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CASE REPORT

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# Tonsillar carcinoma as a rare cause of cardiac metastases

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**ABSTRACT**

Tonsillar carcinoma metastasis to the myocardium is undermined with detection rate often occurring at autopsy or advance stage. A 60-year-old male with a 1-month history of right-sided facial pain and failed antibiotics therapy underwent head and neck CT scan that revealed a tonsillar mass. Tonsillar biopsy revealed squamous cell carcinoma, HPV-16 positive. PET-CT scan showed a significant activity in the right tonsillar mass along with prominent right level 2 lymph nodes and no distant disease. Definite surgery was deferred and he underwent 7 weeks of radiation therapy with concurrent weekly Cisplatin. PET scan 8 weeks later showed significant improvement in large right palatine tonsil mass; however, a new FDG-avid cardiac mass of right ventricle. An echocardiogram showed an ejection fraction of 59% and a large mass in the apical portion of the right ventricle. Cardiac MRI confirmed a 9 cm right ventricular mass. Complete resection of the cardiac mass was unsuccessful; a partial tumor debulking provided adequate sample for pathologic examination, which was consistent with metastatic squamous cell cancer, p16+, clinical-stage T4aN1M1. Surgical intervention was not performed; instead, he received a palliative radiation therapy to his right-sided cardiac mass with concurrent Keytruda immunotherapy. Unfortunately, the evening of successfully completing his last therapy, he was found unresponsive and subsequently expired. Although tonsillar carcinoma metastasis to the myocardium is rarely coupled with its atypical presentations, clinicians should consider early echocardiogram evaluation for possible metastatic disease so as to provide early interventions.

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Head and neck; tonsillar carcinoma; cardiac metastasis; radiation therapy; chemotherapy

## 1. Introduction

Cardiac metastases are an unusual site of disease for head and neck tumors, with less than 1% originating from head and neck primaries. The incidence of cardiac metastases is substantially higher in malignancies from other sites such as melanoma, lung, breast, esophagus, and lymphomas. Local recurrences are more common for head and neck tumors, however, when distant metastases occur, they often involve the lung, skin, liver or bone [1,2]. Due to the nonspecific symptoms associated with cardiac metastases, they are often not detected until an advanced stage or at autopsy; thus, the reported incidence has varied widely in the literature from 0.2% to 11.8% [1,3]. Cardiac metastases can often be detected in the absence of an evident primary tumor. Despite advances in cancer treatment, management of metastatic cardiac tumors continues to pose a challenge. Currently, there is no standardized therapeutic regimen; however, most patients benefit from palliative chemo-radiation treatment and in rare cases, surgical resection [2].

In this report, we present a 60-year-old Caucasian male who underwent successful chemo-radiation therapy for tonsillar carcinoma but later presented with a right ventricular mass consistent with cardiac metastases.

## 2. Case report

A 60-year-old Caucasian male with a past medical history of tobacco use (30 pack-years), prostate cancer treated with brachytherapy 7 years prior, and GERD was evaluated by his primary care physician for a 1-month history of right facial pain. He received a course of antibiotics for presumed infection without resolution of his symptoms. His right facial and neck pain progressed over the course of a month, prompting a computed tomography (CT) scan of the neck, which revealed a tonsillar mass measuring 4.6 cm in maximal dimension. Following initial ENT evaluation, a tonsillar biopsy was performed that was positive for squamous cell carcinoma, HPV-16 positive. The patient underwent a whole-body positron emission tomography – computed tomography (PET-CT) that showed significant activity in the right tonsillar mass with a maximum dimension of 4.8 cm and standard uptake value (SUV) of 16.5 along with prominent right level 2 lymph nodes measuring 1.1 cm with SUV activity of 3.3 (Figure 1). There was no other significant neck lymphadenopathy noted and no distant disease was

