Chapter

Humeral Artery Aneurysm Revealing a Rare Association between Tuberculosis and Behçet's Disease

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Abstract

The association of pulmonary tuberculosis and Behçet's disease revealed by an aneurysm of the humeral artery is exceptional with a complicated management. We report a case in which the two conditions occurred concomitantly with the vascular complication, apart from any use of immunosuppressive therapy, something that has never been reported in the literature. We report an extremely rare case of a spontaneous rupture of an aneurysm of the humeral artery of a 29-year-old woman, with no history. The patient underwent axillo-humeral bypass. Investigations concluded the diagnosis of Behçet's disease associated with pulmonary and lymph node tuberculosis. Anti-tuberculous chemotherapy followed by corticosteroids, immunosuppressants and colchicine have been administrated. Based on this observation, we insist on the necessity of searching the symptoms of Behçet's disease in the presence of arterial involvement when having a young patient. Therapeutic management must include medical treatment to control inflammation and limit the risk of recurrence. Endovascular or surgical treatment is necessary if the arterial involvement is threatening. The association with tuberculosis complicates management and requires close monitoring.

Keywords: Behçet's disease, tuberculosis, aneurysm, humeral artery, imaging

1. Introduction

Behçet's disease is an inflammatory, systemic vasculitis originally described by the Turkish dermatologist Hulusi Behçet in 1937. It is typically characterized by the combination of recurrent oral and genital aphtosis with ocular involvement. Vascular involvement in Behçet's disease occurs in 5 to 40% of cases depending on the series [1] and is associated with increased mortality [2]. Venous thrombosis is frequently observed, while arterial damage such as aneurysms, pseudoaneurysms, strictures and occlusions are less reported [2]. Arterial involvement in Behçet's disease mainly affects the aorta and pulmonary arteries. The humeral artery is extremely rarely affected.

The association of Behcet's disease and tuberculosis is rare and often correlated with the use of immunosuppressants.

To our knowledge, there is no reported case in the literature of spontaneous rupture of an aneurysm of the humeral artery of a patient having Behçet's disease and tuberculosis. Thus, we report the first case revealing this association.

2. Observation

We report the case of a 29-year-old woman with no history who presented with a right humeral mass of 50 mm x70mm evolving for 2 months and that has spontaneously ruptured. An axillo-humeral bypass using the basilic vein was made. The intraoperative findings were consistent with an aneurysm of the humeral artery. The axillary artery had an inflammatory aspect with a very thickened wall suggesting vasculitis, and the humeral artery downstream was narrowed.

Histological analysis of the resected lesions showed a non-specific panvascularitis.

Investigations carried out postoperatively revealed recurrent bipolar aphtosis associated with a 2-year history of inflammatory arthralgia and a 2-month history of claudication of the left upper limb. Physical examination showed a mouth ulcer on the inside of the lower lip (**Figure 1**), scars of genital ulcers, pseudo folliculitis. Peripheral pulses were present, symmetrical but weak in the left upper limb. Pathergy test was positive.

Arterial Doppler objectified the patency of the left axillary, subclavian, humeral, radial and ulnar arteries which were thin with damped and demodulated spectra. A thoraco-abdominopelvic CT angiography was performed in search of other vascular lesions. It showed a saccular aneurysm of the left subclavian artery, bronchiolar micronodules, thoracic and sub-diaphragmatic lymphadenopathies, the largest of which contained central necrosis and some of which were calcified. The diagnosis of Behçet's disease with mucocutaneous and arterial involvement, associated with tuberculosis was made. Anti-tuberculous chemotherapy followed by corticosteroids and immunosuppressants (cyclophosphamide and Azathioprine), as well as colchicine, has led to an uneventful recovery without recurrence.

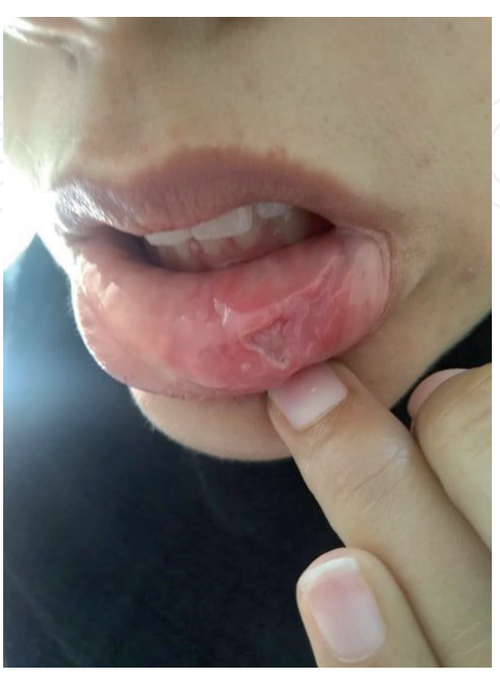

Figure 1.
Mouth ulcer on the inside of the lower lip.

