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Case Report

Imaging-Guided Diagnosis of Malignant Pericardial Involvement in an HIV-Positive Patient with Non-Hodgkin's Lymphoma

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ABSTRACT

Malignant pericardial involvement is a rare manifestation of non-Hodgkin's lymphoma (NHL), particularly in immunocompromised individuals. In human immunodeficiency virus (HIV)-positive patients, this condition is especially uncommon and presents diagnostic challenges. Radiologic imaging is essential for early detection and management. An 80-year-old HIV-positive man with chronic kidney disease and a history of NHL presented with progressive dyspnea and a productive cough. Imaging revealed a large pericardial effusion with tamponade physiology. Urgent echocardiography-guided pericardiocentesis drained serosanguineous fluid. Chest computed tomography (CT) demonstrated diffuse nodular pericardial thickening and mediastinal lymphadenopathy, raising suspicion for malignant pericardial disease. Cytologic analysis confirmed diffuse large B-cell lymphoma. A pericardial catheter was placed for recurrent effusion management. Although initially stabilized, the patient developed tumor lysis syndrome and septic shock, and care was transitioned to hospice. Malignant pericardial effusion as an initial presentation of NHL in HIV-positive patients is rare. Differential diagnoses include opportunistic infections, Kaposi's sarcoma, and primary pericardial malignancies. Multimodal imaging, especially echocardiography and CT, plays a crucial role in diagnosing, guiding emergent interventions, and informing treatment planning. This case highlights the importance of integrating imaging with clinical findings to manage complex presentations in immunocompromised populations.

Keywords: CT, echocardiography, HIV, non-Hogkin's Lymphoma, pericardial effusion, PET-CT

INTRODUCTION

Malignant pericardial effusion is a rare clinical entity, particularly as an initial manifestation of non-Hodgkin's lymphoma (NHL).[1] In immunocompromised patients, such as those with human immunodeficiency virus (HIV), this presentation is exceedingly uncommon and poses significant diagnostic challenges. The buildup of fluid within the pericardial sac, known as pericardial effusion, is often linked to a poor prognosis and can result in severe complications, including cardiac tamponade, hemodynamic instability, and fatal outcomes.[2,3] Hence, early and accurate diagnosis through radiologic imaging is essential to guide clinical decision-making and optimize patient outcomes.

This case report details a unique presentation of malignant pericardial effusion with nodular pericardial thickening in an HIV-positive patient, emphasizing the diagnostic and therapeutic contributions of radiologic imaging.

CASE PRESENTATION

Informed consent was obtained from the patient for the publication of this case report, including the use of relevant clinical and imaging data.

The patient is an 80-year-old male with a significant medical history, including HIV and receiving highly active antiretroviral

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therapy (ART), hypertension, solitary kidney (status post gunshot wound with right nephrectomy), chronic kidney disease secondary to focal segmental glomerulosclerosis, NHL, and a history of cardiac tamponade requiring drainage.

He presented with a 4-day history of progressive shortness of breath, productive cough with white-yellow sputum, and generalized weakness. Physical examination revealed shallow breathing, increased work of breathing, diffuse coarse breath sounds, generalized abdominal tenderness, and bilateral lower extremity edema.

In the emergency department, the patient was tachypneic and hypoxemic, requiring supplemental oxygen. Laboratory findings were significant for normocytic anemia and elevated creatinine (3.3 mg/dL). A transthoracic echocardiogram (TTE) was performed urgently and revealed a large pericardial effusion with echocardiographic signs of cardiac tamponade. Based on these findings, emergent pericardiocentesis was performed, yielding serosanguinous fluid. Cytologic analysis of the pericardial fluid confirmed malignant cells consistent with NHL.

Following the procedure, a chest computed tomography (CT) was obtained during the oncology consultation, which demonstrated diffuse circumferential nodular thickening of the pericardium and mediastinal lymphadenopathy. These findings supported the diagnosis of diffuse large B-cell lymphoma with malignant pericardial involvement. The patient subsequently underwent pericardial catheter placement for recurrent effusion management. Despite initial stabilization, his condition progressively declined due to tumor lysis syndrome and septic shock. After multidisciplinary discussions and alignment with the patient's goals of care, he was transitioned to palliative care and discharged to hospice.