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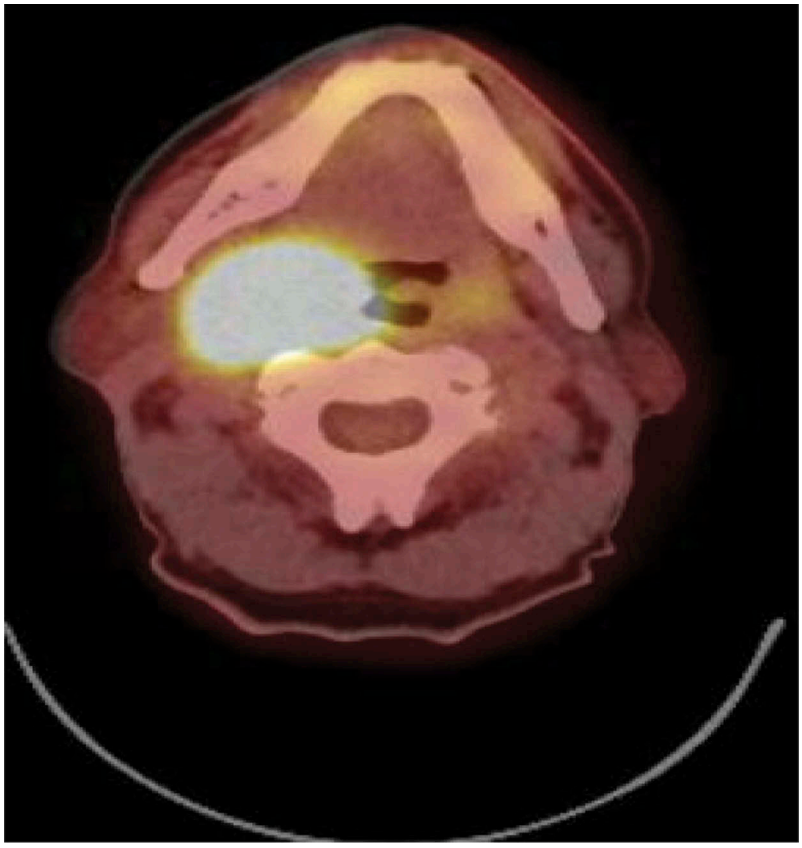

Figure 1. PET-CT demonstrates a significant activity in the right tonsillar 4.8 cm mass.

documented. The patient was evaluated by Otolaryngology; however, due to the extensive nature of the right tonsillar tumor and involvement of the tongue and submandibular space, he was not offered surgery. The patient was referred for the definitive treatment of his tonsillar cancer with chemo-radiation therapy. He received 7 weeks of radiation with concurrent weekly Cisplatin. A follow-up PET scan 8 weeks later demonstrated significant improvement in large right palatine tonsil mass with small region of mild residual hypermetabolic uptake (Figure 2). However, he was noted to have new FDG-avid 4.9 cm cardiac mass in the anterior wall of right ventricle (Figure 3). At that time, the patient reported fatigue but was otherwise asymptomatic. An echocardiogram showed an ejection fraction of 59% and a large mass of 17.7 cm in the apical portion of the right ventricle. Cardiac MRI obtained confirmed a 4.6 cm right ventricular mass (Figure 4); thus, the patient was referred to thoracic surgery for the removal of the cardiac mass. Complete resection of the mass was unsuccessful, however, a partial tumor debulking provided for an adequate sample for pathologic examination. The biopsy was consistent with metastatic squamous cell cancer, p16+, clinical-stage T4aN1M1. After a comprehensive discussion, surgical intervention was not performed; instead, the decision was made to begin palliative radiation therapy to his cardiac mass with concurrent Keytruda immunotherapy. The patient tolerated his treatments well with the exception of fatigue. Following the completion of his last radiation treatment, he was found to be unresponsive by his wife and sent to the hospital. Unfortunately patient expired shortly thereafter despite exhaustive resuscitation measures.

## 3. Discussion

Cardiac tumors are often secondary to advanced malignancies that metastasize to the heart, with melanoma and mediastinal primary tumors being the most common malignancies [2,4]. Although the mechanism of cardiac metastasis is still unknown, some proposed pathways include direct extension, hematogenous spread, intracavitary diffusion via the inferior vena cava, and lymphatic channel spread [4,5]. Metastatic cardiac tumors can be insidious in presentation and as a result, often go undetected until late-stage disease. When a patient does present with symptoms, they are often nonspecific. Therefore, in a patient with advanced malignancy who presents with sudden onset of heart failure, arrhythmia or respiratory symptoms, metastatic cardiac tumor should be considered on the differential diagnosis [2]. In this case, our patient was asymptomatic and the cardiac mass was an incidental finding.

