



Huge right ventricular mass revealing a testicular nonseminomatous germ cell tumor

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Background: Cardiac intracavitary metastases from a testicular cancer are very unusual, and intra-cardiac metastasis is exceptionally the first expression of a noncardiac primary neoplasm. We report a case of a young patient for whom a cardiac symptom led to the diagnosis of a metastatic testicular cancer.

Case presentation: Our presentation describes an unusual case of a 32 years-old male patient admitted for dyspnea, in whom full examination and tests led to the diagnosis of a huge right ventricular mass revealing a testicular malignant teratoma. As the mass was huge and obstructing the root of pulmonary artery, we had decided to opt for surgical treatment in order to remove the obstruction of the pulmonary trunk. Subsequently, the patient has received systemic adjuvant chemotherapy.

Conclusions: Here, we describe the world's first reported case of intraventricular metastasis from a nonseminomatous germ cell tumor of the testis which occupies almost all the right ventricular volume and extending to the root of pulmonary artery that underwent surgical resection of the ventricular mass before chemotherapy.

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Keywords: Intra-cardiac metastases, Nonseminomatous germ-cell tumor of the testis, Chirurgical treatment, Palliative treatment

Introduction

Cardiac intracavitary metastases are very uncommon. We report the case of a 32-year-old male patient who was suffering from dyspnea. Results of transthoracic echocardiography

(TTE) and computed tomography revealed a large intraventricular mass and a mass in the left testicle, with a heterogeneous aspect and multiple calcifications. The patient underwent a left inguinal orchidectomy and a resection of the ventricular tumor with tricuspid valvuloplasty. The anatomicopathological study revealed a malignant mixed

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germ cell tumor (GCT) with a secondary localization in the right ventricle. Afterward, the patient received systemic adjuvant chemotherapy.

Case report

A 32-year-old man with no medical history who was suffering from rapidly progressive dyspnea associated with incoercible vomiting pre-

sented to our institution. Results of his cardiovascular and pulmonary physical examination were normal. TTE revealed a huge right ventricular mass occupying all the ventricular volume (Fig. 1A). While reexamining the patient, we detected a left scrotal mass that was hard and painless. The scrotal ultrasound confirmed the left testicular mass with a normal-appearing right testis. Computed tomography

