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CASE REPORT

Pneumopericardium: a rare complication following pericardiocentesis

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Abstract
Pneumopericardium is the presence of air in the pericardial cavity. It is a rare case entity that has been reported most commonly after trauma, or spontaneously without any underlying cause in a healthy adult. Pneumopericardium following pericardiocentesis has been rarely reported in the literature. Pneumopericardium is often self-resolving and rarely requires a pericardial drain for treatment. We report a case of pneumopericardium presented with tamponade physiology following pericardiocentesis for tubercular pericardial effusion, requiring emergency pericardiectomy.

Keywords Pneumopericardium · Pericardiocentesis · Pericardiectomy

Introduction

Pneumopericardium or presence of air in the pericardium is a rare disease and is rarely reported in the literature. Possible etiology may be chest trauma, mechanical ventilation, or may result spontaneously without any underlying cause [1]. Very few cases of pneumopericardium following pericardiocentesis has been reported in the literature. Most of the reported cases of pneumopericardium has been managed conservatively by putting drainage catheter. We present here a case of pneumopericardium following pericardiocentesis presented with tamponade physiology. Patient required emergency pericardiectomy.

Case report

A 21-year-old male patient reported to the cardiology department with the complaints of worsening dyspnea since the last 5 months. He was further investigated and was diagnosed as a case of pericardial effusion for which pericardiocentesis was done. Pericardial fluid examination revealed a raised adenosine deaminase level and it was positive for acid fast bacilli. Antitubercular treatment was started as per the WHO guideline and patient was discharged. Since last the 1 month, his dyspnea progressed from NYHA class II to class IV with progressive abdominal distension and chest pain on exertion with low-grade fever. On examination, the patient had moderate ascites and pulsus paradoxus with raised jugular venous pressure. Chest X-ray showed a typical pericardial halo of air with air-fluid level (Fig. 1) and electrocardiography showed a low-voltage complex in the chest leads. Two-dimensional echocardiographic evaluation revealed chronic constrictive pericarditis with effusion and pneumopericardium with tamponade physiology. Pigtail catheter was inserted. Pericardial drainage was less than 100 ml/day and was purulent in nature. Patient continued having worsening dyspnea and chest pain with spikes of fever. Contrast-enhanced computed tomogram (CECT) chest was done which showed chronic constrictive pericarditis with pneumopericardium and loculated effusion with pigtail catheter in situ (Fig. 1). Under general anesthesia, pericardiectomy was done through median sternotomy (Fig. 2). His postoperative course was uneventful and was discharged on antitubercular treatment. Histopathological examination confirmed chronic inflammation. Patient is asymptomatic and under regular follow.

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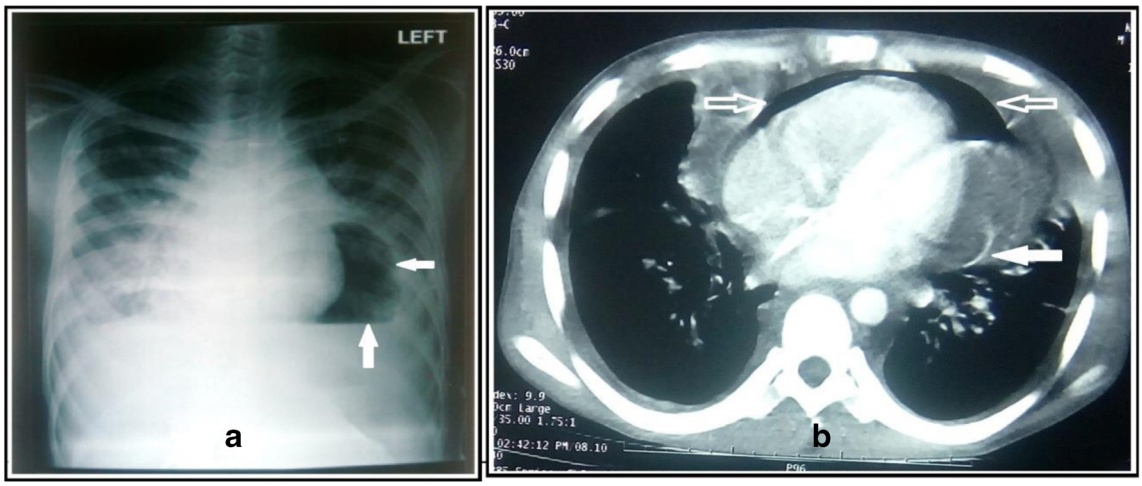

