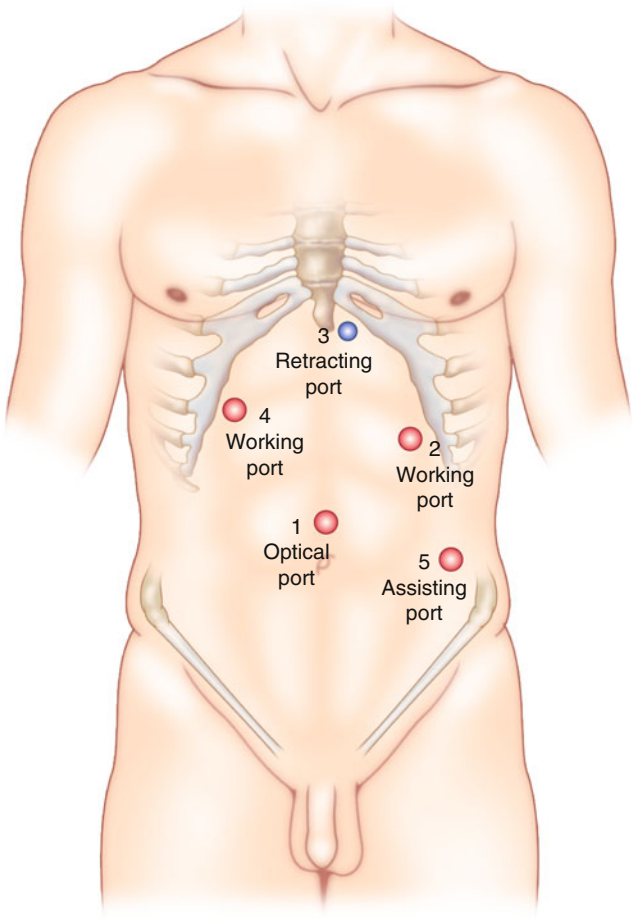

Fig. 7.1 Operative ports in order of placement for a laparoscopic Nissen fundoplication

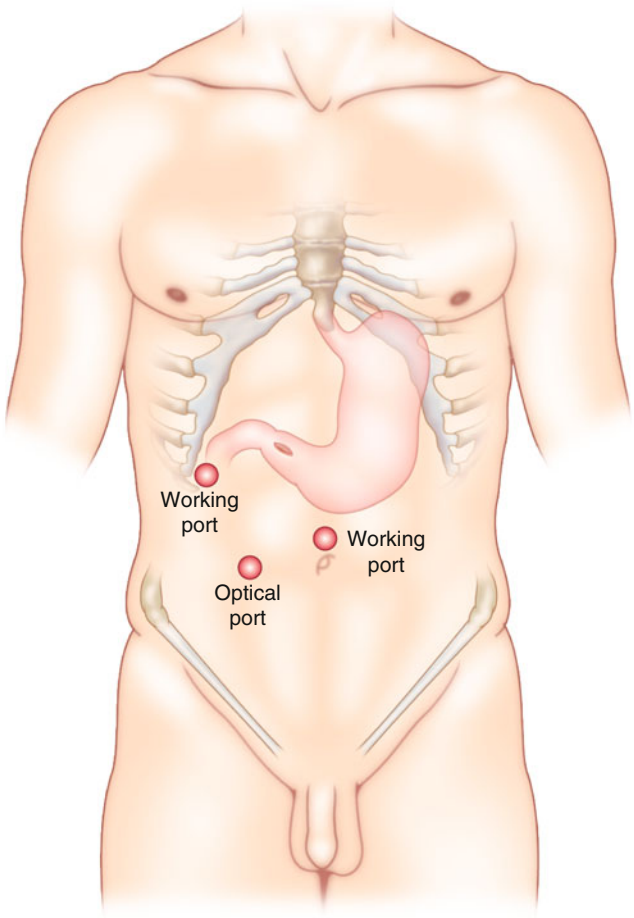

Fig. 7.2 Port placement and rearrangement for a pyloroplasty

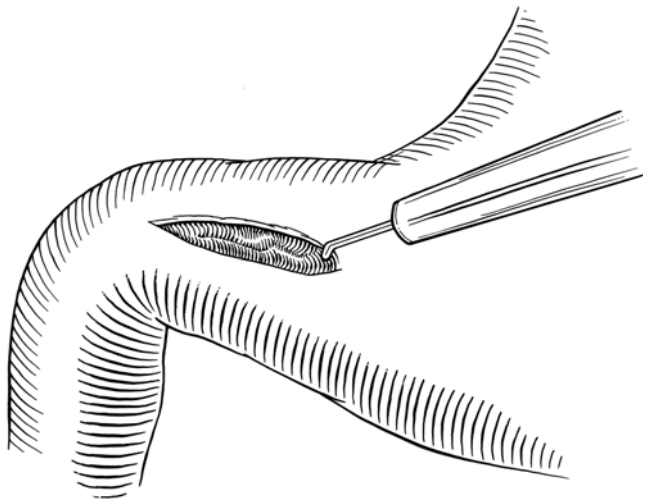

Fig. 7.3 The pylorus is entered and a 5-cm longitudinal enterotomy is carried distally in the duodenum and proximally in the antrum

