

Cardiac metastasis of tongue squamous cell carcinoma complicated by pulmonary embolism

A case report

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Abstract

Rationale: Cardiac metastasis is known as a rare complication of head and neck malignancy.

Patient concerns: We present a 58-year-old woman patient with a history of tongue carcinoma who was admitted in emergency department for sudden chest pain. Imaging work-up by computed tomography (CT) and positron emission tomography-computed tomography (PET-CT) diagnosed a cardiac metastasis complicated by intraventricular thrombus and pulmonary embolism.

Diagnosis: Cardiac metastasis from tongue carcinoma complicated by pulmonary embolism.

Interventions: After undergoing 2 cycles of palliative chemotherapy, the patient declined any further treatment.

Outcomes: Patient died 3 months after the diagnosis of cardiac metastasis.

Lessons: Cardiac metastasis should be considered as a differential diagnosis in patients with a history of head and neck malignancy who present non-specific cardiac symptoms.

Abbreviations: ¹⁸F-FDG = Fluorodeoxyglucose, CT = computed tomography, ECG = electrocardiogram, IVS = interventricular septum, PE = pulmonary embolism, PET = Positron emission tomography, SUV = standardized uptake value.

Keywords: cardiac metastasis, intraventricular thrombus, pulmonary embolism

1. Introduction

Head and neck carcinoma is the 6th most common tumor, globally. Regional and distant metastases play a pivot role in prognostic features of this disease. Although it is known to usually metastasize to the cervical lymph nodes, distant metastasis is not infrequently observed. Myocardial metastasis is a rare site of metastasis from head and neck malignancies.^[1] However, myocardial metastasis that originated from tongue carcinoma is much less common when compared with other malignancies (1% in head and neck cancers compared with 2–20% in others).^[2–4]

It is fundamental to consider the cardiac metastasis as a differential diagnosis when cardiac symptoms are present in a patient with a history of head and neck malignancy.

2. Case presentation

“Ethical approval was waived by the institutional review board of our hospital.”

Editor: Shizhang Ling.

The authors report no conflicts of interest.

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Medicine (2017) 96:28(e7462)

Received: 13 October 2016 / Received in final form: 13 June 2017 / Accepted: 14 June 2017

<http://dx.doi.org/10.1097/MD.0000000000007462>

A 58-year-old woman with a history of a previous heavy smoking was diagnosed in 2005 for a tongue carcinoma classified as pT2pN2cM0. She benefited from a right hemiglossectomy and her treatment was completed by adjuvant radiotherapy. She suffered from multiple episodes of recurrence treated every time by surgery and radiotherapy (60 Gy on the tumor site, 48 Gy on the adjacent lymph nodes) until 2015. No recurrence was reported since then.

On July 2016, she was admitted to the emergency department for acute chest pain suspected for pulmonary embolism (PE). A thoracic computed tomography (CT) was undertaken which demonstrated a left lobar PE (Fig. 1). Additionally, a round filling defect was seen in the right ventricle, abutting the interventricular septum (IVS), along with a localized thickening of the apex of the heart (Fig. 2). To better characterize the latter findings, a delayed acquisition was immediately performed which revealed an apical enhancing mass with infiltration of the IVS in contact with the intracavitary thrombus (Fig. 3). Electrocardiogram (ECG) showed a slight ST elevation in V3 and V4. Troponin T was increased to 66 ng/L (>10 ng/L). This value remained stable at further serial controls. The transthoracic echography confirmed the thoracic CT findings and demonstrated an apico-septal hypokinesia.

A complementary positron emission tomography-computed tomography (PET-CT) displayed the cardiac metastasis (Fig. 4) along with hepatic, bone, and muscular secondary lesions. The patient underwent palliative chemotherapy by cetuximab 400 mg/m², carboplatin area under the curve 350 mg/m², and fluorouracil (5-FU) 1000 mg/m². After completion of 2 cycles of chemotherapy (21 days each), the patient declined any further treatment or investigation and asked to be discharged home, where she died 10 days later.

