

Cardiac metastasis secondary to tongue cancer: An unusual mimicker of ST elevation myocardial infarction

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Abstract

We present a case of a 46-year-old female who presented with acute onset of worsening chest pain for 8 hours. Electrocardiogram (ECG) showed ST elevation in leads II, III and avF with diffuse T wave inversions. On admission, troponin-I was 0.124 ng/mL. Based on the symptoms, ECG changes and elevated troponin, there was a concern for inferior wall ST elevation myocardial infarction (STEMI). The patient was emergently taken for cardiac catheterization. Angiography showed mild non-obstructive coronary artery disease. Transthoracic echocardiogram (TTE) revealed thickened and hypokinetic inferoseptal, inferior and inferolateral walls. It also showed round echodensity in the left ventricular (LV) cavity arising from the thickened infero-lateral wall measuring 1.8x1.5 cm² suspicious for metastatic intramyocardial tumor. For further evaluation, she underwent cardiac magnetic resonance imaging (MRI). It revealed 3.9 x 2.3 x 3.4 cm mass with imaging findings suggestive of malignant tumor attached to and infiltrating LV inferior myocardium, epicardial fat and pericardium. Based on the angiographic findings, echo and cardiac MRI, her symptoms were attributed to intramyocardial mass causing infiltration or displacement of myocardium. Her chest pain was controlled with tramadol. Our report demonstrates a rare case of cardiac metastasis secondary to tongue cancer presenting as STEMI.

Introduction

In United States, head and neck cancer accounts for 3 percent of malignancies [1]. Head and neck cancer mainly remains localized to the primary site and regional lymph nodes. Cardiac metastasis is an uncommon site of metastasis for head and neck cancer. The reported incidence is 1% [2]. We present an interesting case of cardiac metastasis secondary to tongue cancer in a patient who presented with STEMI. It is prudent to consider cardiac metastasis in a patient with head and neck cancer presenting with non-specific cardiac symptoms.

Case Presentation

A 46-year-old female presented to our hospital emergency room with the chief complain of acute onset of chest pain for 8 hours. She described pain as pressure like, constant and was progressively worsening. The pain was present in substernal area and was non radiating. Patient denied fever, chills, shortness of breath, palpitations, nausea, vomiting or dizziness.

The patient had a past medical history significant for squamous cell carcinoma of left tongue diagnosed three years ago status post left hemi-glossectomy with reconstruction, adjuvant ra-

diation and chemotherapy. Two years after the initial diagnosis, on surveillance positron emission tomography (PET) scan she was noted to have hypermetabolic lesions in the left neck, right thigh, left scapula and posterior right rib concerning for metastatic disease. Also, she had left apical lung mass, biopsy proven as squamous cell carcinoma consistent with metastasis. She had past surgical history of cesarean section, right ovarian cyst rupture status post laparoscopic ovarian cystectomy and left hemi-glossectomy with reconstruction. She had smoking history of 15 packs per year. She denied alcohol or recreational drug use. His family history included breast cancer in the mother. Physical examination revealed a thin female in mild distress. Her vitals were within normal limits. Lungs were clear to auscultation bilaterally. Heart sounds, rate and rhythm were regular. No murmur was heard. No reproducible chest pain was noted. Abdomen was soft, non-tender and non-distended with no hepatosplenomegaly. Cranial nerves 2-12 were grossly intact. No edema or cyanosis noted in extremities bilaterally.

On admission, electrocardiogram (ECG) showed sinus rhythm, rate 97 beats per minute, ST segment elevation in leads II, III and avF and diffuse T- wave inversions (Figure 1). On admis-

