Cardiac Tamponade as an Initial Manifestation of Lung Carcinoma

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**Background:**
Pericardial involvement, with subsequent effusion and cardiac tamponade, may be a metastatic manifestation of an advanced lung carcinoma. These neoplastic pericardial effusions are usually asymptomatic and often times being diagnosed at an autopsy. We report on a 44-year-old woman who presented with cardiac tamponade and further investigations revealed a metastasis from the lung cancer as a cause for her pericardial effusion. Symptomatic pericardial effusion as an initial manifestation of a metastatic lung carcinoma is extremely rare and there have been very few reports of pulmonary adenocarcinoma presenting as cardiac tamponade.

**Case report:**
A 44-year-old woman with a past history bronchial asthma and tobacco abuse was admitted to the emergency room (ER) of our hospital with a 3 days history of shortness of breath. She was apparently in good health before this illness. In addition, she complained of orthopnea without any paroxysmal nocturnal dyspnea. She also denied any weight loss, fever, cough, chest pain and hemoptysis. Initial assessment in the ER revealed a blood pressure of 90/60, respiratory rate of 28, a temperature of 98\(^\circ\) F, a pulse of 120 beats per minute and a pulsus paradoxus of 20 mmHg. Further clinical examination revealed a raised JVP of 8cm, normal heart sounds, and scattered rales in both lung bases. Routine laboratory data were essentially normal. An electrocardiogram (Fig 1) showed sinus tachycardia and a low voltage pattern. Cardiomegaly and peri-hilar vascular congestion were noted on the chest radiograph (Fig 2).

![Figure 1: Electrocardiogram showing sinus tachycardia and low voltage pattern.](image)

The clinical setting of this patient, including the findings of a low blood pressure, tachycardia, the pulsus paradoxus of 20 mmHg, raised JVD, a low voltage EKG and the finding on chest x-ray, were compatible with a pericardial effusion and a cardiac tamponade. An urgent bedside echocardiography confirmed the presence of 5 cm global pericardial effusion, with evidence of cardiac tamponade. An emergent pericardiocentesis was performed and about 1.5 liters of serosanginous fluid was drained. A subsequent contrast enhanced computed-positron emission tomography (CT-PET scan) of the chest (Fig3) performed, revealed a spiculated right upper lobe mass with mediastinal lymph nodes and an increased uptake in the same areas with a standardized uptake value (SUV) of 3.
Breast mammography was essentially normal. Meanwhile, the pericardial fluid cytology was found positive for the malignant cells. Subsequently, a transbronchial biopsy of the right lung mass was performed which confirmed the diagnosis of a primary lung adenocarcinoma. Further hospital course was complicated by recurrence of pericardial effusion and subsequent cardiac tamponade. Patient underwent pericardial window drainage for recurrent pericardial effusion. Histological studies of the pericardial biopsy showed the presence of metastatic glandular structure consistent with adenocarcinoma. In view of patient’s young age, the patient was treated with pericardial window drainage and chemotherapy.

age, excellent performance status she was enrolled in an experimental chemotherapeutic regimen for treatment of metastatic lung adenocarcinoma. At 9 months of follow up, she has been doing well and had shown an excellent response to chemotherapy without any recurrence of pericardial effusion.

Discussion
Malignancy is one of the leading causes of pericardial effusion in the United States. Many autopsy studies have shown pericardial involvement in almost 6-22% of patients with a history of malignancy, and the primary tumors commonly found in the studies were those arising from lungs (37%), breasts (22%), hematological malignancies (17%) and melanoma (3%). Among the tumor subtypes adenocarcinoma was the most common, followed by squamous carcinoma, to cause cardiac tamponade.

Cardiac tamponade has been reported to occur as an initial manifestation with the malignant tumors of the thymus, kidneys, stomach, thyroid and esophagus. [3-11]. Malignant pericardial effusions are usually exudates and are hemorrhagic in nature. The cytological examination of the pericardial fluid may reveal malignant cells in more than 70% of these cases [12]. The identification of tumor markers like, LDH and CEA may help provide further clues to the diagnosis.

The pericardial involvement as a result of the metastatic lung diseases is usually asymptomatic. It can infrequently result in a hemodynamically significant pericardial effusion. Tumor implantation on serosral surfaces leads to augmented fluid production and exudation. In addition, epicardial lymphatic and venous obstruction by tumor cells causes further increase in hydrostatic pressure and hence fluid accumulation. Other non-tumor related causes like hypoalbuminemia from cachexia, infectious pericarditis and radiation or chemotherapy related pericarditis should be considered in the differential diagnosis [13].

In a review of the malignant cardiac tamponade cases, the most common symptoms reported were dyspnea (79%), cough (47%), chest pain (26%), orthopnea (26%) and dysphasia (18%) [2]. The physical signs commonly encountered were tachycardia (50%) and signs of systemic venous congestion. Pulsus paradoxus and pericardial rub were present in only 30% and 12% of the cases. The famous Becks triad characterized by hypotension, quiet heart and increased jugular venous pressure is reported more often in surgical settings than in medical patients. Cardiac tamponade is a clinical diagnosis and an echocardiography helps to confirm it. The echocardiographic findings suggestive of the cardiac tamponade are diastolic collapse of the right atrium or right ventricle with respiratory Doppler variation in transmittal inflow velocities [14]. EKG abnormalities suggestive of tamponade include low voltage, ST segment changes and electrical alternans. In the majority of the cases, these abnormalities are non-specific. Electrical alternans considered being a pathognomonic feature of cardiac tamponade is seen rarely [15]. Chest radiograph may be normal or reveal cardiomegaly. The examination of the lung fields on a chest radiograph may also reveal the cause of the pericardial effusion like a mass lesion or a tubercular infiltrate.

Cardiac tamponade is a medical emergency and treatment involves urgent pericardiocentesis [16]. Pericardiocentesis should be carried out in cardiac catheterization laboratory with appropriate technical and nursing support. The management of the malignant pericardial effusion requires either pericardial fenestration or the sclerosis of the pericardium by tetracycline. However, more recently, subxiphoid pericardiotomy and balloon catheter pericadiotomy have replaced the older methods of pericardiocentesis. [17]. Subxiphoid pericadiotomy is performed under local anesthesia and has a very low mortality and morbidity. The prognosis of patients with neoplastic cardiac tamponade is usually poor and the survival dependents upon the tumor type, performance score at presentation and use of combined chemotherapy and or radiotherapy [18].
References:


Conflict of Interest: None

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