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Repair of Bochdalek hernia in an adult complicated by abdominal compartment syndrome, gastropleural fistula and pleural empyema: Report of a case

Toshiaki Suzuki[a,*], Tomoyoshi Okamoto[a], Ken Hanyu[a], Katsuhito Suwa[a], Shuichi Ashizuka[b], Katsuhiko Yanaga[c]

[a] Department of Surgery, The Jikei Universiy, Daisan Hospital, Japan
[b] Department of Surgery, Division of Pediatric Surgery, The Jikei University School of Medicine, Japan
[c] Department of Surgery, Division of Gastrointestinal Surgery, The Jikei University School of Medicine, Japan

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ABSTRACT

INTRODUCTION: Bochdalek's diaphragmatic hernia (BDH) rarely developed symptomatic in adulthood but mostly required an operation. In adult BDH cases, long-term residing of the massive intraabdominal organs in the thoracic cavity passively causes loss of domain for abdominal organs (LOD).
PRESENTATION OF CASE: A 63-year-old man presented at our institution complaining of sudden left upper quadrant abdominal pain. Chest radiography showed a hyperdense lesion containing bowel gas in the left pleural space. Computed tomography revealed a dilated bowel above the diaphragm and intestinal obstruction suggestive of gangrenous changes. These findings were consistent with the diagnosis of incarcerated BDH and an emergency laparotomy was performed. Operative findings revealed the hypoplastic lung, lack of hernia sac, and location of the diaphragmatic defect, which indicated that his hernia was true congenital. Organs were reduced into the abdominal cavity, and large defect of the diaphragm was repaired with combination of direct vascular closure and intraperitoneal onlay mesh reinforcement using with expanded polytetrafluoroethylene (ePTFE) mesh. On the postoperative day 1, the patient fell into the shock and was diagnosed to have abdominal compartment syndrome (ACS). Conservative therapies were administered, but resulted in gastropleural fistula and pleural empyema, which required an emergency surgery. Mesh extraction and fistulectomy were performed.
DISCUSSION: A PubMed search for the case of ACS after repair of the adult BDH revealed only three cases, making this very rare condition.
CONCLUSION: In dealing with adult BDH, possible post-repair ACS should be considered.

1. Introduction

Congenital posterolateral diaphragmatic hernia, also referred to as Bochdalek's diaphragmatic hernia (BDH), is one of the most common congenital diaphragmatic hernias in infants[1–3] and can result in severe respiratory distress, necessitating immediate surgery. In contrast, presentation of BDH in adulthood is rare and usually incidentally discovered in patients presenting with gastrointestinal symptoms.[2,3] In such cases, loss of right of domain (LOD) possibly occurs because of long-term residing of massive intraabdominal organs into the thoracic cavity. Abdominal compartment syndrome (ACS) is well recognized as a potential complication of complicated laparotomy, in which hernia repairs for huge abdominal hernia with LOD are included.

We present a case of adult BDH who suffered from postoperative ACS causing gastropleural fistula and pleural empyema and was successfully treated by mesh extraction and fistuletomy. To our knowledge, there is only one such complicated case.

2. Case presentation

A 63-year-old man was admitted to our hospital with symptoms of sudden left upper quadrant abdominal pain and nausea, which developed one day prior to admission in August 2012. Physical examinations revealed dullness on percussion of the left lower part of the chest in addition to reduced breath sounds without crackles in the same area. Laboratory data were normal. Chest radiography showed a hyperdense lesion containing bowel gas in the left pleural space (Fig. 1a).

* Corresponding author at: Department of Surgery, The Jikei University, Daisan Hospital, Izumihoncho 4-11-1, Komae-shi, Tokyo 201-8601, Japan.
Tel.: +81 3 3480 1151; fax: +81 3 3480 8295.
E-mail address: toshiaki1129jp@yahoo.co.jp (T. Suzuki).

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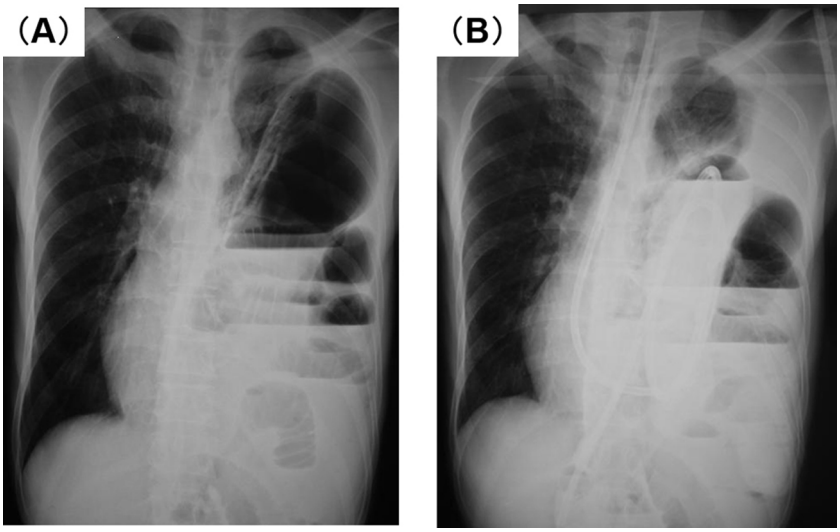

