Spontaneous rupture of the diaphragm: Case report and comprehensive review of the world literature

Julian E. Losanoff, MD,[a,b] David A. Edelman, MD,[a] Walter A. Salwen, MD,[a,b] and Marc D. Basson, MD, PhD, MBA,[b,c] Detroit and Lansing, Mich

CLINICAL SUMMARY

A 36-year-old male patient came to the emergency department with high fever, cough, and sore throat consistent with an acute viral illness. His medical history was significant for medically controlled arterial hypertension. A chest radiograph showed no abnormalities (Figure 1). The patient was treated with antibiotics and antihistamines for presumed acute viral upper respiratory tract infection. He returned to the emergency department 12 hours later with pain in the left lower part of the chest that started after a recent bout of coughing. On examination, there was mild tenderness over the left lower area of the chest. No bruises were noted. Bilateral rhonchi were heard on auscultation. The patient was prescribed acetaminophen with codeine for musculoskeletal pain.

He returned again 24 hours later in respiratory distress. A chest radiograph suggested that the stomach had herniated through the left hemidiaphragm. The study was repeated with oral contrast medium revealing herniation of 50% of the stomach into the left side of the chest. No pleural effusion was seen (Figure 2).

A diagnosis of spontaneous rupture of the diaphragm (SRD) was made and the patient underwent emergency laparotomy. The operative findings included a 10-cm defect of the diaphragm extending from the posterior axillary line to the tendinous center right next to the pericardium. The stomach, spleen, and hepatic flexure of the colon were found in the thorax. The hernia was reduced and no alteration of the blood supply of the involved organs was noted. The edges of the diaphragmatic rupture looked macroscopically normal. Biopsy of the diaphragm was submitted for histopathologic review. The pleural cavity was drained and the defect repaired with figure-of-eight permanent sutures. The abdominal incision was closed primarily.

The patient made an uneventful recovery and left the hospital on postoperative day 4. He was last seen 4 months after the operation. At that time he had no symptoms and the chest x-ray films showed no abnormalities. Histopathologic examination of the specimen showed no pathologic findings.

DISCUSSION

SRD is considered one of the rarest thoracoabdominal emergencies, with 28 detailed reports published in the world literature (1956–2009).[1-5] Median age of the patients was 40 years, with a range of 3 to 74 years. Eleven (39%) patients were female and 3 (15%) were children. Coughing was the preceding event in 9 (32%) patients, physical exercise in 6 (21%), vaginal delivery in 4 (14%), vomiting in 2 (7%), and massage in 1 (4%); no history was available for a single comatose patient.[3] There were 5 (18%) patients in whom no effort preceded the hernia, including 2 postoperative patients in whom iatrogenic diaphragmatic injuries had been ruled out.[2] Previous studies reported multiple and varied comorbidities; however, similar to our experience, they could link no predisposing conditions directly to the SRD.[1-5]

The most common symptoms among patients with SRD were abdominal or thoracoabdominal pain, nausea, vomiting, and dyspnea. Ecchymosis over the hernia and/or intercostal

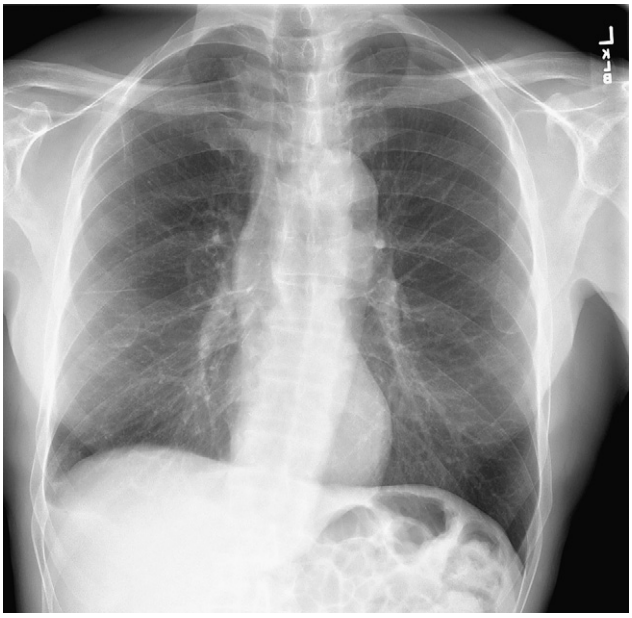

FIGURE 1. Chest x-ray film at initial presentation.

