

Laparoscopic Nissen Fundoplication: The “Right Posterior” Approach

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The main steps for performing a laparoscopic Nissen fundoplication are described: They start with a “right approach” by dissection of the high lesser curve, near the esophagogastric junction. Then the posterior surface of the stomach is easily visualized by the “posterior approach.” The fat pad and both vagal trunks are displaced to the right, avoiding any vagal injury. Two to three short gastric vessels are divided, leaving a loose gastric fundus. A 360° total symmetric and geometric fundoplication is then performed, including the esophageal wall in the most proximal and distal stitch. A final stitch for an anterior fundophrenopexy is performed. This surgical approach has been used in 225 patients with severe chronic pathologic reflux with a 1.3% conversion rate, no mortality, and only one significant postoperative complication. Late evaluation at 5 years after surgery has shown excellent or good results in 85% and fair or poor results in 15% of the patients.

KEY WORDS: Laparoscopic, Nissen fundoplication, reflux esophagitis

Nissen fundoplication is the “gold standard” procedure in most surgical centers to treat pathologic gastroesophageal reflux.¹ The laparoscopic approach has shown excellent results in patients with noncomplicated reflux esophagitis and has replaced completely the open approach.^{1,2} According to the literature from dedicated centers in North America and Europe, the standard Nissen fundoplication includes the following steps:

- Division of short gastric vessels from a left approach allowing the mobilization of the gastric fundus. However, with this approach, the posterior short gastric vessels are not divided, making this mobilization incomplete.
- Opening of the lesser omentum usually dividing the hepatic branch of the left (anterior) vagal nerve, which represents a risk of late gallstone disease.³
- Isolation of the abdominal esophagus through a careful dissection between the right crus and the posterior wall of the esophagus.

With these steps, a floppy wrap can be obtained; nevertheless, one or both vagal trunks may be included in the plication, as well as the gross fatty tissue.

The purpose of the present report is to show how we perform a laparoscopic Nissen fundoplication by a different surgical approach, to see clearly all structures of the esophagogastric junction, to keep fatty tissue away from the plication, to construct a symmetrical plication, and to preserve intact both vagal trunks outside the wrap.

METHODS

We approach the esophagogastric junction via what we call “the right posterior approach.” We start the operation by dissecting the lesser curve (right approach) 2–3 cm distal to the esophagogastric junction, just where the anterior and posterior layers of the lesser omentum insert into the lesser curvature.

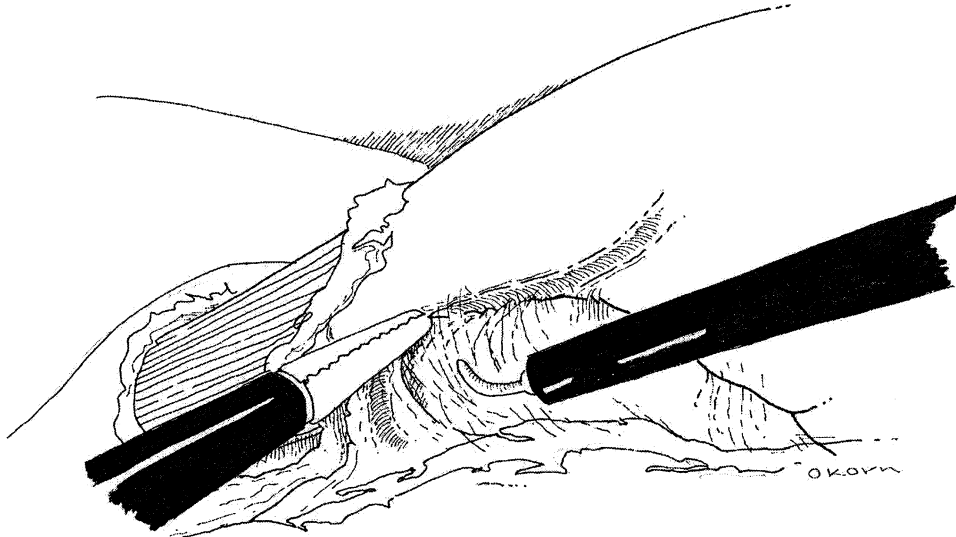


Fig. 1. The beginning of the operation via the “right approach” starts with the section of the anterior and posterior layer of the lesser omentum along the proximal lesser curve, 2–3 cm distal to the cardia.