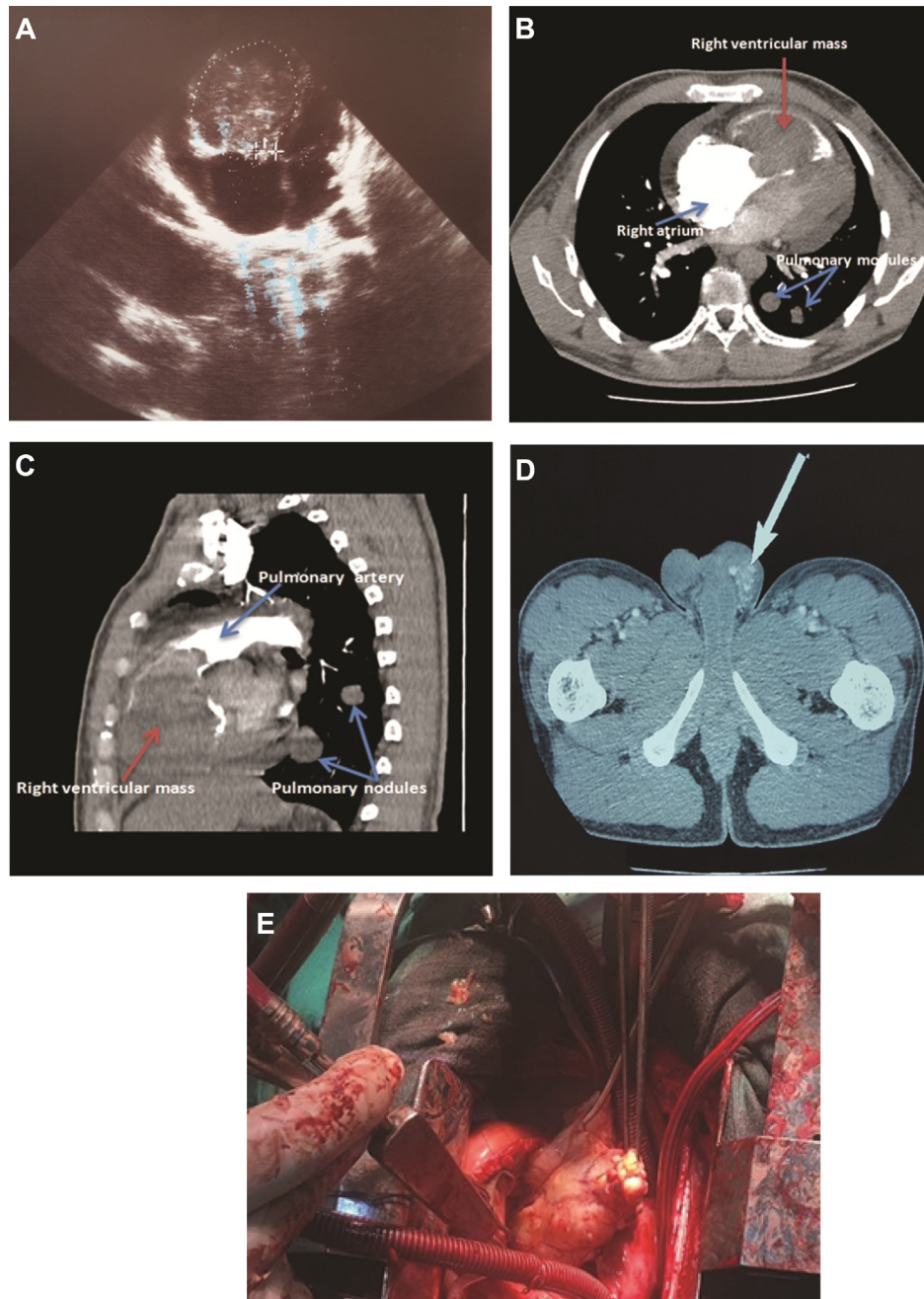


Figure 1. (A) Transthoracic echocardiography revealing a huge right ventricular mass occupying almost all the ventricular volume. (B and C) Chest computed tomography showing the presence of the solid mass that extending to the root of pulmonary artery with multiple pulmonary nodules. (D) Testis computed tomography showing a heterogeneous aspect with multiple classifications of left testicle. (E) Surgical view of the right ventricular mass.

of the head, chest, abdomen, and pelvis confirmed the presence of a solid intraventricular mass measuring 79.4 mm × 80.7 mm and extending to the root of the pulmonary artery with multiple pulmonary nodules (Fig. 1B and C), as well as a mass of the left testicle, with a heterogeneous aspect and multiple calcifications (Fig. 1D). Levels of tumor markers (alpha-fetoprotein, lactate dehydrogenase, and beta-human chorionic gonadotropin) were very high. After agreement was reached between the cardiovascular surgeon, anesthetist, and urologist surgeon, one-stage cardiac surgery with left-side inguinal orchidectomy, under cardiopulmonary bypass was planned. The operative findings revealed a tissue mass occupying the entire right ventricle, which was very adherent to the ventricular surface of the tricuspid valve, to the diaphragmatic and anterior face of the right ventricle, and extending through the pulmonary valve into the pulmonary trunk. The pulmonary artery was clamped to prevent embolization into the lungs. The surgical procedure consisted of a careful liberation of the mass from the different structures to which it adhered. Because the mass was very adherent, complete resection could damage the contractile function of the right ventricle; so we just resected 80% of the mass. Also, tricuspid annuloplasty (De Vega) with reinsertion of the cords on the papillary muscles of the right ventricle was carried out with difficulty. Simultaneous left inguinal orchidectomy was performed, all with good postoperative evolution. The patient was discharged from the hospital on the 10th postoperative day. Echocardiographic control showed, 20 days after surgery, a dilated right ventricle with moderate systolic dysfunction and a moderate to severe tricuspid regurgitation. The anatomopathological study of the removed testicular tissue revealed a malignant mixed GCT combining a polydermal teratoma in malignant transformation of its embryonic component to a primary neuroectodermal tumor (90% of the tumor) and a yolk sac tumor (10% of the tumor). The spermatic cord, vaginal, and albuginea were free from tumor invasion without any intravascular tumor emboli. Histology of the right ventricular mass revealed a secondary localization of the testicular malignant mixed GCT. Afterward, the patient received four cycles of systemic adjuvant chemotherapy (cisplatin, etoposide, and bleomycin) with a good initial evolution. However, 5 months after the operation, the patient died because of severe ventricular arrhythmia.