3. Discussion

Rarely reported in living patients, cardiac metastasis is more frequently reported in autopsies, with a prevalence between 1.5%

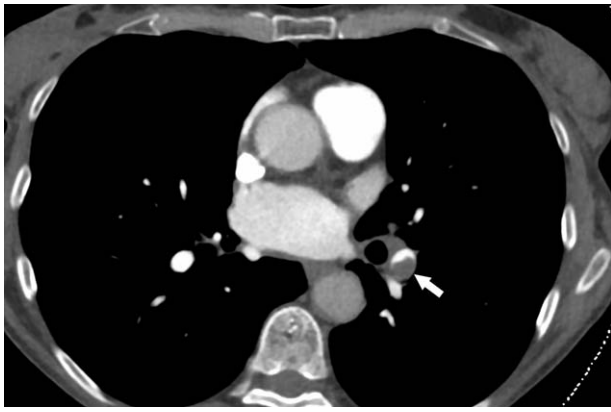


Figure 1. Axial contrast-enhanced CT (arterial phase) at the level of the pulmonary hili shows a filling defect within the left lower pulmonary artery (arrow), consistent with left lobar pulmonary embolism. CT = computed tomography.

and 31%.^[5,6] This difference seems to be due to the silent nature of this condition in the majority of cases. It can be the cause of non-specific clinical manifestations as dyspnea, palpitation, or chest pain. The progression of disease may lead to heart failure, valvular dysfunction, dysrhythmia, conduction disturbance, and even sudden death.^[7,8] It is currently accepted that cardiac metastasis can result from 4 mechanisms: direct extension, blood stream, lymphatic pathway, and intracavitary via inferior vena cava or pulmonary veins.^[2]

Cardiac metastasis can be further complicated by tamponade, heart failure, and cardioembolic events that can affect the pulmonary, cerebral, and coronary arteries. To the best of our knowledge, PE due to cardiac metastasis from tongue carcinoma was not priorly reported. This case is the first record of this manifestation. PE was caused by the intraventricular thrombus, which was assumed to result from the apico-septal hypokinesia provoked by cardiac metastasis.

The ECG findings of cardiac metastasis, when present, are non-specific and could have a wide spectrum of manifestations: tachycardia, atrial fibrillation, right bundle branch block, low voltage QRS, ST elevation, and/or pathological Q waves.^[6,9] The

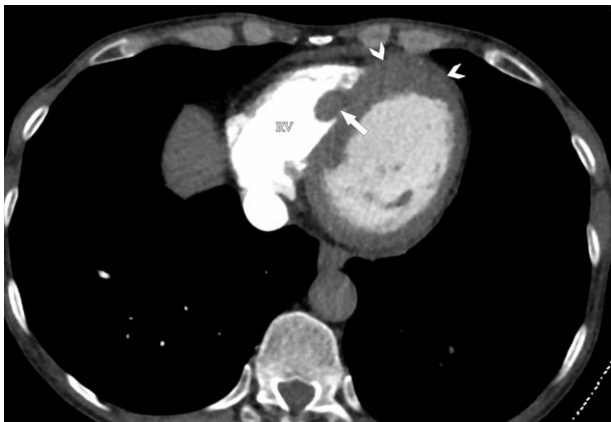


Figure 2. Axial contrast-enhanced CT (arterial phase) at the level of the ventricular chambers shows a hypodense filling defect (arrow), within the right ventricle (RV), consistent with an intracavitary thrombus, along with a localized thickening (arrowheads) of the apical myocardium. CT = computed tomography.

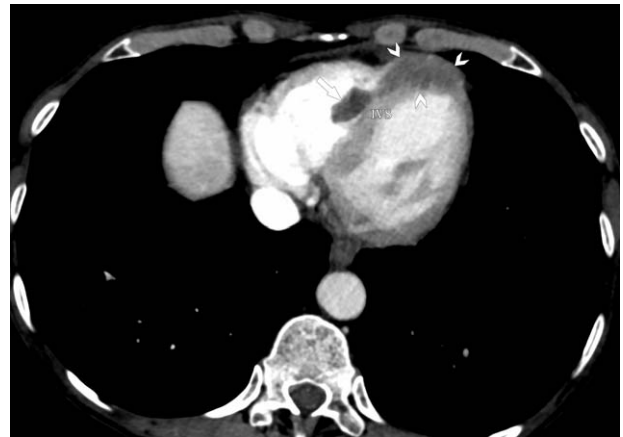


Figure 3. Axial contrast-enhanced CT (delayed phase) at the same level as Fig. 2 shows the low-attenuating myocardial mass (arrowheads), in contact with the intraventricular thrombus (arrow), infiltrating the apical myocardium and the interventricular septum (IVS), consistent with a cardiac metastasis. CT = computed tomography.

