

# Laparoscopic Heller Myotomy and Dor Fundoplication for Esophageal Achalasia. How I do It

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**Abstract** The advent and the success of minimally invasive surgery have changed the treatment algorithm for esophageal achalasia. Today, a laparoscopic Heller myotomy and partial fundoplication is considered the treatment of choice for this disease. This article describes the technique of laparoscopic Heller myotomy and Dor fundoplication.

**Keywords** Esophageal achalasia · Pneumatic dilatation · Laparoscopic Heller myotomy · Esophagectomy

During the 1970s and 1980s, although it was recognized that a myotomy was more effective than pneumatic dilatation, it was generally accepted by the medical community that pneumatic dilatation was the primary form of treatment for esophageal achalasia. As a consequence, even in tertiary care centers, the experience was limited to few myotomies per year, mostly for patients who still had dysphagia after multiple dilatations, or for those who suffered a perforation at the time of a dilatation.

The application of minimally invasive surgery to the treatment of esophageal achalasia has determined an unexpected change in the treatment algorithm of this disease. Today, a laparoscopic Heller myotomy is considered by most gastroenterologists and surgeons as the primary treatment for achalasia, reserving pneumatic dilatation to the few failures of this operation.<sup>1,2</sup> This shift in practice is due to the recognition that minimally invasive surgery is better than other treatment modalities. The operation, in fact, relieves dysphagia in about 90% of patients, and it allows a short hospital stay, minimal postoperative discomfort, and a fast recovery time.<sup>1–10</sup>

The following describes a step-by-step approach of a laparoscopic Heller myotomy and Dor fundoplication for the treatment of esophageal achalasia.

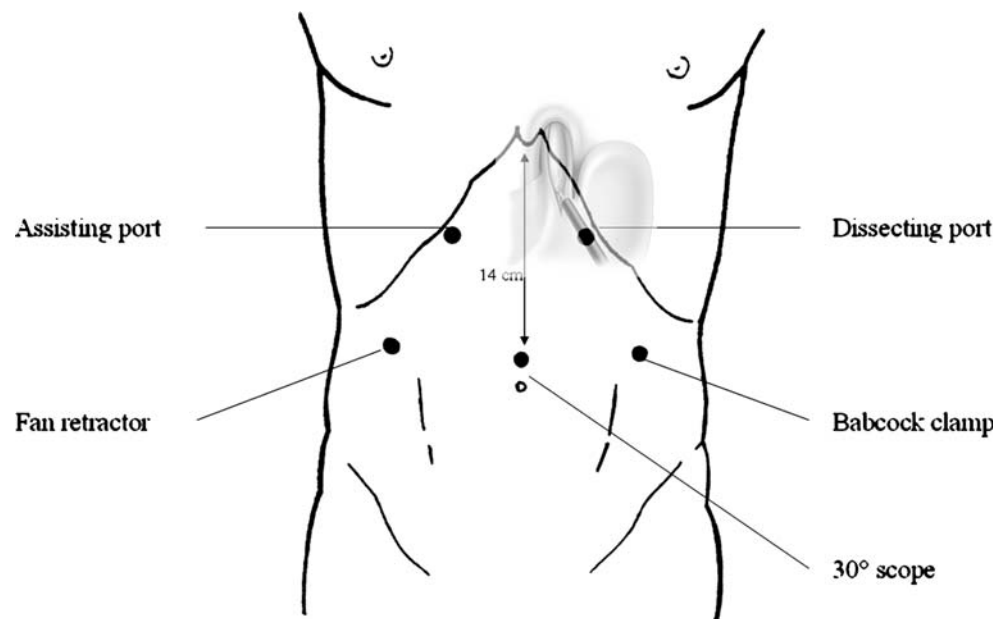
## Positioning of the Patient on the Operating Room Table

After induction of general anesthesia with a single lumen endotracheal tube, the patient is positioned supine on the operating table over a beanbag. The beanbag is used to create a saddle under the patient's perineum to avoid sliding during the operation when a steep reverse Trendelenburg position is used. The legs are extended on stirrups, with the knees flexed only 20 to 30°. The surgeon stands in between the patient's legs.

## Position of the Trocars

Five trocars are used for the operation (Fig. 1). The first trocar is placed in the midline, 14 cm distal to the xiphoid process, and it is used for the 30° scope camera. A second trocar is placed in the left mid clavicular line at the same level with the camera, and it is used for inserting a Babcock clamp and instruments to divide the short gastric vessels. A third trocar is placed in the right midclavicular line at the same level of the previous two trocars, and it is used for the insertion of a retractor to lift the left lateral segment of the liver. The fourth and a fifth trocars are placed under the right and left costal margins, so that their axes form an angle of about 120° with the camera. They are used for the dissecting and suturing instruments.

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**Figure 1** Trocar placement.

### Dissection

The operation is usually started by dividing the gastrohepatic ligament. The right crus of the diaphragm is identified and separated from the esophagus by blunt dissection. After the peritoneum and phreno-esophageal membrane overlying the esophagus are transected, the left pillar of the crus is separated by blunt dissection from the esophagus. The dissection is continued in the posterior mediastinum, lateral and anterior to the esophagus, to expose 6 to 7 cm of the esophagus. No posterior dissection is necessary if Dor fundoplication is planned. During this part of the dissection, it is important to identify and preserve the posterior and anterior vagus nerves. The short gastric vessels are then divided. When a large hiatal hernia is present, it is safer to divide the short gastric vessels first and reach the left pillar of the crus after such division.

