



## Cardiac Chloroma of Three Heart Chambers in a Patient with Non-M3 Acute Myeloid Leukemia

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The aim of this study was to investigate the three heart chambers' cardiac chloroma in a patient with non-M3 acute myeloid leukemia. In this report, we presented a 38-year-old man in good health with no relevant history of any specific diseases before. There was swelling of the right lower extremity with the first impression of acute deep vein thrombosis. Anticoagulant treatment was initiated after duplex sonography of lower limbs confirmed this diagnosis. Our case had a complete response to chemotherapy regimen, and radiotherapy was not needed and then bone marrow transplant was performed successfully.

**Key words:** Acute myeloid leukemia, cardiac chloroma, chemotherapy

### INTRODUCTION

Acute myeloid leukemia (AML) is a hematopoietic neoplasm of the myeloid line of blood cells.<sup>1</sup> Clinically, secondary heart tumors usually remain silent.<sup>2</sup> Several mechanisms have been suggested for the occurrence of cardiovascular disease during acute leukemia: leukemic thrombi or leukostasis in major arteries, leukemic infiltration into the myocardium or pericardium, and disorders of coagulation secondary to leukemia and antileukemic therapies.<sup>3</sup> We present a case of intracavitary heart masses in three heart chambers by AML. After the chemotherapy, induction treatment, and then consolidation therapy, cardiac lesions were completely disappeared. Bone marrow transplant was successfully performed and now, 10 months after the transplant, the patient is in remission and good general condition.

### CASE REPORT

A 38-year-old man with no relevant history of any specific diseases and good health condition admitted to our hospital suffering from pain and edema of the right lower extremity with the first impression of acute deep vein thrombosis (DVT), and duplex sonography confirmed the diagnosis of DVT and

treatment initiated with anticoagulants. Five days after starting treatment, the patient developed dyspnea and hemoptysis. Chest multidetector computed tomography (CT) was done, and acute pulmonary thromboemboli in lobar branches of both lungs with extension to their segmental branches were reported.

At this time, a cardiac duplex echocardiography was performed that showed echodense mobile masses in the right atrium (RA) measuring 1.8 cm × 1.2 cm and multiple masses in the right ventricle (RV) septal and lateral wall and in the left ventricle (LV) septal wall with dimensions 2.7 cm × 0.8 cm [Figure 1].

Infectious, vegetation, clot, primary tumors, or metastases were in the differential diagnosis for the masses seen in the heart. Also in the patient's laboratory test, thrombocytopenia and anemia were observed. In peripheral blood smear (PBS), blast cells were reported, and according to PBS results, bone marrow aspiration and biopsy were done and non-M3 AML was diagnosed.

According to the result of the bone marrow test, the probability that cardiac masses are the chloroma resulting from AML was at the helm of differential diagnosis proposed.

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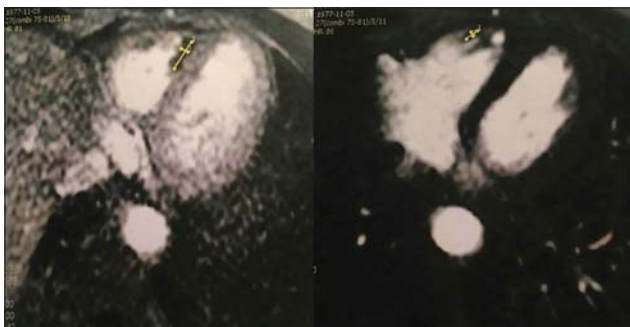
At this stage, due to the patient's poor condition of respiratory distress and severe thrombocytopenia, it was not possible to perform cardiac lesions' biopsy and the patient was treated with induction chemotherapy by mitoxantrone and cytosor. Because of thrombocytopenia, anticoagulant therapy was not possible and then an inferior vena cava filter was deployed. After initiation of chemotherapy, serial echocardiography was performed weekly. After 2 weeks of treatment, the size of cardiac masses began to decrease dramatically, and after 28 days of induction therapy, bone marrow aspiration and biopsy showed complete remission criteria.

At this time, the patient's condition allowed him to be transferred to cardiac magnetic resonance imaging (MRI) center. It showed partial resolution of left ventricular mass and decrease in sizes of RA masses and ventricle which were isosignal in T1 and T2 and heterogeneous late gadolinium enhancement in favor of metastasis.

