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Cardiac Tamponade: A Rare Manifestation of Lung Cancer. A Case Report

Taponamiento cardíaco: una rara manifestación de cáncer de pulmón. Reporte de un caso

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SUMMARY

Background: *Malignancy is the most common cause of non-inflammatory pericardial effusion that is usually neglected. Metastatic involvement of the pericardium is reflecting the advanced stage of the disease and generally associated with poor outcomes.*
Case presentation: *We report an unusual case of a malignancy patient with pericardial effusion complicated by cardiac tamponade. The patient was treated urgently with pericardiocentesis and cytology pericardial fluid aspirate showed malignant glandular cells. Computed tomography of the chest confirmed the presence of a malignant lung tumor.*
Conclusion: *Our case demonstrates the possibility of metastatic pericardial involvement in patient with malignancy that was successfully treated with pericardial drainage.*

Keywords: *Cardiac tamponade, neoplasms, pericardial effusion, pericardiocentesis.*

RESUMEN

Antecedentes: *La neoplasia maligna es la causa más frecuente de derrame pericárdico no inflamatorio que suele pasar desapercibido. La afectación metastásica del pericardio refleja la etapa avanzada de la enfermedad y generalmente asociada con malos resultados.*
Presentación del caso*: Presentamos un caso inusual de un paciente con derrame pericárdico complicado con taponamiento cardíaco. La paciente fue tratada de urgencia con pericardiocentesis y citología aspirada de líquido pericárdico que mostró células glandulares malignas. La tomografía computarizada de tórax confirmó la presencia de tumor pulmonar maligno.*
Conclusión: *Nuestro caso demuestra la posibilidad de afectación pericárdica metastásica en paciente con neoplasia maligna tratada con éxito con drenaje pericárdico.*

Palabras clave: *Taponamiento cardíaco, neoplasias, derrame pericárdico, pericardiocentesis.*

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INTRODUCTION

Metastatic pericardial effusion is common, but cardiac tamponade appears to be a rare manifestation which is an emergency case. Accumulation of fluid in the pericardial cavity in cardiac tamponade causes compression of the heart, decrease of cardiac output, and shock. Metastatic pericardial effusion is a sign of poor prognosis, with a mortality rate of more than 75 % within 12 months (1,2). Early detection and emergency measures such as percutaneous drainage or surgical management aim to reduce the symptoms.

Case Presentation

A 56-year-old female patient was admitted to the emergency unit because of continuous chest pain, on the left side, radiating to the back for 2 months. On the third day of admission, she complained of worsening shortness of breath, improving with a sitting position. She also complained of discomfort in the left side of the chest that feels like fullness, accompanied by penetrating pain that radiates to the back, with nausea-vomiting, and a decrease in appetite. She presented hypotension with BP 90/60 mmHg, tachycardia 125 bpm, tachypnoea with 28 breaths per minutes, and oxygen saturation was 96 % with a simple mask at 6 lpm. There was a distention of the jugular vein with muffled heart sounds from the cardiac examination. Her complete blood counts and electrolytes were normal. Electrocardiography showed sinus tachycardia 125 bpm with low voltage (Figure 1). Chest radiography showed an enlargement of the cardiac silhouette (Figure 2). Bedside echocardiography was done and showed a massive pericardial effusion with cardiac tamponade (Figure 3).

She underwent an emergent percutaneous pericardiocentesis and approximately 500 mL of bloody pericardial fluid was evacuated (Figure 4). A pericardial fluid sample was sent for cytology review and malignant glandular cells were found. The patient got better on the seventh day of treatment. There was no dyspnoea, nausea, or vomiting. On physical examination, the patient was awake and alert. The hemodynamic state was stable. The total pericardial fluid aspirated was about 1 241 mL. An echocardiogram was done for evaluation, and it showed moderate effusion without collapse of heart chambers, normokinetic left ventricle with an ejection fraction of 60 %, and normal diastolic function.

An evaluation chest computed tomography scan showed a malignant lung mass, with multiple nodules in both lungs and multiple lytic lesions at the sternum and corpus vertebrae (Figure 5). The lung mass encased the right pulmonary artery and adhered to the superior vena cava causing difficulty in tumor biopsy. The pericardial cell block was performed as an alternative and was sufficient for the EGFR mutation test, but no mutation was found. The patient was diagnosed with EGFR wild-type metastatic lung adenocarcinoma and was planning for getting chemotherapy.

