Unusual association of diseases/symptoms

A smoker with cyanosis and hypotension

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Summary

Involvement of the pericardium and pericardial effusion at postmortem is common in advanced malignant disease. However, cardiac tamponade presenting as the first manifestation of malignancy is uncommon. We present the case of a patient who presented with malignant pericardial effusion who had advanced lung cancer with metastasis and paraneoplastic features

BACKGROUND

Cardiac tamponade as the initial manifestation of a malignancy is rare; however, pericardial effusion is a common postmortem finding in patients with advanced malignancy.¹ It can occur with carcinomas of the lung, breast, leukaemias and lymphomas. Malignant pericardial effusions are resistant to treatment and, hence, have a poor prognosis. The mean survival in malignant pericardial effusion is reported to be between 7 days and 12 months after diagnosis.² We report the case of a 66-year-old woman who presented with acute cardiac tamponade as the first manifestation of a stage 4 non-small cell carcinoma of her lung.

CASE PRESENTATION

A 66-year-old oncology receptionist presented to the emergency department with a 1-week history of vomiting, diarrhoea and ankle oedema. Her medical history was uneventful except for childhood asthma and heavy smoking, which she had stopped a couple of months ago. On examination in the emergency department she was conscious and alert but was diaphoretic and peripherally cyanosed to her wrists and ankles with cold clammy skin. The jugular venous pulse was elevated up to her jaw; chest examination revealed bibasal crepitations. Her peripheral pulses were not palpable and her systolic blood pressure was 70 mm Hg. Her oxygen saturation was 88% on 15 litres

Figure 1 Chest x-ray showing an enlarged cardiac silhouette and a nodular opacity in the right upper zone.

Figure 2 Trans-thoracic echo image of a large pericardial effusion on the apical four chamber view.

O₂. She had preserved mentation and answered questions appropriately. She had tender hepatomegaly, was oligo-anuric and had pitting oedema in both her legs.

INVESTIGATIONS

Her ECG had low voltage complexes without electrical alternans and chest radiograph revealed a globular heart (figure 1). Blood gas results revealed severe metabolic acidosis with a lactate of 8.8. She had elevated liver enzymes (alanine transaminase 93 U/l, aspartate aminotransferase 201 U/l, bilirubin 35 µmol/l) and renal dysfunction (urea 37 mmol/l, creatinine 307 µmol/l, estimated glomerular filtration rate 13 ml/min) on biochemistry with a mild coagulopathy (international normalised ratio 1.5 PT 20s) and D dimer levels of 20 mg/l. An echocardiogram (figure 2) revealed a large pericardial effusion (5 cm) with evidence of diastolic collapse of the right atrium, left atrium and right ventricle indicating cardiac tamponade.

TREATMENT

A therapeutic pericardiocentesis was performed and 1500 ml of haemoserous fluid was drained. However, she remained hypotensive with systolic blood pressure of 80 mm Hg on 5 mcg/kg/min of dopamine. A transthoracic echocardiogram was performed, after a pericardial drain was inserted, which showed vigorous left-ventricular systolic function and moderate-to-severe right ventricular systolic function. A provisional diagnosis of resolving cardiogenic shock was made and her blood pressure was augmented with an intra-aortic balloon pump (IABP) and she was moved to the intensive care unit (ICU).

OUTCOME AND FOLLOW-UP

She became symptomatically better with improvement in her lactate levels but was still shocked on her second day in

the ICU. She was cyanosed in her toes and fingertips. A doppler scan of her peripheral veins was done to rule out deep vein thromboses; the scan revealed extensive clots in her superficial and deep femoral veins bilaterally. CT pulmonary angiogram showed subsegmental pulmonary emboli; lung nodules suggestive of malignancy, hilar and mediastinal lymph node enlargement (figure 3) with an adrenal metastasis.

A heparin infusion was started. The patient improved haemodynamically on day 3 and her IABP was removed. The pericardial drain was removed after the effusion was fully drained. Over the next 2 days she became confused. The pericardial fluid cytology showed malignant cells suggestive of non-small cell carcinoma. Her carcinoma was staged T4 N3 M1 and an oncology consultant discussed the poor prognosis with the patient's family and the treatment options possible. The family agreed that she would wish for palliative measures and she was admitted to the palliative care ward where she died 2 days later.

