

Simultaneous Pneumopericardium and Pneumomediastinum following pericardiocentesis: an unusual condition

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Abstract

An 80-year-old lady was referred to our cardiology emergency department with complaints of increasing shortness of breath since 45 days earlier, which had gradually worsened over the last week

Key words: cardiology emergency; chronic kidney disease; thoracic echocardiography

Case presentation

An 80-year-old lady was referred to our cardiology emergency department with complaints of increasing shortness of breath since 45 days earlier, which had gradually worsened over the last week. She had a history of chronic obstructive pulmonary disease, diabetes mellitus, hypertension and chronic kidney disease. At the time of presentation, she had a blood pressure of 197/124 mmHg, regular heart rate of 108 bpm, oximetry of 84% in air room, respiratory tachypnea of 28 pm, jugular venous distension and muffled heart sounds. The rest of the systemic examinations were unremarkable. Initial trans-thoracic echocardiography showed massive pericardial effusion (2 cm in lateral of left ventricle and 1.5 cm around right ventricle and atrium) with partial right atrial collapse compatible with impending cardiac tamponade and the heart team approach was to perform pericardiocentesis.

The patient was transferred to the cardiac catheterization laboratory and under aseptic techniques with 2% lidocaine as a local anesthetic, an incision was made below the left costal margin and after confirmation of

the position of the needle by echocardiography, a pigtail catheter was inserted and successful drainage of 500 cc non-hemorrhagic fluid was done. The right chamber function was recovered and the patient was transferred to the cardiac care unit.

The pericardial fluid was sent for biochemical evaluations, which showed a fluid protein content of 5.5 g/dL and a total cell count of 1236 cells/ml with 93% lymphocytes and 7% neutrophils. Gram-staining was negative and the cytology report was negative for the presence of any atypical cells. In CCU, bedside echocardiography was done every 4 h to assure patients' hemodynamic condition and gradual fading of echocardiographic image quality particularly in parasternal and apical views with reduced O₂ saturation (86% in room air) was noticeable during frequent visits. Subsequently, we planned a chest computed tomography (CT) without contrast to rule out pulmonary causes and unpredictably it revealed pneumopericardium with simultaneous pneumomediastinum (**figure1**).

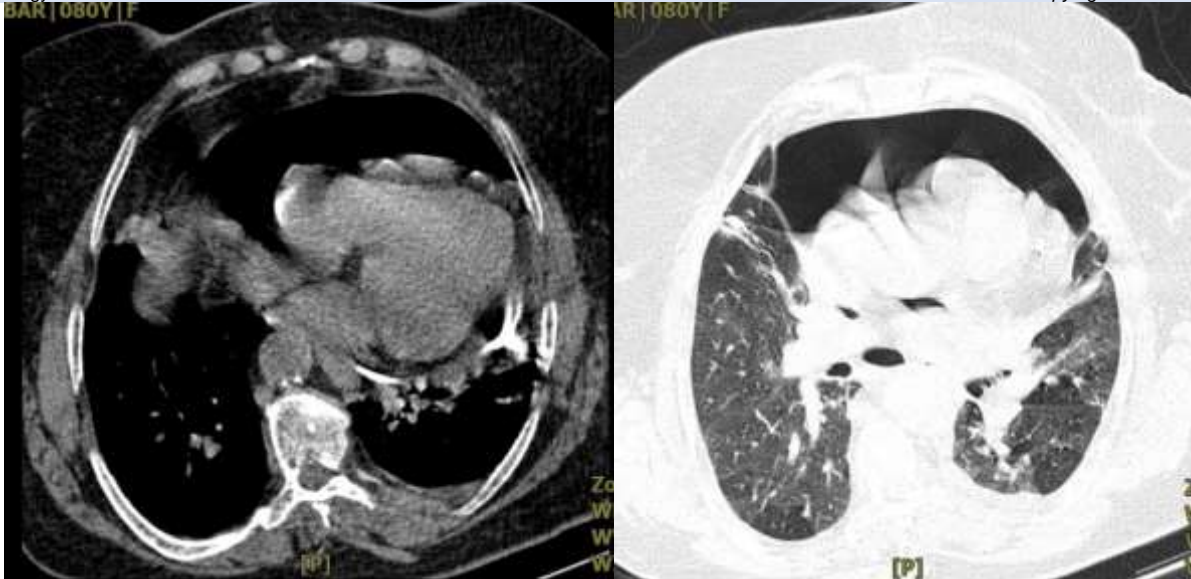


Figure 1: Lung CT scan the following day of pericardiocentesis which shows air collection in mediastinum and pericardial space

After that, patient was retransferred to catheterization lab and under fluoroscopy drainage of at least 300 cc air the condition stabilized. We observed the patient on the table for another ten minutes to reevaluate the

fluoroscopy and surprisingly patient developed the pneumopericardium again and we decided to insert a new pigtail catheter anterior to the heart this time to drain the residual gas and effusion (**figure-2**).



Figure 2: Pneumopericardium and pneumomediastinum in fluoroscopy at lateral view with resolution of air collection with change of pigtail catheter

Chest CT was repeated the following day to evaluate the extent of the pneumopericardium and provided resolution of air and it was as a reference for future follow-up. After 5 days of hospitalization, all air and fluid were drained and patient was discharged for future follow-up.

This case was another example of pericardiocentesis complicated by simultaneous pneumomediastinum and pneumopericardium. Informed written consent was obtained from the patient to use the clinical data, biochemical levels, and radiological images for academic and research purposes.

Discussion

The accumulation of gas in the pericardial cavity is pneumopericardium. Pneumopericardium can be iatrogenic or because of trauma, pericarditis and fistula formation between pericardium and air-containing organs such as pleural space. Iatrogenic causes include pericardiocentesis, thoracocentesis, radiofrequency ablation and pacemaker implantation [1]. Iatrogenic pneumopericardium and pneumomediastinum following pericardiocentesis is a rare but potentially fatal condition, which results from drainage system leakage or pericardial and pleural space communication. In this patient, it occurred due to leakage from the side of the sheath and was detected during monitoring and serial echocardiography after pericardiocentesis [2]. Several cases of iatrogenic pneumopericardium and pneumomediastinum are reported after

pericardiocentesis for cardiac tamponade [1–3]. A chest radiograph, chest CT and echocardiography would be helpful in early diagnosis of this condition after pericardial puncture. X-ray based methods show air in the pericardial space and despite diagnostic limitation of echocardiography in detecting air because of ultrasound wave nature, disappearance of echocardiographic (echocardiographic obscured heart sign) view following pericardial puncture can be an alarming clue in the diagnosis of this condition [4]. Because of expanding nature of pneumopericardium and possible development of tension pneumopericardium, proper monitoring after pericardiocentesis and other invasive procedures must be considered.

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