Multiple cardiac metastases of pulmonary pleomorphic carcinoma

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DESCRIPTION

A man in his 80s was referred to our hospital for anorexia and weight loss (3 kg). He had a history of hypertension, dyslipidaemia, hyperuricaemia and benign prostatic hyperplasia. The patient was a smoker (50 pack-year smoking history). He denied any respiratory or cardiac symptoms such as cough, dyspnea, dizziness or presyncope. He had lower limb oedema; however, it did not bother him as his daily activities were not disrupted. He had no infectious symptom, such as fever.

On admission, he was conscious with a body temperature of 36.8°C, blood pressure of 144/91 mm Hg, pulse rate of 66 beats/min and oxygen saturation (room air) of 98%. He was 155 cm tall and weighed 62.5 kg. Physical examination revealed slight bilateral pitting lower limb oedema. Jugular venous distention was not obvious. There were no cardiac murmurs, wheezes or crackles on chest auscultation. Heart failure, an endocrine disease or a malignancy was suspected. Electrocardiography (ECG) revealed a first-degree atrioventricular block, low voltage in the limb leads, and ST elevation in V3–V5 in the precordial leads (figure 1). Chest radiography revealed an enlarged cardiac silhouette and a mass in the left upper lobe of the lung. Blood examination revealed: haemoglobin 82 g/L; white cell count 7800 x 10^9/L ; platelet 93×10^9/L; urea nitrogen 30 mg/dL; creatinine 1.13 mg/dL; aspartate aminotransferase 18 U/L; alanine aminotransferase 10 U/L; lactate dehydrogenase 408 U/L; gamma glutamyl transferase 23 U/L; troponin T 0.055 ng/mL; N-terminal prohormone of brain natriuretic peptide 16217 pg/mL. Contrast-enhanced chest CT demonstrated a mass (6 cm in length) in the left lung upper lobe, irregular thickening of the myocardial wall with heterogeneous contrast effect and pericardial effusion. Masses were also observed in the pancreatic tail and bilateral adrenal glands, but without massive ascites (figure 2). Transthoracic echocardiography revealed a left ventricular ejection fraction of 67% and diastolic dysfunction caused by abnormal myocardial masses with narrowing of the endocardial cavity and pericardial effusion (figure 3). We suspected multiorgan metastases of primary lung cancer, including heart metastases. However, pulmonary tumour markers were negative; carcinoembryonic antigen, 3.6 ng/mL; squamous cell carcinoma antigen, 0.4 ng/mL; and progastrin releasing peptide, 50.4 pg/mL. After admission, there was a progressive onset of dyspnoea. Informed of the high probability of primary lung cancer with multiple metastases, the patient and his family did not consent to further examination. Consequently, a definitive diagnosis could not be established. The heart failure rapidly worsened, and his cardiopulmonary condition deteriorated daily. He received palliative treatment and died of heart failure on day 12 of admission. Pathological autopsy confirmed the diagnosis of primary lung pleomorphic carcinoma with multiple metastases to the myocardium, pericardium (figure 4), liver, pancreas, bilateral adrenal glands and retroperitoneal lymph nodes.

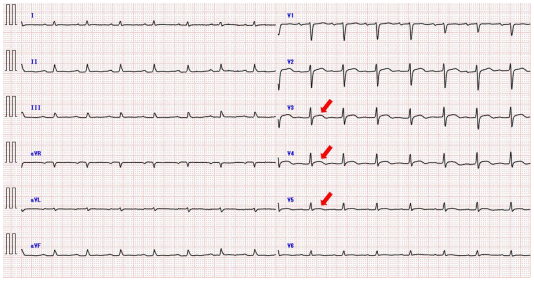

Figure 1 Electrocardiography showing a first-degree atrioventricular block, low voltage in limb leads, and ST elevation in V3—V5 (arrows) in precordial leads.

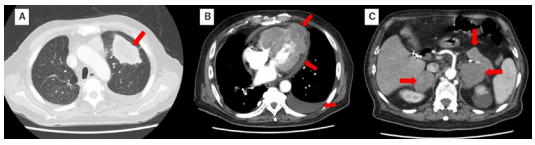

Figure 2 (A) Chest CT showing emphysematous changes and a mass (6 cm in length) in the left upper lobe of the lung (arrow). (B) Irregular myocardial wall thickening with heterogeneous contrast effect, pericardial effusion and left sided pleural effusion are shown (arrows). (C) Abdominal CT showing masses in the pancreatic tail and bilateral adrenal glands (arrows).

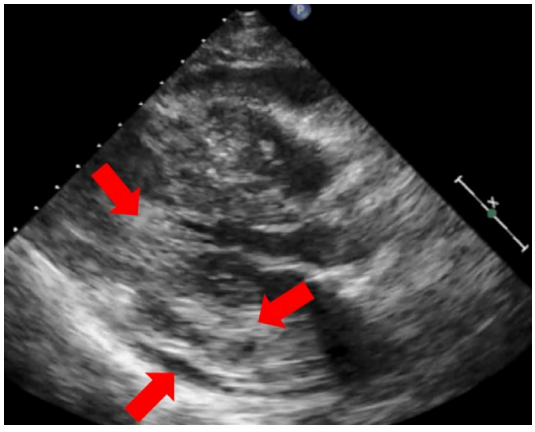

Figure 3 Parasternal long axis view by transthoracic echocardiography showing abnormal myocardial masses with narrowing of the endocardial cavity and pericardial effusion (arrows).