Initial imaging revealed moderate cardiomegaly, a large pericardial effusion with echocardiographic signs of cardiac tamponade, pulmonary venous hypertension, and trace pleural effusion (Figure 1a and 1b).

Follow-up chest CT showed diffuse circumferential high-attenuation nodular thickening of the pericardium with diffuse mediastinal and hilar lymphadenopathy (Figure 1c and 1d). Differential considerations included primary effusion lymphoma secondary to Human Herpesvirus 8. Additional possibilities included metastatic disease or primary pericardial mesothelioma. Imaging also revealed small bilateral pleural effusion with associated compressive atelectasis of the adjacent lung parenchyma.

MAIN POINTS

- Malignant pericardial effusion is an uncommon initial manifestation of non-Hodgkin's lymphoma, especially in immunocompromised patients such as those with human immunodeficiency virus. Early recognition is critical to prevent life-threatening complications like cardiac tamponade.
- Imaging modalities such as echocardiography, computed tomography, and fluorodeoxyglucose positron emission tomography/computed tomography play a central role in diagnosing pericardial involvement in lymphoma. These tools aid in detecting pericardial effusion, guiding pericardiocentesis, and differentiating between infectious and malignant causes.
- The management of malignant pericardial effusion requires collaboration between oncology, cardiology, infectious disease specialists, and palliative care teams. This ensures appropriate intervention strategies, including pericardiocentesis, catheter placement, chemotherapy, and symptom-directed palliative care.

DISCUSSION

Malignant pericardial involvement as a presenting manifestation of NHL is rare, with limited cases reported in the literature. Malignancies affecting the pericardium typically manifest as pericardial effusion or constrictive pericarditis, though these presentations are usually late-stage secondary developments.[4]

In patients with HIV/acquired immunodeficiency syndrome (AIDS), the incidence of pericardial effusion is notably higher, and when present, it should raise suspicion for underlying malignancies, including lymphoma. The immunocompromised state associated with HIV complicates both the diagnosis and treatment of such malignancies, as evidenced by cases where pericardial effusion was the first indication of disseminated lymphoma in AIDS patients.[5]

Moreover, patients with HIV come with diagnostic challenges due to atypical presentations of cardiac involvement. For instance, cardiac lymphomas in HIV-positive patients may present with vague symptoms, complicating the diagnostic process.[6] Additionally, there are diverse etiologies of pericardial effusions in HIV patients, including opportunistic infections such as tuberculosis, bacterial infections, and malignancies such as lymphoma and Kaposi's sarcoma. This diversity necessitates comprehensive diagnostic evaluations to determine the exact cause.[7]

Radiologic imaging was pivotal in identifying the pericardial effusion and nodular thickening, guiding emergent management, and suggesting an underlying malignancy. TTE is often the first-line imaging modality for detecting pericardial effusions.[8] Particularly echocardiography and CT aid in planning pericardiocentesis or biopsy by identifying optimal access points and evaluating procedural risks. In addition, follow-up imaging, especially with positron emission tomography (PET)-CT or magnetic resonance imaging, is essential for assessing response to chemotherapy and ART in HIV-associated NHL.

F-FDG PET/CT is a highly effective imaging modality for the initial staging of lymphoma and for assessing early treatment responses, enabling tailored management for individual patients. However, its use in post-treatment surveillance is not recommended due to a substantial risk of false-positive findings. Specifically in HIV-positive patients, this risk is exacerbated by opportunistic infections that can mimic lymphoma on PET imaging. Additionally, the recurrence of lymphoma is more common in HIV-positive individuals; factors contributing to this increased recurrence include larger tumor burden at diagnosis,