In this way, we are sure to preserve Latarjet’s nerve (Fig. 1). The phrenoesophageal ligament and the fat pad are dissected from the esophagogastric junction

and are displaced to the right, including the anterior and posterior vagal trunks, together with the celiac and hepatic branches. Then by the posterior wall of the

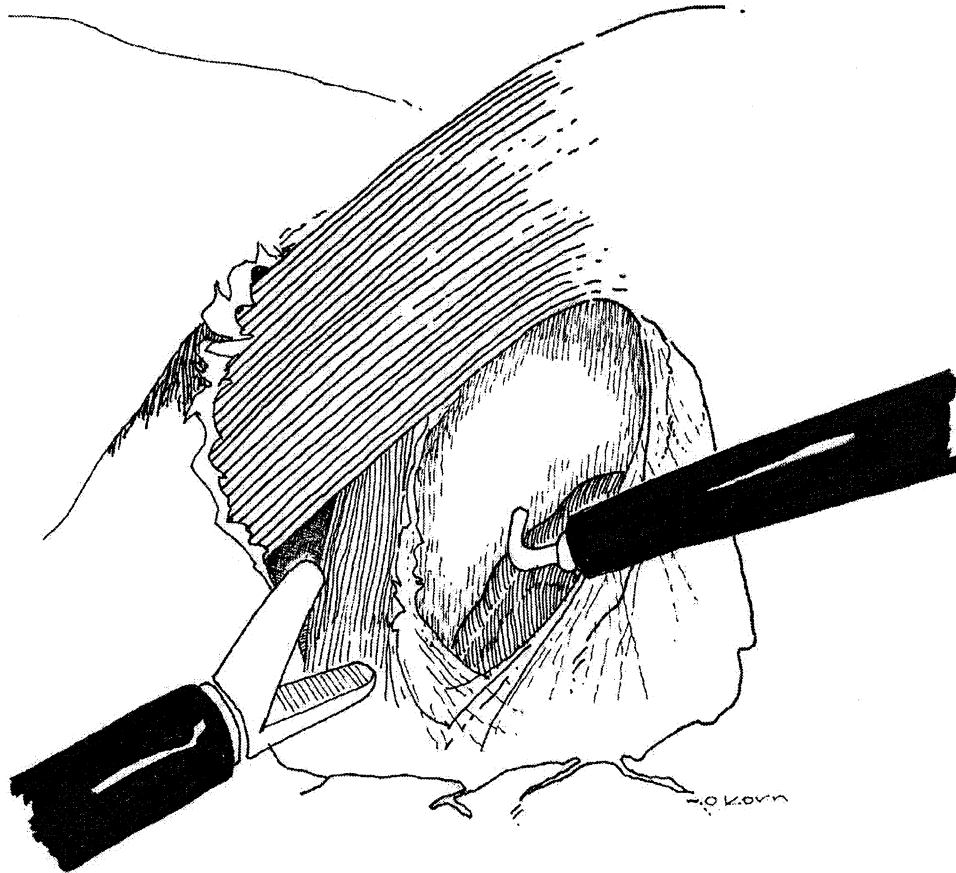


Fig. 2. The “posterior approach” to the short gastric vessels behind the posterior surface of the stomach allows a very clear view of the first short gastric vessels.

