Heart & Lung 43 (2014) 574–576

Contents lists available at ScienceDirect

Heart & Lung

journal homepage: www.heartandlung.org

Unresolved pulmonary embolism leading to a diagnosis of pulmonary artery sarcoma

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ARTICLE INFO

Article history:
Received 19 April 2014
Received in revised form
9 May 2014
Accepted 11 May 2014
Available online 11 June 2014

Keywords:
Neoplasm
Radiography
Pulmonary embolism
Diagnosis
Differential
Sarcoma
Pulmonary hypertension

ABSTRACT

Pulmonary artery sarcomas (PAS) are rare tumors with a poor prognosis. They are often misdiagnosed as pulmonary embolism (PE) leading to futile anticoagulation treatment and delay in proper diagnosis. We present a case of a patient who was initially misdiagnosed and anticoagulated for presumed pulmonary embolism. Progressive symptoms and additional imaging led to the diagnosis of intimal pulmonary artery sarcoma for which he underwent surgical resection. This case serves as a reminder to consider pulmonary artery sarcoma in the differential diagnosis of patients with dyspnea and filling defects on CT pulmonary angiogram offering the potential for resection prior to metastasis.

Introduction

Radiologic appearance of pulmonary artery sarcoma (PAS) is often mistaken for pulmonary emboli leading to delayed diagnosis and treatment. Untimely diagnosis leading to late stage presentations coupled with a high reoccurrence rate contributes to the poor prognosis of this disease. It is important to alert clinicians of the key clinical and radiographic characteristics of this pathology since proper diagnosis coupled with surgical resection can be curative. We present a case of a PAS that was initially thought to be a pulmonary embolism and was treated as such. However the patient's symptoms did not resolve prompting reconsideration of the initial diagnosis and ultimately treatment for PAS.

Case report

A previously healthy 51 year old man presented with progressive right sided pleuritic chest pain and an unintentional 10 pound weight loss. Work up revealed a large central filling defect in the main pulmonary artery (PA) on the computed tomography of the pulmonary arteries (CTPA) (Fig. 1A). He was diagnosed with a large pulmonary embolism (PE), anticoagulated, and subsequently discharged.

Four months later, he presented with dry cough, myalgia, wheezing, night sweats, and intermittent right sided pleuritic chest pain of 3 weeks duration. On arrival, he was hemodynamically stable, had no jugular venous distension or lower extremity edema, had normal heart sounds, and clear lungs to auscultation. The EKG showed normal sinus rhythm, first degree AV block (PR interval

Source of support: none.
Conflict of interest: none.
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http://dx.doi.org/10.1016/j.hrtlng.2014.05.006

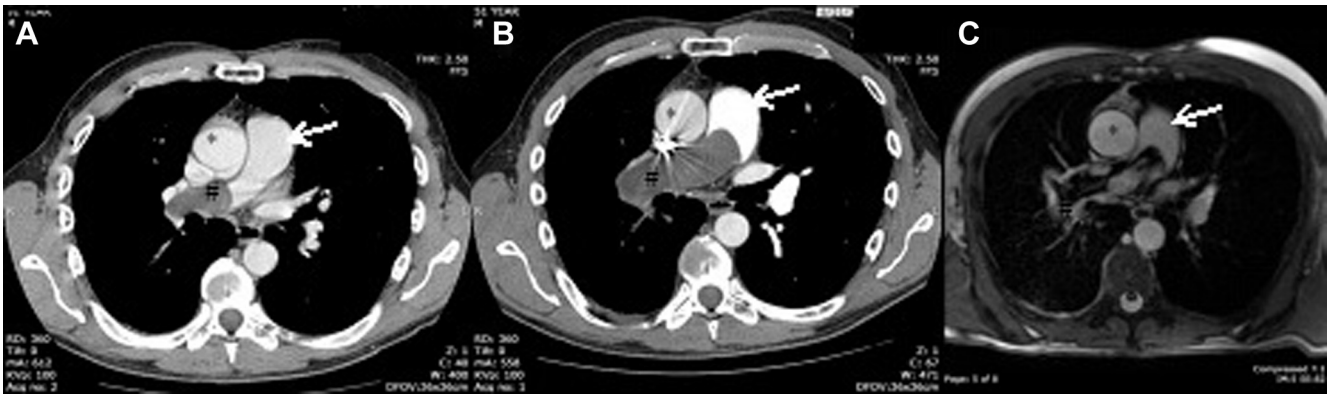

Fig. 1. Panel (A) CTPA at initial presentation showing filling defect of the pulmonary artery. Panel (B) CTPA four months later showing increased filling defect of pulmonary arteries. Panel (C) MRI with gadolinium contrast displaying delayed enhancement. * Ascending aorta. Arrow: Main pulmonary artery. # Pulmonary artery sarcoma.

