

Use of a mobilized, perfused, falciform ligament patch for repair of paraconduit herniation after robotic-assisted Ivor Lewis esophagectomy



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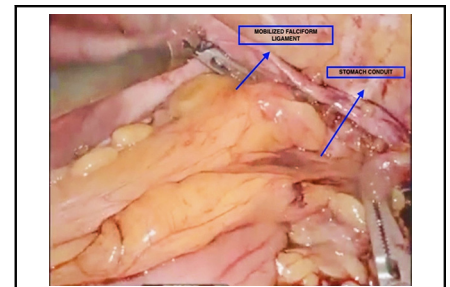
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Reduced conduit sutured to the hiatus and reinforced with a mobilized falciform ligament.

CENTRAL MESSAGE

We describe a novel technique for robotic repair of paraconduit hernia after minimally invasive esophagectomy that utilizes the falciform ligament as an autologous mesh to cover the hiatus.

▶ Video clip is available online.

Paraconduit herniation is a known complication of esophagectomy, with an increased incidence noted after esophagectomy using minimally invasive approaches.¹⁻³ Paraconduit hernias most often occur to the left and anterior of the gastric conduit.⁴ This is believed to be secondary to the location of the right gastroepiploic arcade because surgeons are less likely to place sutures adjacent to the arcade for fear of injuring the gastric conduit's sole blood supply. Presentation may range from an incidental finding to respiratory and gastrointestinal symptoms, including acute bowel obstruction. A watch-and-wait strategy can be employed if a patient is truly asymptomatic after a thorough assessment, but we encourage most patients with symptomatic hernia to undergo repair.⁵

In this article, we present a novel technique of coupling laparoscopic robotic reduction of hernia and cruroplasty with utilization of a mobilized falciform ligament to buttress and patch the esophageal hiatus to exclude the peritoneal contents from the mediastinum.

CASE PRESENTATION

The patient highlighted here was a 56-year-old man with a history of T3 N2 distal esophageal adenocarcinoma. We received consent from the patient to present the details of this case; institutional review board approval was not required. The patient underwent neoadjuvant chemoradiation followed by robotic-assisted minimally invasive

esophagectomy (RAMIE) and feeding jejunostomy tube placement. During RAMIE, we routinely place a stitch posterior to the conduit to approximate the right and left crura, narrowing the hiatus, and place a stitch between the conduit and the crura to discourage herniation. The patient underwent an R0 resection, and the postoperative course was uneventful. A computed tomography scan during follow-up 2 years after RAMIE revealed paraconduit herniation of the colon at the splenic flexure (Figure 1). The patient was symptomatic and agreed to robotic-assisted repair of the hernia.

OPERATIVE TECHNIQUE

The patient was placed in reverse Trendelenburg position with his arms abducted. Four 8-mm robotic ports and an assistant port were placed (Figure 2). A Nathanson liver retractor was introduced through a stab wound in the epigastrium.

After appropriate adhesiolysis was completed, the herniated contents were reduced. A left cruroplasty was performed using horizontal mattress suturing with 0 Ethibond suture (Johnson & Johnson) between the apex

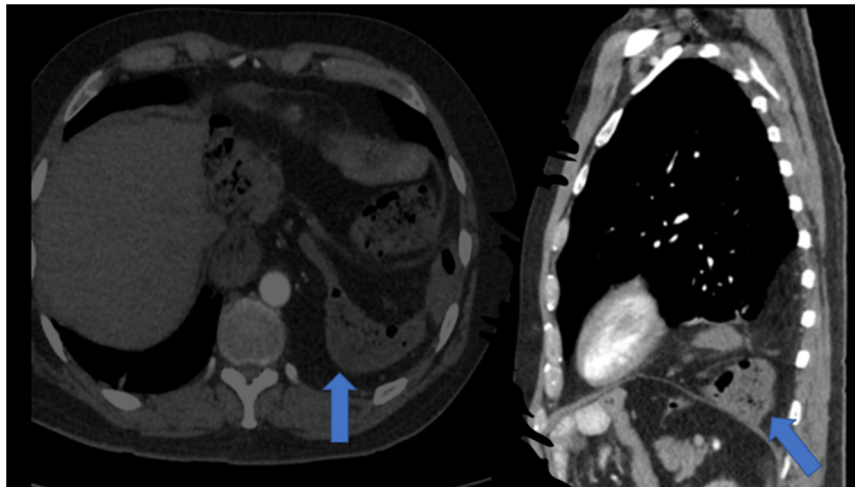


FIGURE 1. Sagittal (A) and axial (B) images from the patient’s computed tomography scan demonstrating paraconduit herniation of the splenic flexure of the colon through the esophageal hiatus (*blue arrows*).

and the body of the left crus. Another stitch was placed between the anterior wall of the conduit and the hiatus to further narrow the hiatus anteriorly.

