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A Case Report of a Cardiac Metastasis of Chondrosarcoma

Yaiche Rahma (MD)*, Mansouri Nada (MD), Gargouri Faten (MD), Karima Tlili (MD), Msakni Issam (MD), Laabidi Besma (MD)

Pathology Department. Military Hospital of Tunis, Montfleury, 1008, Tunis, Tunisia

***Corresponding-author:** Dr. Rahma Yaiche, Pathology Department. Military Hospital of Tunis, Montfleury, 1008, Tunis, Tunisia (1). Phone Number: (+216) 22 653 878.

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Abstract

Background: *Chondrosarcomas are malignant bone tumors characterized by formation of cartilaginous matrix and malignant chondrocytes embedded in lacunae. Their cardiac metastasis is extremely uncommon.*

Case: *We report, hereby, the case of a 58-year-old female patient with cardiac metastasis of a known chondrosarcoma.*

Conclusion: *Cardiac Chondrosarcoma is an extremely rare condition with a poor prognosis that could only be improved after complete surgical resection. The presented case could enrich the few documentations listed in literature about this unusual diagnosis.*

Keywords: *Chondrosarcoma, cardiac, metastasis.*

Introduction

Chondrosarcomas (CS) are heterogenous primary malignant bone tumours characterized by formation of hyalin cartilaginous matrix and malignant chondrocytes embedded in lacunae. Their heterogenicity lies in their clinical outcomes, biological findings and their variable response to different therapies [1].

They are considered as the second most frequent solid bone cancer, accounting for approximatively 10-20% of malignant bone neoplasms [2,3].

These generally slow-growing tumors affects adults especially between the 4th and 7th decades of age and are mostly located in the pelvis and proximal long bones [2,4].

Local recurrences are often encountered. Distant metastases arise mainly in the lungs by hematogenous spread [3,4]. However, cardiac metastasis of CS is extremely scarce and has only rarely been reported in the literature, involving in most cases the right atrium (66%) [3,4,5].

We report, hereby, the case of a patient diagnosed with an intracavitary cardiac metastasis originating from a known pelvic chondrosarcoma, collected at the pathology department of the Military Hospital of Tunis, in January 2022.

Case Report

A 58-year-old female patient with a seven-year history of a type 2 diabetes was admitted to the hospital for observation with pleuritic chest pain and progressive dyspnea. Her medical history included a left iliac grade 2 chondrosarcoma, for which she underwent surgical resection in November 2019.

Her medical follow-up was stable and unremarkable with free routine thoracic computed tomography, until about one month prior to the present admission when the patient started experiencing some respiratory problems.

A Chest-Tomography-Scan (CT-scan) was performed and revealed a pulmonary veinous emboli associated to a multilobulated intracardiac mass. For a better characterization of the tissular nature of this lump, cardiac magnetic resonance imaging (C-MRI) was undertaken, confirming the large heterogenous mobile mass previously identified by CT-scan which initially suspected to be of thrombotic origin.

The decision was to remove the cardiac mass surgically and send it to histology. Gross examination showed an arborescent, multilobulated mass of 8 x 3 x 2 cm. The cross- sectional plane was of greyish-beige colour with a myxoid appearance. Histopathological examination demonstrated a neoplastic tissue consisting mainly of malignant cartilaginous proliferation, arranged in diffuse sheets of dense chondroid tissue with minor areas of necrosis. The tumor cells had atypical, hyperchromatic and enlarged nuclei. Some cells were binucleated. One mitotic figure was noted per 10 high power fields. No dedifferentiated zones were observed.