Fig. 1 **a** Chest X-ray showing pericardial halo of air with air fluid level (arrow). **b** CECT showing pneumopericardium (arrow) with loculated effusion and pigtail catheter in situ (solid arrow)

Discussion

Pneumopericardium is a rare entity which often is self-limiting. Potential causes of pneumopericardium can be blunt chest trauma, iatrogenic, spontaneous, or pericardial infections [1]. Clinical presentation of pneumopericardium can be variable and nonspecific. Patient may present with dyspnea, chest pain, palpitation, dilated neck veins, altered phonation, Hamman's sign, or tamponade symptoms [2]. They may also present as a potential life-threatening condition in the form of tension pneumopericardium. Our patient had features of chronic constrictive pericarditis like dyspnea, chest pain, ascites, and dilated neck veins. He had a history of pericardiocentesis with pericardial drain insertion for pericardial effusion which lead to the entrapment of air due to faulty drainage system and ingress of air.

Diagnosis can be made easily with chest X-ray and echocardiography. CECT chest may be done to rule out other plausible causes like fistulous communication or associated injuries in case of trauma [3]. CECT, in this case, was done to look for any other possible cause like lung trauma during pericardiocentesis and extent and localization of pericardial collection to plan for a possible surgical approach. There was no evidence of lung injury or bronchopericardial fistula in this case.

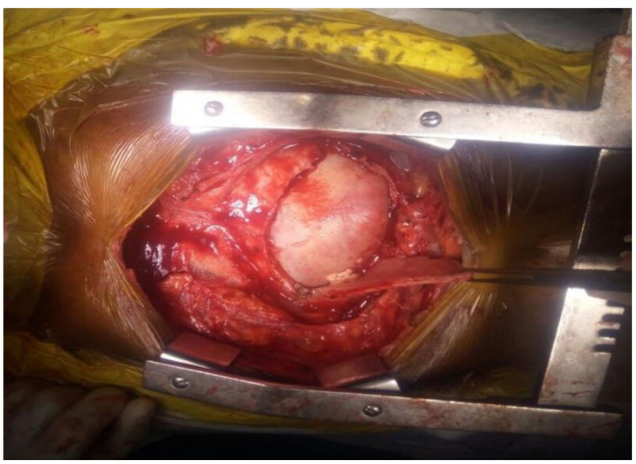

Fig. 2 Operative image showing thickened pericardium

Pneumopericardium is often a self-limiting condition. It resolves with the treatment of possible primary etiology. Emergency pericardiocentesis is required under hemodynamic monitoring for tension pneumopericardium or in cases with tamponade physiology [4]. Early surgical exploration is warranted in cases with loculated collection, purulent collection, increasing pneumopericardium, or with fistulous communication [5]. Presence of purulent discharge, loculated collection, and inadequately draining pericardial catheter with worsening symptoms lead us to go for early surgical intervention. Post-surgery patient had a marked symptomatic improvement. A strong clinical suspicion is important for early diagnosis and to prevent a fatal outcome. Our patient had symptoms of chronic pericarditis with tamponade physiology and required prompt surgical management.

Conclusion

Pneumopericardium is a rare clinical entity, often self-limiting but can be life threatening. It can be diagnosed easily by clinical presentation, chest X-ray, echocardiography, and CECT chest. Prompt decompression is warranted in the form of pericardiocentesis or pericardiectomy in a selected group of patients with clinical deterioration.

Compliance with ethical standards

Statement of human and animal rights All procedures performed in this study on human participants were in accordance with the ethical standards of the institutional ethics committee of King George's Medical University, Lucknow, and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

This article does not contain any studies with animals performed by any of the authors.

Informed consent Informed consent was obtained from the patient included in the study.

Conflict of interest The authors declare that they have no conflict of interest.

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