Case Report

Carcinoma Lung Presenting with Cardiac Tamponade due to Malignant Pericardial Effusion: A Case Report

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Abstract

Cardiac tamponade is a medical emergency arising from rapid or significant accumulation of fluid within the pericardial sac, leading to impaired ventricular filling and reduced cardiac output. When caused by malignancy, it signals advanced disease and poses unique diagnostic and therapeutic challenges. Pericardial effusion is observed in approximately 5–15% of all cancer patients out of which Malignant pericardial effusion (MPE) accounts for around 15–50% of large or recurrent pericardial effusions and Cardiac tamponade develops in 10–30% of patients with MPE (approximately 2 % of patients) depending on the type and stage of cancer. Malignancy-related pericardial effusions are typically due to direct tumor invasion, lymphatic obstruction, or metastasis to the pericardium. Common cancers associated: Lung cancer, Breast cancer, Lymphomas, and Leukemias.

Keywords: Cardiac tamponade, Pericardial effusion, Lung cancer, Pericardiocentesis, Sepsis.

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Introduction

Malignant pericardial effusion (MPE) is a critical but often underdiagnosed manifestation of advanced malignancy. It occurs when malignant cells infiltrate the pericardial space, leading to fluid accumulation, which can progress to cardiac tamponade—a life-threatening condition.[1] Among malignancies, Lung cancer is the most common etiology associated with pericardial effusion,[2] followed by Breast cancer and hematological malignancies. Pericardial effusion in the setting of malignancy portends a poor prognosis, and in some cases, may be the first clinical manifestation of an underlying cancer.

Cardiac tamponade results from pericardial fluid exerting pressure on cardiac chambers, thereby limiting diastolic filling and reducing stroke volume. It is considered a medical emergency requiring prompt recognition and intervention. While MPE is seen in approximately 5–15% of cancer patients, Malignant pericardial effusion accounts for around 15-50% of large or recurrent pericardial effusion. Cardiac tamponade develops in 10–30% of those with MPE, so (in approximately 2 % of patients). This condition frequently arises in the context of metastatic spread, often indicating an advanced stage of disease.

Clinically, patients with cardiac tamponade present with nonspecific symptoms including dyspnea, fatigue, and chest discomfort. Physical signs may include elevated jugular venous pressure, muffled heart sounds, and hypotension—collectively known as Beck's triad. Echocardiography remains the gold standard for diagnosis, revealing signs such as diastolic right ventricular collapse and a swinging heart.

Here, we present the case of a 44-year-old female who was diagnosed with malignant pericardial effusion secondary to Lung carcinoma and presented acutely with features of cardiac tamponade. This case underscores the importance of early diagnosis, urgent intervention, and multidisciplinary management in improving outcomes in such patients.

Case Presentation

A 44-year-old female presented with complaints of shortness of breath at rest for 1 week, cough with expectoration, fever for 15 days, and frequent retching. She had no prior comorbidities but reported tobacco use. On examination, she had a pulse of 80 bpm, BP 116/76 mmHg, RR 22/min and patient required 2L O2 by nasal prongs, afebrile. Respiratory exam revealed bilateral normal breath sounds. Cardiovascular exam was unremarkable. GCS was 15/15.

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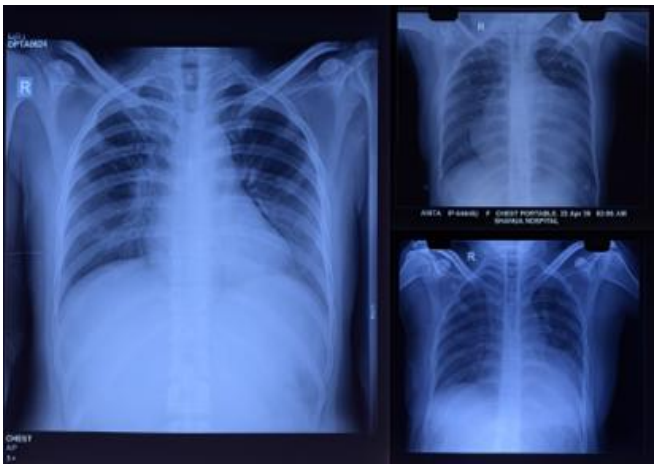
Investigations: Initial investigations showed Dimorphic anemia with neutrophilic lecucocytosis and signs of sepsis (TLC 22,100/mm³, OT/PT 570/623 U/L). Imaging revealed right-sided pleural effusion and massive pericardial effusion. CECT thorax showed a right lung mass with mediastinal lymphadenopathy. Pericardial fluid cytology was positive for malignant cells suggestive of Lung Adenocarcinoma.