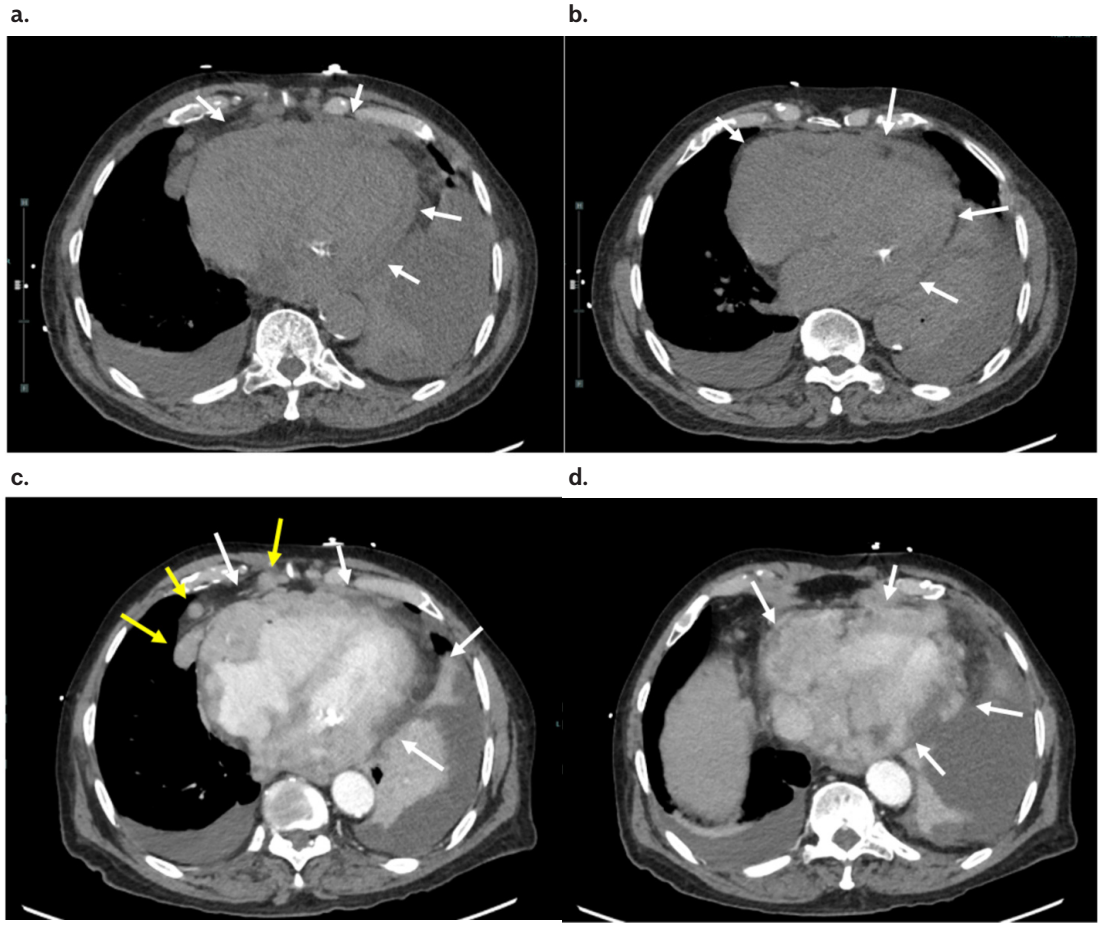

Figure 1. (a, b) Axial non-contrast CT images demonstrate a high-attenuation pericardial thickening (arrows), concerning for hemopericardium or pericardial infiltration, bilateral pleural effusion and left lower lobe compression atelectasis. **(c, d)** Axial post-contrast chest CT images show nodular, contrast-enhancing thickening of the pericardium (arrows), suggestive of malignant infiltration, enlarged pericardial lymph nodes (yellow arrows), consistent with lymphomatous involvement.

CT, computed tomography.

ongoing immune dysfunction, and less-than-optimal therapy in this patient population.[9] As a result, imaging strategies should be carefully aligned with the patient's clinical symptoms and the level of suspicion for disease recurrence.

This case demonstrates the diagnostic and therapeutic challenges of malignant pericardial effusion in an HIV-positive patient. Radiology played a central role in identifying the effusion, suggesting malignancy, and guiding emergent interventions. This report highlights the importance of a multidisciplinary approach to managing rare and life-threatening presentations of malignancy.

The rarity of malignant pericardial effusion as an initial presentation of lymphoma underscores the importance of maintaining a broad differential diagnosis in immunocompromised patients presenting with cardiopulmonary symptoms. Early recognition and management are crucial to prevent life-threatening complications such as cardiac tamponade.

Ethics

Informed Consent: Informed consent was obtained from the patient for the publication of this case report, including the use of relevant clinical and imaging data.

Footnotes

Author Contributions

Concept Design – M.N.D., D.O-T.; Data Collection or Processing – M.N.D., D.O-T.; Analysis or Interpretation – M.N.D.; Literature Review – M.N.D.; Writing, Reviewing and Editing – M.N.D.

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