Thus, consolidation therapy with high-dose cytarabine was started and repeated every 3 weeks [Figure 2]. During four courses of consolidation, lesions gradually became smaller, and with the completion of chemotherapy, before attempting bone marrow transplant, intracardiac masses were completely vanished that is verified in repeated MRI [Figure 3]. Bone marrow transplant was successfully performed, and after 2 months, echocardiography was repeated and only some residual fibrosis was seen [Figure 4]. Now, 10 months after the transplant, the patient's general condition is good.



**Figure 1:** Echocardiography, before treatment



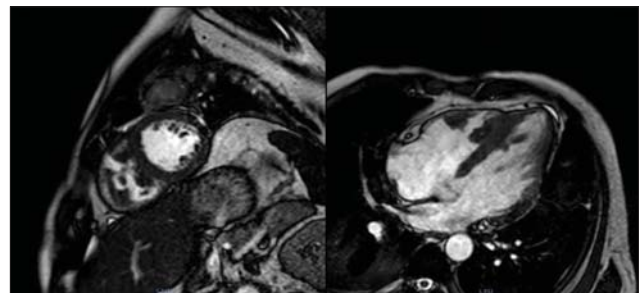
**Figure 3:** Magnetic resonance imaging, 1 month after starting treatment

## DISCUSSION

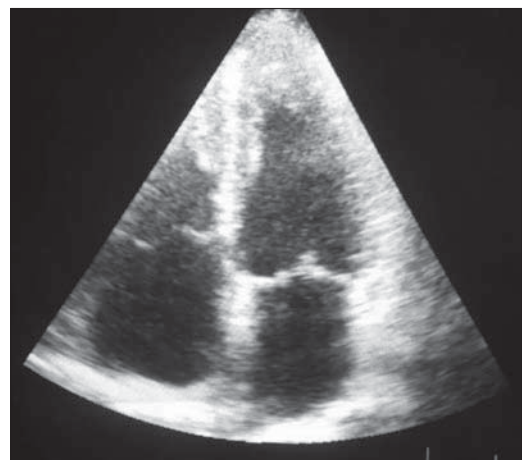
Secondary heart tumors with partial or total intracavitary growth are very rare.<sup>2</sup> Chloroma, also known as myeloid sarcoma, is a localized extramedullary tumor composed of malignant cells of myeloid cell line, most frequently occurring in myelogenous leukemia. Myeloid sarcomas are uncommon and considered poor prognostic when present in patients with AML.<sup>4</sup>

This tumor can affect almost any organ in the body, the most common sites of involvement being bone, soft tissue, lymph nodes, and skin. Cardiac involvement is very rare and usually diagnosed at autopsy.<sup>5</sup> There are a few case reports of cardiac chloroma in the literature most of them in RV and atrium as a solitary tumor or infiltration in myocardium.<sup>6,7</sup>

Involvement of three cardiac chambers (RA, RV, and LV) like our case has not been reported yet in the literature according to our knowledge. There are no physical or laboratory examinations that specifically detect cardiac metastases in tumor disease diffusion. In cases of intracavitary metastases, systolic and/or diastolic murmurs can occur in relation to their location, size, and mobility;<sup>2</sup>



**Figure 2:** Magnetic resonance imaging, at the end of chemotherapy before bone marrow transplantation



**Figure 4:** Echocardiography, 2 months after bone marrow transplant

however, in our case, cardiac physical examination was completely normal. Cardiac echocardiography, CT, and MRI are the main imaging modalities for detailed evaluation of suspected cardiac metastases.<sup>8</sup> An optimal management of chloroma has not yet been developed. The treatment of choice depends on the underlying diseases and also on the chloroma lesion site. In general, chloroma emerging at presentation in combination with AML was treated as AML. Chemotherapy is typically applied as a first-line treatment, and radiotherapy serves as a palliation or consolidation treatment for chloroma. Treatment results for cardiac chloroma have only been addressed by a few studies.<sup>9</sup> Usually, cardiac infiltrations in leukemia and lymphoma respond well to radiotherapy or chemotherapy.<sup>9</sup>

Our case had a complete response to chemotherapy regimen and radiotherapy was not needed; then, bone marrow transplant was performed successfully.

## CONCLUSION

It is extremely rare with heart involvement by chloroma. Nowadays, both CT and MRI are the main imaging modalities for detailed evaluation of suspected cardiac metastases. Chemotherapy is typically applied as a first-line treatment.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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