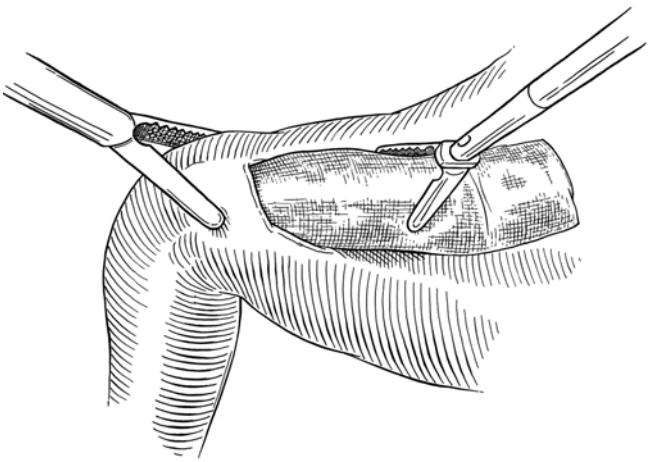

Fig. 7.4 A rolled piece of Gelfoam is introduced into the lumen of the pylorus to prevent incorporation of the posterior wall of the pylorus during closure

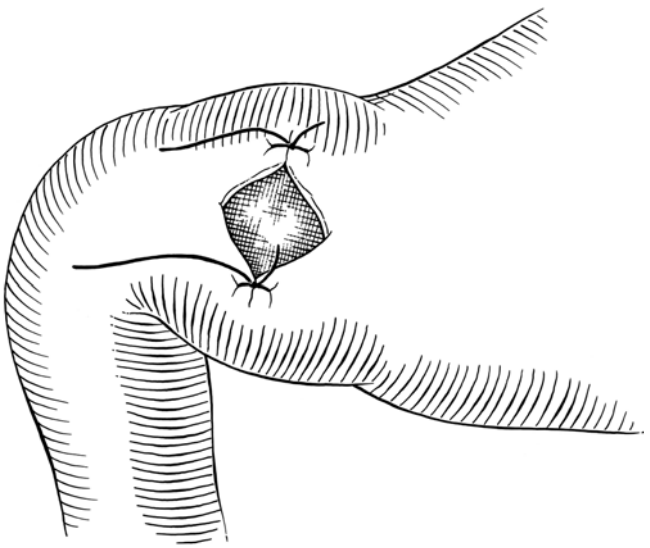

Fig. 7.5 The enterotomy is closed transversely with interrupted 2-0 silk sutures, starting from the ends and progressing towards the middle

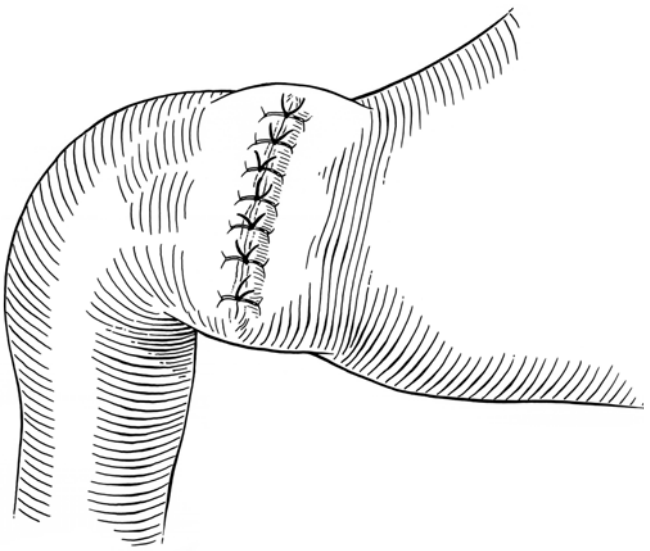

Fig. 7.6 The sutures are placed a few millimeters apart and are tied intracorporeally

7.3 Postoperative Care

A barium swallow is performed on postoperative day 1 to rule out a gastric leak. All patients are then started on a soft mechanical diet the morning of postoperative day 1 and are asked to keep this dietary regimen for the first 2 weeks postoperatively. Patients can then advance to more solid foods as tolerated.

Suggested Reading

Bais JE, Samsom M, Boudesteijn EA, van Rijk PP, Akkermans LM, Gooszen HG. Impact of delayed gastric emptying on the outcome of antireflux surgery. Ann Surg. 2001;234:139–46.

Davis CS, Jellish WS, Fisichella PM. Laparoscopic fundoplication with or without pyloroplasty in patients with gastroesophageal reflux disease after lung transplantation: how I do it. J Gastrointest Surg. 2010a;14:1434–41.

Davis CS, Shankaran V, Kovacs EJ, Gagermeier J, Dilling D, Alex CG, et al. Gastroesophageal reflux disease after lung transplantation: pathophysiology and implications for treatment. Surgery. 2010b;148:737–44; discussion 744–5.

Fisichella PM, Davis CS, Shankaran V, Gagermeier J, Dilling D, Alex CG, et al. The prevalence and extent of gastroesophageal reflux disease correlates to the type of lung transplantation. Surg Laparosc Endosc Percutan Tech. 2012;22:46–51.

Hinder RA, Stein HJ, Bremner CG, DeMeester TR. Relationship of a satisfactory outcome to normalization of delayed gastric emptying after Nissen fundoplication. Ann Surg. 1989;210:458–64; discussion 464–5.

Khajanchee YS, Dunst CM, Swanstrom LL. Outcomes of Nissen fundoplication in patients with gastroesophageal reflux disease and delayed gastric emptying. Arch Surg. 2009;144:823–8.

Mendez BM, Davis CS, Weber C, Joehl RJ, Fisichella PM. Gastroesophageal reflux disease in lung transplant patients with cystic fibrosis. Am J Surg. 2012;204:e21–6.

Pellegrini CA. Delayed gastric emptying in patients with abnormal gastroesophageal reflux. Ann Surg. 2001;234:147–8.