Laparoscopy With Left Chest Collis Gastroplasty: A Simplified Technique for Shortened Esophagus

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Axial shortening of the esophagus is caused by repetitive esophageal injury from gastroesophageal reflux disease resulting in esophagitis, submucosal fibrosis, and esophageal dysmotility. A short esophagus (<2 cm of intraabdominal length after type II mediastinal dissection) is encountered in 20% to 63% of patients undergoing paraesophageal hernia repair. An esophageal lengthening procedure can be a useful adjunct to fundoplication to reduce the 50% recurrence rate reported at 5 years. We describe a simplified Collis gastroplasty technique that negates the need for wedge fundectomy, potentially saving operating room time and cost, while hypothetically reducing morbidity.


Definitive diagnosis of short esophagus is made in the operating room after type II mediastinal dissection [1]. However, clinical suspicion that a patient with a large hernia may require a Collis gastroplasty should be raised if any of the following are present: history of a failed antireflux operation, long history of gastroesophageal reflux disease, evidence on manometry of short esophagus or dysmotility (i.e., absence of distal high pressure zone, hypoperistalsis, aperistalsis), moderate to severe esophagitis, history or presence of a stricture, Barrett’s esophagus, large (>5 cm) type I or giant type II hernia [1–3]. The goal of adding a gastroplasty is to reduce axial tension and potentially reduce the 5-year 50% recurrence rate seen after paraesophageal hernia (PEH) repair [4].

We describe a simplified Collis gastroplasty technique accomplished via the left chest during laparoscopy. This method obviates the need for wedge fundectomy, and it is accomplished with one staple load, avoiding the potential leak at the crotch of multiple staple lines while decreasing materials cost.

Technique

The patient is intubated with a single-lumen endotracheal tube and positioned in low lithotomy. The left arm is tucked at the patient’s side to facilitate left thorax access, which is draped into the sterile surgical field. We use a laparoscopic technique that includes division of the proximal short gastric vessels, complete hernia reduction with excision of the hernia sac, and type II mediastinal dissection to or above the inferior pulmonary veins for maximal esophageal mobilization with vagal preservation [5].

Once dissection is completed, intraabdominal esophageal length is measured laparoscopically. The length is calculated from the anterior hiatus to the endoscopically verified gastroesophageal junction. When a short esophagus is confirmed, a left pleurotomy is created laparoscopically, allowing CO2 insufflation of the hemithorax. A 10-mm, 30-degree, extended-length camera is advanced through the hiatus into the thorax via the left pleurotomy while holding ventilation. Next, a single left anterior axillary line fourth intercostal space incision is created to accommodate an endostapler (Fig 1). A 45-mm endoscopic linear stapling device is guided into the thorax and advanced into the abdomen via the pleurotomy using direct laparoscopic vision. Ventilation is resumed, and the stapler is fully articulated caudal in anticipation of fundic stapling. A 44-French bougie is then advanced into the stomach, and the fundus is delivered into the stapler (Fig 2). After accurate fundic positioning is verified, including appropriate location of the short gastric line at the 3-o’clock position, the stapler is closed against the bougie and fired, thus completing the Collis gastroplasty (Fig 3). Cruroplasty and fundoplication are then completed [5].

Comment

Creating a tension-free PEH repair that minimizes the risk of wrap herniation or hiatal breakdown can be challenging, and reported long-term recurrence rates after PEH repairs are humbling. Even in experienced hands, radiographic recurrence rates are significant. Luketich and colleagues [6] reported a radiographic recurrence in 15.7% of patients after 662 laparoscopic giant PEH repairs at a median of 22 months post operatively; 63% of these repairs included a Collis gastroplasty [6]. In another...
report, at a median follow-up of 58 months, Oelschlager and colleagues [4] described 54% to 59% radiologic recurrences after PEH repair with or without the use of a biologic mesh respectively. A Collis gastroplasty was performed in 5/108 (4.6%) of patients in the same series [4]. Whereas the recurrence rate of PEH repair may never approach zero, the use of an esophageal lengthening procedure to reduce axial tension could decrease the rate of recurrence [2]. We believe that surgeons should perform a Collis gastroplasty if less than 2 cm of intraabdominal esophagus is achieved after type II mediastinal dissection.

Several esophageal lengthening techniques have been described in the literature. Most publications currently describe using the laparoscopic wedge fundectomy, whereas a combined laparoscopic and thoracoscopic single stapler technique has also been published [3]. Previous publications regarding a combined laparoscopic and thoracoscopic technique all use the right chest for access [2, 3, 6, 7]. We believe that the left chest assisted laparoscopic Collis gastroplasty has several advantages over both aforementioned techniques.

First, a single staple line is superior to wedge fundectomy for several reasons. The single-staple Collis gastroplasty technique is simple, quick, and reproducible, and it avoids the need to unnecessarily remove fundic tissue. It also results in decreased materials cost, because a wedge fundectomy requires at least two staple loads and occasionally three. Finally, the crossing of staple lines is avoided, which hypothetically could reduce leak rate and related patient morbidity.

In comparison with the combined right thoracoscopic and laparoscopic approach, the entire procedure is accomplished with only one monitor containing standard laparoscopic equipment, negating the need for two towers or doubling the equipment on each tower. As result, the technique is easier to perform and reproduce at other institutions. This is possible because the left pleurotomy allows thorax insufflation and visualization of the left hemi chest using a single, extended-length camera.

In summary, surgical management of hernia repair complicated by a shortened esophagus is a challenging problem for the surgeon. We have developed a combined laparoscopic and left chest Collis gastroplasty technique that may offer several advantages over other techniques.
that have used a laparoscopic fundectomy or combined techniques using the right chest.

References