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Cardiac metastases from a squamous cell lung carcinoma in the absence of local recurrence – a unique case

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Abstract. – OBJECTIVE: Metastatic tumors of the heart are much more frequent than primary tumors. In this paper, we present the uncommon case of heart metastases of a squamous cell lung carcinoma.

CASE REPORT: The study is a description of a unique case of cardiac metastases from lung cancer in the absence of local recurrence. The patient had a squamous cell lung carcinoma and underwent pulmonectomy two years before, followed by four cycles of chemotherapy.

RESULTS: We report this case to raise the awareness of cardiac manifestations of neoplastic diseases that are usually underdiagnosed.

CONCLUSIONS: According to our knowledge, there is no such case described in the literature. Heart metastases are significantly underdiagnosed. Although the survival prognosis is very poor, earlier diagnosis could provide the chance to start the treatment and to prolong patients' life.

Key Words:
Lung cancer, Cardiac metastases, Electrocardiography.

Introduction

Lung cancer is the most common cause of cancer death in both women and men. Every year, more people die of lung cancer than of colon, breast and prostate cancer combined. Taking the histopathology result into account, the primary lung cancers can be divided into two groups: heterogenous non-small cell lung carcinoma (NSCLC) and small-cell lung cancer. NSCLC diagnosed at an early stage can be surgically treated. In more advanced stages, chemo-or chemoradiotherapy are administered and, in some cases, the target points for biological and immunological treatment can be found[1-3]. Small-cell lung cancer is treated with chemo- or chemoradiotherapy.

Lung cancer often leads to the development of metastatic changes in regional and distant lymph nodes, bones, the central nervous system, the liver or adrenal glands[2]. Cardiac metastases are among the least known issues in oncology with only a few studies dedicated to this topic[4]. Although primary tumors of the heart are uncommon, the incidence of metastatic tumors is higher, and they are significantly underdiagnosed.

Together with new methods of treatment, early diagnosis is the best method of prolonging patients' life and improving its quality.

Case Report

A 70-year-old male was presented in October 2016 with an episode of mild hemoptysis, retrosternal pain on the day of presentation and dysphagia for a period of one month. The patient had a history of arterial hypertension, myocardial infarction in 2010 and left pulmonectomy due to a squamous cell lung carcinoma, followed by four cycles of chemotherapy in 2014.

The initial ECG revealed sinus rhythm 99/min, normal heart axis, negative T waves in the leads I, aVL, V4-V6, pQ segment depression in II, III, and aVF leads.

Laboratory results demonstrated mild anemia, D-dimer level of 3392 ng/mL (normal <500 ng/

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mL), troponin I level of 13.91 mcg/L (normal < 0.04), leukocytosis of 9.98 x 10^{12}/L with a left shift, and C-reactive protein level of 141 mg/L (normal < 5).

On auscultation, there was normal vesicular sound over the remaining right lung. The patient was stable at cardiovascular and respiratory level.

He underwent angio-computed tomography extended with ECG-gating in the arterial and venous phase and with the performance of secondary gated reconstruction within a range of 5-95% of the cardiac action cycle. This procedure excluded pulmonary embolism but revealed a small amount of pericardial effusion, enlarged periaortic lymph nodes (20 mm in diameter) and four metastases to myocardium, pericardium and epicardial fat, with the largest measuring 35 × 28 × 25 mm (Figure 1).

Transthoracic echocardiography demonstrated an ejection fraction of 60%, grade 2 mitral regurgitation, grade 2 tricuspid regurgitation, and grade 1 aortic regurgitation. At the axis of the left ventricle, there was an anechoic space measuring 2.3 × 1.7 cm.

The structure described in transthoracic echocardiography was not visible in the transesophageal evaluation. In the lumen of the left atrium, an irregular, hyperechogenic mass was visible with a maximum thickness of 2.3 cm. The mass was coming from the opening of the left pulmonary veins and was expanding along the wall of the atrium above the ascending aorta and above the interatrial septum within the area of the pulmonary trunk. One of the protrusions of the pathological mass was "crawling" on the anterior mitral cusp.

