CASE REPORT

Massive pulmonary embolism and a cardiac mass: Thrombus or metastasis?

Yoğun pulmoner emboli ve kalp kitlesi: Trombüs mü yoksa metastaz mı?

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Summary– Cardiac mass can be described as an abnormal structure within or directly contiguous to the heart. Tumors and thrombi are the most common types of cardiac masses. Intracardiac thrombi have been encountered in various clinical settings and can result in severe morbidity and mortality due to embolic events. Cardiac neoplasms are extremely rare, and are usually metastatic tumors. The major primary malignancies associated with cardiac metastases include cancers of the lung, breast, stomach, and liver, and lymphoma, leukemia, and melanoma. Osteosarcoma (OS) is the most common type of bone malignancy, and is almost always highly malignant. A previous study demonstrated that OS very rarely metastasizes to the heart. Presently reported is an unusual case of OS with intracaval, right atrial, and right ventricular extension that was misdiagnosed as venous thrombus.

Özet– Kalp kitleleri kalbin komşuğulunda veya içinde bulunan anormal yapılar olarak tanımlanabilir. Kalp kitlelerinin en sık karşılaşılan tiplerini tümörler ve trombüs oluşturmaktadır. Kalp içi trombüse çeşitli klinik durumlarda rastlanır. Trombüs embolik olaylar nedeniyle ciddi morbidite ve mortaliteye yol açabilir. Kalp tümörleri oldukça nadir olup sıklıkla metastaz kaynaklıdırlar. Kalbe metastaz yapan tümörlerin büyük kısmını akciğer, meme, mide, karaciğer karinomları, lösemi, lenfoma ve melanom oluşturmaktadır. Osteosarkom (OS) en sık görülen kötücül kemik tümörüdür. Yapılan çalışmalar OS'nin nadiren kalbe metastaz yaptığını göstermiştir. Bu yazıda, vena kava, sağ atriyum ve ventrikül içine uzanımı olan ve ilk etapta venöz trombüs olarak değerlendirilen metastatik OS'li olgu sunuldu.

Tumors and thrombi are the most common types of cardiac masses– abnormal structures within or directly contiguous to the heart. Presenting in various clinical settings, intracardiac thrombi can result in severe morbidity and mortality due to embolic events. Usually metastatic tumors, cardiac neoplasms are extremely rare.[1,2] Cancers of the lung, breast, stomach, and liver, as well as lymphoma, leukemia, and melanoma, are the major primary malignancies associated with cardiac metastases.[3] Osteosarcoma (OS) is the most common type of bone malignancy and is almost always highly malignant.[4] It has been shown that OS very rarely metastasizes to the heart.[5] Described in the present report was a rare case of OS in which intracaval, right atrial, and right ventricular extension was misdiagnosed as venous thrombus.

Abbreviation:
OS *Osteosarcoma*

CASE REPORT

A 25-year-old female was referred due to sudden onset and continuous increase of dyspnea. She had been diagnosed with scapular OS 3 weeks earlier, and preparation for chemotherapy was underway. On physical examination, blood pressure was 80/50 mmHg, pulse rate was 112 beats/minute and oxygen saturation was 82%. Grade 3/6 pansystolic murmur was heard at tricuspid focus with hyper-dynamic precordium and diminished breath sounds in the right lung. Electrocardiogram showed sinus rhythm. In addition, S-wave was observed in D1, and Q-wave and negative T-wave

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were observed in D3. Thoracic tomography revealed bilateral massive pulmonary embolism in the main pulmonary arteries.

Transthoracic echocardiography revealed dilatation of the right heart chambers, decreased right ventricular function, severe tricuspid regurgitation, severe pulmonary hypertension (105 mmHg) (Figure 1a), and a snake-like echogenic thrombus originating from the right atrium, crossing the tricuspid valve, and entering the pulmonary artery during systole (Figure 1b, Video*). Following diagnosis of pulmonary thromboembolism, alteplase infusion was initiated, symptoms improved, and oxygen saturation increased after treatment. Transthoracic echocardiography revealed nearly 40% reduction in thrombus volume.