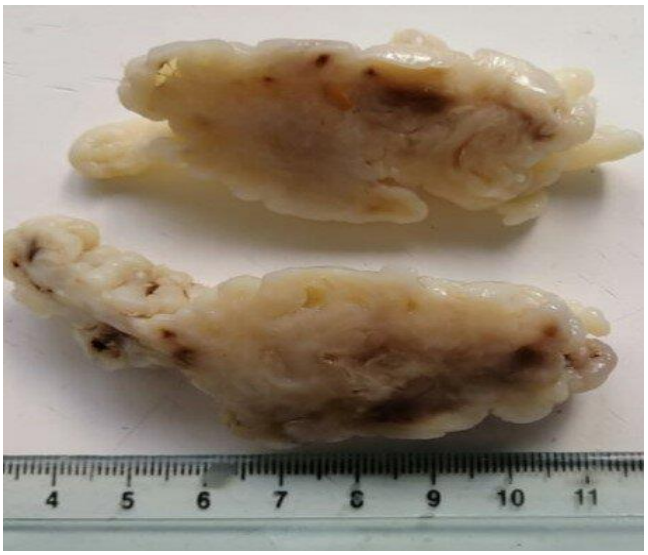

Figure (1): Intra-cardiac mass: Gross exam showing an arborescent lesion with myxoid appearance

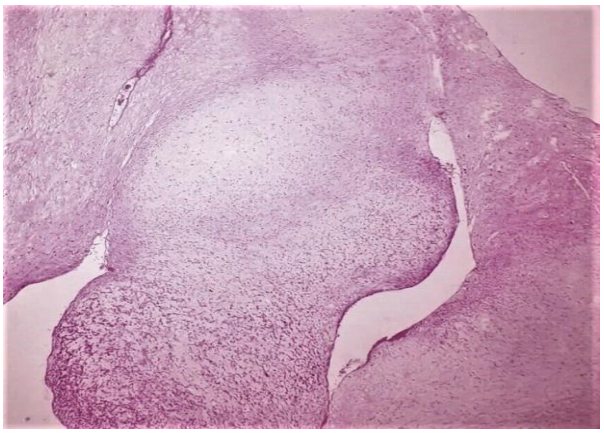

Figure (1A): Histological examination. (HE x 10). Cartilaginous proliferation.

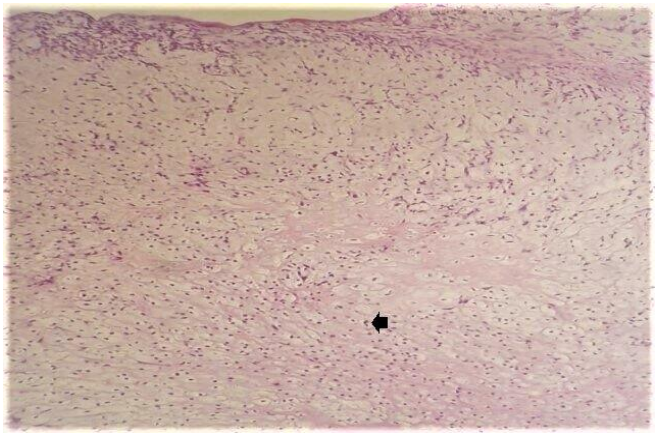

Figure (2B): Histological examination (HE x 20). diffuse sheets of atypical cells including binucleate lacunae (black arrow) within cartilaginous differentiation associated to a myxoid background.

Based on the background of the patient and these morphological features which were similar to the previously identified grade 2 pelvic CS grounded on the first histopathological report, the diagnosis of the resected intracavitary cardiac mass was consistent with a metastasis of her known CS to the right atrium.

Post-operative course was stable, and the patient was referred to the postoperative intensive care unit for monitoring for about 5 days then transferred to a normal room for thirteen more days. She was started on prophylactic unfractionated heparin to avert post-operative deep venous thrombosis, pulmonary embolism and arterial clotting especially after cardiac surgery. A transthoracic echocardiogram was performed before discharge, which showed no residual mass and a right ventricular ejection fraction assessed at 57%.

Nevertheless, close cardiac monitoring was highly recommended after discharge to evaluate her cardiac function especially with her diabetic condition.

Unfortunately, the patient didn't survive as a result of right heart failure occurring three months later despite her initial stabilization.

Discussion

This paper attempts to report an uncommon case of a CS metastatic to the right atrium, through which we highlight some physiopathologic aspects of cardiac metastatic disease.

Indeed, few studies have been devoted to the tumors metastasizing to the heart inspite of being considerably debated topics in oncology field.

