CASE REPORT

Solitary cardiac metastasis from primary oral squamous cell carcinoma presenting as ST-elevation MI

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SUMMARY

Cardiac metastases from oral squamous cell carcinoma (SCC) are rare, especially in the absence of systemic metastasis. We describe a case of a patient presenting with chest pain and ECG abnormalities concerning for ST-elevation myocardial infarction that eventually was found to have an incidental right ventricular mass on chest CT angiogram. Ultimately, she had an intracardiac echocardiography-assisted biopsy diagnosis of isolated cardiac metastasis from primary oral SCC. The extent of the disease precluded any surgical intervention, and the patient subsequently transitioned to hospice care. Most cardiac metastases remain clinically silent until widespread systemic disease leads to death. Thus, cardiac metastasis should be considered in a patient with SCC who develops new cardiovascular symptoms or conduction abnormalities.

BACKGROUND

This is a rare case of an isolated cardiac metastasis from primary squamous cell carcinoma (SCC) that was diagnosed antemortum. Isolated cardiac metastasis from oral SCC is rare with only less than 10 previously reported cases.^{1–8} Most cardiac metastases remain clinically silent until widespread systemic disease leads to death. An antemortum diagnosis of cardiac metastases of head and neck tumours has been reported in only a few cases.^{3 9 10} This case serves as a reminder that cardiac metastasis should be considered in a patient with a known extracardiac malignancy that develops new cardiovascular symptoms or conduction abnormalities. Furthermore, this case highlights new non-invasive means to facilitate the diagnosis of intracardiac tumours. We hope our findings will facilitate early detection and appropriate treatment of tumours.

CASE PRESENTATION

The patient was a middle-aged woman with SCC of the lower oral cavity and tongue who had surgical resection and adjuvant chemoradiotherapy 6 months prior to presentation. She had been told that her cancer was in remission, and her port had been recently removed. Prior to admission, she had non-specific upper respiratory symptoms that had progressed over several weeks. On the day of presentation, she had acute worsening of chest pain

and dyspnoea with exertion. She had no previously reported cardiac history.

INVESTIGATIONS

In the emergency department, her troponin was normal but the ECG showed a right bundle branch block pattern and ST-elevations in leads V3–V6 which were concerning for an acute ST-elevation myocardial infarction ([figure 1](#)). Given her ongoing symptoms of chest pain, urgent coronary angiography was performed which revealed only non-obstructive coronary artery disease. A chest CT angiogram ruled out pulmonary embolism (PE), but revealed a large filling defect in the right ventricle (RV). Cardiac MRI (CMR) was performed which demonstrated a large RV mass originating in the myocardial wall, infiltrating and obliterating two-thirds of the ventricular cavity without outflow obstruction ([figure 2](#)). The patient underwent intracardiac echocardiography (ICE)-guided endomyocardial biopsy ([figure 3](#)) which identified SCC ([figure 4](#)). CT of the head, neck, abdomen and pelvis did not reveal any other widespread metastatic disease.

OUTCOME AND FOLLOW-UP

Unfortunately, due to extensive involvement of the RV free wall, the tumour was not amenable to surgical resection. The patient was discharged with scheduled palliative chemotherapy, but approximately 2 weeks later, she presented again with progressive lower extremity swelling and dyspnoea at rest. A chest CT angiogram revealed a new PE of the right lower lobar artery, interval development of at least one new right lower lobe pulmonary nodule, extension of the RV mass beyond the pulmonic valve and a new pericardial effusion with diffuse pericardial thickening, likely representing pericardial disease extension/metastases. After initial stabilisation, the patient and family opted for home hospice care, and she died within a few weeks at home thereafter.

DISCUSSION

Primary cardiac tumours are extremely rare with an incidence of less than 0.1% on autopsy studies.^{11 12} In contrast, metastatic involvement of the heart is more common with an incidence ranging from 1% to 8%.^{12 13} Breast, lung cancer, leukaemia and

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Figure 1 Initial ECG showing conduction delay in a right bundle branch block pattern, as well as, ST elevations in leads V3-V6.

melanoma are primary malignancies that commonly metastasise to the heart.^{1 5 14} The mechanisms of cardiac metastases of tumours include haematogenous spread, direct invasion, lymphatic or tumour growth into the vena cava extending into the right atrium.^{15 16}

Oral SCC has a distant metastasis rate that is variable ranging from 5% to 21%, usually diagnosed postmortem.¹⁷⁻²¹ The lung is the most common site for metastasis, followed by liver and bone.²² Isolated cardiac metastasis from oral SCC is rare with only less than 10 previously reported cases.¹⁻⁸ Most cardiac metastases remain clinically silent until widespread systemic disease leads to death. Only in a few reported cases has the diagnosis of cardiac metastases of head and neck tumours been made antemortem.^{3 9 10}

Generally, there are no significant clinical findings with cardiac metastasis unless more extensive systemic disease is present.²³ Most cardiac metastases remain clinically silent until extensive systemic disease leads to death.²⁴ When present, usually in advanced disease, symptoms include congestive heart failure, angina and conduction abnormalities.²³ Non-specific ST-wave

Figure 2 Cardiac MRI revealing a large right ventricular mass (yellow asterisk) originating in the myocardial wall, infiltrating and obliterating two-thirds of the ventricular cavity without outflow obstruction.

Figure 3 Intracardiac echocardiogram-guided endomyocardial biopsy of the right ventricular mass with the bioptome forceps (yellow arrow).

and T-wave changes can be seen, especially with myocardial involvement,²⁵ as seen in our case. However, some tumours with extensive spread to the heart produce no symptoms and may be incidentally found.²⁶⁻²⁸

The diagnosis of cardiac metastases is generally made incidentally,²⁶ commonly by echocardiogram or CT scan done for other indications, but a CMR is generally preferred once a cardiac tumour is suspected to obtain additional details on tumour type and extent of cardiac involvement.^{29 30} Ultimately, a tissue sample is required for definitive histological diagnosis. Fluoroscopy is commonly used to guide transvenous endomyocardial biopsies. However, as demonstrated in our case, newer imaging modalities such as ICE are being employed to guide biopsies. ICE provides clear near-field images of the tumour and surrounding structures for precise targeting for adequate tissue sampling, and real-time monitoring for complications during the procedure.³¹

Figure 4 Histological slide of the right ventricular endomyocardial mass biopsy consistent with squamous cell carcinoma.

Treatment of cardiac metastasis is generally palliative. Rarely surgical resection of cardiac metastases is pursued for symptom relief or to prolong life. However, the prognosis after surgery is unclear.^{32–34} Given the lack of evidence for any treatment, there remains uncertainties in the role of radiotherapy, surgery and/or chemotherapy.

Learning points

- Solitary cardiac metastasis from primary oral squamous cell carcinoma is rare.
- Cardiac metastases should be considered in a patient with known extracardiac malignancy, such as oral squamous cell carcinoma, presenting with new cardiovascular signs (ie, conduction abnormalities) and symptoms.
- Most patients are not surgical candidates, and thus palliative measures are pursued. Given the lack of evidence for any treatment, there remains uncertainties in the role of radiotherapy, surgery and/or chemotherapy.

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