Approximately 12 hours into follow-up, symptoms re-appeared, and blood pressure and oxygen saturation suddenly decreased. On control echocardiography, thrombus size and pulmonary pressure persisted. This new clinical status was interpreted as an embolism secondary to tumor thrombosis. In spite of a second thrombolytic infusion, symptoms did not improve. The patient was referred to cardiovascular surgeons for emergency surgery. Surgical embolectomy and pulmonary arteriotomy was successfully performed through the inferior vena cava, right atrium, and pulmonary artery. A soft, gelatinous material that did not resemble blood clot was removed from the pulmonary artery. Pathological examination showed histological features consistent with OS metastasis (Figure 1c).

DISCUSSION

Pulmonary embolism, myocardial infarction, and stroke are the most significant causes of cardiovascular mortality. Occlusion of the pulmonary artery can lead to an acute, life-threatening, but reversible form of right ventricular failure. In the majority of cases, pulmonary embolism is the result of deep vein thrombosis.[6] Pulmonary thromboembolism is a lethal complication of malignancy, and its incidence is unclear. In autopsy studies, evidence of embolism was found in approximately 50% of cases.[7] Most cardiac metastases are asymptomatic, with symptoms reported in only a few patients.[8] Metastatic spread to the heart occurs by lymphatic or hematogenous route, or by direct or transvenous tumor extension (via the pulmonary veins, or superior or inferior vena cava).[1] OS is usually detected in the second decade of life, with 60% of cases diagnosed in patients younger than 25 years, and an estimated incidence of 4–5 per million.[9] OS very rarely metastasizes to the heart, and metastasis to the right atrium and pulmonary artery is even more unusual, with only a few reported cases. Secondary tumors presenting as intracardiac mass are very rare and usually covered by thrombotic material, leading to tumor thrombosis, as in the present patient,[1] which may explain her improved symptoms after thrombolytic therapy.

In the vast majority of cases, cardiac metastasis manifests in patients with advanced tumor disease, with the heart only involved in the generalized tumor spread. At this stage of the disease, many patients will have already undergone surgical treatment for the tumor of origin, or radio- or chemotherapy. Cardiac treatment is mostly confined to palliative measures. Surgical resection is only indicated in exceptional cases of solitary intracavitary heart metastases leading to obliteration of the cardiac chambers, or valve obstruction if the tumor of origin was surgically re-

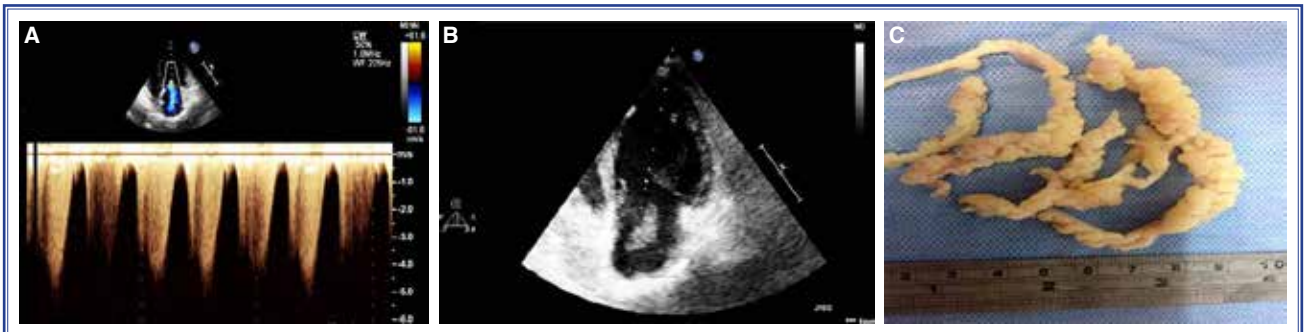

Figure 1. **(A)** Apical four chamber view ,severe tricuspid regurgitation and severe pulmonary hypertension (105 mmHg). **(B)** A snake-like echogenic thrombus was originating from right atrium, crossing the tricuspid valve. **(C)** A soft, gelatinous material removed from pulmonary artery. Pathology examination showed histological features consistent with metastasis of osteosarcoma.

sected in total and the patient appears to have good prognosis.[1] Our patient underwent emergency surgery due to clinical deterioration in spite of thrombolytic therapy. These patients can be misdiagnosed and administered thromboembolism treatment. In patients with malignancy and suspected thromboembolism, direct metastasis to the pulmonary artery should be considered during differential diagnosis.

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****Supplementary video file associated with this article can be found in the online version of the journal.***

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