Several autopsy series have demonstrated that the incidence of cardiac death due to metastatic diseases

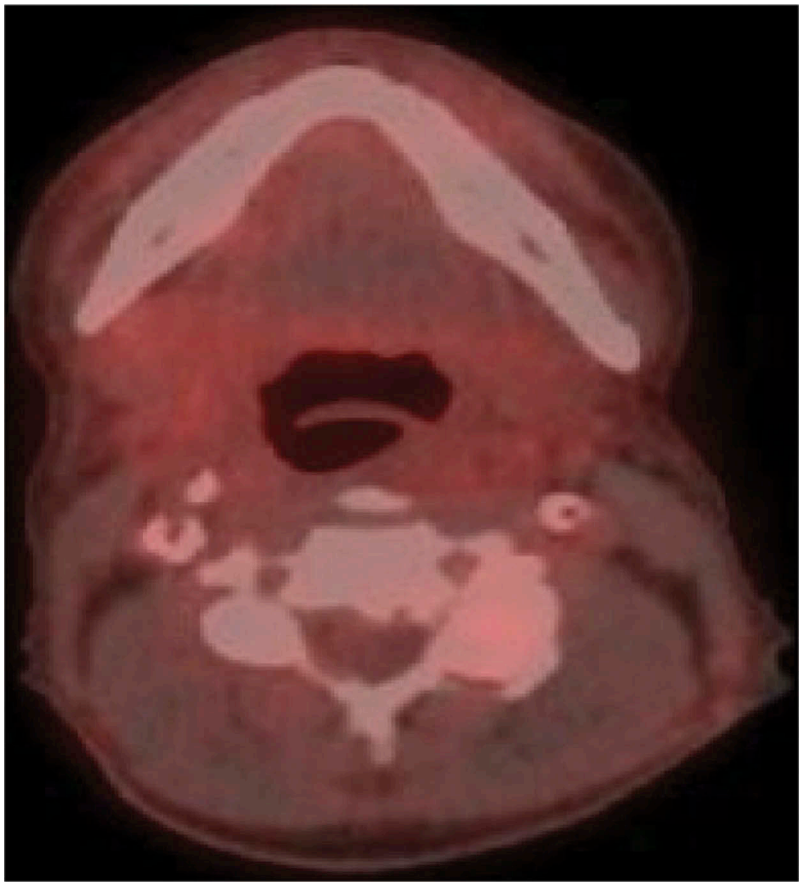

Figure 2. PET-CT shows significant improvement in large right palatine tonsil mass post chemo-radiation therapy.

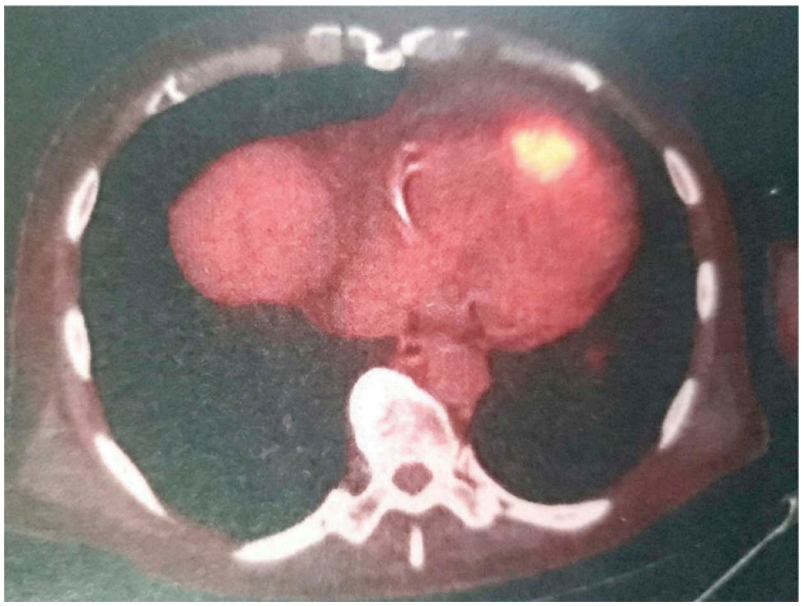

Figure 3. PET CT showing new FDG-avid 4.9 cm cardiac mass in the anterior wall.

