

CASE STUDY

Isolated pulmonary arteries involvement in a patient with Takayasu's arteritis

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Isolated pulmonary arteries involvement in a patient with Takayasu's arteritis. O. Brugiere, H. Mal, C. Sleiman, O. Groussard, F. Mellot, M. Fournier. ©ERS Journals Ltd 1998.

ABSTRACT: Pulmonary arteries involvement is well described in Takayasu's arteritis (TA), a condition which is mainly associated with involvement of the systemic arteries. We report a case of TA with documented isolated pulmonary arteries involvement. Symptoms were quite similar to those encountered in chronic thromboembolic disease. A pulmonary angiogram showed bilateral stenosis and occlusion of pulmonary arteries. Diagnosis of TA was suspected, and as such a complete aortogram was made but proved to be normal. Massive haemoptysis suddenly occurred, which resulted in death. Autopsy disclosed characteristic pathological lesions of TA in pulmonary arteries and confirmed the lack of involvement of the aorta and its branches. The frequency of such a clinical form could be underestimated, given the difficulties of diagnosis and features similar to those of chronic thromboembolic disease.

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Takayasu's arteritis (TA) is a chronic inflammatory disease which mainly affects the large arteries, such as, the aorta, its main branches and, to a lesser extent the pulmonary arteries. The disease occurs worldwide, with a predilection for young adult females. The clinical features of TA are quite variable, depending on the stage of the disease. Typical features relate to systemic arteries involvement. A few cases of TA with exclusive manifestation of pulmonary symptoms have been reported, however an association with asymptomatic involvement of the systemic arteries has always been evident, thus permitting an accurate diagnosis of TA [1-3]. We present here a case report with isolated pulmonary lesions mimicking chronic thromboembolic disease.

Case report

A 25 yr old West Indian female was healthy until 4 months prior to admission when she gradually developed increasing exertional dyspnoea and recurrent haemoptysis. She was referred to our hospital because of sudden syncope on exertion. On admission, she was not dyspnoeic at rest, but a harsh systolic heart murmur was audible in the third left sternal border. The extrathoracic physical examination was normal and all peripheral pulses were present. The haemoglobin value was 9.8 g·dL⁻¹ and the white blood cell (WBC) count 9,300 cells·mm⁻³, containing 70% neutrophils and no eosinophils. The platelet count was 274×10³ cells·mm⁻³ and the sediment rate was 15 mm·h⁻¹. Serum creatinine was 1.01 mg·dL⁻¹. Arterial blood gases on room air revealed an arterial oxygen tension (P_{a,O_2}) of 10.2 kPa (76.5 mmHg) and an arterial

carbon dioxide tension (P_{a,CO_2}) of 5.06 kPa (40 mmHg). An electrocardiogram (ECG) showed a right axis deviation. Chest radiography revealed a small right pulmonary artery shadow. An echocardiography disclosed right atrial and right ventricular enlargement, with an important tricuspid regurgitation on the doppler study. A perfusion scan showed total absence of perfusion to the right lung and a perfusion defect of the left upper lobe. A ventilation scan was normal. The pulmonary angiogram (*i.v.* digital subtraction angiography) demonstrated a filiform stenosis of the right main pulmonary artery without distal opacification (fig. 1a), an irregular stenosis of the left main pulmonary artery with a lack of the opacification of the left upper lobe artery and a normal left lower lobe artery (fig. 1b). The haemodynamic study revealed a pulmonary artery pressure of 80/16 (mean 41) mmHg in the main pulmonary artery. In addition, other laboratory evaluations were made: serum antinuclear factor rheumatoid factor, and hepatitis B antigen were negative, and urinalysis was normal.

Chronic thromboembolic pulmonary disease was one of the suspected diagnoses. Treatment with heparin was started but rapidly stopped because extensive haemoptysis recurred. Although phlebocavography was normal, a vena cava filter of Greenfield type was placed because it was impossible to carry on with heparin treatment. A thoracic computed tomography (CT) scan did not show any mediastinal mass nor any sign of fibrosing mediastinitis. Because TA was also suspected, an aortogram was made. It did not demonstrate any involvement of the thoracic aorta, the supra-aortic vessels, the abdominal aorta or of



Fig. 1. – Pulmonary angiogram (*i.v.* digital subtraction angiography with selective injection of each pulmonary artery) demonstrating: a) a filiform stenosis of the right pulmonary artery beginning just at the origin of this artery without distal opacification; and b) an irregular stenosis of the left pulmonary artery with a lack of the opacification of the upper lobe artery and a normal left artery.