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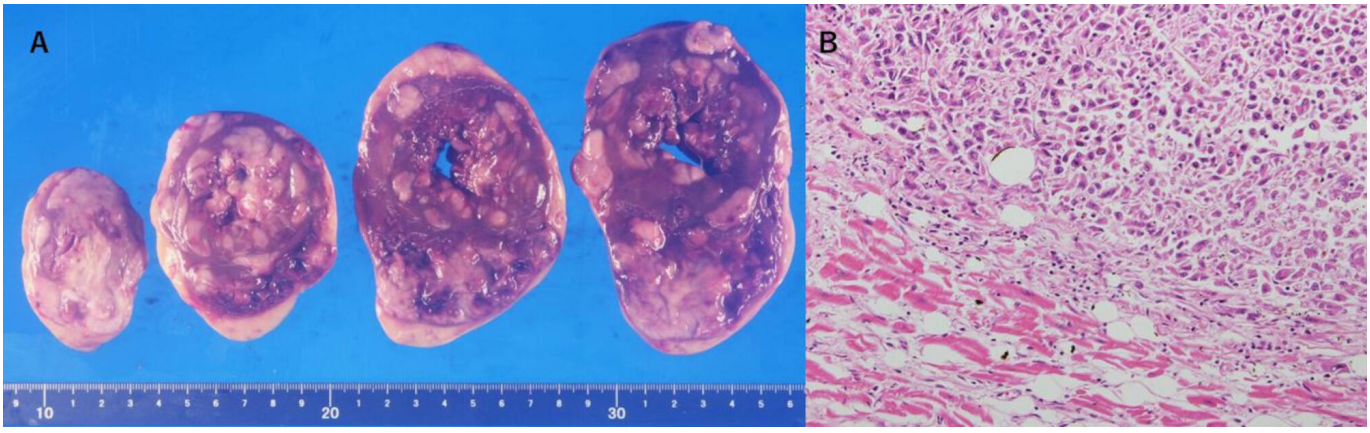

Figure 4 (A) The pathological autopsy confirmed multiple myocardial and pericardial metastases. (B) Microscopic findings of the lung tumour showing pleomorphic carcinoma with spindle cells and adenocarcinoma cells. H&E stain, ×100 magnification.

Primary cardiac tumours are reported 0.01%–0.1% of autopsy cases, while metastatic cardiac tumours are observed in 0.7%–3.5% of cases.[1] Cardiac metastases are predominantly caused by lung cancer (36%–39%).[1] Other tumours known to frequently metastasise to the heart include pleural mesothelioma and malignant melanoma.[2] The most common site of metastasis is the pericardium. Myocardial metastasis is rare in all lung cancer histotypes.[2] Haematogenous spread leads to myocardial metastasis, while lymphatic spread results in pericardial metastasis.[1] The presence of pericardial metastases and numerous myocardial metastases suggested that both haematogenous and lymphatic metastases had occurred. Indicative findings of myocardial involvement include excessive heart sounds, friction rub, arrhythmia and ST-T changes (especially focal ST elevation in the absence of ischaemic symptoms) on ECG.[1] Among all lung cancer histotypes, pleomorphic carcinoma accounts for 0.1%–0.4% and has a poor prognosis due to its high invasive potential.[3] However, the frequency of cardiac metastasis in pulmonary pleomorphic carcinoma remains unclear. In this case, there were no abnormal findings on auscultation. ECG showed low voltage, slight ST elevation and electrical alternans. Although it was initially challenging to suspect myocardial metastasis, these ECG abnormalities played a crucial role in advancing the diagnostic process using echocardiography and chest CT. Cardiac or pericardial metastases should be considered in patients with carcinoma who present with new cardiac symptoms. This is a unique case of a rare histological type of highly invasive lung cancer with multiple cardiac metastases.

Patient's perspective

The patient's wife said, 'My husband had suddenly lost his appetite and weight two months before we went to see the doctor. It was too much trouble for him to go to the hospital. I was surprised that someone who had been so healthy suddenly developed such a serious illness. I hope that my husband's experience will be useful in advances in medicine.'

Learning points

- Cardiac metastasis of lung cancer is not uncommon; cardiac or pericardial metastases should be considered in patients with carcinoma who present with new cardiac symptoms.
- Electrocardiography abnormalities are very instrumental in advancing the diagnostic process using echocardiography and chest CT.
- Pleomorphic carcinoma is a rare histological type of lung cancer, with an unclear optimal treatment and the ability to present in a rapidly deteriorating advanced stage with multiple metastases.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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