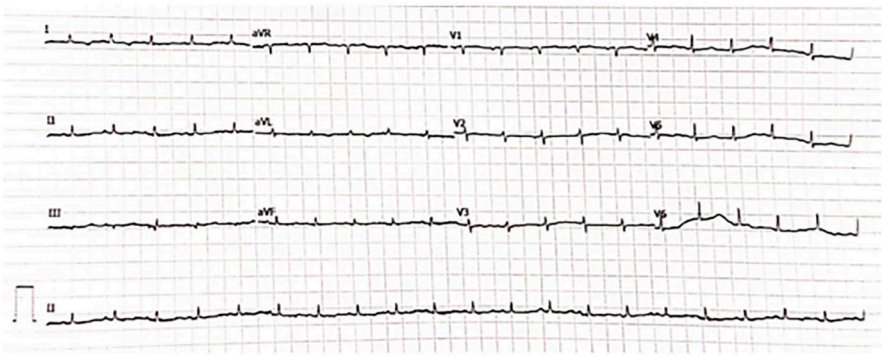

Figure 1. Electrocardiography examination showed sinus tachycardia with low voltage.

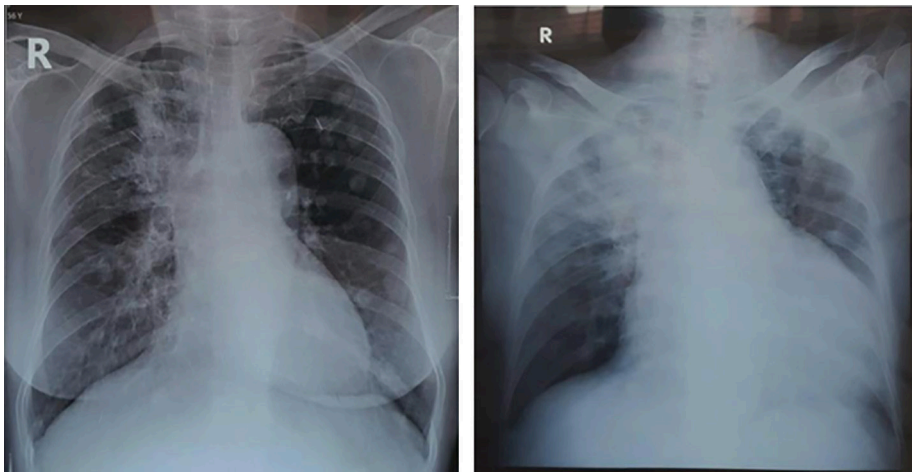

Figure 2. Comparison of the patient's first (October 2021) and second chest radiography (December 2021).

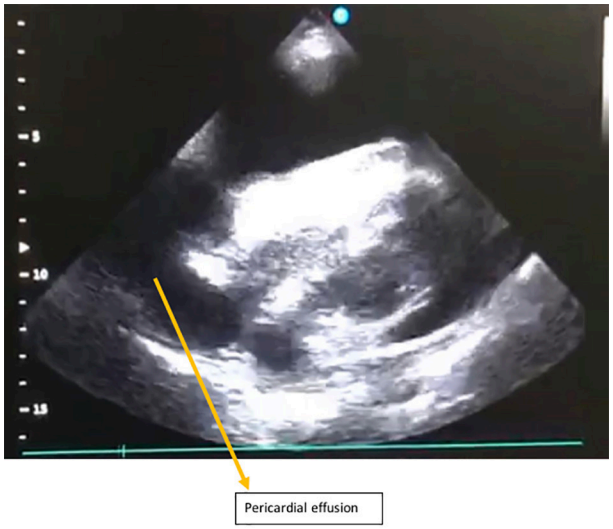

Figure 3. Echocardiography examination showed massive pericardial effusion.

Figure 4. A volume of 500 mL bloody effusion was aspirated through pericardiocentesis.

DISCUSSION

Lung cancer is often asymptomatic in the early stages and causes a delay in diagnosis. The late diagnosis makes such a high mortality rate. Lung cancer metastases to distant organs and cause most deaths from lung cancer. Malignancy-associated pericardial effusion reflects an advanced stage of the disease and has poor outcomes with mortality of more than 75 % in 12 months (1-4).

Almost 95 % of malignant pericardial effusion (PE) was caused by a metastatic process, with lung and breast cancer as the most common cause.