Fig. 1. (A) The chest radiography on admission demonstrated a lesion containing bowel gas in the left pleural space. (B) The chest radiography 1 day after admission showed a ileus tube, which however was not effective.

The pain was not relieved by ileus tube decompression for 24 h following admission (Fig. 1b). Chest radiography performed the next day revealed complete collapse of the left lung and a right shift of the mediastinum (Fig. 2a). Computed tomography revealed dilated bowel above the diaphragm and intestinal obstruction with suspicion of gangrenous changes (Fig. 2b).

The patient underwent emergency laparotomy during which a left posterolateral diaphragmatic hernia with incarceration of the small bowel, transverse colon, and most of the stomach was detected. No hernia sac was found and the left lung was hypoplastic. There was no intestinal malrotation. After reduction of misplaced organs in the mediastinum into the abdominal cavity, the left lung appeared well-formed but small. Organ color returned to normal once the mesentery was straightened. The fornix of the stomach was fixed to the diaphragm and the large diaphragmatic defect was repaired with combined simple closure and expanded polytetrafluoroethylene (ePTFE) mesh (Fig. 3a and b). Due to LOD for abdominal organs, the abdominal wound could not be closed directly, therefore Composix™ mesh (Bard mesh) was placed to bridge the fascial defect (Fig. 3c and d).

On the next day, the patient exhibited tachycardic with low urine output. Intra-abdominal pressure, measured using a manometer attached the urinary catheter, was 25 mmHg, leading to the diagnosis of ACS. Conservative therapies under endotracheal sedation were administered and led to decline the pressure to 15 mmHg five days post-surgery and his vital signs and urine output returned to normal thereafter.

However, the patient's condition deteriorated during the next few weeks due to progressive accumulation of pleural effusion and pneumonia of the left lung (Fig. 4a). He was subsequently diagnosed with empyema accompanied by leukocytosis, which was treated unsuccessfully by tube thoracostomy. Endoscopy and a double contrast study of the upper gastrointestinal tract revealed a gastropleural fistula around the fixed point of the stomach on the diaphragm, which was found to be responsible for the empyema (Fig. 4b and c). *Streptococcus faecalis* was isolated from the pleural fluid. Also, skin necrosis of the abdominal wound and composix mesh infection were found.

As gastropleural fistula and skin necrosis seemed to be responsible for strangulation and ACS, the patient underwent a second operation to close the abdominal wound and fistulectomy at two months after the first operation (Fig. 5). The skin defect of the abdominal wall was autografted with a tensor fascia lata myocutaneous flap by plastic surgeons. After the second surgery, a

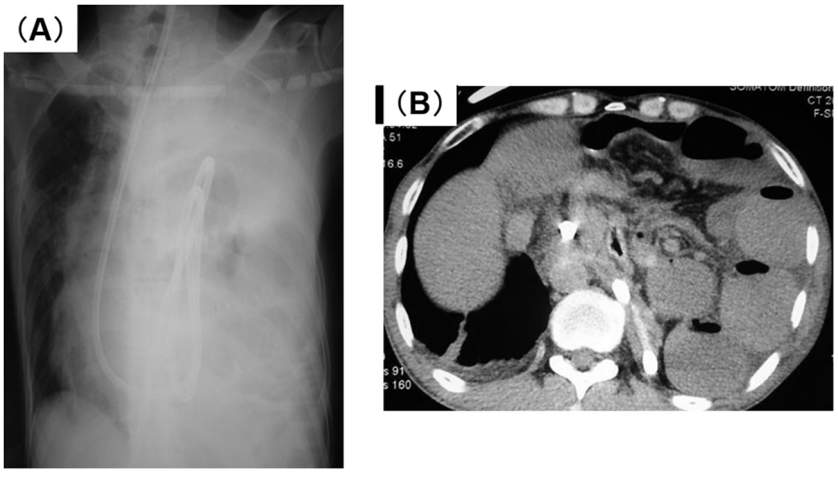

Fig. 2. (A) The chest radiography on admission showed complete collapse of the left lung and a mediastinal shift to the right. (B) The chest computed tomography demonstrated the small bowel, transverse colon, and most of the stomach in the left pleural cavity.