

Metastatic Tumor of Squamous Cell Carcinoma from Uterine Cervix to Heart: *Ante-Mortem* Diagnosis

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Sixty-three-year-old woman with a past medical history of uterine cancer and complaint of fatigue and dyspnea on mild exertion. Physical examination revealed hypertension and rales at lung bases. A transthoracic echocardiogram showed a mass with reduced mobility in the right ventricle. The patient was taken to surgery during which a mass involving the anterior wall of the pulmonary artery, tricuspid valve, right atrium, and posterior wall of the right ventricle was found. The pulmonary artery and the right ventricle were reconstructed with a bovine pericardium patch and the tricuspid valve was replaced by a number-31 biological prosthesis. The pathological examination revealed metastasis of squamous cells with well-differentiated infiltrative areas. The patient was discharged one month after surgery. Four months later, however, she was readmitted to hospital in terminal stage, confirming the guarded prognosis of the disease at this stage.

Cardiac metastases from squamous cell carcinoma of the uterine cervix are uncommon findings; however their diagnosis and successful surgical treatment are even rarer.

Among the several different types of neoplasia that may affect the heart, secondary tumors are 40 times more common than primary tumors¹ and the most varied types of tumors may attack the heart. The main tumors to metastasize to the heart are, in descending order, melanoma, leukemias, bronchogenic tumors, and breast cancer. Metastasis from squamous cell carcinoma of the uterine cervix is one of the less frequent metastases, occurring in 5.9% of the cases².

The metastatic squamous cell carcinoma of the uterine cervix is one of the less common secondary tumors and it is difficult to be diagnosed; most of them are only found in autopsies. When symptomatic, it may cause arrhythmias, and may lead to complete heart block, pericardial tamponade, congestion due to myocardial replacement by tumor cells, intracardiac obstructions, myocardial infarction, peripheral embolism, and others. True myocardial infiltration or a simple intracardiac extension of the vena cava or of the pulmonary vein may occur³.

In the present case, we report the *in vivo* diagnosis and the importance of considering cardiac metastasis in carcinoma of the uterine cervix, since this is a common disease among women and the symptoms of metastases are unspecific.

Key words

Metastatic tumor, squamous cell, *in vivo*.

Case Report

Female, 63 years of age, born in the State of Santa Catarina, Brazil, was referred to the Department of Cardiovascular Surgery of a University Hospital in the city of Curitiba with a previous diagnosis of cardiac tumor and past medical history of uterine cervix cancer diagnosed at the age of 30 after three miscarriages, and treated with surgical resection (conization), 35 sessions of radiation therapy, and 3 sessions of chemotherapy.

Two months prior to the hospitalization for evaluation of the cardiac tumor mass, the patient underwent angioplasty, and the obstruction of the anterior descending coronary artery was reduced by 80%. At admission she complained of fatigue and dyspnea on mild exertion. Physical examination revealed hypertension (blood pressure of 180x100mmHg), and crepitant rales at lung bases, with no other findings.

Laboratory tests: Chest radiograph with mild signs of pulmonary congestion; electrocardiogram showing area of inactivation in the anterior wall and T wave inversion in leads V3 and V4 (Fig. 1). The echocardiogram showed the presence of a mass with reduced mobility in the right ventricle, but a point of fixation could not be identified (Fig. 2); sclerosis in aortic valve and moderate tricuspid valve regurgitation, although no systolic murmur in the tricuspid area had been detected in physical examination. Systolic pressure in the pulmonary artery was estimated at 39mmHg. Doppler demonstrated mitral transvalvar flow compatible with alteration in left ventricle relaxation. Computed axial tomography (CAT) of the thorax showed an image suggestive of an approximately 3cm-thick pericardial effusion (Fig. 3) which was not enough to cause muffled heart sounds in physical examination. CAT of the pelvis revealed uterine enlargement.

During the clinical course, the patient was taken to surgery with resection of the tumor mass, which extended from the upper wall of the pulmonary artery up to the posterior wall of the right ventricle. Bovine pericardium patches were implanted to reconstruct these structures. The tricuspid valve that was infiltrated by the tumor was also replaced by a number 31 bovine pericardium biological prosthesis.

