Pneumopericardium caused by gastropericardial fistula


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INTRODUCTION

Pneumopericardium is an uncommon condition defined by the presence of gas inside the pericardial cavity, which arises from a communication between the pericardium and its neighbouring air-bearing structures. Less common causes of this condition are infections by gas-producing organisms.

A number of cases of spontaneous idiopathic pneumopericardium have been reported in the literature; however, their most frequent cause is trauma. There are also iatrogenic causes, these being secondary to neighbouring organ pathologies or primary pericardial infection (1).

The present study aims at reviewing this condition on a patient treated for secondary pneumopericardium, which arose as a result of a hollow viscera perforation.

CASE REPORT

A 56-year-old male was admitted to the emergency room with a 3-day history of suffering from severe epigastric pain, which occasionally radiated towards the left shoulder, and neck. His personal history included a Billroth I gastrectomy because of a gastric ulcer 9 years ago, and resurgery 6 months later due to a laparocel.

Physical examination revealed only hypotension (90/60 mmHg), tachycardia (110 bpm), and jugular engorgement.

A blood test showed leukocytosis (19,260/mm³) with neutrophilia (85.9%), hyperglycemia (224 mg/dl), GOT...
= 65 IU/l, CPK = 218 IU/ml, Na+ = 130 mEq/l, and prothrombin activity = 59%. All other tests were normal. An EKG revealed an upper unevenness of the ST segment on lower and lateral surfaces. A chest X-ray showed a raised left hemidiaphragm and gas in the pericardium, indicating a pneumopericardium (Fig. 1).

The patient was admitted to the Intensive Care with a possible diagnosis of acute severe pericarditis. A gastro-duodenal study was carried out using a water-soluble contrast to highlight the pericardial cavity (Fig. 2). The patient underwent surgery, and the left diaphragm was found to be raised with a medial thickening that was in direct contact with the gastric fundus. Separation of the gastro-diaphragm revealed an ulcer in the gastric fundus with a perforated pericardium. The fluid obtained from the pericardial cavity had a purulent appearance. A full gastrectomy was performed with an esophagojejunostomy reconstruction as transmesocolon Roux-en-Y, and a pericardial wall biopsy was also performed. Drainage of the pericardium, left pleural cavity, and abdominal cavity was carried out.

A postoperative echocardiogram showed minimal pericardial hemorrhage, and blood pressure was compatible with restricted pericarditis, albeit with good ventricular function. The patient was again subjected to surgery 45 days later, when a cholecystectomy was performed due to acute cholecystitis.

The pathology report indicated a perforated gastric ulcer and moderate-atrophic chronic gastritis with intestinal metaplasia. Pericardial tissue had fibrosis, was partially necrotized, and showed well-differentiated gastric glands, indicating an adhering gastric mucosa. Acute cholecystitis was also present.

The patient was discharged 3 months after his first surgery, and was found to be asymptomatic 9 years later.

DISCUSSION

The first author to report this condition, called “bruit de moulin” in 1844, was Bricheteau, who discovered it in a patient suffering from hydropneumopericardium. It is a condition that has since then been considered pathognomonic for this illness, and which consists of a fluctuating sound in the precordium (2), even though it only develops in complicated pneumopericardium cases. Isolated cases with varying etiologies, presentations, and treatments have been reported in the literature ever since.

We may classify pneumopericardium etiologies into two main groups: traumatic and non-traumatic. The causes of traumatic cases are manifold and varied, and open
or close trauma is found to have the greatest incidence (1, 3). Other etiologies include ingestion of foreign bodies and other iatrogenic causes, including those arising after bronchoscopy, oral endoscopy, thoracocentesis, mechanical ventilation, fine needle puncture, cauterization of esophageal membrane, endotracheal intubation, aortocoronary bypass (1), esophageal metallic stent insertion (4), and even dental extraction (5). The most representative non-traumatic etiologies are acute asthma, esophageal ulcers, neoplasia, and spontaneous rupture (6); however, there can be other etiologies, like lung- and tuberculosis-derived abscesses, pericarditis from gas-producing organisms (1,3,7), subdiaphragmatic and hepatic abscesses (8,9), recent cardiac surgery, spreading of a prior pneumomediastinum (7), spontaneous rupture of a hollow viscus, other symptoms such as dysphagia and/or odynophagia, tachycardia, cyanosis, hypotension, and respiratory distress may be seen (7).

Regarding echocardiography, its interpretation becomes difficult because of air interference. There further exists a diagnosis-guiding sign called the "air gap sign," which corresponds to a long echo band which cyclically darkens cardiac structures; this sign is, however, non-specific, as it also develops in pneumomediastinum (1). An EKG was performed in our patient, who revealed an upper unevenness of the ST segment on the heart's lower and lateral faces; chest X-rays revealed a pneumopericardium and an elevation of the left hemidiaphragm. The patient was admitted to the Intensive Care with a diagnosis of pericarditis. A gastroroduodenal study was carried out using a water-soluble contrast because of the presence of pneumopericardium; it showed the contrast flowing into the pericardial cavity, whereupon a decision for an urgent surgical procedure was made.

We learned of two patients with gastropericardial fistula who survived following conservative treatment with antibiotics and pericardiocentesis (13,14). However, the best option to increase survival of patients with this condition includes early diagnosis, pericardial drainage, and gastrointestinal surgery adapted to each case. Our patient had a perforation in the gastric fundus that communicated with the pericardium; Treatment included an aspiration of purulent pericardial fluid, full gastrectomy, and esophagojejunostomy reconstruction as Roux-en-Y. He was also subjected to pericardial, left pleural, and abdominal drainages.

Mortality is 85% in patients with gastropericardial fistula secondary to a perforated benign ulcer (15). Our patient was reoperated for cholecystitis and remains asymptomatic 9 years after surgery.

REFERENCES