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sion, troponin-I 4 was 0.124 ng/mL. Based on the above symptoms and ECG abnormalities, there was a concern for inferior wall ST elevation myocardial infarction (STEMI). She underwent emergent coronary angiography. Angiography showed mild non-obstructive coronary artery disease. Transthoracic echocardiography (TTE) with contrast was performed. It showed thickened and hypokinetic inferoseptal, inferior and inferolateral walls with a round echo density present in the left ventricular (LV) cavity arising from the thickened inferolateral wall measuring 1.8x1.5 cm² (Figure 2). The biventricular systolic function was normal with no significant valvular abnormalities. There was a concern for metastatic intramyocardial tumor. For further evaluation, she underwent cardiac magnetic resonance imaging (MRI). It revealed 3.9 x 2.3 x 3.4 cm mass with imaging findings suggestive of malignant tumor attached to and infiltrating LV inferior myocardium, epicardial fat and pericardium. It also revealed 1.2 x 0.8 x 0.9 cm mobile mass in the mid- LV cavity, possibly attached to posteromedial papillary muscle with imaging findings consistent with a thrombus. In the light of the angiographic, echo and cardiac MRI findings, her symptoms and ECG abnormalities were attributed to the cardiac mass causing infiltration or displacement of the myocardium. The patient was started on apixaban for LV thrombus. On day 2 of hospitalization, her chest pain was controlled with tramadol. Repeat ECG showed persistent ST elevation in leads II, III and avF and T wave inversions. She has persistent elevation in troponins ranging 0.16 to 0.20 ng/mL. Our report highlights a rare case of cardiac metastasis in a patient with tongue cancer presenting as STEMI.

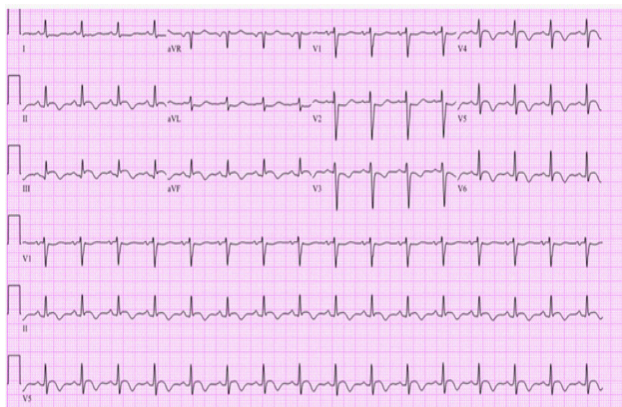


Figure 1: Electrocardiogram showing sinus rhythm, ST segment elevation in leads II, III and aVF with diffuse T-wave inversions.

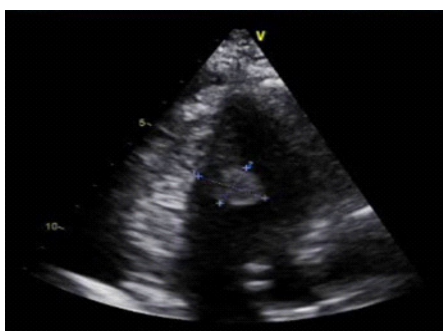


Figure 2: Echocardiogram showing a round echo density present in LV cavity arising from the thickened inferolateral wall measuring 1.8 x 1.5 cm²

Table 1: Literature review showing secondary cardiac tumor mimicking ST elevation MI.

Author	Publication Year	Age-Gender	Symptoms on presentation	Imaging	Primary malignancy	Histopathology
Cordeli et al	1999	57F	Dyspnea	Echo- left intraventricular mass	Uterus	Leiomyosarcoma
Vallet et al	2001	69M	Dyspnea	Echo- mass in apex of LV	Lung	Squamous-cell
Konishi et al	2001	69M	Chest pain	Echo- mass in septal aspect of LV	Lung and Gastric	Adenocarcinoma
Shimura et al	2007	78M	Chest and back pain	CT chest without contrast- normal CT chest with contrast- intra-myocardial tumor	Lung	Squamous-cell
Jin Oh na et al	2011	63M	Chest discomfort	Echo- hypokinetic apico-anteroseptal wall of LV with mural mass CMR- 37x31 mm enhanced mass in same location	Bladder	Unknown
Conzoli et al	2011	67M	Dyspnea and palpitations	Echo- akinesis of apex and septum, mass at the apex of LV and RV wall CMR- 40 mm mass in the apex and septum of LV	Esophagus	Squamous-cell
Oliveira et al	2012	81M	Chest discomfort	Echo- mass in anteroseptal wall of LV	Esophagus	Squamous-cell
Cincin et al	2013	65M	Dyspnea, fatigue, leg swelling, abdominal pain	CMR, PET and RHC - RV metastasis with constrictive pericarditis like physiology	Lung	Squamous-cell
Cheng et al	2013	58M	Chest discomfort	Nuclear stress test- LV mass	Esophagus	Squamous-cell
Soga et al	2015	73F	Chest pain	CT chest with contrast- pericardial metastasis, myocardial metastasis in intraventricular septum and posterolateral LV wall	Lung	Not performed
Yang et al	2015	54F	Chest tightness, palpitations, upper back pain	Echo- hypokinesis of LV apical and midapical wall, ejection fraction 40%. CT chest and abdomen- 1 large adrenal mass, multiple masses in liver	Adrenal	Phaeochromocytoma
Chen J et al	2016	55M	Confusion, generalized weakness	Echo- 2.4 cm mass involving LV and RV epicardium and myocardium. Ejection fraction 75%	Mouth	Squamous-cell
Ilbeyaz et al	2016	63F	Dizziness, weakness, hematemesis	Echo- large and mobile mass attached to LV posterolateral wall CMR- esophageal mass from LV lateral wall and papillary muscle causing dynamic LV outflow tract obstruction	Breast	Invasive ductal cancer
Patel et al	2018	-	Chest pain	Chest CT angiogram- incidental RV mass Intracardiac biopsy- isolated secondary cardiac metastasis	Oral	Squamous-cell
Travaglio et al	2018	48M	Jaundice	Echo- mild apical hypokinesis, Normal ejection fraction CT chest- lesion in apex of LV CMR- tumor in apex of LV	Nasopharynx	Squamous-cell
Demir et al	2019	59M	Chest pain	Echo- mass involving free wall of RV and cavity with RV hypokinesia	Tongue	Unknown

