Echocardiographic Presentations of Isolated Metastasis of Mediastinal Carcinoid to the Left Ventricle: A Case Report

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September 24, 2021

Abstract

Abstract A mediastinal carcinoid is a low-grade malignant tumor, which has low risk of metastasis, and cardiac metastasis is even rarer. When a patient has cardiac metastasis, the primary carcinoid is usually widely metastasized. In this case report, we presented occurrence of isolated left-sided cardiac metastases ten years after surgical removal of left anterior superior mediastinal carcinoid.

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A mediastinal carcinoid is a low-grade malignant tumor, which has low risk of metastasis, and cardiac metastasis is even rarer. When a patient has cardiac metastasis, the primary carcinoid is usually widely metastasized. In this case report, we presented occurrence of isolated left-sided cardiac metastases ten years after surgical removal of left anterior superior mediastinal carcinoid.

Keywords:carcinoid, cardiac tumors, echocardiography

Introduction

A mediastinal carcinoid is a low-grade malignant tumor, which has low risk of metastasis, and cardiac metastasis is even rarer. Here we presented an isolated left ventricle mass in the absence of other metastases ten years after surgical removal of carcinoid.

Case presentation

A thirty-three-year-old man underwent surgical resection of left anterior superior mediastinal tumor in May 2007. Intraoperative observations were as follows: A tumor was located in the left anterior superior mediastinum, approximately 10 cm × 12 cm in size, and it exhibited some capsule breakdown with a rough surface. The tumor had extensive adhesion with the chest wall, pericardium, and septal nerve. According to these observations, a diagnosis of malignant tumor was made. Therefore he underwent total tumor resection and phrenicectomy by thoracotomy. Postoperative pathologic examination revealed mediastinal carcinoid. Recently, the patient was admitted with complaint of chest pain at resting position without obvious trigger. On July 15, 2018, he underwent two-dimensional echocardiography and the following findings were revealed. High echogenic masses, which were 83 mm × 61 mm and 45 mm × 25 mm in size in the left ventricle (LV)(Figure 1)and LV wall epicardium(Figure 2), respectively. The mass within the LV swung slightly and

appeared to be associated with the inferior LV wall and apex. LV dilation with LV end-diastolic diameter of 68 mm. Reduced LV systolic function, with LVEF of 44%. Pericardial effusion of 8 mm. PET/CT imaging also revealed masses in the LV and at lateral posterior LV wall near the apex, with local hypermetabolism and high SUV_{max} of 6.5(Figure 3).These results indicated cardiac malignant tumor without metastasis to other sites. On July 25, 2018, he underwent LV neoplasm resection. Intraoperative observations showed that the tumor was fragile and located inside the LV with a wide base and connected extensively to the ventricular septum and apex. Due to the tender texture and wide invasion to the LV, it was difficult to remove the tumor completely. Pathologic examination showed neuroendocrine tumor, equivalent to an atypical carcinoid, with invasion into cardiac striated muscle tissue, which suggested mediastinal tumor metastasis (Figure 4).He died about a month later after the operation because of heart failure.

Discussion

Carcinoid tumors are slow-growing, low-grade malignancies derived from neuroendocrine cells. Carcinoid tumors can be invasive and can metastasize to lymph nodes and the liver. However, carcinoid tumors usually have good prognosis because they are generally well differentiated and grow slowly. Over 70% of carcinoid tumors arise along the digestive tract and are infrequently found in mediastinum.[1] Mediastinal carcinoid tumors usually derive from thymic enterochromaffin-like cells or ectopic growth of bronchial mucosal argyrophilic cells during foregut embryonic development. Mediastinal carcinoid tumors are often seen around the major blood vessels and pericardium at the base of the heart. They can grow along the vascular space and compress and invade large blood vessels and pericardium.

The incidence of cardiac tumors is low. The modes of carcinoid tumors metastasis include direct diffusion, lymphatic metastasis and hematogenous metastasis [2]. In this case, the coronary vessels, located in the epicardium or superficial myocardium underneath the epicardium, branch towards the heart wall at right-angle, invade the myocardium from the epicardium and then invade the endocardium. Regarding cardiac metastases, pericardium metastasis has the highest incidence, about 90%, while cardiac chamber and myocardium metastases occur in about 10% cases. About 7% patients with cardiac metastases will have signs and symptoms of heart dysfunction.[3] In this report, the patient had reduced LV systolic function, with EF of 44%. About 11–60% carcinoid patients have carcinoid heart disease,[4] which typically causes valve and endocardium diseases leading to right ventricular failure. The common symptoms include tricuspid and pulmonary valve regurgitation or stenosis and they mainly occur in late-stage carcinoid patients with liver metastasis. In 74 patients with carcinoid heart disease, three had cardiac metastasis.[5] The patient in this report did not have valve involvement, but had masses within the LV, myocardium, and epicardium. Moreover, the mass within the LV swung slightly. Once tumor tissues shed, they may cause infarction in vital organs, which might be life threatening.[6] The patient decided surgically removed the mass at last.

Conclusion

Although the incidence of myocardial metastasis is low, we should be aware that it indicates poor prognosis. So patients with a history of carcinoid tumors who presents with cardiopulmonary symptoms should undergo prompt evaluation for possible cardiac metastasis.

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Figure legends

Figure 1 Transthoracic echocardiography showing a large round and high echogenic mass in the left ventricular. M, mass; LV, left ventricle.

Figure 2 Transthoracic echocardiography showing a high echogenic mass attaching to the LV wall epicardium.M, mass; LV, left ventricle.

Figure 3 PET/CT imaging showed masses in the LV and at lateral posterior LV wall near the apex, with local hypermetabolism and high SUV_{max},M, mass; LV, left ventricle.

Figure 4 Pathologic examination showed neuroendocrine tumor, equivalent to an atypical carcinoid, with invasion into cardiac striated muscle tissue, which suggested mediastinal tumor metastasis.