

## Cardiac metastasectomy with cardiopulmonary bypass in a case of mediastinal osteosarcoma metastasis with left atrial invasion

*Sol atriyum invazyonu olan mediastinal osteosarkom metastazı olgusunda kardiyopulmoner baypas ile kardiyak metastazektomi*

Ulaş Kumbasar,<sup>1</sup> Serkan Uysal,<sup>2</sup> Tuba Şahinoğlu,<sup>3</sup> Rıza Doğan<sup>1</sup>

*Institution where the research was done:*

Medical Faculty of Hacettepe University, Ankara, Turkey

*Author Affiliations:*

<sup>1</sup>Department of Cardiovascular Surgery, Medical Faculty of Hacettepe University, Ankara, Turkey

<sup>2</sup>Department of Thoracic Surgery, Bolu İzzet Baysal State Hospital, Bolu, Turkey

<sup>3</sup>Department of Thoracic Surgery, Sivas Numune Hospital, Sivas, Turkey

### ABSTRACT

The most common organ to which osteosarcomas metastasize is the lungs. Extrapulmonary osteosarcoma metastases are being observed in increasingly more patients, particularly after pulmonary metastases, and becoming less sensitive to chemotherapy with shorter survival. Surgical resection is advocated for prolonging survival and improving quality of life when the primary tumor is under control. In this article, we present a case of mediastinal osteosarcoma metastasis with left atrium invasion in a 25-year-old female patient. During her seven-year oncologic follow-up, patient was performed two right, two left thoracotomies for pulmonary metastasectomies and one right Dartevelle incision for metastasis located in the right upper lobe extending through the clavicle and the first rib. She was also performed a median sternotomy for resection of a mediastinal metastasis adjacent to both atria. Patient received radiotherapy and several courses of adjuvant chemotherapy throughout her therapy. On patient's final computed tomography scan, mediastinal tumor recurrence was detected which was invading the left atrium. Considering that surgical resection would be the most appropriate therapeutic approach to prolong survival, patient was performed metastasectomy under cardiopulmonary bypass support and cardiac arrest with partial left atrial resection and bovine pericardial patch.

**Keywords:** Cardiopulmonary bypass; metastasectomy; osteosarcoma.

### ÖZ

Osteosarkomların en sık metastaz yaptıkları organ akciğerlerdir. Ekstrapulmoner osteosarkom metastazları giderek daha fazla hastada özellikle pulmoner metastazlardan sonra görülmekte, kemoterapiye daha az duyarlı ve sağkalım daha kısa olmaktadır. Primer tümörün kontrol altında olduğu durumlarda sağkalımın uzatılması ve yaşam kalitesinin iyileştirilmesi için cerrahi rezeksiyon önerilmektedir. Bu yazıda, 25 yaşındaki bir kadın hastada sol atriyum invazyonu olan bir mediastinal osteosarkom metastazı olgusu sunuldu. Hastaya yedi yıllık onkolojik takibi sırasında pulmoner metastazektomiler nedeniyle iki kez sağ, iki kez sol torakotomi ve bir kez de sağ üst lobda bulunan ve klavikula ve birinci kaburgaya uzanım gösteren metastaz nedeni ile Dartevelle insizyonu uygulandı. Ayrıca, her iki atriyuma bitişik mediastinal metastazın rezeksiyonu için median sternotomi uygulandı. Hasta tedavisi boyunca radyoterapi ve birkaç adjuvan kemoterapi kürü aldı. Hastanın son bilgisayarlı tomografi taramasında sol atriyuma invazyon gösteren mediastinal tümör nüksü saptandı. Sağkalımı uzatmak için en uygun terapötik yaklaşımın cerrahi rezeksiyon olduğu düşünülerek hastaya kardiyopulmoner baypas desteği ve kardiyak arrest ile parsiyel sol atriyum rezeksiyonu ve bovine perikardiyal yama kullanılarak metastazektomi uygulandı.