Discussion

Head and neck cancer mainly remains localized to the primary site and regional lymph nodes. Depending on the tumor stage and depth of invasion, up to 66% of patients with tongue cancer have cervical nodal metastasis. The reported incidence of distant metastasis is between 2 to 26 percent based on the nodal involvement, primary site and tumor stage [3]. The most common distant sites in head and neck cancers include lungs followed by liver and bone. Cardiac metastasis is an uncommon site of metastasis for head and neck cancer. The reported incidence is 1% [2]. Cardiac metastasis is particularly seen in malignant melanoma [4]. Other cancers that are commonly associated with cardiac metastasis include lung, breast, hepatocellular and thyroid [5].

The cardiac metastasis can be associated with spectrum of non-specific ECG changes. Cates et al studied 1046 consecutive autopsies performed between year 1981 to 1983 [7]. Of

these patients, 47 had 2 cardiac metastasis. ECG abnormalities included diffuse T wave inversions, segmental T wave inversions, ST elevation, low voltage QRS and atrial arrhythmias [7]. So, it is important to consider further work up with imaging modalities such as TTE, cardiac MRI or CT in patients with history of head and neck cancer with new ECG changes or new cardiovascular symptoms. It can provide information about the presence of tumor, location of the tumor within the heart, its extent and type of tumor which can help guide treatment options. TTE is the most commonly used initial imaging modality to evaluate suspected cardiac tumors. Our patient had a history of metastatic tongue cancer who presented with chest pain, new ECG changes and elevated troponin. This led to an initial misdiagnosis of STEMI. However, a coronary angiogram ruled out STEMI as the cause of patient's presentation. We then considered if the head and neck cancer could be the etiology of the patient's presentation. Rare cases of cardiac metastasis from various malignancies mimicking STEMI have been described [8-24] (Refer to Table 1). On our literature search, we found only four cases of metastatic head and neck cancer mimicking STEMI. Echocardiogram and cardiac MRI was performed in our patient which confirmed LV intracavitary mass.

There is no standard treatment protocol for cardiac metastasis. Surgical resection is reserved for solitary intracavitary mass which can be completely removed [25]. However, frequently, complete resection fails and is associated with high post-operative mortality. Treatment of cardiac metastasis is mainly limited to palliation with chemotherapy and other supportive measures. Such measures include pacemaker placement for tumor related heart block or pericardial window for recurrent pericardial effusion. Currently, there is some available data on the efficacy of immunotherapy such as nivolumab and pembrolizumab in metastatic head and neck cancer [26,27]. In our patient, surgery was not considered because the mass was infiltrating LV myocardium, epicardium and pericardium. She was started on nivolumab after the detection of cardiac metastasis.

Conclusion

Our report highlights a rare case of cardiac metastasis secondary to tongue cancer presenting as ST elevation myocardial infarction. It is prudent to suspect cardiac metastasis in a patient with a history of underlying cancer presenting with new cardiovascular symptoms, new murmur, ECG abnormalities or pericardial effusion.

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