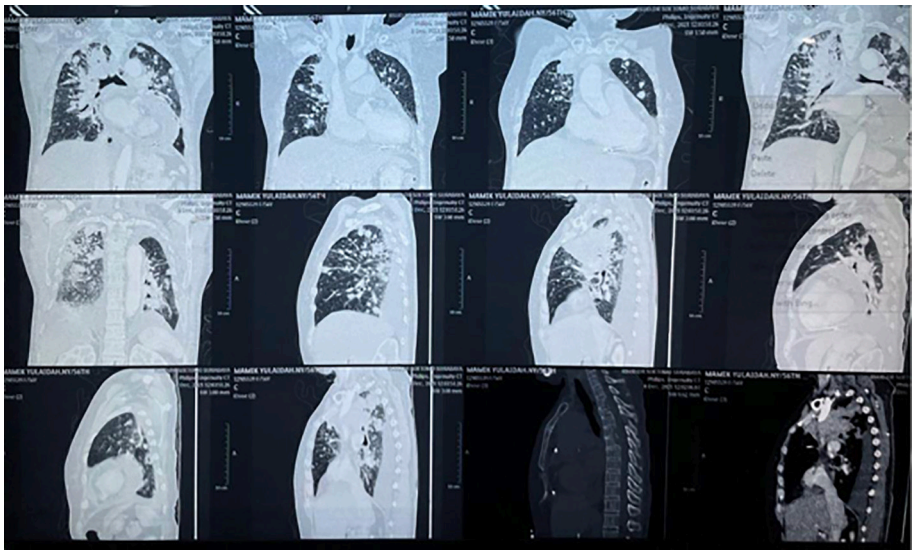

Figure 5. Thorax CT with contrast showed multiple nodules in both lungs, multiple lytic at sternum and vertebrae reflecting a metastatic process.

These two primaries along with hematologic malignancies such as leukemia and lymphoma are responsible for 75 % of malignant PE. Malignancy is the most common cause of non-inflammatory PE with a prevalence of 12 %-23 % One-third of PE cases were complicated by cardiac tamponade, in which the accumulation of pericardial fluid leads to impaired venous return, loss of left ventricular preload, and causes hemodynamic instability (5-8).

Cardiac metastases are usually asymptomatic in the early stages. The clinical signs of cardiac tamponade vary depending on the rate of fluid accumulation. In malignancy cases, pericardial fluid is built up at a chronic or subacute pace, with a volume that can be more than 1 000 mL without causing significant symptoms (1,2,9). As in this patient, a 1 241 mL volume of bloody pericardial effusion was collected after her symptoms emerged.

Classic symptoms of pericardial effusion are dyspnoea on exertion, which may progress to orthopnoea, chest pain, tachypnoea, and/or a feeling of fullness in the chest. Other symptoms can occur due to local compressions such as nausea-vomiting, dysphagia, hoarseness, and hiccups. Non-specific symptoms can be found such as cough, anorexia, palpitations, peripheral edema, and fatigue. Fever can be found in pericarditis cases (2,6,7,10,11). Classic signs of cardiac tamponade are Beck's triad of hypotension, distention of jugular veins, and muffle of heart sounds. Low voltage and electrical alternans can be seen on electrocardiography but are not sensitive nor specific. Mostly only seen as sinus tachycardia (1,2,6,10,11).

PE can be seen as an enlarged heart on chest radiography, but an enlarged cardiac silhouette only appears after the effusion reaches a moderate degree (~200 mL). Prior chest radiographs with normal cardiac silhouette can help to diagnose PE. This patient had prior chest radiography 2 months before admission and showed a normal size of the heart that supports the suspicion of new pericardial effusion (Figure 2). Transthoracic echocardiography is the first-line imaging in patients suspected of pericardial disease, which can detect pericardial effusion and its hemodynamic impact. Echocardiography not only can determine the right puncture point, but also the first choice for the evaluation of treatment (1,2,6).

Management of pericardial effusion depends on its etiology and its effect on hemodynamic.

Large volume effusion without any symptoms or causing unstable hemodynamic can be treated with conservative management, including periodic observation and treatment for underlying disease. PE with symptoms and collapse of the heart chamber are indications of drainage (2,6,10,12-14). The surgical approach is the definitive therapy of pericardial effusion, but because of its risks with variable recurrence, percutaneous intervention is recommended. Guided pericardiocentesis by echocardiography or by fluoroscopy is recommended to reduce the risk of injury to vital organs and determine the closest puncture point with the largest volume of effusions. CT-guided pericardiocentesis may be considered in cases of loculated effusions (10,14).