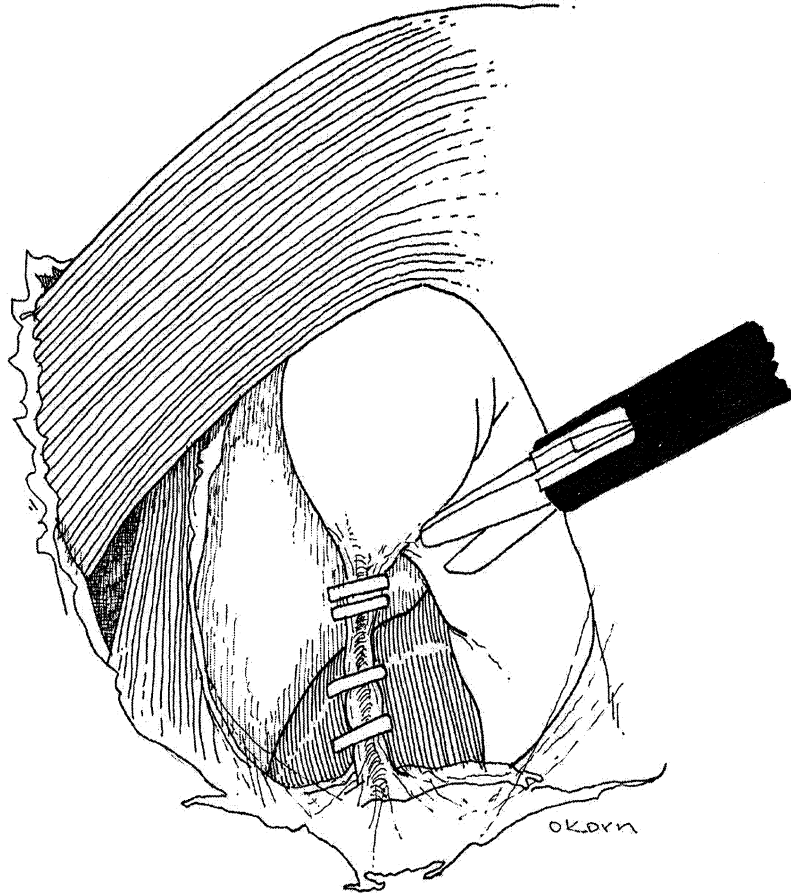


Fig. 3. Section of the first two short vessels with clips or by ultrasonic dissection.

stomach (posterior approach), we approach the short gastric vessels, through the lesser sac (Fig. 2). In this way, the first and second short gastric vessels, which

form the retroperitoneal vessels, are easily divided by clips (Fig. 3) or with the ultrasonic dissector. We are convinced that this posterior approach is much

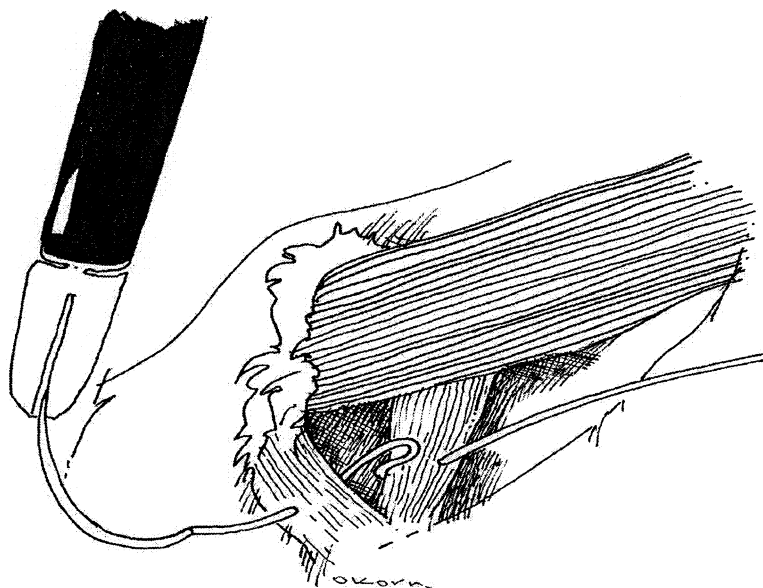


Fig. 4. Closure of the hiatus by two or three nonabsorbable stitches.