admitting ECG from the presented case showed a slight ST-elevation which remained unchanged during subsequent control (at 3 and 6 hours). Unchanged slight ST-elevation argued unlikely in favor of acute coronary syndrome. Troponin (T or I) are cardiac proteins that, when elevated, are highly specific for myocardial infarction.^[10] However, this increase may only be meaningful in conjunction with a typical clinical presentation of acute ischemia and ECG findings.^[11] In the present case, the lack of typical chest pain and ECG modifications argued against the diagnosis of myocardial infarction. An ST-elevation can also be found in PE, but typically involves leads I and III, which was not the case in our patient. This elevation was eventually attributed to the cardiac tumoral infiltration, which has been priorly reported in the literature, as well as the association with high troponin level.^[12]

Imaging studies have a pivotal role in the depiction of cardiac lesions. In the presented case, CT was the initial imaging modality to be performed, because of the clinical suspicion of PE. In spite of the fact that CT was obtained in arterial phase, both the cardiac tumor and the intraventricular clot were depicted by this

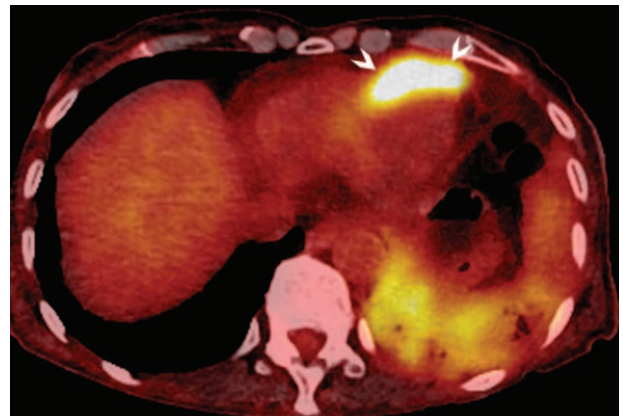


Figure 4. Axial image of a Fluorodeoxyglucose-positron emission tomography-computed tomography (¹⁸F-FDG-PET-CT) shows a hypermetabolic myocardial mass (arrowheads), with a maximum standardized uptake value [SUV_{max}] of 15.

technique. Cardiac ultrasound is a good complement to CT to assess the cardiac function^[13]; in the current case, it was useful to identify myocardial hypokinesia as the probable cause for the blood clot formation and, thus, for PE.

In our patient, PET-CT was important to demonstrate the presence of multiple similar lesions in other locations, which was useful for the decision to adopt a palliative therapy.

Surgical resection of cardiac metastasis is controversial, presents limited benefits for prognosis and is usually reserved for isolated lesions that can be entirely resected; it could, therefore, not be considered in our patient. The palliative treatment which was undertaken in the current case, consisted of chemotherapy, using 3 cytotoxic drugs, targeted on tongue metastases. The choice of these 3 agents was a trade-off between their cytotoxic efficacy on the disseminated tumor and their potential cardiac adverse effect, which might have worsened the already impaired cardiac function of the patient. Indeed, while cetuximab is known as a chemotherapy agent with a low cardiotoxicity risk, 5-FU can cause arrhythmia and myocardial infarction which usually occurs during the first to third dose.^[14,15] Cardiac toxicity has also been reported in association with carboplatin treatment, as well as cardioembolic events, especially during the first 2 cycles of treatment.^[16]

In the absence of autopsy, it cannot be determined if the cause of the patient's death was related to the progression of her oncologic condition or to the cumulative effect of both her heart metastasis and the cardio-toxic side-effect of her treatment.

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