ranges from 1.5% to 21% of all cancers. The primary cancer found to have the highest rate of metastasis to the heart is malignant melanoma, although other potential primaries include the lungs, breast, esophagus, thyroid, and malignant lymphoma [2,6]. However, rarely does an oropharyngeal tumor metastasize to the heart given the high rate of local control. Metastases to the heart are often noted after patients have undergone surgical, radio- or chemotherapy of the origin tumor; thus cardiac metastasis can occur without the presence of local recurrence such as in our patient. Physical examination and laboratory testing are nonspecific for the detection of cardiac metastasis. Imaging such as echocardiogram can be used to detect intracavitary, peri- or paracardial

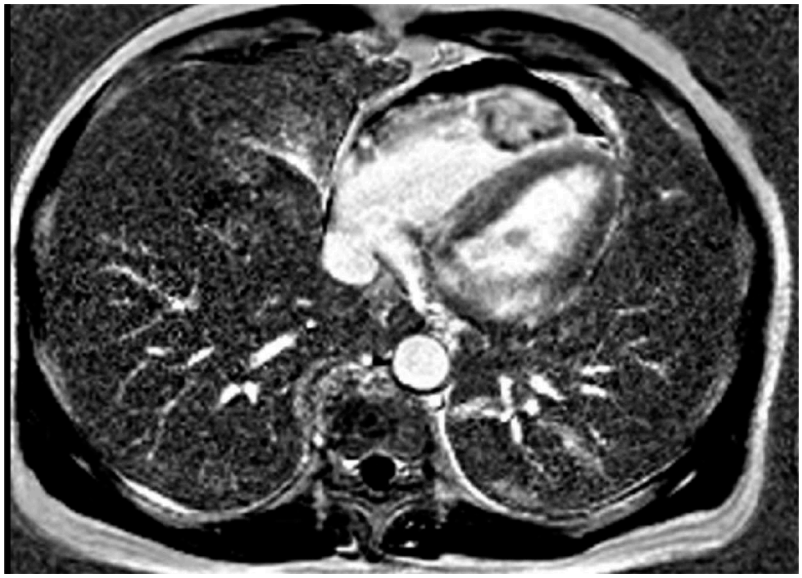

Figure 4. Cardiac MRI showing a bulky mass in the right ventricular apex 4.6 cm of right ventricle post chemo-radiation therapy. Moderate-sized pericardial effusion and septal hypertrophy.

lesions. Although there is little data to help guide the optimal imaging modality, computer tomography or magnetic resonance imaging are often used to aid in the determination of the extension or sizing of the cardiac metastasis [6–8]. Cardiac biopsy remained the most valuable tool in the diagnosis of cardiac metastasis, especially if the tissue diagnosis will influence therapy and patient`s prognosis [2,9]. Biopsy obtained in our patient was consistent with metastatic squamous cell from prior tonsillar carcinoma.

There is no cure for metastatic cardiac diseases, and patients are often not good candidates for surgical interventions. In such cases, the primary goal is to improve patients' quality of life by managing their symptoms via palliative measures. Chemotherapy, immunotherapy, and palliative radiation therapy have all been reported as treatment modalities for metastatic cardiac tumors, with surgery only indicated in exceptional cases [2,6,10]. This patient was not a candidate for complete surgical resection due to the challenging location of the cardiac tumor, thus he received palliative radiotherapy along with the immunotherapy, Keytruda. To our knowledge, our patient tolerated the palliative measures, receiving his final treatment on the day of his death. It is uncertain what precipitated his death, but it appears to have been of cardiac origin, likely related to his metastatic disease.

## 4. Conclusion

Despite the nonspecific presentation associated with cardiac metastases, it is reasonable that patients with tonsillar carcinoma be considered for early echocardiographic evaluation for possible metastatic disease at the onset of symptoms. By presenting this case, we hope the further the understanding of this rare disease entity so that more effective treatment protocols can be discovered.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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