Pathological examination demonstrated 5 irregular fragments similar to one another. The larger one was 4.5x2.0x0.7 cm formed by a white rosy elastic tissue with one of its surfaces covered with a yellow smooth homogeneous 0.2cm-thick tissue (Fig. 4). Intracardiac squamous cells

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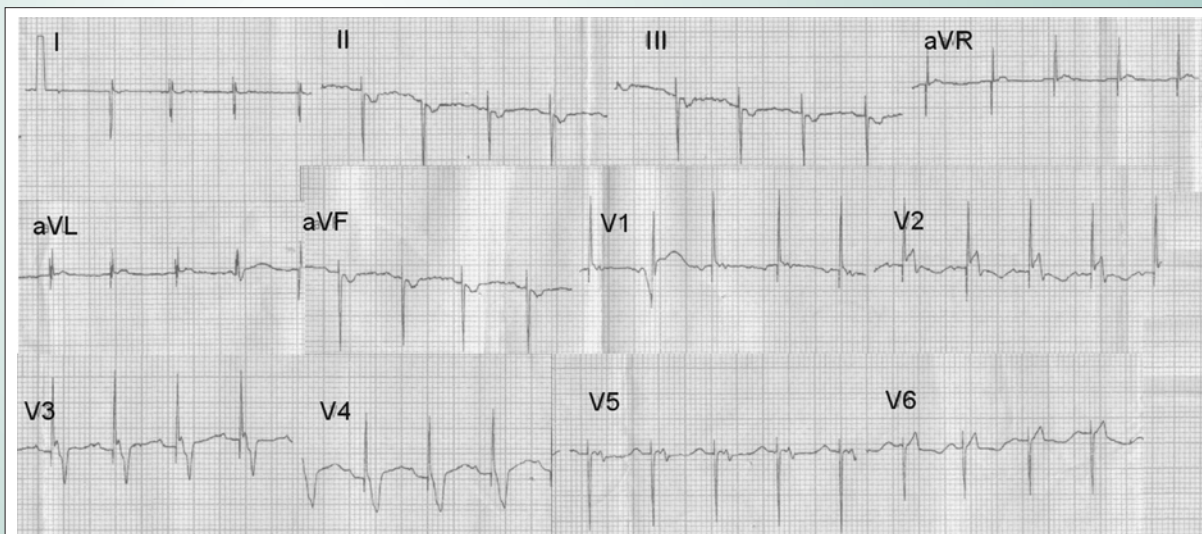


Fig. 1 - ECG with area of inactivation in the anterior wall and T wave inversion in leads V3 and V4.

with well-differentiated and infiltrative areas were seen in microscopic examination (Figs. 5 and 6).

The patient progressed to a complete heart block and low cardiac output following surgery and required a temporary pacemaker, which was replaced by a permanent atrioventricular epimyocardial pacemaker after withdrawal of the extracorporeal circulation.

The post-operative echocardiography showed dyskinesia of the mid-apical region of the septal wall, aneurysm of the interatrial septum, and obliteration of the apex of the right ventricle. The patient was discharged after a 1-month hospitalization and was followed in an outpatient basis for four months, which was our last contact with her family who reported that the patient was in terminal stage.

Discussion

The incidence of secondary tumors is higher than that of primary tumors. However, these statistics do not seem

to corroborate the clinical practice, since metastatic cardiac tumors, in their majority, are diagnosed *post-mortem*.

Experiments in laboratory animal suggest that the failure to develop myocardial metastases in 80 to 98% of the patients with metastatic cancer is due to some protective factors⁴.

According to Prichard (1951), there are four factors that contribute to the low rate of metastasis to the cardiac site: 1) the strong myocardial contraction, 2) the peculiar metabolism of the striated muscle, 3) the high speed of the blood when it passes through the heart, and 4) the distance between the cardiac area and the lymphatic vessels.