204 ms), and mild non-specific inferior ST elevation (almost, but not quite, 1 mm) that persisted long term. A repeat CTPA showed a persistent but larger filling defect involving the proximal right PA extending into the main and left PA (Fig. 1B). The echocardiogram showed mild right ventricle dilation. The rest of the workup was negative.

Given his history, his systemic symptoms, the failure to respond to warfarin, and the atypical appearance on CTPA, a diagnosis of malignancy was entertained. A Magnetic Resonance Imaging with gadolinium (Fig. 1C) revealed a filling defect of the main pulmonary artery which expanded the main and lobar PA on the right and was hyperintense on T1 images. The lesion showed heterogeneous enhancement part of which appeared attached to the vessel wall. He was referred for definitive diagnosis and potentially curative mass resection (Fig. 2).

Histologically, the tumor showed a high grade pleomorphic spindle cell sarcoma in a loose fascicular pattern with scattered chondroid and epithelioid areas (Fig. 3). By immunohistochemistry, the neoplasm was strongly positive for vimentin, and focally positive for CD68, desmin, and bcl-2. The neoplastic cells were negative for CD31, CD34, pan-cytokeratin, low-molecular weight cytokeratin, PAX-8, smooth muscle actin, and S-100. This nonspecific immunophenotype and the absence of a specific line of differentiation led to the diagnosis of an intimal sarcoma.

The patient underwent subsequent radiotherapy and chemotherapy without evidence of local recurrence. Sixteen months later he was diagnosed with a left frontal brain tumor which proved to be a metastatic lesion from his sarcoma. He underwent resection and radiotherapy and is currently healthy and still in remission almost two years after his brain surgery (and ~ 3.5 years after his initial presentation).

Discussion

PAS are extremely rare.[1–4] As shown by this case report, PE diagnosis by CTPA is not always accurate therefore it is important to consider alternative diagnoses.[5] PAS occur in middle aged patients without clear sex predominance.[2,3,6] They present with dyspnea, occasional chest pain, cough, weight loss and other nonspecific findings such as fever or fatigue.[2,7] Less frequent presentations include hemoptysis when they infiltrate a bronchus or syncope due to pulmonary hypertension.[3,8,9] Other causes of pulmonary artery filling defects include fat embolism or tumor macro-embolism, among many other causes (Table 1).

On physical exam, patients may have a systolic ejection murmur[3,8] due to narrowing in the area of the pulmonary valve and a diastolic murmur due to pulmonary insufficiency. There may be

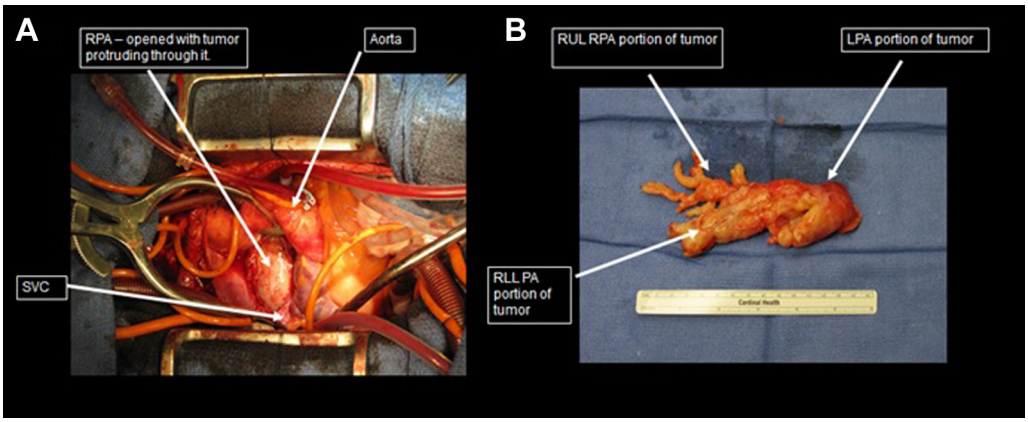

Fig. 2. Panel (A) Intra-operative image. Panel (B) Macroscopic image of tumor. RPA denotes right pulmonary artery. RUL RPA: Right upper lobar right pulmonary artery, RLL PA: Right lower lobar pulmonary artery, LPA: left pulmonary artery.