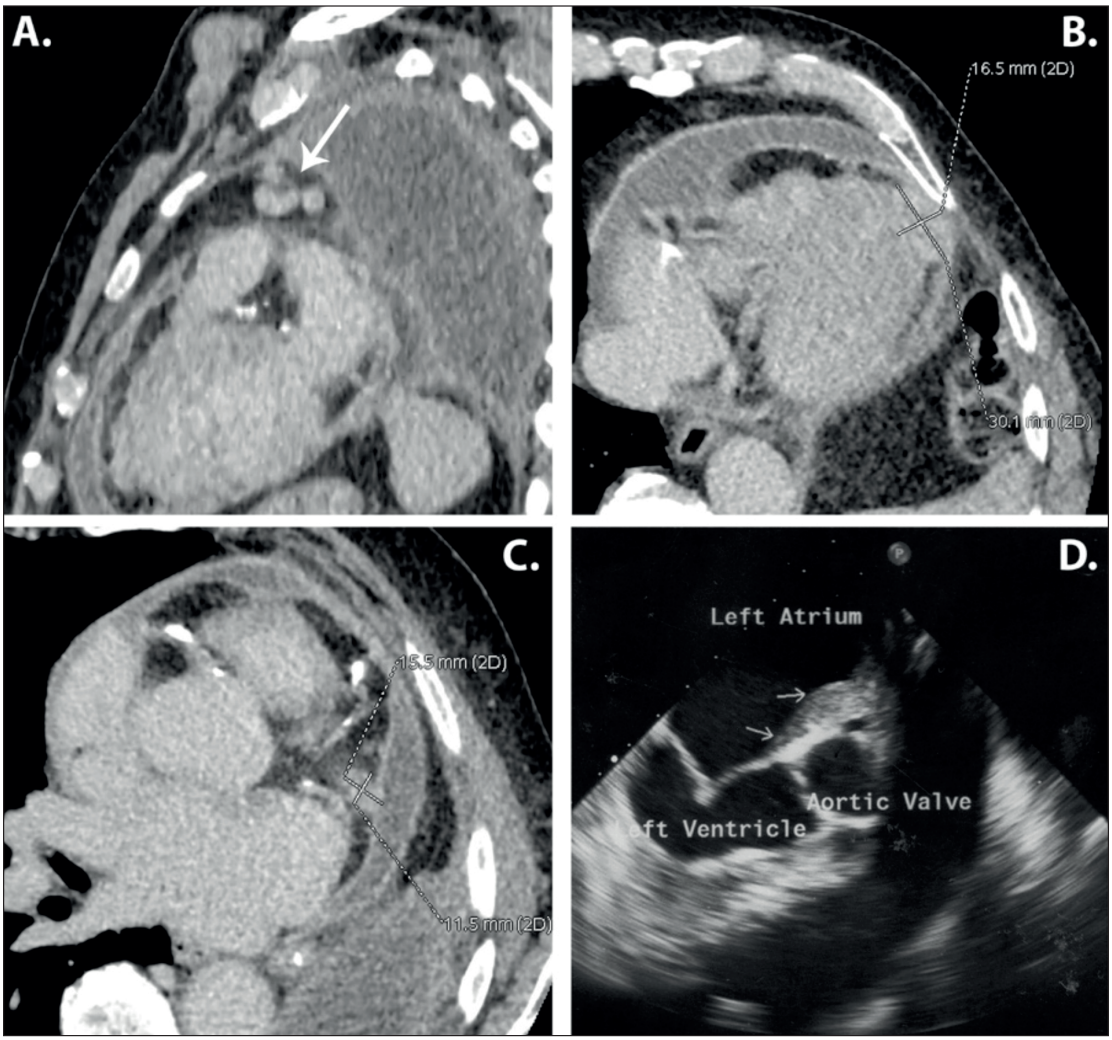

Figure 1. A, Enlarged periaortic lymph nodes. **B, C**, metastases to myocardium and pericardium. **D,** pathological mass in the lumen of the left atrium.

The patient did not give consent to a myocardial biopsy. In the absence of any primary or metastatic tumors in the remaining lung, neck, abdomen and pelvis, it was assumed that the changes described above were metastases from lung cancer and the patient was referred for palliative chemotherapy.

Discussion

Metastatic tumors of the heart are much more frequent than primary tumors[5]. In a post-mortem study[6] of 7289 patients with malignant neoplasms, a 9.1% prevalence of heart metastases was found. The highest occurrence of cardiac metastases was reported in pleural mesothelioma (48.4%), melanoma (27.8%), lung adenocarcinoma (21%), undifferentiated carcinoma (19.5%), lung squamous cell carcinoma (18.2%), and breast carcinoma (15.5%). Heart metastases are usually present in the disseminated phase of neoplastic disease; cardiac metastases as the primary manifestation of a neoplasm located elsewhere in the body are very uncommon[7], although described in the literature[8]. Neoplastic cells can reach the heart directly by extension, through hematogenous or lymphatic spread or dissemination through blood vessel walls[6]. Myocardial and epicardial metastases usually antecede the spread to the pericardium[6] which is the most common site of heart metastases[9].

Since metastases to the heart can lead to hemodynamic instability, they should be diagnosed as quickly as possible. The patient should be taken care of by a multidisciplinary team consisting of a cardiologist, oncologist, radiotherapist and pulmonologist[6]. In the majority of cases, heart metastases are underdiagnosed or diagnosed postmortem as they are clinically silent[6,10,11]. Due to the lack of data from clinical trials of a high number of cases, the survival prognosis for patients with heart metastases is difficult to predict. Clinical observation shows that in most cases, it is unfortunately poor[12].

In the presented case, the patient underwent radical treatment for a squamous cell lung carcinoma 22 months before admission to our Department. Besides periaortic lymph nodes, which potentially could be enlarged because of metastases, the heart was the only location of the pulmonary carcinoma recurrence. According to our knowledge and the data in the literature, this is the first case describing cardiac metastases from lung cancer in the absence of local relapse.

Echocardiography, especially transesophageal, is recommended as the investigation of choice for diagnosis and preliminary evaluation in heart metastases[7]. Computed tomography and magnetic resonance provide additional anatomical information, allowing for the distinction between the tumor and the myocardium and an initial assessment of tumor character (primary/metastatic) and malignancy[12,13].

The patient in question underwent four cycles of palliative chemotherapy and a total regression according to RECIST criteria was observed. After 11 months without treatment, a rapid progression occurred and the patient died in March 2018. The cause of death was myocardial infarction probably caused by growing cardiac metastases. An autopsy was not performed due to the lack of consent of the patient's family.

It is worth noting that heart metastases should be suspected in all patients with malignancy displaying any cardiac symptoms, and even patients not displaying specific signs.

Conflict of Interest

The Authors declare that they have no conflict of interests.

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