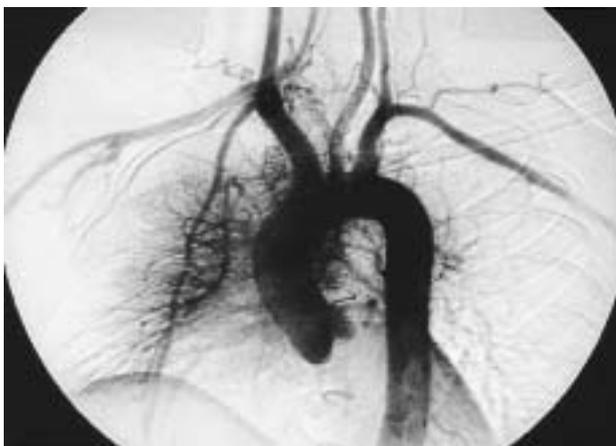


Fig. 2. – Aortography showing absence of systemic arteries involvement and enlarged bronchial arteries which supply the nonperfused right lung.



Fig. 3. – Selective right bronchial arteriogram. Systemic hypervascularisation with a bronchial-pulmonary arterial shunt from an enlarged right bronchial artery is shown.

the main collaterals, but right enlarged bronchial arteries were seen providing collateral vessels to the right hypoperfused lung (fig. 2). A selective bronchial arteriogram confirmed a systemic hypervascularization of the right lung from two right enlarged bronchial arteries. A right distal anterograd systemic-pulmonary artery shunt was also documented in the latest phase of the procedure (fig. 3).

Although aortogram was normal, the suspicion of TA led us to treat the patient with prednisone ($1 \text{ mg}\cdot\text{kg}^{-1}\cdot\text{day}^{-1}$) and antituberculous therapy (isoniazid, $5 \text{ mg}\cdot\text{kg}^{-1}\cdot\text{day}^{-1}$; rifampin, $10 \text{ mg}\cdot\text{kg}^{-1}\cdot\text{day}^{-1}$; ethambutol, $20 \text{ mg}\cdot\text{kg}^{-1}\cdot\text{day}^{-1}$). Because of the severity of pulmonary hypertension with recurrent severe haemoptysis, the patient was considered for heart-lung transplantation but died suddenly of massive haemoptysis 3 weeks after admission. Macroscopic examination at autopsy showed occlusive narrowing of right pulmonary artery and important thickening of the pulmonary artery walls. The histopathological study of the pulmonary arteries showed characteristic changes of TA, with transmural sclerosis (fig. 4a), and inflammatory infiltrates of lymphocytes and plasma cells with destruction of the medial elastic lamina (fig. 4b). Repermeated occlusions of pulmonary arteries were also found (fig. 4c). These blood vessels were opacified by systemic-pulmonary artery shunt on bronchial arteriogram (fig. 3). Aorta, brachiocephalic, left subclavian, left carotid, renal and superior mesenteric arteries were macroscopically and histologically normal.

Discussion

We report a case of TA with an exclusive involvement of the pulmonary artery. Other diagnoses including chronic pulmonary embolism, fibrosing mediastinitis and congenital stenosis of the pulmonary arteritis were suspected on

