

Unexplained Pulmonary Hypertension in Cancer: A Case Report of Pulmonary Tumor Emboli

Hanbyul Choi^{1*}, Jake Gurland¹ and Nisha Kotecha²

¹Department of Internal Medicine, Overlook Medical Center, Summit, NJ, USA

²Department of Pulmonary and Critical Care, Overlook Medical Center, Summit, NJ, USA

***Corresponding Author:** Hanbyul Choi, Department of Internal Medicine, Overlook Medical Center, Summit, NJ, USA.

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Abstract

This is a case report of a patient who was previously diagnosed with breast cancer. She presented to hospital with progressively worsening shortness of breath. Transthoracic Echocardiogram (TTE) showed new pulmonary hypertension (PH) which was found to be due to pulmonary tumor emboli (PTE). The diagnosis of PTE was made from cytology obtained during right heart catheterization. Her cardiopulmonary function deteriorated rapidly during hospitalization. Referral to Extracorporeal membrane oxygenation (ECMO) was made, but patient was not a suitable candidate. Oncology was contacted for emergent chemotherapy for PTE. Before initiation of chemotherapy, patient went into pulseless electrical arrest (PEA). Tissue Plasminogen Activator (tPA) was administered during code for possible thromboembolism from PTE. Unfortunately, despite of full resuscitative efforts, patient passed away. In making diagnosis of PTE, early recognition of manifestations of PH with a low clinical index of suspicion is the key. If patients are undergoing right heart catheterization, performing cytology and aspirate of pulmonary artery catheter is recommended.

Keywords: *Unexplained Pulmonary; Pulmonary Tumor Emboli*

Introduction

PTE is a rare disease with extremely high mortality, and diagnosis is challenging in an alive patient [1]. We will present a case to describe the nature of dramatic decline of cardiac function with PTE in a patient with breast cancer at an advanced stage.

Case Report

We are presenting a 43 year-old-woman with history of metastatic intra ductal breast carcinoma (ER 79%, PR 44%, Her2 positive), which was treated with bilateral mastectomy, radiation, and chemotherapy. Chemotherapy course was complicated by pleural/pericardial effusion requiring drainage with thoracentesis and pericardial window. A few weeks prior to admission, she started to experience dyspnea and underwent TTE after pulmonary embolism (PE) was ruled out with CT angiography (CTA). TTE showed normal pulmonary artery systolic pressure/right ventricular systolic pressure (PASP/RVSP; 31.07 mm Hg) with normal left ventricular function and mildly reduced apical right ventricular function. The prior TTE 3 months ago showed RVSP of 28.44 mm Hg. On the admission day, she presented with worsening dyspnea and was admitted with acute hypoxic respiratory failure from re-accumulation of malignant pleural effusion. PE was ruled out with CTA again. TTE on hospital day 1 showed right ventricular dilation and new pulmonary hypertension (PASP/RVSP; 58.95 mm Hg). Subsequent TTE on hospital day 2 showed RVSP 61mm Hg. Right and left heart catheterization on hospital day 3 revealed

elevated pulmonary vein resistance (6.7 wood units) without constriction. Cytology from fluid sample from distal pulmonary artery was positive for malignant cells consistent with metastatic breast cancer. On hospital day 4, patient continued to deteriorate with profound hypoxia and eventually, had a cardiac arrest. She was transferred to coronary care unit after achieving return of spontaneous circulation. Multiple vasopressors (epinephrine, vasopressin, and norepinephrine) and inotropes were required to compensate her cardiogenic shock. Hydrocortisone and heparin drip were initiated. Referral for VA ECMO was initiated, but patient was not deemed to be a suitable candidate. Oncology was contacted for emergent chemotherapy for PTE. Unfortunately, before initiation of chemotherapy, she went into PEA cardiac arrest. tPA was administered during code for possibility of thromboembolic phenomenon contributing to acute decompensation. However, she passed away despite full resuscitative effort.

Discussion

This patient had normal pulmonary artery pressure a few weeks prior to admission. However, during the hospitalization, she was found to have new PH, which has a broad differential and poor prognosis because of fast clinical decline before making the diagnosis. Two main pulmonary micro vascular conditions related PH in malignancy include pulmonary tumor thrombotic microangiopathy (PTTM) and PTE [2]. The diagnosis of PTE was confirmed on cytology from cardiac catheterization in this case. PTE is a rare, end-stage manifestations of malignancy that has a very poor prognosis. The clinical manifestations can be nonspecific with the majority of patients presenting with progressive dyspnea just as our patient did. This is thought to present more likely with features suggestive of PH such as dyspnea, hypoxemia, right heart strain, and clear lungs. Most diagnostic tests are unfortunately nonspecific, but can help raise clinical suspicion. Initial tests include chest x-ray, CT angiography, VQ scan, echocardiogram, and of course routine bloodwork and arterial blood gas. Additional testing is aimed at obtaining a cytologic or histologic diagnosis. This is preferably done by a transbronchial lung biopsy [3]. If clinical suspicion remains still high with negative transbronchial lung biopsy result, then would be appropriate to do a surgical lung biopsy. Unfortunately, often times, patients are not well enough for this type of procedure. Alternatively, aspiration of the pulmonary artery using a right heart catheterization as was done in this patient may be appropriate as a diagnostic test. If it is negative, then providers can proceed to lung biopsy if well enough. Definitive therapy is directed at treating the primary tumor. Surgical resection, systemic chemotherapy, radiation therapy, or any combination of the above can be tried. The main differential diagnoses are pulmonary embolism, interstitial lung disease, pneumonia, heart failure, and other embolization syndromes (amniotic, fat) [4]. Therapy, unfortunately is not curative, and, many times, the malignancy will recur or progress despite therapy. The prognosis with or without therapy is generally poor as this is an end stage manifestation of malignancy. Most patients pass away within 3 to 12 months after presentation. This patient was quite unique in that we were able to make the diagnosis premorbid. Unfortunately, despite making the diagnosis, the patient passed away before systemic chemotherapy could be administered.

Conclusion

Early recognition of manifestations of PH with a low clinical index of suspicion is the key to making diagnosis of PTE. We also recommend performing cytology and aspirate of pulmonary artery catheter if patients are undergoing right heart catheterization.

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