Case report - Thoracic oncologic

Laparoscopic repair of post-esophagectomy diaphragmatic hernias using human acellular dermal matrix

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Abstract

Diaphragmatic hernias occur in up to 2% of patients after esophagectomy with gastric pull-up, and the surgical repair in the setting of a previous esophagectomy is a challenge with high complication rates, in particular with regards to the gastric conduit and its critical vascular supply. We describe two cases and the technique of minimally invasive, laparoscopic repair of diaphragmatic defects with organ herniation after esophagectomy using absorbable human acellular dermal matrix.

Keywords: Biologic mesh; Diaphragmatic hernia; Esophageal cancer; Minimally invasive

1. Introduction

Diaphragmatic hernias occur in up to 2% of patients after esophagectomy with gastric pull-up [1]. The surgical repair of these hernias is a challenge with high complication rates, in particular with regards to the gastric conduit and its critical vascular supply [1]. Fewer than 50 cases of diaphragmatic hernia repair after esophagectomy have been described so far, and a laparoscopic diaphragmatic hernia repair has been reported in only two cases [2]. In both patients, diaphragmatic reconstruction included additional coverage with non-absorbable composite polyester meshes. In our technique report, we describe two cases of laparoscopic repair of diaphragmatic hernias after esophagectomy using absorbable human acellular dermal matrix.

2. Clinical summary

2.1. Case 1

A 76-year-old male had undergone a thoracolaparoscopic esophagectomy for stage I adenocarcinoma of the esophagus. An incidental finding of a transhiatal herniation of transverse colon into the chest was seen on a surveillance computed tomography (CT)-scan after 15 months (Fig. 1). The patient underwent a laparoscopic diaphragmatic hernia repair and closure with placement of a human acellular dermal matrix (AlloDerm 8 × 16 cm, ultrathick; LifeCell, Branchburg, NJ, USA). The patient was discharged on the third postoperative day and followed for 10 months without evidence of hernia recurrence.

2.2. Case 2

An 81-year-old male underwent an open transhiatal esophagectomy with a gastric conduit for Barrett’s esophagus with high-grade dysplasia. Postprandial fullness prompted another CT-scan 17 months after surgery, revealing a herniation of transverse colon into the chest. A laparoscopic diaphragmatic hernia repair with defect coverage was performed using a human acellular dermal matrix (Flex HD 8 × 12 cm, thick; Ethicon, Somerville, NJ, USA). The patient was discharged the same day and followed for seven months with no evidence of hernia recurrence.

3. Operative technique

Patients were placed in a modified lithotomy position. Pneumoperitoneum was achieved at a pressure of 15 mmHg via an open Hasson technique, and three additional 5 mm ports were placed to triangulate around the defect. In both cases, the dimension of the hiatal defect was about 5 × 8 cm. The herniated transverse colon was reduced easily due to lack of dense adhesions – without removing the hernia sac. The defects were then covered with a human acellular dermal matrix allograft mesh and attached to the diaphragm with the ENDOPTH Endoscopic Multifeed Stapler (Ethicon), achieving an overlap on the diaphragm of at least 2 cm (Fig. 2).

4. Discussion

Patients with diaphragmatic hernias after esophagectomy with a gastric pull-up are a surgical challenge. Primary repair by reapproximating the diaphragmatic crura with sutures is controversial, as it may put the conduit at risk...
for strangulation. Furthermore, the defect might be too large for closure with acceptable tension, as was felt to be in our cases. However, there can be disastrous complications related to the use of non-absorbable meshes, such as infection and erosion into the conduit [3]. These concerns have resulted in attempts to implant absorbable biologic meshes.

We previously reported the use of human acellular dermal matrix meshes for reconstruction of diaphragmatic defects [4]. To our knowledge, the present report is the first one of minimally invasive repair of postesophagectomy diaphragmatic hernias with human acellular dermal matrix, and no evidence of recurrences of the diaphragmatic hernia were observed in two patients. Both transabdominal and transthoracic repair of hiatal (not post-esophagectomy) hernias have been extensively described, and in general the minimally invasive transabdominal access seems to be more established [5]. In the presence of a gastric conduit, our cases show that a minimally invasive transabdominal repair is safe due to the production of few adhesions in the left upper quadrant.

In the authors’ esophagectomy technique, the hiatus is incised anteriorly for a length of about 2.5 cm to increase exposure to the lower mediastinum. At the end of the procedure, this defect is closed with interrupted sutures, and in our opinion adequate closure is critical to prevent the development of a postesophagectomy hernia.

Technically challenging repairs of diaphragmatic hiatal defects in the presence of a gastric conduit after esophagectomy can be done safely laparoscopically. In an attempt to avoid complications associated with the use of non-absorbable meshes, defect closure using human acellular dermal matrix can be performed.

References