Diaphragmatic Herniation through Prosthetic Material after Extrapleural Pneumonectomy: Be Aware of Tumor Recurrence

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Abstract

Extrapleural pneumonectomy (EPP) is indicated in selected group of patients with pleural mesothelioma. Diaphragmatic reconstruction represents a part of this complex operation. We present the case of a late diaphragmatic gastric herniation through prosthetic material after EPP.

Keywords

- pleural mesothelioma
- extrapleural pneumonectomy
- complications

Introduction

Extrapleural pneumonectomy (EPP) in the setting of multimodality treatment is indicated in selected groups of patients with pleural mesothelioma. Technically challenging, the procedure is accompanied by a high rate of perioperative morbidity (overall morbidity rate near 60%).[1] Efforts have been made to prevent these complications and some solutions concern diaphragmatic reconstruction. We present the case of a late diaphragmatic gastric herniation through the prosthetic material after EPP and we discuss causes and consequences of it.

Case Report

A 69-year-old man was admitted to our department complaining of intense left side chest pain. Medical history showed only benign prostate disease. The patient was known in our department 2 years before for histologically proven malignant pleural mesothelioma of epithelial type. He was treated with our national multicenter protocol that includes neoadjuvant chemotherapy, EPP with intrathoracic hyperthermic chemotherapy, and external radiotherapy. During the initial surgery, the pericardial reconstruction was performed with a Vicryl (Ethicon, St-Stevens-Woluwe, Belgium) mesh. The diaphragmatic reconstruction was performed with the dynamic Gore-Tex (W.L. Gore & Associates, Inc., Flagstaff, Arizona, USA) patch over the intact peritoneum.[1] The postoperative classification was pT2N0M0 and the postoperative period was uneventful.

When the patient was admitted, he presented with pain and nausea for several days. The results of imaging tests (chest X-ray and computed-tomography scan) showed an intrathoracic stomach trough prosthesis defect from the reconstructed diaphragm (►**Figs. 1** and **2**). Emergency surgery was decided.

During the surgery, through an upper laparotomy with left anterior thoracotomy, we noticed that only the stomach was inside the left thorax. The stomach was reintegrated, a small zone of gastric necrosis was resected, and the diaphragmatic defect was repaired by a Gore-Tex patch. Biopsies from the thoracic cavity showed no tumor deposits. The postoperative course was uneventful, with good control on the imaging tests (chest X-ray and barium swallow). The patient was discharged on the 14th postoperative day. One-month later, he returned because he was experiencing abdominal pain, nausea, and vomiting. The thoracoabdominal CT scan revealed signs of ascites with peritoneal carcinomatosis. Biopsy of one parietal peritoneal lesion confirmed the recurrence of a tumor. The fatal outcome arrived shortly after.

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Fig. 1 The X-ray of chest revealed the intrathoracic stomach with air–liquid level.

Fig. 2 The computed-tomographic scan of chest showed the diaphragmatic prosthetic opening.

Discussion

The diaphragmatic dynamic patch was first described by Sugarbaker et al.[1] It represents the constant evolution and improvement of their technique, which is meant to prevent organ herniation in the pleural cavity after EPP. In the immediate postoperative period, temporary ileus may increase intra-abdominal pressure. Disruption of the diaphragmatic patch is an immediate postoperative event, but the new double-patch prevents tension on the sutures. Moreover, the patch is sewn loose over the chest wall, tailored to accommodate the mediastinal structures. Gastric or bowel herniation can occur, but this dynamic patch attempts to recreate the dome shape of the diaphragm in the first postoperative days. After that, the fluid accumulation in the chest prevents a late diaphragmatic herniation. Our case presented with a 2 years old history of gastric herniation through the double patch. Perhaps, the initial event was the local abdominal recurrence. The progression of microscopic peritoneal carcinomatosis slowly increased the abdominal pressure that caused the stomach to be pushed upward through the double patch, and into the thorax.

Mesothelioma, unlike lung cancer tends to progress locally rather systemically.[2,3] Most of the patients had recurrences within ipsilateral, hemithoracic, or abdominal regions. The relationship appears to result from direct extension from the thorax. In our case, we first thought of mechanical dehiscence of the diaphragmatic double-patch because all of the preoperative thoracic samples were tumor-free in frozen section and the peritoneal cavity showed no macroscopic carcinomatosis. No further biopsies were taken from the abdomen. Unfortunately, the microscopic recurrence grows rapidly after, caused by the surgical trauma and consecutive immune suppression event.

In conclusion, late diaphragmatic hernia through dynamic double-patch after EPP is possibly not a mechanical problem but an early sign of peritoneal recurrence of pleural mesothelioma.

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