DISCUSSION

The pericardium is the most frequent site of metastatic involvement of the heart in primary lung cancer.³ In one study, pericardial lesions were either the immediate or contributory cause of death in 86% of patients with symptomatic pericardial effusion.⁴ Cardiac tamponade has previously been considered to be rare as a presenting feature of malignancy, but epidemiological evidence regarding the true incidence of this mode of presentation is lacking. Important differential diagnosis of patients presenting with cardiac failure and hypotension of unknown aetiology should include pulmonary embolism, right ventricular infarction, constrictive pericarditis and malignant cardiac tamponade secondary to tumours, uraemia, autoimmune disorders or tuberculosis. A MEDLINE search done by Balgith *et al* revealed only 17 cases reported in the English

Figure 3 CT scan image with arrows pointing to the enlarged hilar nodes and peripheral nodules.

medical literature where cardiac tamponade was the initial presenting symptom of lung carcinoma.¹ Yalcinkaya *et al* reported the 19th case of lung carcinoma presenting as malignant tamponade in 2004.²

Malignancies spread to the myocardium or the pericardium by three important routes: (i) haematogenous, (ii) lymphatic and (iii) local extension. The latter two mechanisms are rare and are seen in carcinomas of the breast and the lung. Lung tumours spread to mediastinal lymph nodes from where retrograde spread occurs to the epicardial lymphatic plexus. Slow accumulation of large volumes of fluid may then occur. Among the histological variants of lung carcinoma, squamous carcinoma of the lung is typically endobronchial and may present as cardiac tamponade as it presents earlier with symptoms of haemoptysis, cough or bronchial obstruction. This is in contrast to the adenocarcinomas of the lung, which are more usually situated distally in the pulmonary parenchyma and have a higher chance of obstructing the lymphatics.⁵

The most common clinical features of malignant cardiac tamponade are non-specific. Malignant tamponade usually presents clinically with features of congestive cardiac failure as it develops as an acute event superimposed on a background of a large, slowly developing, pericardial effusion. Although abnormal ECGs were reported in over 90%, the changes were all non-specific apart from electrical altern-

ans, which occurred in only 5%. Right ventricular diastolic collapse on echocardiography or cardiac catheterisation is evident prior to the development of hypotension or pulsus paradoxus. Mean arterial pressure is maintained in the early stages of tamponade. The recommended approach in such patients includes an immediate transthoracic echocardiogram followed by therapeutic pericardiocentesis.¹ The fluid should be sent for diagnostic cytology. A haemorrhagic pericardial fluid in the absence of trauma or anticoagulants is associated with pericardial metastasis. In one series, a combination of cytology and measurement of carcinoembryonic antigen in the fluid was 100% sensitive and specific for malignancy.⁶

The approach to treatment has to be weighed against the patient's clinical condition and the underlying malignancy. In particular, the presence of pericardial effusion in patients with non-small cell lung cancer indicates a grave prognosis. Therefore, treatment with an initial pericardiocentesis followed by indwelling pericardial catheter is often recommended since surgery, radiation treatment and systemic chemotherapy are not always helpful in controlling the pericardial effusion secondary to lung cancer.⁷

There are several unusual features with this case. Most of the case reports of lung carcinoma presenting as malignant cardiac tamponade in the literature have been in male patients. It is most commonly caused by breast carcinomas

in women. None of the case reports that presented as cardiac tamponade were complicated by hypercoagulability and pulmonary embolism contributing to further right ventricular dysfunction. Also the mean survival for patients with cardiac tamponade secondary to carcinoma of the lung or breast was 4 months; our patient survived only 4 days after the diagnosis. We believe that the pericardial effusion was reasonably longstanding and the pre-terminal decompensation was caused by the pulmonary embolus leading to additional right heart strain and her terminal decline.

Learning points

- ▶ Cardiac tamponade is a rare presentation of malignancy though pericardial effusion is a common autopsy finding in advanced malignancy.
- ▶ The pericardium is the most common site of metastasis of heart in primary lung cancer. Tumours of the breast, leukaemia and lymphoma are also implicated.
- ▶ A high degree of suspicion is vital in patients presenting with cardiac failure and hypotension of unknown aetiology.
- ▶ An echocardiogram followed by pericardiocentesis is essential for management. A combination of diagnostic cytology and carcinoembryonic antigen is highly sensitive.

Competing interests None.

Patient consent Obtained.

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