Surgical Management of Achalasia: Thoracoscopic Myotomy

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Introduction

Achalasia is an esophageal motility disorder that results in clinically significant dysphagia. The esophageal manometry findings are characterized by aperistalsis in the body of the esophagus and incomplete relaxation in the lower esophageal sphincter during swallowing. The etiology of achalasia is unknown, and the current therapeutic interventions target the underlying pathophysiology of the disease. Endoscopic therapies, such as pneumatic balloon dilation and botulinum toxin injection, typically only produce temporary improvement of dysphagia symptoms. The cornerstone of surgical therapy for achalasia is esophagomyotomy. The surgical myotomy for achalasia was first described by Heller in 1913 and included an anterior and posterior myotomy by an abdominal approach. Ellis described the first transthoracic esophagomyotomy through a left thoracotomy [1]. The video-assisted thoracoscopic approach for esophagomyotomy was described by Pellegrini in 1992 [2]. This chapter will describe the thoracoscopic approach for performing esophagomyotomy for the surgical management of achalasia.

Indications

Achalasia is an esophageal motility disorder that is characterized by failure of the lower esophageal sphincter (LES) to relax and the absence of esophageal peristalsis. The indications for thoracoscopic myotomy are the same as for laparoscopic myotomy. Currently, laparoscopic myotomy is the more commonly performed technique for surgical myotomy; however, the thoracoscopic myotomy would be an excellent

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alternative for patients who have undergone multiple abdominal operations and have extensive abdominal adhesions. Patients with achalasia often present with severe dysphagia, weight loss, regurgitation, aspiration, and chest pain. An esophageal manometry study is the gold standard for the diagnosis of achalasia and should be performed prior to any surgical myotomy. The manometry study typically demonstrates an elevated LES relaxation pressure and no evidence of peristalsis in the body of the esophagus.

In addition to manometry, a contrast esophagram and endoscopy should be performed in patients with suspected achalasia. The contrast esophagram will typically show a dilated esophagus and the classic bird's beak tapering of the distal esophagus at the esophagogastric junction in patients with achalasia. An upper endoscopy should be performed to rule out an esophageal cancer in the distal esophagus, which could mimic the symptoms of achalasia.

Technique

The objective for thoracoscopic myotomy is the effective lowering of the lower esophageal sphincter (LES) relaxing pressure, which results in the correction of the esophageal obstruction which occurs in achalasia. The complete division of the outer longitudinal fibers and the inner circular muscle fibers in the distal third of the esophagus is the cornerstone of the operation. The myotomy should be carried down onto the cardia of the stomach for a total length of 3 cm to ensure complete division of the muscle fibers at the esophagogastric junction.

Thoracoscopic myotomy requires single lung ventilation; therefore, a double lumen endotracheal tube is required. The author prefers a right thoracoscopic approach which provides complete access to the intrathoracic esophagus. The left thoracoscopic approach only provides access to the distal third of the esophagus because the aortic arch limits access to mid-esophagus at the level of the carina and azygous vein. For the right thoracoscopic myotomy, the patient is placed in the left lateral decubitus position. A total of four thoracoscopic ports are placed for the procedure (Fig. 37.1). The 12 mm thoracoscopic ports are placed in the 8th intercostal space posterior axillary line, the 7th intercostal space 3 finger breadths below the tip of the scapula, the 5th intercostal space anterior axillary line, and the 9th intercostal space posteriorly. Carbon dioxide insufflation is utilized to assist with exposure by depressing the right hemidiaphragm. The right lung is completely deflated and retracted anteriorly to expose the posterior mediastinum.

