

## Recurrent Cardiac Metastasis of Primary Femoral Osteosarcoma: A Case Report

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### ABSTRACT

A 17-year-old female patient with a history of surgery for primary femoral and metastatic lung osteosarcoma was admitted to our clinic with palpitations. Upon evaluation, a metastatic osteosarcoma in the left ventricle was diagnosed. Based on the collaborative decision of the oncology and cardiovascular surgery clinics, surgery was performed and the patient was discharged without any problems. According to the recommendation of the oncology clinic, chemotherapy was postponed for 6 months after surgery. Five months postoperatively, however, she had a recurrence with 2 tumors. Based on the collaborative decision, chemotherapy was initiated and in 2 months the size of the recurrent tumors had diminished. The patient is still under the care of the oncology and cardiovascular surgery clinics and continuing her chemotherapy regimen.

Osteosarcomas have a high mortality. Metastatic tumors of the heart are not common. The location of the metastasis and the characteristics of the primary tumor determine the treatment modality. In some previously published reports, various treatment choices have been described. In the present case report, we present a rare case with metastatic cardiac osteosarcoma.

### INTRODUCTION

Primary sarcomas of the heart constitute <25% of cardiac tumors [Silverman 1980]; metastatic tumors are far more common, with an incidence of 0.1% to 0.3% of all cardiac surgeries (approximately 1 in every 500 cardiac surgeries) [Straus 1945]. Herein, we present a rare case with recurrent metastatic cardiac osteosarcoma in the left ventricle.

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### CASE

A 17-year-old girl sought evaluation in the emergency department of our cardiology clinic for palpitations. In her medical history she had femoral osteosarcoma and left lung superior lobectomy for metastatic lung tumor. She had been under the care of an oncology clinic at another institute. The cardiac rhythm was ventricular tachycardia, so 2D transthoracic echocardiography was performed. A mass 2.1 × 1.7 cm in size, which had a close relationship to the free wall and papillary muscle, in the middle of the left ventricle extending to the apex of the heart, was noted. The other chambers and valves were normal. The nonhomogenous margins of the mass did not permit measurement of the diameter on 2D echocardiography; thus, cardiac magnetic resonance imaging (MRI) was performed. On the cardiac MRI, we demonstrated the relationship of the nonhomogenous mass within the heart and calculated the diameters (2.0 cm) (Figure 1). With a tentative diagnosis of cardiac metastasis of primary femoral osteosarcoma, we consulted with the oncology clinic where she had been under care and recommended combination therapy (surgery + late postoperative chemotherapy).

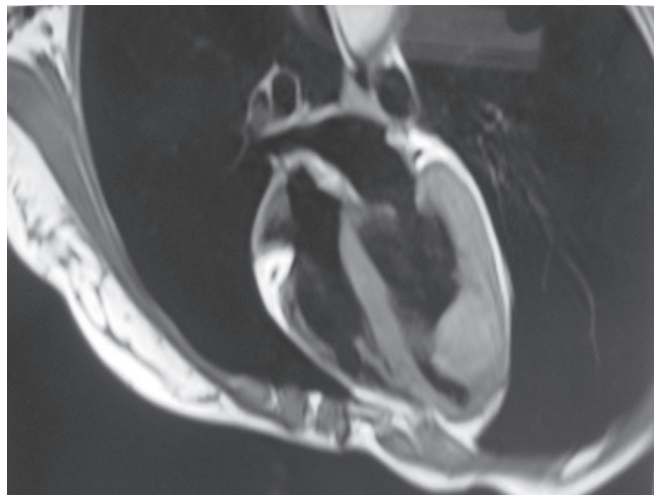


Figure 1. Tumor seen at computed tomography.

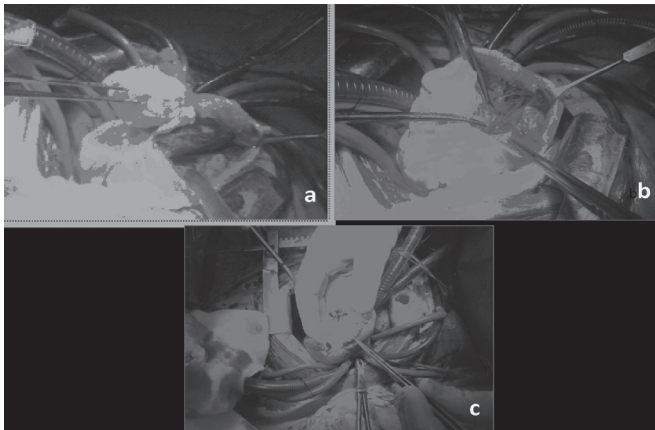


Figure 2. Intraoperative sight. A, tumor in left ventricle; B, after resection; C, after reconstruction.