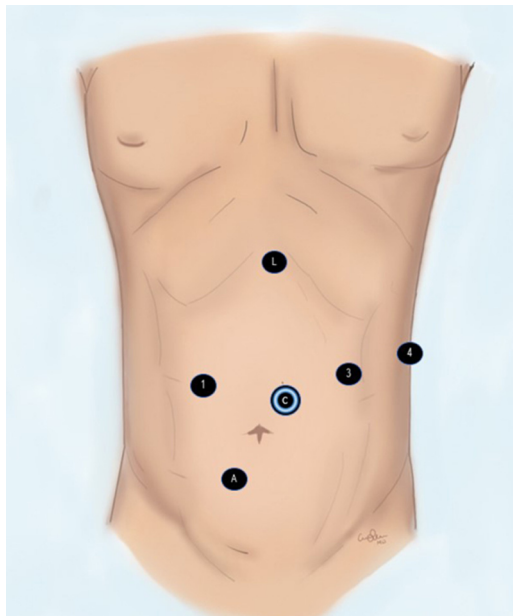


FIGURE 2. Port placement for robotic-assisted hernia repair and mobilization of a falciform ligament patch. 1, Eight-millimeter robotic port, right paramedian midclavicular line, for Cadiere forceps. C, Eight-millimeter robotic port, 2 cm above and to the left of the umbilicus, for camera. 3, Eight-millimeter robotic port, 15 cm from tip of the xyphoid process midclavicular line, for harmonic scalpel. 4, Eight-millimeter robotic port, left subcostal area, for double-fenestrated tip-up grasper. A, Twelve millimeter port, right lower quadrant, used by assistant. L, Stab wound, epigastrium, for liver retractor. Diagram was previously published in reference^{E5}; used under CC BY-NC-ND-4.0 (<https://creativecommons.org/licenses/by-nc-nd/4.0/>).

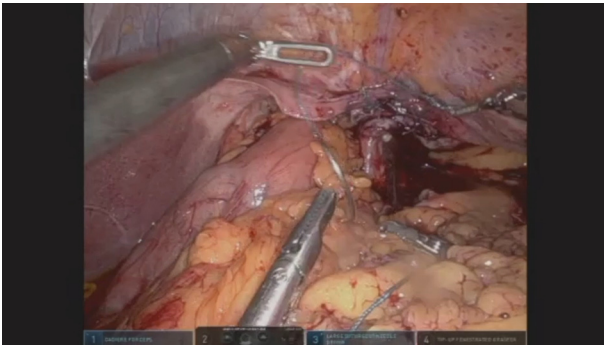
The falciform ligament was then lysed and mobilized from the anterior abdominal wall. After thorough dissection, the ligament was brought under the left lobe of the liver, making sure that its blood supply, which arises from the hepatic branches in the liver hilum, was preserved. The falciform ligament was then sutured to both crura using V-Loc suture (size 0; Medtronic) and to the anterior surface of the gastric conduit using interrupted 3–0 vicryl sutures (*Video 1*).

The patient’s postoperative course after repair was uneventful, and he was discharged home, tolerating a liquid diet, on postoperative day 1. Since discharge, he has been followed with serial imaging, with no evidence of recurrent disease or hernia during 2 years of follow-up. At our institution, this approach has been used to repair 2 of 3 paraconduit hernias that presented in 138 patients who underwent conventional minimally invasive esophagectomy (MIE) or RAMIE from May 2017 to March 2023. Both patients remain free from hernia recurrence.

DISCUSSION

We developed this novel technique of utilizing a mobilized falciform ligament patch during hernia repair to address the problem of hernia recurrence. The falciform ligament can be used irrespective of the patient’s body habitus because the primary benefit comes from the fibrotic ligament rather than the attached adipose tissue.

Paraconduit hernias after RAMIE or conventional MIE are common, with a reported incidence of 4.3% to 15%.^{1-4,E1,E2} Ivor Lewis MIE or RAMIE is associated with a higher incidence of symptomatic paraconduit herniation (9.4%) compared with open esophagectomy (1.5%).² Currently, most approaches described for repair of paraconduit herniation entail minimally invasive reduction of the



VIDEO 1. Technique for robotic mobilization of falciform ligament and use as a patch during paraconduit hernia repair. Video available at: [https://www.jtcvs.org/article/S2666-2507\(24\)00101-9/fulltext](https://www.jtcvs.org/article/S2666-2507(24)00101-9/fulltext).

herniated contents, cruroplasty, and suture fixation of the conduit to the hiatus.^{E3} Hernia recurrence after repair occurs in 14% to 29% of patients.^{2,3,E4}

Although a larger series with sufficient follow-up is required to compare hernia recurrence with the falciform patch with other approaches, the absence of recurrence in our patients thus far is encouraging. Based on our limited and short experience, we believe that this technique will reduce the risk of hernia recurrence. An added advantage

of the falciform patch repair is that suture placement does not have to be near the vital gastroepiploic arcade.

Conflict of Interest Statement

The authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

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