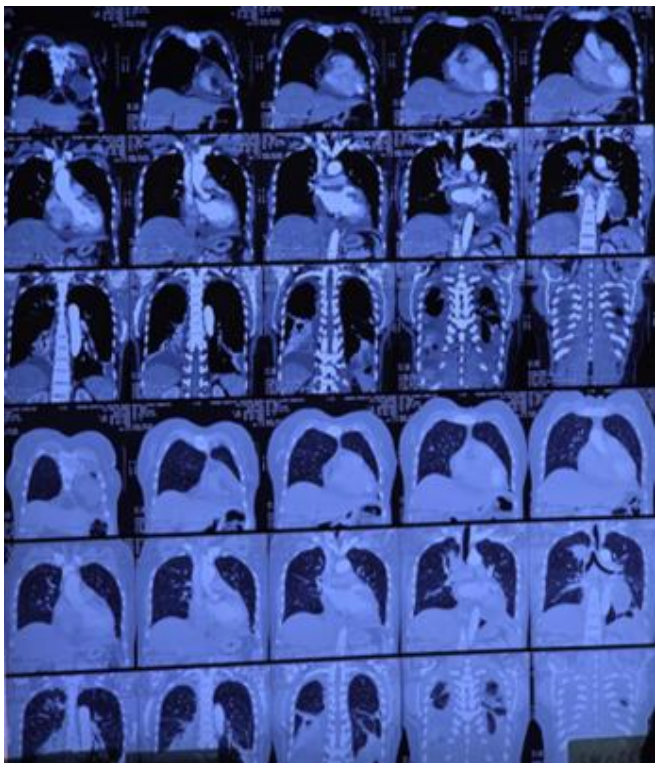
Hospital Course: The patient was initially evaluated in the emergency department for acute onset shortness of breath, non-productive cough, fever, and signs of systemic illness. Clinical examination revealed raised JVP, muffled heart sounds, and tachypnea, prompting a bedside point-of-care ultrasound (POCUS) which confirmed a large pericardial effusion with right ventricular diastolic collapse. These findings were consistent with cardiac tamponade, and the patient was promptly admitted to the intensive care unit (ICU).

Initial laboratory work-up showed anemia (Hb 7.3 g/dL), neutrophilic leukocytosis (TLC 22,100/mm³), deranged liver enzymes (OT/PT 570/623 U/L), and elevated ALP (177 IU/L), suggesting an inflammatory or infectious state. Electrolyte imbalance in the form of Hypokalemia was corrected during the stay. High-flow nasal cannula (HFNC) oxygen support was initiated to manage respiratory distress. Broad-spectrum intravenous antibiotics and supportive medications, including intravenous fluids, PPIs, and mucosal protectants, were started empirically.

Below is the Chest Xray Image of the patient



CECT Thorax revealed - Enhancing soft tissue lesion in apical segment of right upper lobe. Pericardial effusion with an enhancing lymph node of size 10mm in SAD in the right pericardial region along with multiple calcified lymph nodes seen in prevascular, pretracheal, precarinal, subcarinal, aortopulmonary region. Bilateral pleural effusion with maximum thickness- 18mm in the right side with Loculated effusion extending to major and minor fissures and with basal lung atelectasis and thickness - 13mm on the left side. Patchy area of consolidation with air bronchogram sign and surrounding ground glass opacities is seen in the posterior segment of bilateral lower lobe with calcification within. Inter lobular septal thickening in seen predominantly in bilateral lower lobes. Below is The CT Thorax Film:-