3. Discussion

Tuberculosis is an infectious disease that presents a public health problem in developing countries where it is endemic [3]. Tuberculosis continues to be a major cause of morbidity and mortality. In developed countries, there has been an upsurge in the last decade, especially among HIV carriers, immigrant population and the elderly. [4]

Tunisia is an intermediate-endemic country with a recorded incidence of 35/100,000 inhabitants in 2019 [5].

Extra-pulmonary tuberculosis accounts for 15 to 30% of all locations [6]. Ganglion, pleural, urogenital and bone sites are the most common [7].

Symptoms can be various depending on the location of the tuberculosis. General signs are often seen like weight loss, anorexia and fever, but none of them is specific.

The main cause of tuberculosis is *Mycobacterium tuberculosis*, a thin, slightly curved, aerobe bacillus. In comparison to other bacteria, M tuberculosis has a cell wall with a very high lipid content that resists staining by the usual Gram method. However, it accepts basic fuchsin dyes and is not easily discolorized even with acidalcohol; this resistance to decolorization by acid-alcohol is termed acid-fast [8]. M tuberculosis is transmitted via airborne droplet nuclei that are produced when persons with pulmonary or laryngeal tuberculosis cough, sneeze, speak, or sing [9].

Diagnosing active tuberculosis can be difficult. A chest X-ray and multiple sputum cultures for acid-fast bacilli are typically part of the initial evaluation [10].

Tuberculin testing is helpful, but it is not specific, and a negative test cannot exclude the diagnosis.

Cultures are slow but nevertheless remain the gold standard [11]: they allow the diagnosis to be confirmed and an antibiogram to be obtained. But they are rarely positive in paucibacillary tuberculosis.

The histopathological study is the key exam to prove the diagnosis of tuberculosis by objectifying the tuberculoid granuloma with caseous necrosis.

New diagnostic tools are available today such as Quantiféron.

Polymerase chain reaction should be used when having a positive direct examination, in order to distinguish the bacilli of the *Mycobacterium tuberculosis* from other atypical mycobacteria.

The treatment consists of six months of antituberculosis chemotherapy: rifampicin and isoniazid, initially supplemented by two months of pyrazinamide and ethambutol [12].

Behçet's disease is a rare but severely debilitating vasculitis. The manifestations are typically mucocutaneous with orogenital ulcers and skin lesions [13]. However, many other locations can be seen.

The symptoms are variable, which can explain the delay of the diagnosis in addition to the absence of specific blood test.

Behçet's disease occurs worldwide but clusters are found mainly along the 'silk road' with highest prevalence in Turkey, Japan and Iran, and lower prevalence in North American and northern European populations [14].

It affects people of all ages with a predilection for those aged from 20 to 40 years. Sex distribution is variable. The disease is usually severe in young adult men.

Behçet's disease can affect potentially all organ systems because of its propensity to affect all arteries and veins.

Oral and genital ulcers are the hallmarks of the disease, seen in up to 97% and 60–90% of patients, respectively [15].

The confirmation of diagnosis is based on appropriate clinical symptoms after exclusion of differential diagnoses.

Vascular involvement during Behçet's disease affects preferentially young males with a sex ratio M/F: 5/1 [16]. It is more frequent in the Middle East and Mediterranean countries. Our patient is a 36-year-old woman.

Most often, vascular involvement in Behçet's disease affects the venous system, usually in the form of thrombosis. Arterial involvement affects around 10% of patients and makes the severity of the disease [17]. The main arterial lesions are aneurysms, occlusions and more rarely arterial stenosis or diffuse aortitis [18].

Anatomopathological examination often shows active lesions made of an inflammatory infiltrate preferentially affecting the media, the adventitia and the surrounding of the vasa vasorum. It is associated with scar lesions with fibrous thickening in the media, the adventitia and the intima, all leading to the distension of the walls and the constitution of aneurysms or pseudo-aneurysms.

Aneurysms are by far one of the most serious and feared complications of Behçet's disease, especially the pulmonary location. All arteries can become aneurysmal, the main localizations are aortic, femoral, pulmonary, iliac, popliteal and subclavian (**Figure 2**). The other rarer arterial localizations are digestive, coronary, cerebral and upper limbs [19, 20]. In the series of Saadoun et al. [20], the arterial lesions of the lower limbs were more frequent than those of the upper limbs with respectively 51 cases vs. 5. Nevertheless, we should mention that the arterial localizations are willingly multiple in approximately 30% of the cases [19].

The rupture of the aneurysms of the humeral artery is dominated by traumatic causes (direct contusion, arteriography, arterial catheterization, blood gas, pulmonary biopsy, arterial bypass). In our case, the spontaneous rupture of the aneurysm of the humeral artery would probably be due to its chronicity and its voluminous size.

Ultrasound coupled with color and pulsed doppler, is the key exam and the first to request in front of a pulsatile mass, it allows the diagnosis to be made by showing an increase in the caliber of the artery.

Behçet's disease should be suspected when having a young patient with an arterial aneurysm of the upper limb. Clinical signs in favor should be sought by vigorous interrogation and examination, in order to avoid delayed diagnosis leading to serious complications (**Figure 3**).