**Anahtar sözcükler:** Kardiyopulmoner baypas; metastazektomi; osteosarkom.

The major site of metastasis from osteosarcoma is the lungs. Extrapulmonary osteosarcoma metastases are developing in an increasing proportion of patients, particularly after pulmonary metastasis, and becoming less sensitive to chemotherapy,

portending poor outcome and short survival.<sup>[1]</sup> In this article, we present an unusual case in a 25-year-old patient with mediastinal metastasis involving the left atrium. Metastasectomy was performed under cardiopulmonary bypass support and cardiac arrest



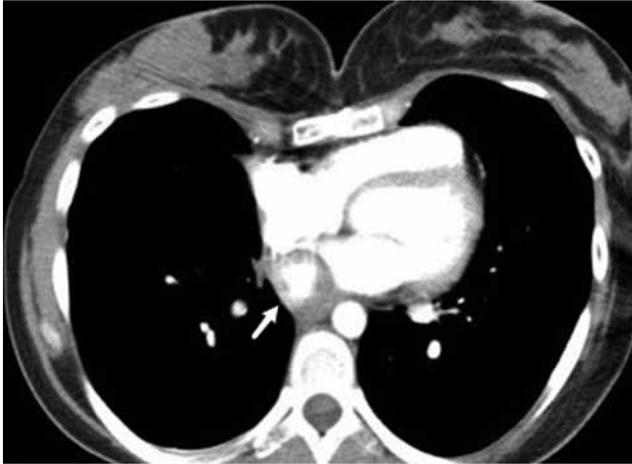
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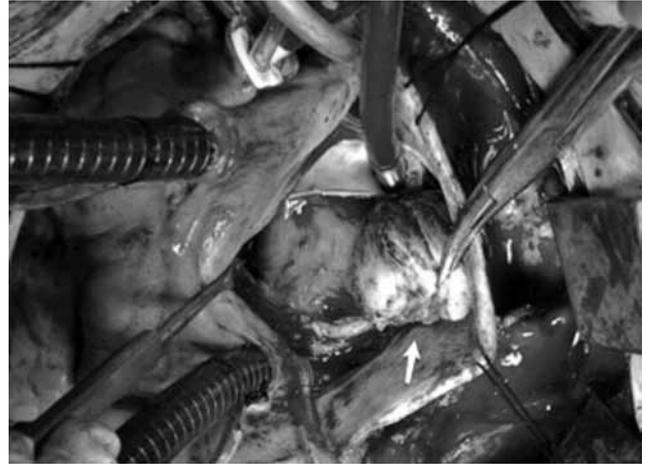
Correspondence: Ulaş Kumbasar, MD. Hacettepe Üniversitesi Tıp Fakültesi Kalp ve Damar Cerrahisi Anabilim Dalı, 06100 Sıhhiye, Ankara, Turkey.

Tel: +90 312 - 305 17 74 e-mail: ulaskumbasar@gmail.com

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**Figure 1.** Computed tomography scan shows a calcific mass located in mediastinum near left atrium (arrow).