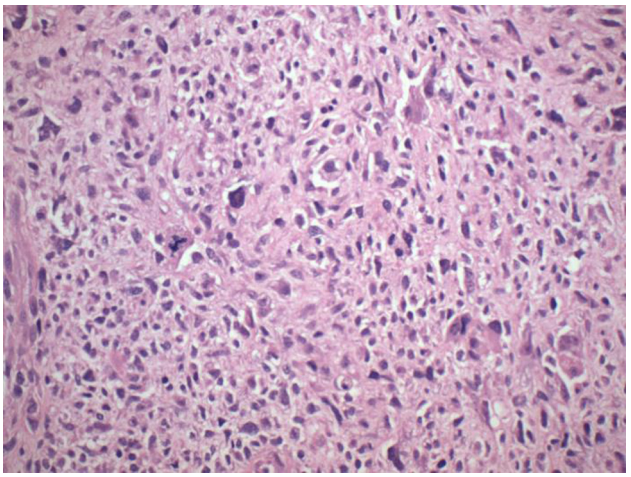

Fig. 3. Microscopically the tumor is composed of pleomorphic spindle and epithelioid cells (H&E stain ×200).

typical signs of pulmonary hypertension and right ventricular overload like increase of the pulmonary component of the second heart sound, jugular venous distension, edema, and hepatomegaly.[8] Laboratory parameters such as elevated erythrocyte sedimentation rate and anemia may help to differentiate it from thromboembolic disease.[8,9]

Chest X-ray may show a hilar mass with unilateral enlargement of the pulmonary artery, elevation of the hemi diaphragm, pleural effusion,[8] and pulmonary nodules.[10] Dilated central arteries and decreased peripheral vascularity related to pulmonary hypertension are also frequent.[8] The CTPA demonstrates a filling defect raising the suspicion of thromboembolism. However, in contrast to PE, PAS tend to present as a unilateral, central, lobulated, PA filling defect with an increase in the diameter of the pulmonary arteries.[4,5,10–12] Furthermore, although both show enhancement on the CTPA, PAS tend to form acute angles with the vessel wall, while these are obtuse in PE.[8] PAS show heterogeneous densities due to areas of necrosis, hemorrhage and ossification within the mass.[8] Differentiation by CTPA is not always possible therefore techniques such as ^{18}F-FDG PET, PET/CT[13] and gadolinium enhanced MRI are often used.[1,4,7,12]

By the time of diagnosis, up to 50% have lung metastasis.[1] The prognosis is dismal[2,3,14,15] with a mean survival of 1.5 months[2] which increases to 10–18 months with surgical excision making this the primary treatment.[1,2] An aggressive approach with complete radical resection seems to increase mean survival to 71 months.[1] Chemotherapy and radiotherapy use is controversial.[1,2,16] To ensure appropriate surgical planning and maximize survival, it is important to keep this diagnosis in mind when encountering a patient with constitutional symptoms and the CTPA characteristics described above.

Table 1
Differential diagnosis of pulmonary artery filling defects noted on CT angiogram of the chest.

- Pulmonary thromboembolism
- Pulmonary artery sarcoma (PAS)
- Tumor macro-embolism
- Fat embolism
- Congenital absence of pulmonary artery or pulmonary stenosis
- Pulmonary parenchymal/airway, or mediastinal tumors
- Pulmonary infections
- Pulmonary arterial hypertension (smaller vessel involvement)
- Fibrosing mediastinitis
- Takayasu arteritis

Conclusion

PAS are frequently misdiagnosed in clinical practice. Due to the high lethality of this tumor and the therapeutic and prognostic implications, it is of paramount importance for clinicians to be aware of the key features that differentiate this pathology from the frequently encountered pulmonary embolism.

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