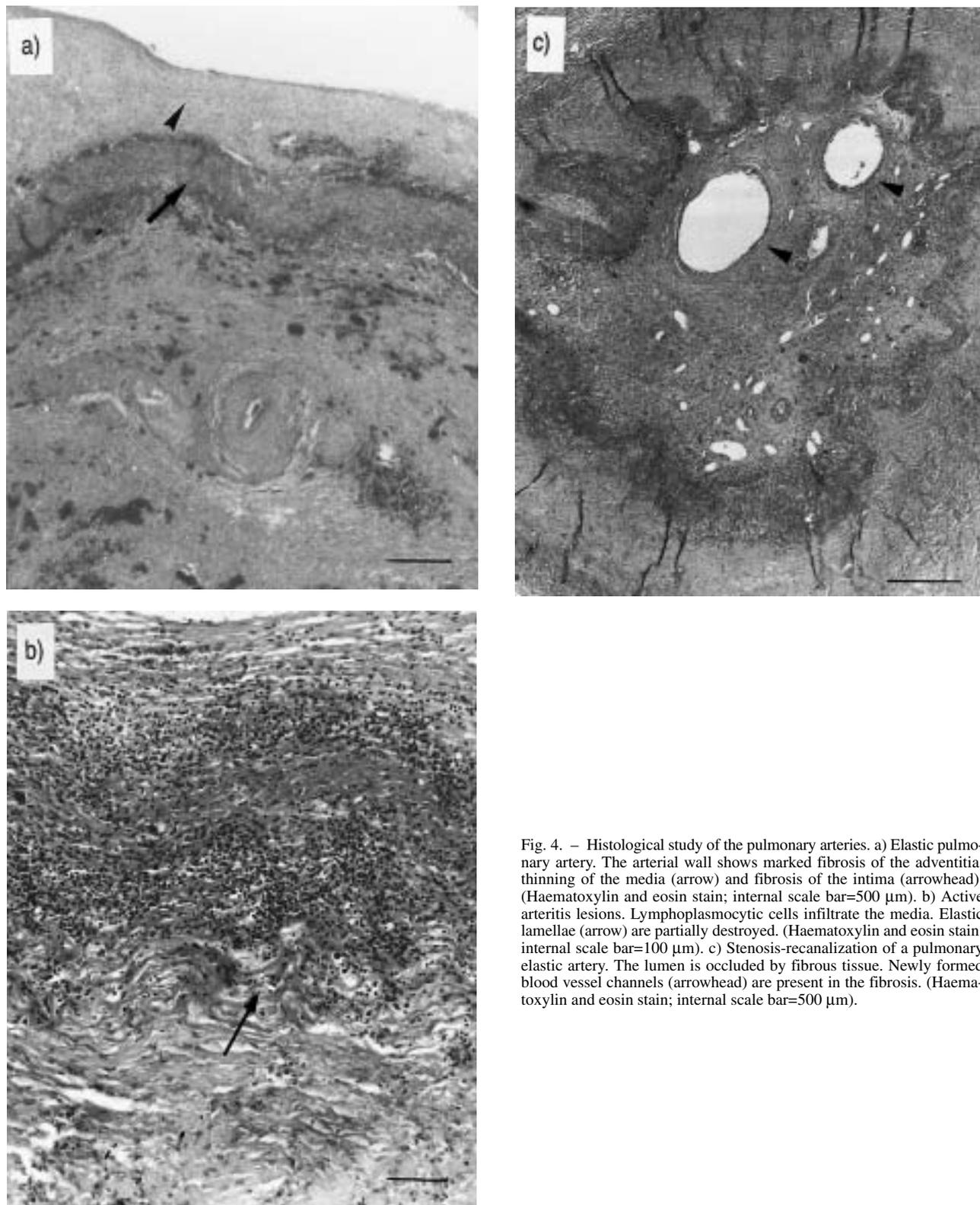


Fig. 4. – Histological study of the pulmonary arteries. a) Elastic pulmonary artery. The arterial wall shows marked fibrosis of the adventitia, thinning of the media (arrow) and fibrosis of the intima (arrowhead). (Haematoxylin and eosin stain; internal scale bar=500 μ m). b) Active arteritis lesions. Lymphoplasmocytic cells infiltrate the media. Elastic lamellae (arrow) are partially destroyed. (Haematoxylin and eosin stain; internal scale bar=100 μ m). c) Stenosis-recanalization of a pulmonary elastic artery. The lumen is occluded by fibrous tissue. Newly formed blood vessel channels (arrowhead) are present in the fibrosis. (Haematoxylin and eosin stain; internal scale bar=500 μ m).

the basis of initial clinical presentation and the angiographic pattern. Despite the absence of systemic arteries involvement, diagnosis of TA was finally documented by the association of clinical, angiographic, pathological and biological findings: 1) disease affecting a young adult female [4, 5]; 2) involvement of pulmonary arteries, with narrow-

ing and stenosis on pulmonary angiogram [6–8]; 3) histopathological findings in the pulmonary arteries, though unspecific, were typical of TA, with transmural sclerosis and inflammatory infiltrates of lymphocytes and plasma cells with destruction of the medial elastic lamina [4, 5]; 4) there was no evidence of other systemic vasculitides. Actually,

the patient never complained of upper airway symptoms, asthma or extrathoracic signs. Urinary sediment was normal and there was no eosinophilia. Serological markers of connective diseases were negative. Histopathological examination showed no parenchymal or bronchial wall necrosis. Moreover, the normal erythrocyte sedimentation rate (ESR) found in our patient does not rule out the diagnosis because ESR is not always elevated in TA [4].