The symptoms and complications caused by metastatic tumors to the heart depend on their extension and on the site where

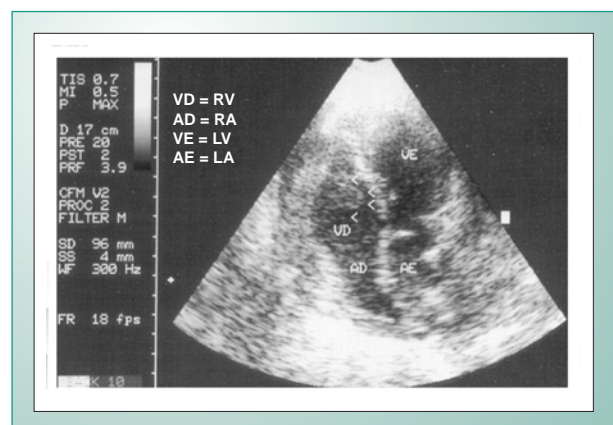


Fig. 2 - Echocardiogram showing mass with protrusion into the right ventricle cavity (apical incidence four chambers transthoracic).

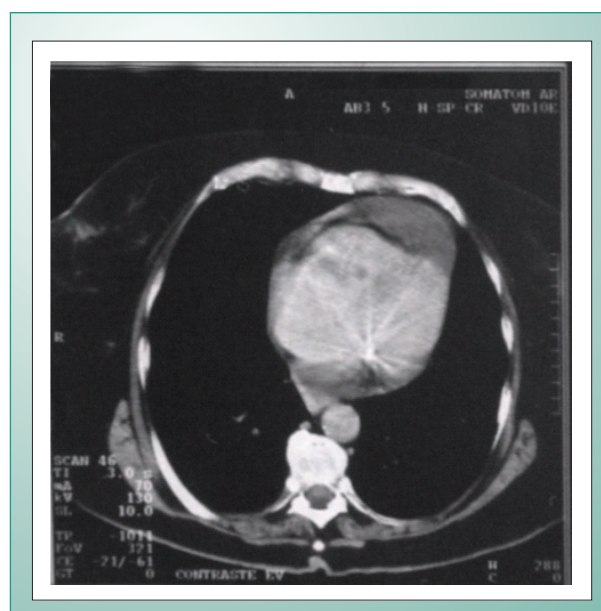


Fig. 3 - Computed axial tomography showing an approximately 3-cm thick pericardial effusion.

tumor cells attach. Because of this variation, the most different clinical presentations can be found from dyspnea, syncope,

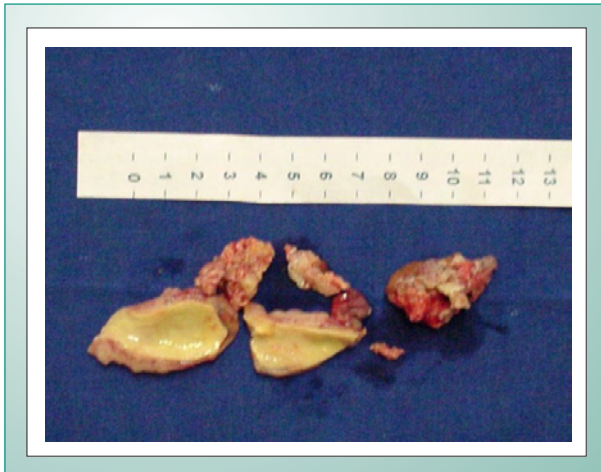


Fig. 4 - Tumor mass removed from the right ventricle and pulmonary artery.

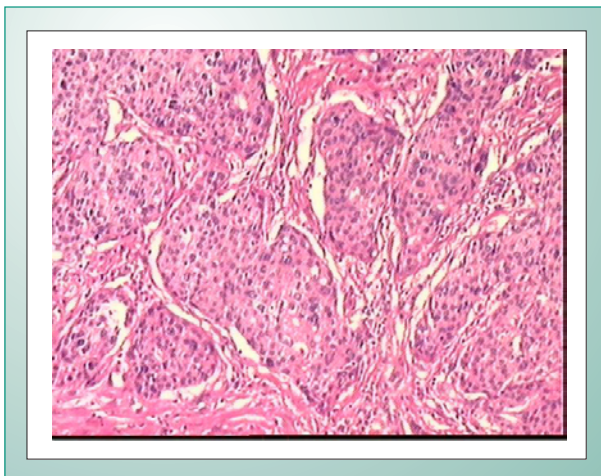


Fig. 5 - Photomicrography of the resected mass showing intracardiac squamous cells with well-differentiated and infiltrative areas (magnification x40, hematoxylin-and-eosin staining).