Secondary tumors of the heart seem to be relatively more common, approximatively 20 times more than primary cardiac neoplasms [6,7]. For so, four paths for cardiac metastases have been described: hematogenous route via the inferior vena cava or the pulmonary veins, leading to intracavitary dissemination, by direct extension of an adjacent malignancy, through the lymphatic system or the systemic bloodstream. [6,7,8].

Nevertheless, cardiac metastases remain extremely rare. However, some tumours are known to spread preferentially to the heart more than others such as melanoma and mediastinal primary tumors [8]. In our case, it was a CS, a neoplasm which to tend to have a low metastasis rate, remaining locally invasive for a long time [3,6].

When confronted to a patient with cardiovascular symptoms, and especially with a history of known malignancy, the possibility of cardiac metastases should not be overlooked, in addition to the likelihood of thromboemboli formations which are pertinent differential diagnoses [3,7]. That was the case in our observation, with the patient previously treated for CS, presenting, two years later, with chest pain and dyspnea.

It is important to highlight the intimate correlation between cancer and thrombosis due to the impact of the latter on both tumor proliferation and extension [9].

Hence, differentiating thrombus, which is the most frequent cardiac mass, from secondary cardiac tumor growth is crucial and appear to be challenging. To do so, cardiac MRI remains a valuable tool in providing incremental and more accurate information regarding tissue nature, with higher sensitivity than echocardiography [4,10].

Moreover, Azos-lopez et al [11] reported in their study an interesting pattern which can help characterizing thrombi from tumor in cardiac MRI: in case of thrombus, it seems to be more common to find hypointense edges at long T1 and brighter central zone called “the etched appearance”, meanwhile the T2 signal ought to be less hyperintense, even though signal intensity varies with the age of the thrombotic formation.

On the other side, Haslinger et al [6] revealed that a hyperintensity at T2 with a peripheral “rim-like enhancement” was considered suspicious and more consistent with malignancy.

However, it can be difficult to distinguish thrombus from vegetation as they can depict similar aspects in Cardiac-MRI. Hereby, clinical findings and context could be helpful [10].

In our case, cardiac MRI was performed and showed a right intra-atrial mass for which radiological findings were unspecific and the distinction between a neoplastic or thrombotic origin couldn’t be evident. Nevertheless, on the basis of the patient history, the suspicion of a tumor nature of that mass has not been ruled out.

As for therapeutic strategies, several studies demonstrated that chemotherapy and radiation have often no results in clinical benefits upon CS [12]. Thus, surgical resection remains the gold standard of treatment for cardiac CS, whenever the tumor mass is circumscribed, and the patient is operable [3,5]. Its indication involves in the first line, definitive histopathological confirmation of the diagnosis, but also it is recommended for the removal of the obstruction caused by the mass, thereby allowing a certain relief of symptomatology which may improve survival [3,7,12].

However, prognosis of cardiac metastatic CS persists extremely dismal due to heart failure and thromboembolic events secondary to the lump [3,4] and surgery is then considered more as a palliative support for patients [6].

In conclusion, Chondrosarcoma is a malignant bone tumor with often an indolent course. The prognosis is favorable after complete surgical resection. However, hematogenous spread, most frequently to the lungs results in poor prognosis.

Cardiac metastasis originating from chondrosarcoma is a rare condition, under-reported in the literature. The diagnosis is challenging and requires multimodality approach guided by clinical context. Imaging findings based on CT-scans and echocardiography are usually unspecific. In contrast, cardiac MRI is more effective due to its superior tissue characterization. Nevertheless, the ultimate diagnosis of the chondrosarcomatous nature of a cardiac metastasis relies exclusively on pathological examination. Radical surgery for cardiac growth arising in the context of metastatic CS remains the best prophylactic option with possible prognostic benefit.

The present case adds to the limited documentation available regarding this rare diagnosis of cardiac metastatic CS.

Declarations

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None.

Authors contributions:
All authors have made substantial contributions in developing the research idea. All authors also declare that they have read and approved the final version of the manuscript:
writing – original draft and writing- review and editing: YR, Conceptualization: MN, Visualisation: GF, data curation: TK, supervision and validation: MI and LB.

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Data will be made available on request.

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Research Ethics Committee of the military hospital of Tunis has approved the work and confirmed that it does not transgress ethics.

Consent Statement:
Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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