Electrocardiographic changes in right ventricular metastatic cardiac tumor mimicking acute ST elevation myocardial infarction: A case of misdiagnosis

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ABSTRACT

Introduction: In patients with ST elevation myocardial infarction (STEMI), minimizing the reperfusion time is the goal of therapy worldwide. However, the differential diagnosis is critical and when a patient is encountered with chest pain and ST elevation, STEMI should not be the only diagnosis considered. By detailed history and focused physical examination, it is possible to avoid a mistaken diagnosis.

Case presentation: In this report, we present a case of a male patient with tongue cancer and accompanying myocardial metastasis that causes electrocardiographic changes, who was initially misdiagnosed with acute myocardial infarction.

Conclusion: Here, we reported a case of metastatic cancer in the heart which was initially diagnosed as acute myocardial infarction. Echocardiography, computed tomography and magnetic resonance imaging of the heart were used accordingly to confirm the myocardial metastasis.

1. Introduction

Atherosclerosis leading to coronary occlusion is the most common reason for the development of ST elevation myocardial infarction (STEMI). Early coronary reperfusion is necessary in STEMI, because the beneficial effects of therapy with reperfusion are greatest when performed quickly. A variety of cardiac and noncardiac conditions have been known to mimic the electrocardiography (ECG) changes similar to those seen in STEMI. Noncardiac conditions mimicking STEMI are central nervous system disease, perforated duodenal ulcer, esophageal rupture, acute pancreatitis, pneumothorax, pneumomediastinum, hyperkalemia, hypocalcemia, hypercalcemia, pheochromocytoma, acute cor pulmonale, and normal variants. Cardiac conditions with ECG changes mimicking STEMI were described in early repolarization, pericarditis, myocarditis, hypertrophic cardiomyopathy, Brugada syndrome, Takotsubo cardiomyopathy (broken-heart syndrome), and also in patients with left ventricular hypertrophy, left bundle-branch block. However, the reported mimicking STEMI in association with cardiac tumors are in a few cases. Primary cardiac tumors are very rare compared to metastatic cardiac tumors. Nevertheless, the antemortem diagnosis of cardiac metastases is rarely made, because most of it, they are clinically silent.

In this case report, a patient under treatment of tongue cancer presented with ECG changes mimicking acute anterior STEMI was described.

2. Case report

A 59-year-old man patient was brought to emergency service because of having acute onset of chest pain. He had a tongue cancer diagnosed two years ago. Complete resection of the tumor was achieved, and radiotherapy is applied following the operation. There’s been no symptoms for about three years. He had no history of major systemic disease such as diabetes mellitus, hypertension or cardiovascular diseases. On examination, he was in no distress; the blood pressure was 130/75 mmHg, the pulse rate 75 beats/min,
respiratory rate 18 breaths/min and body temperature of 36.7 °C, and oxygen saturation of 94%. The heart sounds were normal, and chest examination did not reveal any abnormalities. Repeat surface 12-lead ECG demonstrated sinus rhythm with evidence of ST-segment elevation in all over the anterior leads (V1 to V6) which were compatible with acute anterior wall myocardial infarction (Fig. 1). The patient underwent immediate coronary angiography, which revealed non-critical stenosis coronary artery was detected. Chest X-ray showed clear pulmonary examination with a mildly-dilated heart. Standard transthoracic echocardiography (TTE) showed a giant tumor involving free wall of the right ventricular (RV) and filling the cavity. Additionally, echocardiography also revealed RV wall hypokinesia involving the mid to apex and indicating the tumoral invasion (Fig. 2-A). The short-axis view of TTE showed a D-shaped left ventricle. Computed tomography with contrast (CT) and magnetic resonance imaging (MRI) were performed to get detailed information about the mass. Finally, a tumor in the RV was confirmed (Fig. 2-B). The ST elevations on the ECG remained static and serial cardiac troponin measurements were repeatedly negative. We suspected the tumor to be a metastasis secondary to primary tongue cancer based on its echocardiographical features and the patient’s past history. Referral to the oncology department was ordered. During the follow-up, sepsis was developed and the patient died two months after metastatic cardiac cancer was detected.

3. Discussion

We reported a case of tongue cancer with myocardial involvement, with ECG changes mimicking acute myocardial infarction. Before the echocardiography was in use, only sporadic case reports diagnosed in the right-sided cardiac tumors by angiography and received surgical excision. Echocardiography is the mainstay of diagnosis nowadays. However, the echocardiography diagnosis of a tumor within the heart is not always straightforward. The ST elevations on the ECG remained static and serial cardiac troponin measurements were repeatedly negative. We suspected the tumor to be a metastasis secondary to primary tongue cancer based on its echocardiographical features and the patient’s past history. Referral to the oncology department was ordered. During the follow-up, sepsis was developed and the patient died two months after metastatic cardiac cancer was detected.

Fig. 1. ECG demonstrated normal sinus rhythm, permanent marked S-T segment elevation, biphasic inversion of T-waves in leads V1-V6 and the absence of a Q wave.
et al. reported ECG showed characteristic abnormality (ST segment elevation and T inversion in leads V1-V6) with metastatic cardiac tumor from urothelial carcinoma. Detailed history, physical examination, basic laboratory tests, or imaging studies can generally exclude acute myocardial infarction in such cases. Unnecessary invasive procedures can thus be avoided.

4. Conclusion

Here, we reported a case of metastatic cancer in the heart which was initially diagnosed as acute myocardial infarction. Metastatic myocardial infiltration due to the tumor should be suspected when ECG changes without typical angina are found in a patient with malignancy and negative cardiac enzymes in the blood.

Declaration interest

The authors declare that they have no competing interest.

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