After a routine preoperative work-up, the patient was administered under general anesthesia by midsternal incision. Under cardiopulmonary bypass with a left ventriculotomy, the tumor was visualized. The tumor extended from the apicolateral surface of the left ventricle to the apex (Figure 2A). The left ventricle was dissected 20 mm to 30 mm from the margins of the tumor (Figure 2B). The papillary muscle was partially resected and reinforced with pledged sutures. The area of resection in the left ventricle was patched with a polytetrafluorethylene (PTFE) graft (Figure 2C). The pathologic evaluation of the mass confirmed the diagnosis as a “high grade metastatic osteosarcoma (osteoblastic, chondroblastic, and fibroblastic mixed type) invasive to the vascular space and myocardium, with tumor-free surgical resection margins.”

After 7 days of routine hospitalization, the control 2D echocardiography confirmed that there were no residual tumors, and she was discharged and directed to the oncology clinic for medical follow-up and chemotherapy. In accordance with the preoperative decision, the chemotherapy regimen was not initiated in the early postoperative period. She was re-admitted with palpitations 5 months after the surgery. Ventricular tachycardia was diagnosed and treated medically with an amiodarone therapy protocol. The 2D echocardiography demonstrated 2 recurrent tumors within the heart; specifically, 1 tumor filled the apex, 2.0 × 2.5 cm in size, and the other tumor, 1.5 × 1.4 cm in size, was in relationship with the papillary muscle of the free wall of the left ventricle. The cardiovascular surgery and oncology clinics recommended chemotherapy, and 2 months later 2D echocardiography showed that the masses had decreased in size (1.9 × 1.4 cm and 1.4 × 1.2 cm, respectively). The patient is still under management by the cardiovascular surgery and oncology clinics and continuing the chemotherapy regimen.

## DISCUSSION

Malignant metastatic cardiac tumors are more frequent than primary cardiac tumors, and soft tissue sarcomas are the most frequent malignant neoplasm [Silverman 1980]. The

right side of the heart is more commonly involved than the left chambers, and the myocardium and epicardium are more frequently involved than the endocardium [Gabelman 1979]. The clinical symptoms may vary from case to case; the most common symptoms are arrhythmias and features of infective endocarditis; however, they are commonly asymptomatic until diagnosis by radiologic detection [Putnam 1991].

Chemotherapy has not been shown to be effective in the initial treatment of most nonpediatric left-side heart sarcomas because the patients often present in advanced heart failure. Radiation therapy is difficult in all cases, except from pulmonary artery sarcomas, due to the cardiac toxicity of radiation [Reardon 2006]. Surgical resection remains the primary mode of treatment for most left-side heart tumors. As Herrmann et al [1992] reported in a case series involving 6 patients, cardiac sarcomas treated with chemotherapy alone have a dismal prognosis, with a median survival time of only 6 months. In the surgical series reported by Putnam et al [1991], the median survival time for patients with complete resection was 24 months, while the median survival was 10 months for the entire group. Complete surgical resection appears to double the survival time over palliative resection; however, at the same time, complete resection is mostly impossible because of the vital anatomic specialties. Tumors of the left heart present a surgical challenge because incomplete resection results in local recurrence after a short interval of time [Gabelman 1979]. Patients with a left-side heart tumor have a worse prognosis if it remains untreated or following palliative surgical treatment due to local extension and metastasis of the tumor. These patients succumb to hypotension, congestive heart failure, stroke, heart block, and tumor embolization. The prognosis is not good, but may be improved by early diagnosis and combination chemotherapy and radiotherapy with surgical resection [Watts 1983].

It is known that osteosarcomas are primary bone tumors with a high mortality rate. The surgery for the primary tumor and the metastasis extends the survival. Cardiac metastasis of osteosarcomas rarely occurs, and in these rare cases, chemotherapy and surgical alternatives should be carefully considered. In symptomatic patients (tachycardia, left ventricle outflow tract obstruction, mitral stenosis, pulmonary stenosis, and peripheral emboli), surgery can be performed to ameliorate the symptoms and extend the survival; however, surgery has a unique mortality and morbidity that makes the choice of therapy challenging. While performing surgery, it is important to keep the resection site as far away from the tumor as possible. It was impossible to resect that much tissue in our patient because of close relationship of the tumor with the papillary muscles and the free wall.

As we experienced in our case, chemotherapy is essential. Avoiding chemotherapy in the early postoperative period was the decision of the oncologists to reduce the adverse effects during the recovery period from surgery. Nevertheless, we realized the importance of the chemotherapy (even more than the surgery) after the recurrence of the tumor in the chemotherapy-free period and when we noted the decrease in size of the recurrent tumors after initiating chemotherapy.

In conclusion, we suggest that patients with metastatic cardiac osteosarcoma should be carefully evaluated before treatment choice. If there is a risk of a life-threatening complication, such as emboli and arrhythmias, surgery should be performed as soon as possible. The resection should be extended as much as possible, and it is important to follow the patient with chemotherapy initiated in the early postoperative period.

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