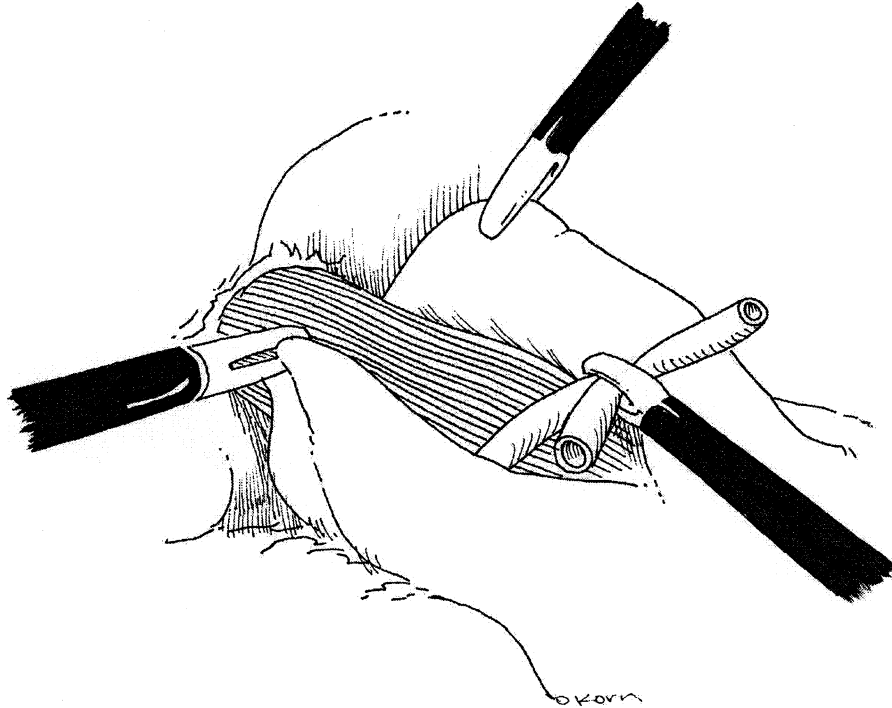


Fig. 5. “Shoe-shine” maneuver clearly demonstrates the looseness of the gastric fundus for a symmetric and geometric fundoplication.

easier than the left-side approach to visualize these vessels. After completing the division of other short gastric vessels, which connect the greater curvature with the spleen, the gastric fundus is loose, not

tense, and adequate for a “floppy” fundoplication. The next step is to close the diaphragmatic crura with two or three nonabsorbable stitches (Ethibond 2-0), having displaced the posterior vagal trunk to the right

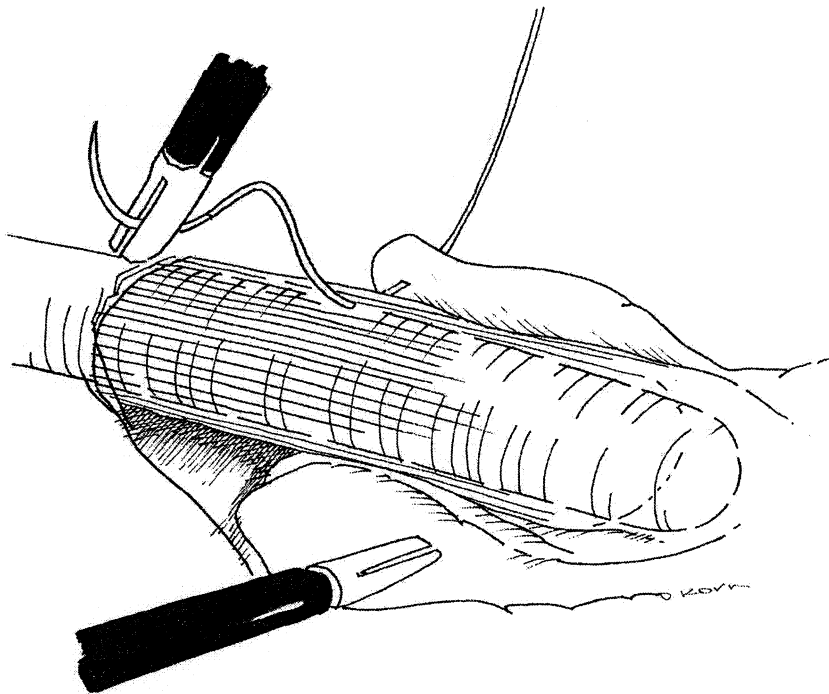


Fig. 6. Proximal stitch of the fundoplication, which includes the esophageal muscular coat, with the bougie inside the esophageal lumen.