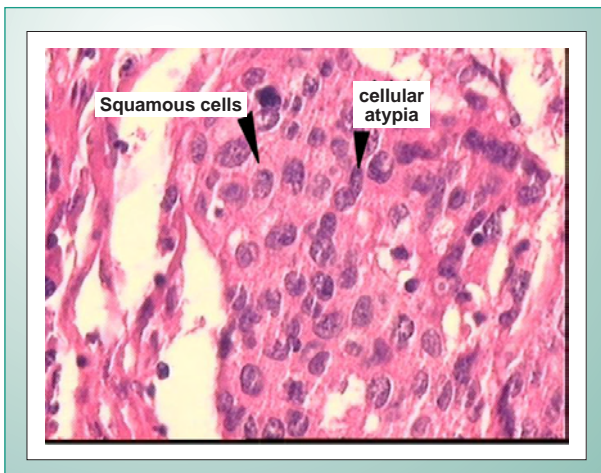


Fig. 6 - Photomicrography of the resected mass showing squamous cells with cellular atypia (magnification x400, hematoxylin-and-eosin staining).

anasarca, heart valve diseases, heart tamponade to chronic pulmonary thromboembolism and acute myocardial infarction⁵. Tumoral involvement frequently mimics other conditions, a fact that enables many authors to state that the diagnosis of neoplastic cardiomyopathy should be considered challenging in the daily clinical practice³. In the present report, the patient presented with non-specific symptoms such as fatigue and dyspnea on mild exertion, which was little suggestive of the presence of an extensive metastasis in RV, a diagnosis that was confirmed only after an echocardiogram was performed and which proved to be a very useful test to detect mobile tumors in heart chambers⁶.

In cases of carcinoma of the uterine cervix, the diagnostic confirmation of cardiac metastasis can also be made using Ga-67 or FDG scintigraphy. The difference between these two methods is that FDG is more sensitive for small lesions⁷.

The pericardium is the most common site of metastasis, and endocardial involvement is rare. In a series of 407 autopsies with cardiac tumors, Mukai et al (1988) found 19% of pericardial involvement, 33% of epicardial involvement, 42% of myocardial involvement and only 6% of endocardial involvement².

Metastases of carcinoma of the uterine cervix firstly affect paracervical lymphatic vessels progressing to paraaortic lymph nodes and then cause distant lesions involving mainly the lungs, and liver and bones in the sequence. Cardiac involvement is rare; the right ventricle is the most frequently involved, followed by the endocardium. The septum and left ventricle may occasionally be involved⁸⁻¹⁰. Autopsy studies show an incidence of cardiac metastasis of uterine cervix tumors between 3 and 4%¹.

Until 1993, only two cases of endocardial involvement diagnosed *ante mortem*⁸ had been described in the literature. The prognosis for these patients is extremely poor; however, studies have shown that an aggressive treatment with chemotherapy, radiation therapy and thoracocentesis may improve the survival and quality of life of these patients.

Some patients with secondary tumors may benefit from surgical intervention, but the patient's imminent risk of death should be initially considered as well as the prognosis and survival of the underlying disease. Surgery is rarely necessary, except for establishing a diagnostic line or decompressing pericardial effusions. However, in the presence of an obstructive mass, resection may be helpful to manage invasive and non-invasive tumors. The best results have been obtained in patients whose primary sites had been successfully treated months before or those in whom total tumor resection could be performed³. The analysis of the cases diagnosed *in vivo* shows that few survive surgical treatment².

With this report we point out the importance of the investigation of cardiac metastasis in the presence of uterine cervix tumors, even in asymptomatic patients. In a previous study⁶, as well as in the present study, the echocardiogram proved to be an excellent diagnostic test for these patients.

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Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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