The inferior pulmonary ligament is incised with the L-hook Bovie electrocautery until the left inferior pulmonary vein is exposed. The mediastinal pleura overlying the esophagus at the level of the inferior pulmonary vein is incised with the Bovie electrocautery. The esophagus is then encircled with a Penrose drain. The distal esophagus is then circumferentially mobilized taking care not to injure the anterior and posterior vagus nerves. Once the distal esophagus is mobilized, the longitudinal muscle layer is scored longitudinally with the L-hook Bovie electrocautery. The

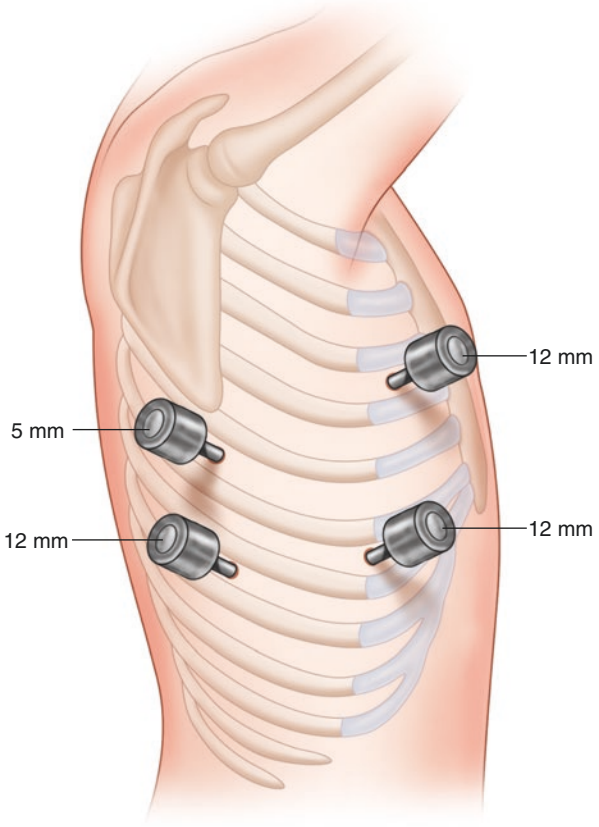


Fig. 37.1 The port placement for the thoracoscopic myotomy

longitudinal muscle layer is then incised with the Bovie electrocautery (Fig. 37.2). The inner circular muscle layer is then carefully incised with the Bovie electrocautery. The completed myotomy is performed down to the mucosal layer and should extend distally across the esophagogastric junction onto the gastric cardia for a total length of 3 cm (Fig. 37.3). The proximal extent of the myotomy should extend approximately 7 cm in length. Laparoscopic graspers are used to tease apart the divided edges of the muscle to ensure that there is complete separation. In order to ensure that the mucosal layer was not injured during myotomy, the distal esophagus is submerged in saline solution, and air insufflation with a flexible gastroscope is performed. If a mucosal injury is detected intraoperatively, a primary suture repair should be performed. It would be advisable to consider converting to an open thoracotomy to complete the repair of the esophagus and cover the repair site with a pleural flap.

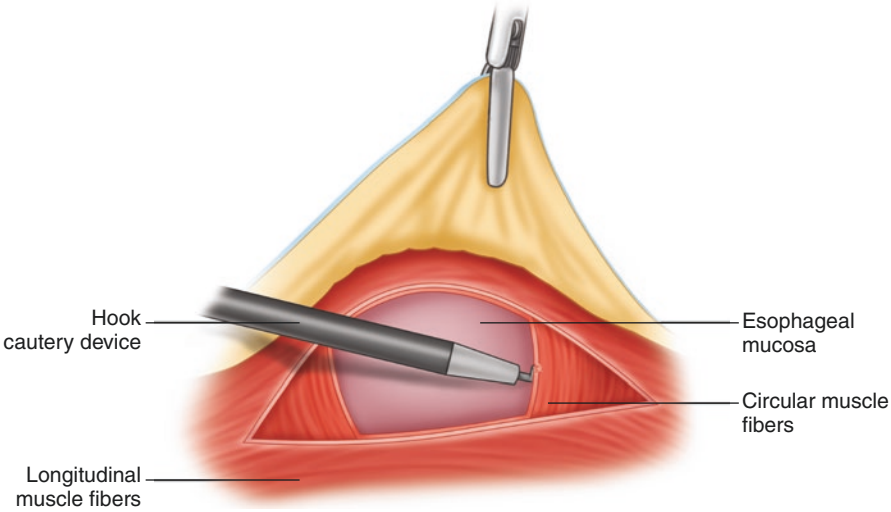
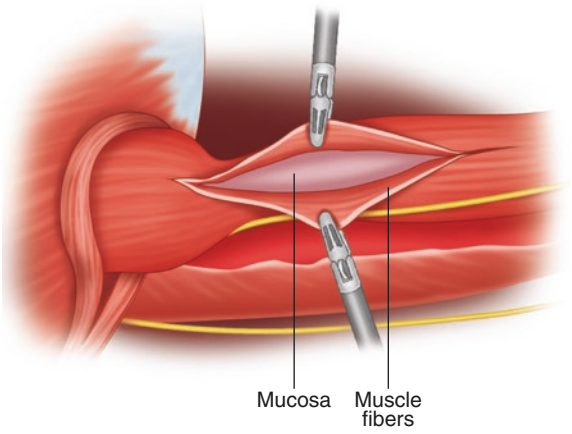


