Subacute Cor Pulmonale due to Tumor Embolism

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Abstract

We describe a patient with subacute cor pulmonale caused by tumor emboli in the lungs. A 64-year-old female suffering from a subacute progressive cough and shortness of breathing died of severe pulmonary hypertension seven days after admission. Neither chest CT scans nor lung perfusion scintigraphy showed any abnormal findings. Microscopic examination after an autopsy revealed diffuse intravascular tumor emboli occluding not only the small pulmonary arteries and arterioles, but also the lymphatic vessels, which were suggested to be metastases of a breast carcinoma resected five years previously. Thus, pulmonary tumor embolism should be considered in the differential diagnosis of primary pulmonary hypertension, particularly in patients with a past history of cancers.

Key words: subacute cor pulmonale, pulmonary hypertension, pulmonary tumor embolism, carcinomatous lymphangitis

Introduction

Pulmonary tumor embolism (PTE) may lead to pulmonary hypertension, with the consequent occurrence of subacute cor pulmonale (SCP) (1). Although the real incidence of the entity is not fully known because insufficient attention is paid to tumor-related lesions of the pulmonary blood vessels, reported frequencies are up to 26% of all cancer cases autopsied (2). Only rarely, however, is the diagnosis established before death. We describe a case with SCP caused by tumor emboli from breast carcinoma. Although multiple subsegmental perfusion defects showing under lung perfusion scintigraphy are characteristic in almost all cases of PTE, on occasion the perfusion scan may be normal, as it was in our case. Furthermore, multiple subsegmental perfusion defects have been reported in the absence of pulmonary emboli in patients with pulmonary hypertension alone (3).

So PTE should be considered in the differential diagnosis of primary pulmonary hypertension, particularly in cases with a past history of cancer.

Case Report

The patient was a 64-year-old woman who had undergone a right radical mastectomy for breast cancer five years previously. One month prior to admission a subacute progressive cough and shortness of breathing occurred. On physical examination, the patient had tachycardia and tachypnea. The lungs were clear on auscultation. A cardiac examination revealed no murmur or gallop. Laboratory studies were as follows: hematocrit 35.8%, WBC 9,600/mm³, platelets 191,000/mm³, serum lactate dehydrogenase 512 IU/l (normal, 150–470 IU/l), C-reactive protein 3.4 mg/dl (normal, <0.5 mg/dl). Blood coagulation test results were as follows: fibrinogen 325 mg/dl (normal, 150–400 mg/dl), fibrin degradation products 5.96 µg/dl (normal, <1.0 µg/dl), crosslinked degradation products (D-dimer) 5.04 µg/ml (normal, <1.0 µg/ml). Arterial blood gas measurements obtained in room air revealed moderate hypoxemia (oxygen partial pressure 68.9 torr) with hypocapnea (carbon dioxide partial pressure 34.0 torr). Among tumor markers, CA-153 presented a high value of 72.4 U/ml (normal, <27.0 U/ml). The chest radiograph showed no cardiomegaly or parenchymal abnormalities (Fig. 1). The chest computed tomography (CT) showed no abnormalities (Fig. 2). Electrocardiograms demonstrated a sinus rhythm at a rate of 100, with inverted T-waves in leads III, a V_f, and V_1 through V_3. A 99mTc macroaggregate perfusion scan showed no perfusion defects (Fig. 3). A pulmonary function test showed a mild restrictive defect with a normal diffusion capacity. Echocardiography
showed a dilated right ventricle with an estimated systolic pressure of 50 mmHg. Pulmonary artery catheterization revealed a pulmonary arterial pressure of 58/30 mmHg, and a pulmonary capillary wedge pressure of 5.0 mmHg. As a result of the above findings, pulmonary hypertension of unknown etiology was diagnosed. The patient’s general condition deteriorated and she died of marked respiratory distress seven days after admission without any findings available for diagnosis. At the autopsy there were no gross pulmonary emboli, discrete areas of tumor spread, or pneumonia. Microscopy revealed diffuse microscopic intravascular metastatic tumor emboli occluding multiple small arteries and arterioles, as well as lymphatic involvement (Fig. 4).

**Discussion**

Brill and Robertson first advocated use of the term “subacute cor pulmonale” to describe a clinicopathological entity characterized by rapid development of right heart failure due to tumor emboli in the lung (1). The most common origin of tumor emboli was the stomach, followed by the breast, and choriocarcinoma (4–6). It is of note that most cases of this entity reported previously were adenocarcinoma (7).

PTE may occur anytime in a cancer disease, from the first presentation of an occult carcinoma to a terminal event. The etiology of SCP is still doubtful. Recently, it has become clear that embolization by tumor cells induces thrombosis and these thrombi and the tumor cells induce a reactive
fibrocellular intimal proliferation, thus increasing the vascular resistance leading to cor pulmonale (7).

Information about the clinical manifestations of this entity has been limited even in large series (4, 8). The patient described in this report had a subacute progressive cough and shortness of breath, which seem to be the most common initial symptoms of PTE. The earliest clinical manifestations of SCP are respiratory distress and right heart failure. Initial laboratory findings are typically hypoxemia. Chest radiographic findings may be normal. Usually, the electrocardiographic findings are nonspecific, although sinus tachycardia may be present. Dilatation of the right cardiac system and increased pulmonary arterial pressure are observed on the echocardiograph (9). Although multiple subsegmental perfusion defects showing under lung perfusion scintigraphy are characteristic in almost all cases, on occasion the perfusion scan may be normal, as it was in the present case. Furthermore, multiple subsegmental perfusion defects have been reported in the absence of pulmonary emboli in patients with pulmonary hypertension alone (3). Although it is generally thought to be difficult to make a diagnosis of PTE even in patients with known underlying malignant tumors, PTE should be considered in the differential diagnosis of primary pulmonary hypertension, particularly in a case with a past history of cancers. It is well known that tumor emboli are commonly associated with intravascular thrombi. We believe this is the reason why our blood coagulation test revealed abnormal results.

A lung biopsy is the only diagnostic method that can unequivocally clarify the etiology of pulmonary hypertension. However, a lung biopsy may often involve risk to patients with PTE, since their condition is often very fragile, with low pulmonary reserve and hypoxemia. Recently, a technique using cytological examination of blood samples from a Swan-Ganz catheter has been found feasible in the detection of tumor cells (10).

Treatment for this entity has not been extensively studied, since the diagnosis is usually not made until postmortem (4, 9). However, there are reports of limited success with chemotherapy (5, 11). Therefore, accurate diagnosis will become increasingly more important as new chemotherapeutic protocols are developed for the treatment of neoplastic disease.

In conclusion, we report a case of SCP caused by tumor emboli in the lung. This entity should be considered in the differential diagnosis of primary pulmonary hypertension, particularly in patients with a past history of cancers, as its recognition will dictate the appropriate therapeutic management.

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References