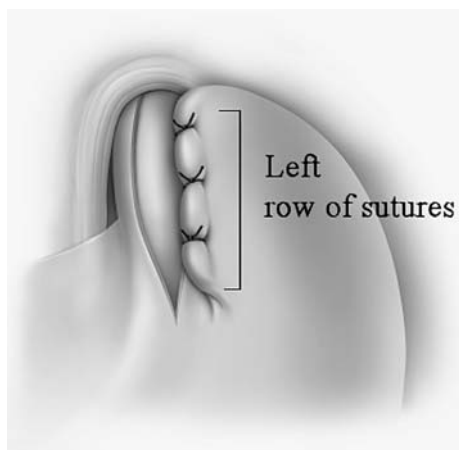
When dealing with a sigmoid esophagus, it is important to extend the dissection more proximally in the posterior mediastinum and to also dissect posterior to the esophagus. This dissection allows straightening of the esophageal axis, avoiding stasis of food after the myotomy.<sup>2</sup>

### Esophageal Myotomy

The fat pad is removed to expose the gastroesophageal junction. Traction is applied by a Babcock clamp to expose the right side of the esophageal wall. The myotomy is performed using the hook cautery in the 11 o'clock position. After reaching the sub-mucosal plane in one point, about 3 cm above the gastroesophageal junction, the myotomy is then extended for about 6 cm upward and onto the gastric wall for about 2.0–2.5 cm (Fig. 2). During the

last few years, the length of the myotomy onto the gastric wall has been increased, as there is evidence that a longer myotomy provides better relief of dysphagia.<sup>3</sup> It is important to be cautious in patients previously treated with intrasphincteric injection of botulinum toxin, as fibrosis can be present at the level of the gastroesophageal junction, with consequent loss of the normal anatomic planes. In these circumstances, the myotomy can be very difficult, and there is an increased risk of mucosal perforation.<sup>7,8,11</sup> If a perforation is suspected, the esophagus should be submerged with water, and air insufflated through the oro-gastric tube. Methylene blue injection via the oro-gastric tube can also be used. Once the hole is identified, it is closed with fine (5-0) absorbable sutures. After the myotomy is completed, the muscle edges are gently

**Figure 2** Completed myotomy.



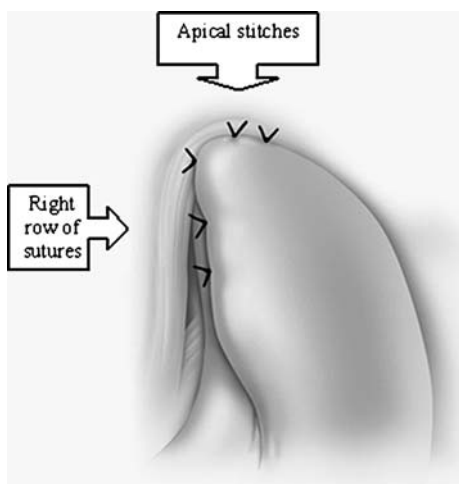
**Figure 3** Dor fundoplication: left row of sutures.

separated to expose the mucosa for about 40% of the circumference.

### Dor Fundoplication

It is generally accepted that if a myotomy alone is performed, reflux occurs in about 50% of patients.<sup>4,12</sup> A 360° fundoplication is generally avoided, as it is felt that with time, it is accompanied by a progressive increase in esophageal retention with poor emptying and recurrence of symptoms.<sup>13</sup> A partial fundoplication is the procedure of choice, as it takes into account the lack of peristalsis. There are no data comparing the results of a posterior and an anterior fundoplication. We do favor the Dor fundoplication (anterior 180° fundoplication) as it does not require posterior dissection and because it covers the exposed mucosa.

The Dor fundoplication is constructed by using two rows of sutures. The first row of sutures is on the left, and comprises three stitches. The uppermost stitch is triangular and incorporates the gastric fundus, the left side of the esophageal wall and the left pillar of the crus. The second and the third stitches incorporate the esophageal and the



**Figure 4** Completed Dor fundoplication.

gastric wall only (Fig. 3). The stomach is then folded over the exposed mucosa so that the greater curvature lies next to the right pillar of the crus. The right row of sutures also has three stitches. The uppermost stitch includes the gastric fundus, the right side of the esophageal wall and the right pillar of the crus. The second and the third stitches are placed between the greater curvature of the stomach and the right side of the esophageal wall. Finally, two or three stitches are placed between the gastric fundus and the rim of the esophageal hiatus (without incorporating the esophageal wall) to decrease the tension of the right row of sutures (Fig. 4).

### Postoperative Course

Patients are fed the morning of the first postoperative day and are instructed to avoid meat or bread for 2 weeks. About 70% of patients are discharged within 23 h, and 90% of patients are discharged within 48 h. Most patients resume their regular activity within 2 weeks.

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