The choice between endovascular or surgical treatment of aneurysmal lesions is not well codified, but it should ideally be made at a distance from the acute phase. However, many of these lesions are diagnosed at the stage of rupture or pre-rupture requiring emergency surgery which is the case of our patient.

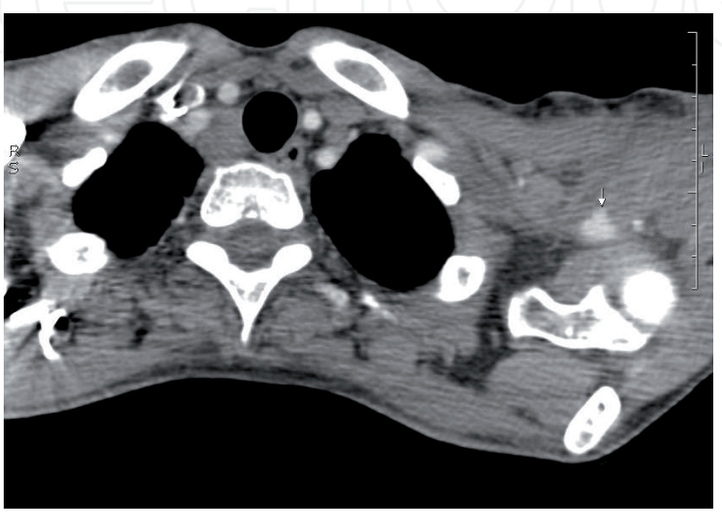

Figure 2.
Thoracic CT angiography showing a saccular aneurysm of the left subclavian artery (cross section).

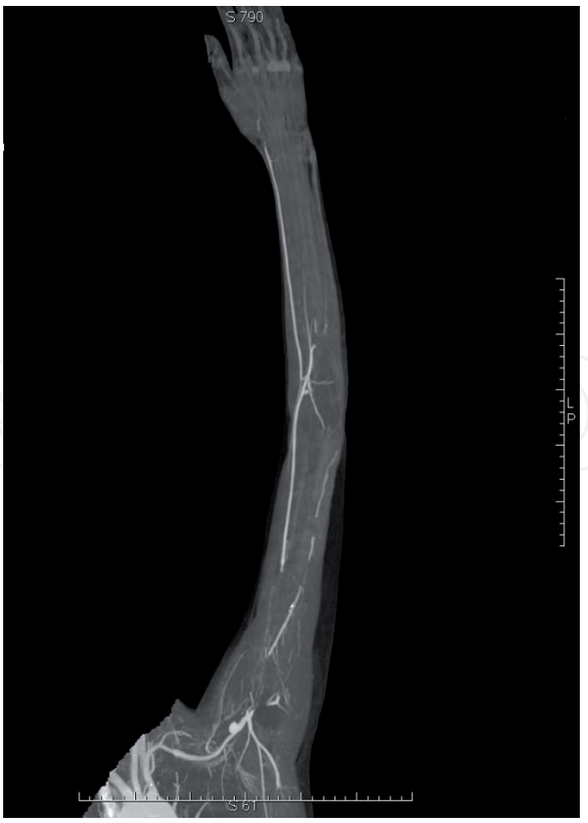

Figure 3.
CT angiography of the left upper limb showing: Fusiform aneurysm of the subclavian artery, occlusions of the left humeral artery of over 13 cm and occlusion of the lower two thirds of the left ulnar artery (reconstruction image).

Control of inflammation is essential, therefore high dose of corticosteroid therapy is recommended for serious arterial damage in combination with immunosuppressants [21].

The association of Behçet's disease with aneurysmal involvement to pulmonary tuberculosis is very rarely reported in the literature [22] and concerns the pulmonary arteries in most cases. The involvement of the humeral artery in the case of our patient is the first ever to be described in the literature in our knowledge.

The rare cases of association of Behçet's disease with other pathologies, notably infectious, such as pulmonary tuberculosis have been particularly observed when treatments such as TNF-a blockers, or other immunosuppressants were newly introduced. That was not the case in our observation which makes it special.

Apart from immunosuppressive therapy, Efthimiou et al. [23], explains this association by the disruption of the immune system induced by the disease itself, by genetic predisposition and by the ethnic factor which seems to be important in our case, since Tunisia is a tuberculosis endemic country. All of this highlights the value of an anti-bacillary prophylactic treatment in the case of immune diseases.

4. Conclusion

Arterial involvement during Behçet's disease is one of the main causes of mortality and morbidity. Aneurysms are the most common form, mainly affecting the aorta, the pulmonary and femoral arteries. The arteries of the upper limbs are rarely affected but they can inaugurate the disease and even be life-threatening in case of spontaneous or traumatic rupture. Hence the importance of suspecting Behçet's disease when facing any arterial aneurysm of the upper limb of a young patient.

Pulmonary or extra-pulmonary tuberculosis can be associated with Behçet's disease even outside the use of an immunosuppressive therapy. Here comes the utility to carry out screening tests or even to administer prophylactic treatment based on Isoniazid in endemic countries before any other medication.

Competing interests

Authors have declared that no competing interests exist.

Consent and ethical approval

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors.

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