Fig. 37.2 Thoracoscopic esophagomyotomy: the division of the outer longitudinal and inner circular muscle layers of the esophagus with a hook cautery device

Fig. 37.3 The completed thoracoscopic myotomy



A routine partial fundoplication is not a part of the thoracoscopic myotomy; therefore, there should be minimal disruption of the hiatal esophageal attachments and the phreno-esophageal membrane. After the conclusion of the thoracoscopic myotomy, a small chest tube is inserted, and the right lung is re-expanded prior to closure. The patients are routinely extubated in the operating room at the conclusion of the operation.

Postoperative Management

After a routine thoracoscopic myotomy, patients are admitted to a regular postsurgical floor. A nasogastric tube is not routinely placed after myotomy, and patients are typically started on clear liquids as tolerated immediately after the procedure. The chest tube is removed on postoperative day number one. The author prefers to obtain a contrast esophagram on postoperative day number one to assess for emptying of the esophagus at the esophagogastric junction and an occult esophageal injury at the myotomy site. Following the contrast esophagram, patients are advanced to a full liquid diet on postoperative day number one and discharged home. Patients advance themselves to a soft mechanical diet as tolerated at home. Routine postoperative esophageal manometry is not obtained unless patients develop recurrent dysphagia and other symptoms of achalasia.

Postoperative Complications

The operative mortality rate for thoracoscopic myotomy is 0% in published reports [3]. The postoperative leak rate ranges from 0% to 5.8%. In the rare cases of postoperative leak at the myotomy site, patients can be managed with a primary repair. Postoperative atelectasis and other pulmonary complications associated with thoracotomy were not seen with the thoracoscopic approach. Other potential postoperative complications include thoracic duct injury and chyle leak, pneumonia, atelectasis, and pulmonary embolus.

Postoperative Outcomes

The results of thoracoscopic myotomy have been very good in reported series. Agrawal et al. demonstrated a significant decrease in lower esophageal sphincter pressure and in the clinical symptom score after thoracoscopic myotomy [4]. Cade compared a cohort of patients who underwent thoracoscopic or laparoscopic myotomy for achalasia [5]. In this report, there was no difference in operative time, conversion rate, or hospital length of stay. At two years, the dysphagia scores and the incidence of symptomatic reflux were the same between laparoscopic and thoracoscopic myotomy. Patti et al. reported a study comparing 30 patients undergoing thoracoscopic myotomy to 30 patients undergoing laparoscopic myotomy [6]. The patients in the laparoscopic group underwent a Dor fundoplication and reported less symptomatic reflux symptoms. However, the clinical dysphagia scores were very similar between thoracoscopic myotomy group and the laparoscopic myotomy group.

Conclusion

Achalasia is an esophageal motility disorder characterized by incomplete relaxation of the lower esophageal sphincter and impaired peristalsis of the esophagus. Thoracoscopic myotomy is an option for surgical management of achalasia. The long-term relief from dysphagia achieved with thoracoscopic myotomy is similar to the rate seen with laparoscopic myotomy.

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