Isolated pericardiocentesis had a recurrence risk of up to 23 %. Pericardiocentesis with extended catheter drainage has lower recurrence rates of up to 10 %-14 %. Long-term use of a catheter can induce local inflammation, stimulate obliteration of the pericardial space, and significantly reduce the risk of fluid re-accumulation. However, the use of a drainage catheter for more than 7 days has a risk of infection. As in this patient, the drain catheter was removed after 6 days of insertion. An evaluation echocardiogram was done 1 month after that, and it showed minimal pericardial effusion at the base. She did another thorax CT 8 months later and it showed no recurrence of pericardial effusion (6,7,14).

Percutaneous pericardiocentesis with extended catheter drainage is the primary treatment for pericardial effusion in malignancy patients. Catheter revision or reimplantation can be done if there is a persistent or relapsing effusion. Several other procedures such as systemic antineoplastic, instillation of sclerotic or cytotoxic agents, percutaneous balloon pericardiotomy, pleuro-pericardiotomy, and radiation therapy, may be recommended if recurrence is found (10,13,14).

CONCLUSION

It has been reported a 56-years-old female with metastatic pericardial involvement that complicated by cardiac tamponade. The patient was successfully treated with pericardial drainage. Pericardiocentesis with extended catheter drainage showed lower recurrence than pericardiocentesis only. Early detection and proper management of cardiac tamponade determine the prognosis of the patient.

Author Contributions

All authors were involved in preparing this article regarding the conception, writing of the manuscript, and conducting a final proofreading.

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Conflict of Interest

There is no conflict of interest regarding the publication of this paper.

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REFERENCES

1. Imazio M, Colopi M, De Ferrari GM. Pericardial diseases in patients with cancer: Contemporary prevalence, management and outcomes. Heart. 2020;106(8):569-574.
2. Stashko E, Meer JM. Cardiac Tamponade. Treasure Island: StatPearls Publishing; 2022. Available from: https://www.ncbi.nlm.nih.gov/books/NBK431090/
3. Wulandari L, Faot NE. Problem Penegakkan Diagnostik Pasien dengan Massa di Paru. J Respirasi. 2017;3(2):41-46.
4. Febriani A, Furqon A. Metastasis Kanker Paru. J Respirasi. 2020;4(3):94.
5. Scheinin SA, Sosa-Herrera J. Case report: Cardiac tamponade resembling an acute myocardial infarction as the initial manifestation of metastatic pericardial

adenocarcinoma. Methodist Debakey Cardiovasc J. 2014;10(2):124-128.

6. Jensen JK, Poulsen SH, Molgaard H. Cardiac tamponade: A clinical challenge. E-Journal Cardiol Pract Cardiol Pract. 2017;21. Available from: https://www.escardio.org/Journals/E-Journal-of-Cardiology-Practice/Volume-15/Cardiac-tamponade-a-clinical-challenge
7. Adler Y, Charron P, Imazio M, Badano L, Barón-Esquivias G, Bogaert J, et al. 2015 ESC Guidelines for the diagnosis and management of pericardial diseases. Eur Heart J. 2015;36(42):2921-2964.
8. Alsagaff MY, Laksmi NPA, Maghfirah I, Susilo H. Tamponade with recurrent chylopericardium in a patient with non-Hodgkin's lymphoma: Chemotherapy is the key management after pericardiocentesis. BMJ Case Rep. 2022;15(5).
9. Andrianto A, Mulia EPB, Suwanto D, Rachmi DA, Yogiarto M. Case Report: Complete heart block as a manifestation of cardiac metastasis of oral cancer. F1000Research. 2020;9:1-14.
10. Lazaros G, Vlachopoulos C, Lazarou E, Tsioufis K. New Approaches to Management of Pericardial Effusions. Curr Cardiol Rep. 2021;23(8).
11. Willner DA, Goyal A, Grigorova Y, Kiel J. Pericardial effusion. Treasure Island: StatPearls Publishing; 2022. Available from: https://pubmed.ncbi.nlm.nih.gov/28613741/
12. Petrofsky M. Management of malignant pericardial effusion. J Adv Pract Oncol. 2014;5(4):281-289.
13. El Haddad D, Iliescu C, Yusuf SW, William WNJ, Khair TH, Song J, et al. Outcomes of cancer patients undergoing percutaneous pericardiocentesis for pericardial effusion. J Am Coll Cardiol. 2015;66(10):1119-1128.
14. Soman B, Vijayaraghavan G. Pericardial involvement in neoplastic disease: Prevalence, clinical picture, diagnosis and treatment. E-Journal Cardiol Pract Cardiol Pract. 2017;15.