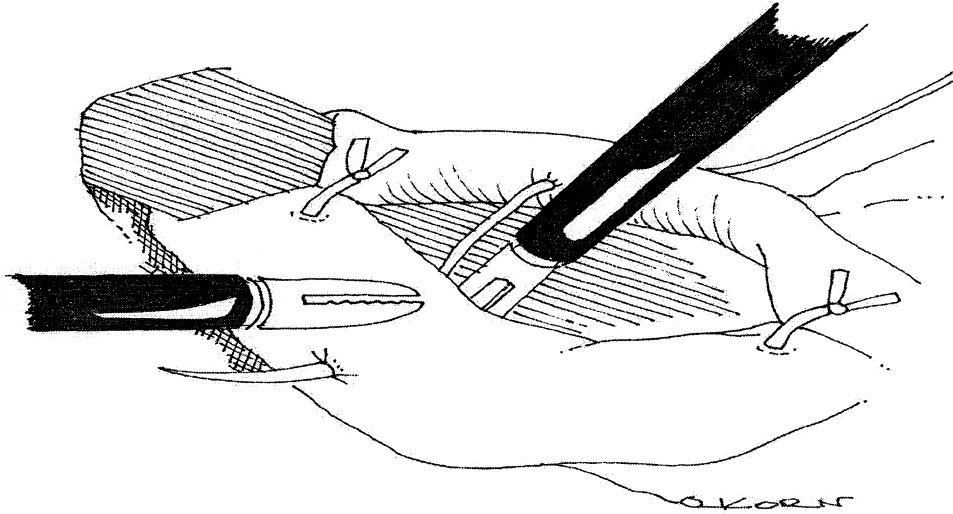


Fig. 7. Distal stitch of the fundoplication, including the esophageal wall.

(Fig. 4). Now it is very easy to perform the “shoeshine” maneuver, which demonstrates the looseness of the gastric fundus (Fig. 5). A short piece ($\pm 12-15$ cm) of soft Nelaton catheter encircles the esophagogastric junction to pull it down in the caudal direction.

A 32 F bougie is inserted into the esophagus, together with a nasogastric tube (14–16 F), which gives a total of 46–48 F. The first stitch is the most proximal, which includes the esophageal wall, to avoid displacement or slipping of the wrap (Fig. 6). In the same way a