**Figure 2.** En-bloc resection of tumor with posterior pericardium and left atrial posterior wall (arrow).

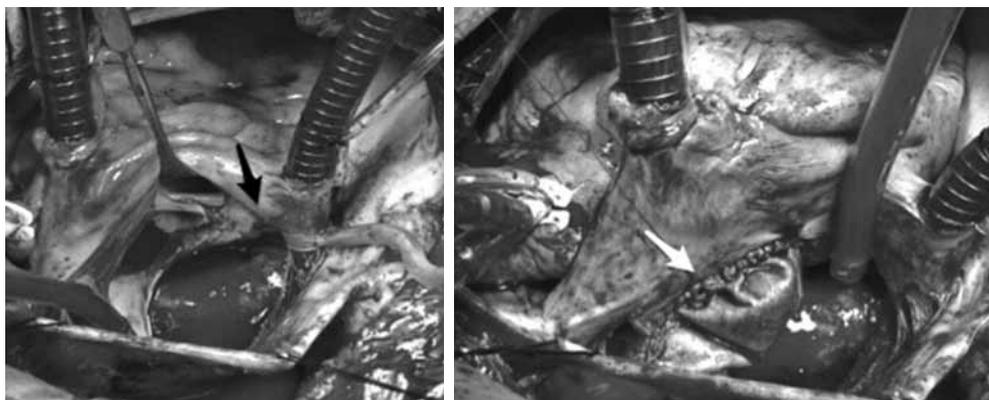
with partial left atrial resection and reconstruction by using bovine pericardial patch.

### CASE REPORT

A 25-year-old female patient was admitted to our clinic with a 2.5 cm calcific mass located in the mediastinum within close proximity to the left atrium which was detected on her last routine screening computed tomography (Figure 1). Transesophageal echocardiography also revealed a 26x19 mm echogenic mass near the left atrium. Her history revealed that she had been followed-up with the diagnosis of osteosarcoma of the left proximal humerus. During her seven-year oncologic follow-up, she had undergone two right, two left thoracotomies for pulmonary metastasectomies and one right Dartevelle incision for resection of the metastasis located in the right upper lobe extending through the clavicle and the first rib. She also underwent a

median sternotomy for resection of a mediastinal metastasis adjacent to both atria. Additionally, she received one cure of radiotherapy and several courses of adjuvant chemotherapy throughout her therapy. A written informed consent was obtained from the patient.

The operation was approached through a repeat median sternotomy. A 2.5x3 cm mediastinal mass located on the esophagus extending through the posterior pericardium and invading the left atrium was detected. Cardiopulmonary bypass (CPB) via aortic and bicaval cannulation was initiated and the heart was arrested with isothermic blood cardioplegia. The tumor was resected en-bloc, including the posterior pericardium and the left atrial posterior wall (Figure 2). The left atrial defect (8x6 cm) was reconstructed by using bovine pericardial patch (Figure 3). The patient was rewarmed and weaned from CPB. The postoperative course was uneventful and she was



**Figure 3.** Reconstruction of left atrial defect (black arrow) by using bovine pericardial patch (white arrow).

discharged on postoperative sixth day. Pathologic examination revealed osteosarcoma metastasis with negative surgical margins.

## DISCUSSION

Even though the most common site of relapse in osteosarcoma has been the lungs, the number of patients who develop extrapulmonary metastases is increasing due to prolonged survival achieved by adjuvant chemotherapy.<sup>[2-4]</sup>

Extrapulmonary disease is commonly treated with chemotherapy as standard treatment. However, in highly selected cases, surgical resection is advocated for prolonging survival and improving quality of life when the primary tumor is under control.<sup>[1]</sup> In our case, the extrapulmonary tumor was a recurrent mediastinal metastasis adjacent to the left atrium. Due to its proximity to a cardiac chamber, surgical approach was planned as if it was a cardiac metastasis.

In the literature, there are few reports of patients undergoing resection for thoracic malignancies with locally advanced invasion into the cardiac structures and most of them favored surgical treatment by showing improved survival compared to conservative treatment.<sup>[5-7]</sup> However, if cardiac structures are infiltrated, curative resection remains challenging and CPB support is often required. Moreover, CPB implies several additional risks including excessive bleeding due to systemic heparinization, possibility of intraoperative tumor spilling, and immune modulatory effects of extracorporeal circulation.<sup>[7,8]</sup> Considered to be the best available therapeutic option for our patient, another metastasectomy was performed under CPB and cardiac arrest with partial left atrial resection and reconstruction.

In conclusion, careful patient selection by taking into consideration the site and the natural history of the disease and intense interdisciplinary evaluation are necessary to point out candidates for surgery.

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