From the Department of Surgery,[a] Wayne State University, Detroit, Mich; the John D. Dingell Veterans Affairs Medical Center,[b] Detroit, Mich; and Michigan State University,[c] Lansing, Mich

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Address for reprints: Julian E. Losanoff, MD, Department of Surgery (11S), John D. Dingell VA Medical Center, 4646 John R, Detroit, MI 48201 (E-mail: jelosanoff@yahoo.com).

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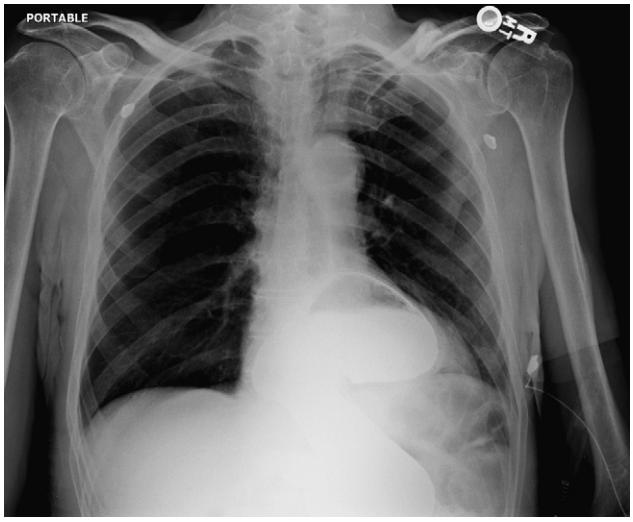

FIGURE 2. Gastrografin swallow showing thoracic hernia of the stomach.

bulge was observed in those who had concomitant intercostal muscle rupture.[1,5] Plain chest radiography was the mainstay in diagnosis of diaphragmatic hernia, followed by verification with contrast studies, similar to the present report. In 2 patients, tube thoracostomy was performed for presumed pneumothorax, resulting in hollow organ injury. Except for one postmortem diagnosis, all SDRs were confirmed surgically. Nineteen (68%) were on the left side and one was bilateral. The defects ranged from 2 cm (n = 2) to 16 cm in size. There were 22 (79%) peripheral and 6 central defects. The hernia contents included stomach (43%), colon (29%), greater omentum (29%), small intestine (25%), spleen (18%), and liver (10%). Ten (36%) hernias contained a single organ, 9 (32%) contained 2 organs, 7 (25%) contained 3 organs, and the hernia contents were not specified twice. All patients who had reached the hospital alive underwent surgery. There was 1 death on admission and there were 3 (14%) hospital deaths. No SRD recurrence was described.[1-5]

SDR can be classified into two types: a type 1 rupture, in which the chest wall remains intact,[2,3] and a type 2 rupture, in which abdominal structures pass through the diaphragm and chest wall.[1,5] Our review indicates that 21 (75%) cases of SRD are type 1 and 25% are type 2. It remains unclear to us whether a pre-existing weak spot in the diaphragm, lack of muscular coordination during intense activity, or both, might be considered in the etiology of SRD.[1-5]

This case and review reminds us that SRD can occur after coughing, exercise, and vaginal delivery. It is a potentially life-threatening surgical emergency requiring a high index of clinical suspicion in the right clinical setting.

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Aneurysm expansion caused by an intercostal type II endoleak after thoracic endovascular aortic repair for secondary elephant trunk graft fixation

Atsushi Kitagawa, MD, Hitoshi Matsuda, MD, Kenji Okada, MD, and Yutaka Okita, MD, Kobe, Japan

From the Division of Cardiovascular Surgery, Department of Surgery, Kobe University Graduate School of Medicine, Kobe, Japan

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Address for reprints: Yutaka Okita, MD, Division of Cardiovascular Surgery, Department of Surgery, Kobe University Graduate School of Medicine, 7-5-2 Kusunoki-cho, Chuo-ku, Kobe 650-0017, Japan (E-mail: yokita@med.kobe-u.ac.jp).

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Although the majority of intercostal type II endoleaks, retrograde aortic branch flows into the aneurysm sac, after thoracic endovascular aortic repair (TEVAR) of a descending thoracic aortic aneurysm generally resolve without any reintervention,[1,2] we report a rare case of aneurysm expansion caused by an intercostal type II endoleak 7 years after TEVAR for secondary elephant trunk graft (ETG) fixation.

CLINICAL SUMMARY

In 1994, a 60-year-old man had an ETG inserted for an aortic arch aneurysm, followed by fixation of the ETG via