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CASE STUDY

Primary pulmonary artery sarcoma resembling chronic thromboembolic pulmonary disease

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ABSTRACT: Two cases of primary pulmonary artery sarcoma resembling chronic thromboembolic disease features are presented. Tumour identification was achieved after pulmonary thromboendarterectomy, which was indicated by documentation of a prothrombotic state in both patients.

A doubtful history of pulmonary emboli or deep venous thrombosis should alert medical personnel to the possible presence of a primary pulmonary artery sarcoma. Advanced imaging methods such as gadolinium-enhanced magnetic resonance imaging could be useful in considering pulmonary thromboendarterectomy.

If a tumour is detected, its surgical resection should be considered with caution, taking into account the poor survival results. Invasion of the adventitia or the right ventricle, as documented in the present cases, is unusual.

As far as the present authors know, this is the first report of this kind of tumour and its coexistence with an activated protein C resistance state and type II heparin-induced thrombocytopenia.

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Primary pulmonary artery sarcoma (PPAS) is a rare disease. Cox *et al*. [1] published a major review of this subject in 1997 with 138 documented cases, identifying 43 undifferentiated sarcomas, 22 leiomyosarcomas, 19 spindle cell sarcomas, 10 malignant fibrous histiocytomas and a few other infrequent forms. The clinical presentation of this disease shares features with chronic thromboembolic disease (CTD), complicating differential diagnosis. The estimated postresection survival rate is poor [2] and the role of adjuvant therapy still obscure. As far as the present authors know, its coexistence with prothrombotic states has not been reported.

Case reports

The Institute of Cardiology and Cardiovascular Surgery initiated a pulmonary thromboendarterectomy (PTE) programme for CTD in 1992; 15 patients have been evaluated to date and two PPAS cases discovered. Evidence of pulmonary emboli or deep venous thrombosis episodes could not be found, but a prothrombotic state was documented in both patients. Activated protein C resistance was detected in patient 1 and type II heparin-induced thrombocytopenia (HIT II) in patient 2. These findings and all the features in common with CTD were decisive for the elective PTE. The mean symptom duration was 48 months and, at the time of surgery, both patients were in New York Heart Association class IV with right heart failure signs.

Patient 1

The patient was a 42-yr-old male with a 3-yr history of progressive dyspnoea. Pulmonary scintigraphy, angiography and tomography results were compatible with CTD and severe pulmonary hypertension, leading to Simon-nitinol filter placement in the inferior vena cava. Activated protein C resistance was detected *via* negative determination of Leiden factor V, although it was present in close (heterozygous) relatives.

PTE revealed a diffuse bilateral tumoural mass strongly attached to the adventitia (fig. 1). Although resection was complete, the patient died due to intrapulmonary haemorrhage. Material from the surgical procedure led to the diagnosis of a malignant fibrous histiocytoma.

Patient 2

The patient was a 33-yr-old female with a 5-yr history of dyspnoea and haemoptysis. Pulmonary scintigraphy, angiography and tomography results suggested CTD with severe pulmonary hypertension, leading to Greenfield filter placement. A few days prior to surgery, unfractionated heparin therapy was initiated, which caused the development of typical HIT II. This was characterized using tests for platelet aggregation and a heparin-platelet factor 4 enzyme-linked immunosorbent assay. Unfractionated heparin therapy was stopped and low-molecular-weight heparin therapy with nadroparine initiated. The platelet count normalized, in spite of the platelet aggregation assay for HIT remaining positive. PTE was started using iloprost

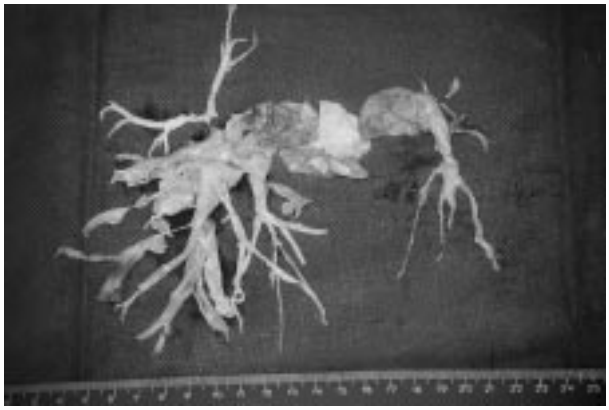

Fig. 1. – Malignant fibrous histiocytoma. Endarterectomy of the entire pulmonary vascular bed.

and a main pulmonary artery tumour invading both branches and the right ventricular outflow was observed. Resection was complete and a homograft replaced the pulmonary valve, but the patient died due to intrapulmonary haemorrhage. On necropsy, an undifferentiated sarcoma with lobar artery neoplastic emboli was diagnosed (fig. 2).