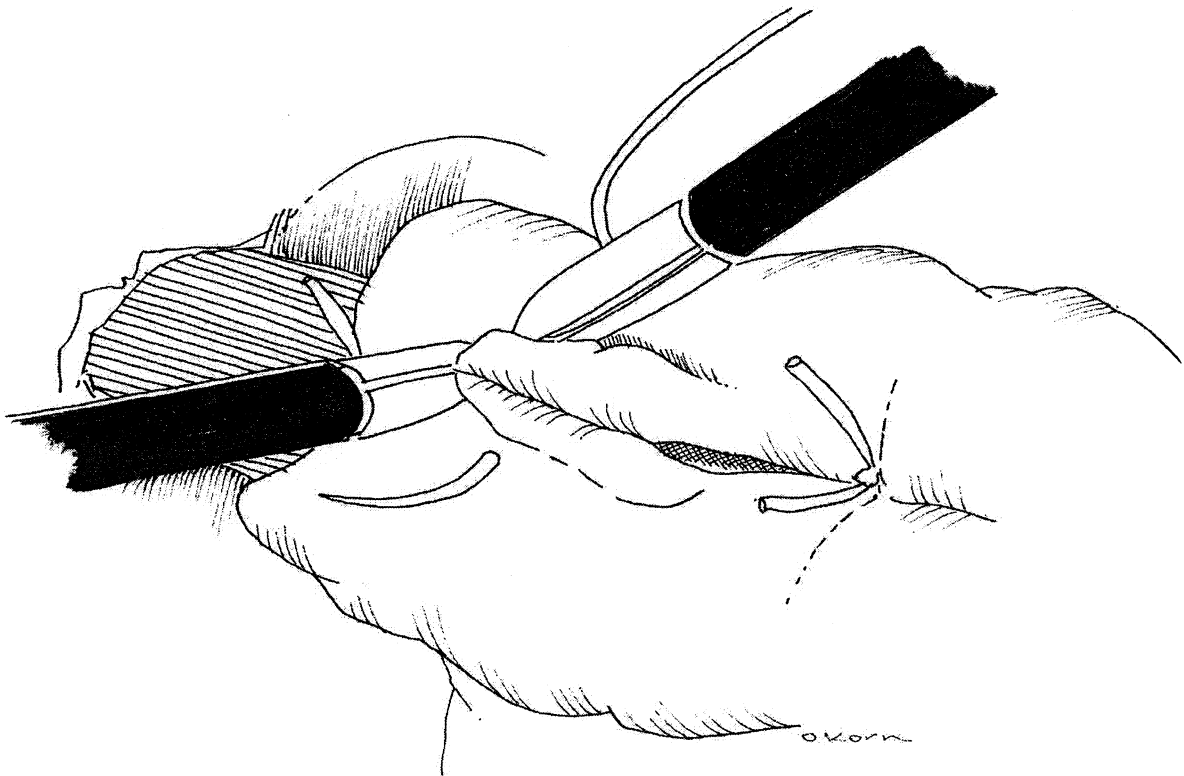


Fig. 8. Mid-stitches of the fundoplication, always using nonabsorbable sutures, which do not include the esophageal wall.

second stitch is placed at the distal portion of the wrap, also including esophageal wall (Fig. 7). The sutures used are nonabsorbable Ethibond 2-0 sutures and the knots are all intracorporeal. The operation is completed by two stitches between the previous ones, which do not include esophageal wall (Figs. 7 and 8). In this way, we construct a 360° fundoplication of 4-cm length. The bougie is removed and introduced again into the stomach gently, to exclude an excessive tightness of the distal esophagus by the wrap. The operation is completed by placing a stitch between the gastric fundus and the anterior hiatus, which we designate as an “anterior fundophrenopexy,” to avoid an anterior iatrogenic paraesophageal hernia (Fig. 9). The nasogastric tube is removed the next day, and oral feeding is started. The usual hospital stay is 2–3 days.

RESULTS

From 1993 through July 2004, the laparoscopic Nissen has been performed on a total of 225 patients

with severe gastroesophageal reflux disease. All patients had an abnormal 24-hour pH study, together with an incompetent lower esophageal sphincter. There have been three conversions due to a large fixed intrathoracic hiatal hernia (1.3%). No other intraoperative complication such as esophageal or gastric perforation or splenectomy has occurred. The average duration of the operation was 75 minutes (60–90 minutes). There was no operative mortality and only one postoperative morbidity (0.4%) due to necrosis of the lesser curve of the stomach, which was repaired 6 days after the operation via a laparoscopic approach, with an uneventful recovery. The late evaluation 4–5 years after surgery has shown Visick I and II results in 85% of the patients and Visick III and IV results in 15% of them.⁴

DISCUSSION

The principles that antireflux surgery should accomplish have been enumerated by us and other