Discussion

Heart metastases occur far more frequently than primary tumors [1]. According to the recent autopsy studies, cardiopericardial metastases have been found in 7.1% of autopsies of patients with cancer and in 2.3% of individuals in unselected autopsy series, with an increasing incidence after 1970 [2–4].

Cardiopericardial metastases are more frequently observed in carcinomas of the lung, breast, melanoma, esophagus, kidney, malignant lymphoma, and leukemia [2,5]. Noting that, the highest frequency of heart metastases are from melanoma with a rate of 50% of cases [6]. The pericardium is the most common cardiac metastasis location, whereas intracavitary lesions are rare [7]. The spread of testicular neoplasms to the heart is extremely rare [6], and the right side is more commonly involved than the left side [8].

Direct intravenous extension via the inferior vena cava is likely the most common source of right-sided heart metastasis in testicular cancers. This could be explained by the particularity of the venous drainage of the testis, which is carried out directly in the inferior vena cava system. In addition, among 13 reported cases of nonseminomatous GCT involving the right-sided heart, 11 had a caval provenance [9–19].

Intracardiac metastases are often asymptomatic, and 1% of patients develop symptoms as a result of intracavitary or intramyocardial involvement [20]. The occurrence of cardiac manifestations such as dyspnea, cough, palpitations, syncope, thoracic pain, signs of heart failure, or a new cardiac murmur in a patient diagnosed with a primary tumor in an organ other than the heart, should alert the clinician to the possibility of intracardiac metastases [20,16,21]. Metastatic tumor in the heart indicates usually widespread metastases in a plethora of body organs, and is rarely the first or the only expression of a noncardiac primary neoplasm [22]. In our case, intracardiac metastasis was the first expression of testicular malignant mixed GCT.

Electrocardiography changes are nonspecific, and depend on the location and extension of the lesion [23].

TTE is the initial imaging test for the detection of cardiac metastases, although chest computed tomography, transesophageal echocardiography, and magnetic resonance imaging also provide excellent anatomic information about cardiac metastases. Cytological examination of pericardial fluid in patients with pericardial effusion is of

great value for the diagnosis, although diagnostic certainty requires a pathological examination of the heart mass obtained by an open or a transthoracic surgical biopsy [24].

Most cardiac metastases are diagnosed in the setting of generalized carcinomatosis. At this stage, the treatment should be palliative and aims to prevent or to slow down symptom recurrence [24]. Surgical resection is usually reserved for cases when the heart is the only site of metastasis, with technical feasibility of a complete resection [2,25]. In these cases, surgical resection offers better chances of prolonged survival despite the significant perioperative mortality (40%) [2]. For specific cases of intracardiac vital structures' obstructions, surgical resection may be necessary in spite of the risk of unsatisfactory outcomes [26]. Postoperative chemotherapy and/or radiotherapy should be given to reduce the chances of local recurrence [24].

Surgical treatment may be delayed after chemotherapy and/or radiotherapy to promote the complete resection of the mass. Of 25 reported cases of nonseminomatous GCT involving the heart, 16 underwent surgical resection after chemotherapy to eliminate the residual tumor [27].

In our case, as the mass was huge and obstructing the root of the pulmonary artery, the surgery was essentially done to remove the obstruction. It should be noted that this patient represents the first case in which an intraventricular metastasis from a nonseminomatous germ cell tumor of the testis occupies almost all the ventricular volume and extending to the root of pulmonary artery that underwent surgical resection of intracardiac mass prior to chemotherapy.

The long-term prognosis of testicular GCT metastasizing in the heart depends on the histological type and the completeness of the surgical excision [28]. Whatever the selected treatment of cardiac metastases is, the prognosis is often disappointing and patients die generally within a year of the diagnosis. Occasionally, patients may survive for several years (5-year survival rate is 7%) [2]. This poor prognosis makes it important to involve a multidisciplinary team in the evaluation and management of the patient with cardiac metastases in order to select the appropriate mode of therapy, with a rather restrictive approach to the use of heart surgery.

In summary, we presented a case of a young healthy adult in which a cardiac symptom led to the diagnosis of a metastatic testicular cancer. This case highlights that the diagnosis of cardiac

metastases should be suspected whenever cardiac manifestations occur in a patient diagnosed with a primary tumor in an organ or tissue other than the heart.

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