The pulmonary artery involvement in TA is well known. In a recent review of the literature [6], where pulmonary artery involvement was specifically looked for, it was found in 41–100 (mean 56)% of cases studied, however this was nearly always associated with the involvement of the aorta or its branches. Some cases of TA with exclusive manifestation of pulmonary symptoms at the initial clinical presentation have already been described, but diagnosis was ultimately made on the evidence of associated systemic arteries involvement on an aortogram [1–3]. One case of exclusive involvement of the pulmonary arteries has been reported in TA, but pathological confirmation has not been obtained [9]. As it has been shown by YAMATO *et al.* [7], there is no correlation between the extent of pulmonary arterial lesions and the extent of systemic arteritis in TA. One can thus hypothesize that the development of such isolated pulmonary lesions are not so rare. The actual frequency of TA located only in pulmonary arteries is not known, but several factors could contribute to underestimate the number of such cases. First, the lack of pulmonary symptoms in cases of pulmonary involvement is frequent in TA, even in cases of documented pulmonary hypertension [10]. Second, it is possible that cases of TA with isolated pulmonary involvement could have been misdiagnosed as chronic thromboembolic disease, since the clinical presentation and angiogram pattern can be quite similar in both diseases. In the absence of systemic involvement, the differential diagnosis between TA and chronic thromboembolic disease may be facilitated by an accelerated ESR, but as in our patient, a normal ESR cannot rule out the diagnosis of TA.

Most often, pulmonary involvement of TA has no or poor clinical impact, although pulmonary hypertension develops in some cases [10], as it did in our patient. The increasing breathlessness noted during the last 4 months prior to admission is probably related to progressive pulmonary hypertension, but a long period of silent pulmonary arteries involvement may have preceded the manifestation of pulmonary symptoms. The amount of intimal proliferation and adventitial fibrosis seen on pulmonary arteries examination, which reflects the severity and duration of the disease [4] favours this hypothesis. The death of the patient was secondary to massive pulmonary haemorrhage. This latter complication is quite unusual in TA, although it has been previously described elsewhere [2, 11]. The causes for bleeding in such pulmonary artery occlusion in TA are: rupture of collateral vessels, rupture of microaneurysm due to vasculitis, or hyperaemic response [11]. In our patient, given the extent of haemoptysis and the bronchial arteriographic pattern, systemic hypervascularization has been suspected as being the cause.

Visualization of a systemic-pulmonary artery shunt on thoracic aortogram or selective bronchial arteriogram has already been described in TA [8]. In our patient, these shunts led to an anterograd opacification of pulmonary

arteries distal to their proximal occlusion. It could be due to stenosis-recanalization lesions of pulmonary arteries. These newly formed channels in the obstructed lumen are thought to originate from branches of bronchial arteries [12]. Such systemic-pulmonary artery shunts appear to be indicative of extensive pulmonary artery involvement in TA [8].

Although ESR was not elevated, lesions of active pulmonary arteries were seen at autopsy. One can hypothesize that the failure of corticoid therapy was due to the severity of associated chronic fibrous changes in pulmonary arteries, but duration of the treatment was too short to appreciate its efficacy.

In conclusion, this case report demonstrated that isolated and independent pulmonary involvement in Takayasu's arteritis may exist. The frequency of such a clinical form could be underestimated given the difficulties of diagnosis and features similar to those of chronic thromboembolic disease. Because of the potential efficacy of glucocorticoids, diagnosis of Takayasu's arteritis should be considered when there is suspicion of chronic thromboembolic disease which does not present with a recognized venous thrombotic site, even when there is a lack of evidence of systemic arteries involvement.

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