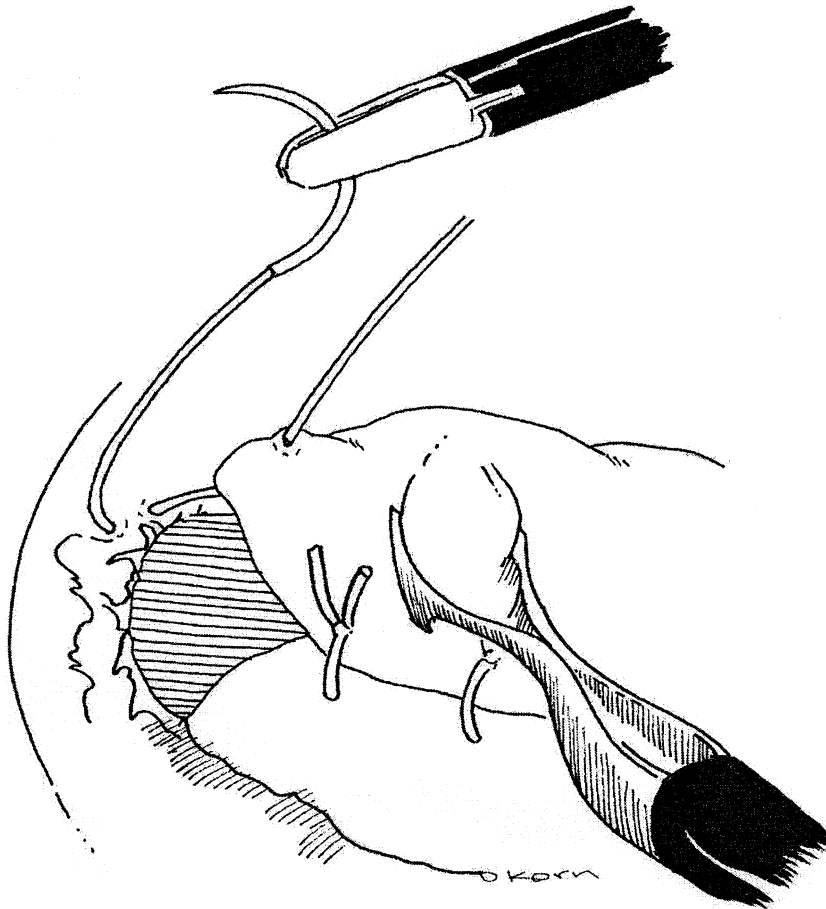


Fig. 9. Final stitch in performing an anterior fundophrenopexy, to avoid a late anterior paraesophageal hernia.

esophageal surgeons.⁴⁻⁹ They include the creation of a long intra-abdominal segment of esophagus,⁵ calibration of the cardia¹⁰ by applying the principle of the Law of La Place, and restoration of the normal length-tension relationship of the muscle responsible for the lower esophageal sphincter.^{5,7,8} Nissen fundoplication achieves all of these principles and is the most used laparoscopic procedure for patients with chronic gastroesophageal reflux disease.

In the present study we describe how we perform this operation. The main difference with other surgeons that we have observed performing Nissen fundoplication, is the initial surgical approach. We believe that the “right posterior” approach has two main advantages over the “left side first” approach: (1) it clearly preserves the vagal trunks, the anterior (hepatic) and posterior (celiac) branches, and the nerves of Latarjet, avoiding complications such as slow gastric emptying, gastric ulcer, gas bloat syndrome, and diarrhea, and (2) it allows a very easy approach to the first short gastric vessels, which fix the gastric fundus to the retroperitoneum. In this way a floppy Nissen can be constructed. We are aware of the four randomized trials comparing this specific point,¹ which refer to the section of the short gastric vessels. However, for surgeons with great experience in this field, it is more desirable to divide the short vessels than to not divide them, to achieve a loose gastric fundus. We always close the hiatus with two or three nonabsorbable stitches, as do the majority of surgeons. The length of fundoplication is near 4 cm, because that is the normal length of the lower esophageal sphincter. Other surgeons perform a wrap of 2- to 3-cm length,¹¹⁻¹³ to decrease the incidence of postoperative dysphagia. However, in our follow-up, postoperative dysphagia has not been a problem and only two patients (0.9%) required endoscopic dilatation after surgery. Dysphagia has been mild and almost gone 3 months after surgery.

We have had concerns in performing a Nissen fundoplication when patients have poor or weak peristalsis. In our experience, weak peristalsis has recovered when reflux is stopped after surgery, with identical results to those reported by Patti et al.¹⁴

In summary, classic Nissen fundoplication, as described in 1956,¹⁵ has undergone several technical modifications in the past 48 years: However, the main principles of this operation have been maintained¹⁰: (1) preparation of the hiatal and fundic region by

dissection of the esophagogastric junction through the “right posterior” approach, (2) preservation of vagal branches, (3) division of the proximal short gastric vessels, (4) closure of the hiatus, and (5) construction of a total 360° symmetric floppy fundoplication. If these principles are adhered to, late clinical results will be favorable.

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