Discussion

The origin of PPAS is uncertain, but is thought to be linked to the malignant development of intimal or subintimal myofibroblasts [3].

At first sight, the tumour appears to be a large mucous mass totally or partially obstructing the main pulmonary artery in 85% of cases and invading the principal branches, following pulmonary blood flow. In 50% of cases, pulmonary or mediastinal metastases can be found, but involvement of the adventitia or right ventricle, as documented in the present patients, occurs infrequently [1, 3–6]. Coexistence with haemostastic disorders is a very rare occurrence [7, 8].

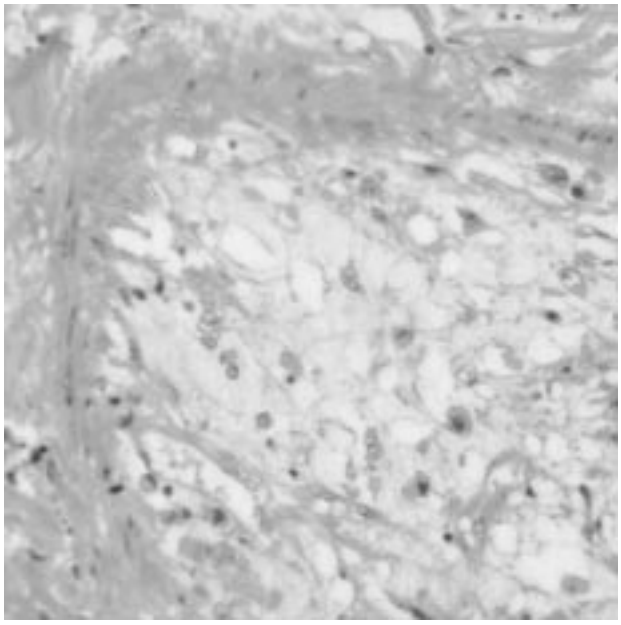

Fig. 2. – Undifferentiated sarcoma, and tumoral embolus in a segmentary pulmonary artery branch. (haematoxylin and eosin stain.)

The clinical and radiological presentation, as well as pulmonary scintigraphy and angiography results, may resemble that of CTD; thus differential diagnosis is crucial [1, 3–6]. In this context, computer-assisted tomography and/or magnetic resonance imaging, particularly with gadolinium enhancement, may be helpful in detecting intravascular images and hilar nodules or determining tumoural vascularity [1, 5]. Therefore, the importance of neither method should be underestimated. The mean survival time without treatment is ~6 weeks [7]. Extensive tumoural resection with vascular reconstruction (with or without pneumonectomy) is the main practice followed [1, 2, 4, 6], but this only extends survival to 10 months [2].

ANDERSON *et al.* [4] reported six cases of bilateral disease, the best survival (19 months) being obtained after extensive tumoural resection, left pneumonectomy and chemotherapy. In the other five cases, extensive resection alone (one patient) or with coadjuvant therapy (four patients) determined the survival of 5–11 months.

Based on these previous six cases and the present two with similar tumour expansion, the authors are not convinced of the benefits of surgical treatment in bilateral disease. Consequently, surgery does not seem to be the treatment of choice if diagnosis can be made preoperatively.

Conversely, there is evidence suggesting that addition of radiotherapy and/or chemotherapy after surgical resection may improve survival by 1–2 yrs, but is still not clear when and what kind of coadjuvant therapy should be implemented [1, 4].

Taking into account the infrequent association between PPAS and haemostatic disorders, it seems likely that the prothrombotic states documented in the present patients may have been mere coincidences. In the authors′ opinion, it is unlikely that the activated protein C resistance or the HIT II, especially the latter, influenced the natural progression of either sarcoma.

In summary, due to the common features shared by PPAS and CID, an exhaustive search for pulmonary emboli or deep venous thrombosis antecedents should be carried out. Advanced imaging methods such as gadolinium-enhanced magnetic resonance imaging could be useful before considering PTE. If a tumour is detected, the decision to undertake surgical resection should be well evaluated, taking into account the poor survival.

As far as the authors know, this is the first report of the coexistence of an activated protein C resistance state and type II heparin-induced thrombocytopenia with a primary pulmonary artery sarcoma.

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