Pericardiocentesis was performed using a pigtail catheter, and 1690 ml of hemorrhagic fluid was drained over several hours. Fluid cytology revealed lymphocyte predominance and malignant cells. Cell block immunocytochemistry was positive for MOC-31, TTF-1, Napsin A, and CK5/6, with Microscopic Finding as –

Sections from serosanguinous pericardial fluid cell block reveals atypical cells clusters, cords and singly scattered cells These cells shows eccentrically placed nucleus and vacuolated cytoplasm. An occasional acinar cluster is also noted. Background shows proteinaceous fluid along with red blood cells indicating metastatic lung adenocarcinoma as the primary source.

Despite hemodynamic stabilization following drainage, the patient's general condition and nutritional status required continuous monitoring. Given the confirmed diagnosis of advanced malignancy, she was referred to a higher oncology center for specialized management, including systemic chemotherapy and palliative care.

Discussion

Cardiac tamponade is a medical emergency caused by the accumulation of fluid in the pericardial sac that compresses the heart and impairs its filling, leading to reduced cardiac output. When pericardial effusion results from malignancy, particularly in the setting of advanced lung cancer, the clinical implications are profound and often indicate a terminal stage of disease. In this case, a 44-year-old woman presented with symptoms of respiratory distress and was ultimately diagnosed with cardiac tamponade secondary to a malignant pericardial effusion.

Malignant pericardial effusion (MPE) is observed in 5–15% of all cancer patients, most commonly arising from lung, breast, or hematological malignancies. Among patients with MPE, 10–30% develop cardiac tamponade (in approximately 2 % of all

patients) highlighting the importance of maintaining a high index of suspicion when patients present with progressive dyspnea and hypotension. Lung cancer, especially adenocarcinoma, is the most frequent primary malignancy associated with tamponade physiology,[3] due to its anatomical proximity and propensity for lymphatic spread.

The diagnosis of cardiac tamponade involves clinical signs such as elevated jugular venous pressure, hypotension, muffled heart sounds (Beck's triad), and pulsus paradoxus. Echocardiography is the gold standard diagnostic modality and often reveals early diastolic collapse of the right ventricle, a dilated inferior vena cava without inspiratory collapse, and swinging of the heart in a large effusion. These findings were present in our patient, and prompt intervention was crucial.[4]

Pericardiocentesis not only relieves the pressure on the heart, improving hemodynamic status,[5] but also provides diagnostic insight through fluid analysis. Cytological examination and immunocytochemistry are essential in cases of suspected MPE. In this case, positivity for TTF-1 and Napsin A in the cell block analysis and Microscopic Findings showing – Sections from serosanguinous pericardial fluid cell block reveals atypical cells clusters, cords and singly scattered cells. These cells shows eccentrically placed nucleus and vacuolated cytoplasm. An occasional acinar cluster is also noted. Background shows proteinaceous fluid along with red blood cells confirmed the diagnosis of Pulmonary Adenocarcinoma.

Therapeutic options include pericardiocentesis, pericardial window surgery, or intrapericardial chemotherapy, depending on the patient's clinical status and the extent of disease. However, recurrence of effusion is common, and treatment must be individualized. In advanced malignancy, palliative care goals often take precedence, and interventions are aimed at symptom relief rather than cure.

This case underlines the significance of early diagnosis and management of malignant cardiac tamponade. Clinicians should remain vigilant for such presentations, particularly in cancer patients with unexplained dyspnea or new cardiovascular findings. Interdisciplinary collaboration between internal medicine, oncology, and cardiology is critical for optimal patient outcomes.

Conclusion

Malignant cardiac tamponade should be considered in patients with known or suspected cancer presenting with unexplained dyspnea. Pericardiocentesis is both therapeutic and diagnostic. Multidisciplinary care including oncology and palliative teams is essential.

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Conflicts of interest

There are no conflicts of interest.

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