New insights on tuberculous aortitis

Laure Delaval, MD,[a] Tiphaine Goulenok, MD,[a] Paul Achouh, MD,[b] David Saadoun, MD, PhD,[c] Julien Gaudric, MD,[d] Quentin Pellenc, MD,[e] Jean-Emmanuel Kahn, MD,[f] Nicoletta Pasi, MD,[g] Damien van Gysel, MD,[h] Patrick Bruneval, MD, PhD,[i] Thomas Papo, MD,[a,j,k] *and* Karim Sacre, MD, PhD,[a,j,k]
Paris and Suresnes, France

ABSTRACT

Objective: Aortitis is an exceedingly rare manifestation of tuberculosis. We describe 11 patients with tuberculous aortitis (TA).

Methods: Multicenter medical charts of patients hospitalized between 2003 and 2015 with TA in Paris, France, were reviewed. Demographic, medical history, laboratory, imaging, pathologic findings, treatment, and follow-up data were extracted from medical records. TA was considered when aortitis was diagnosed in a patient with active tuberculosis.

Results: Eleven patients (8 women; median age, 44.6 years) with TA were identified during this 12-year period. No patient had human immunodeficiency virus infection. Tuberculosis was active in all cases, with a median delay of 18 months between the first symptoms and diagnosis. At disease onset, vascular signs were mainly claudication, asymmetric blood pressure, and diminished distal pulses. Constitutional symptoms or extravascular signs were present in all patients at some point. Aortic pseudoaneurysm was the most frequent lesion, but three patients had isolated inflammatory aortic stenosis. TA appeared as extension from a contiguous infection in only three cases. Tuberculosis was considered because of clinical features, tuberculin skin or QuantiFERON-TB Gold (Quest Diagnostics, Madison, NJ) test results, pathologic findings, and improvement on antituberculosis therapy. A definite *Mycobacterium tuberculosis* identification was made in only three cases. All patients received antituberculosis therapy for 6 to 12 months. Surgery including Bentall procedures, aortic bypass, and open abdominal aneurysm repair was performed at diagnosis in eight patients. Seven patients received steroids as an adjunct therapy. All patients clinically improved under treatment. No patients died for a median follow-up duration of 4 years.

Conclusions: TA may result in aneurysms contiguous to regional adenitis but also in isolated inflammatory aortic stenosis. Steroids may be associated with antituberculosis therapy for inflammatory stenotic lesions. Surgery is indicated for aneurysms and in case of worsening stenotic lesions despite anti-inflammatory drugs. No patient died after such combined treatment strategy. (J Vasc Surg 2017;■:1-7.)

Tuberculous aortitis (TA) stands as a rare but severe manifestation of tuberculosis. In a series of 100 autopsy cases with generalized tuberculosis, only one had TA.[1] In the same line, the major clinical study in the field showed that only 41 cases have been reported in the English-language medical literature between 1945 and 1999.[2] Infection of the aorta by *Mycobacterium tuberculosis* usually appears as the direct extension from a contiguous infection (ie, tuberculous lymphadenitis) that leads to the formation of an aortic pseudoaneurysm, in most cases affecting the thoracic and abdominal aorta equally.[2] A combination of surgical intervention and prolonged antibiotherapy is warranted for disease-free, long-term survival.

We describe 11 patients diagnosed with TA between April 2003 and December 2015 in France with new insights on such an exceedingly rare form of extrapulmonary tuberculosis.

METHODS

Patients. We conducted a retrospective multicenter study of adult patients hospitalized during a 12-year period (from April 2003 to December 2015) with TA. Patients were hospitalized in the Internal Medicine department (Bichat Hospital, Paris; Pitié-Salpêtrière Hospital, Paris; and Foch Hospital, Suresnes, France) and Vascular Medicine or Vascular Surgery department (Bichat Hospital, Pitié-Salpêtrière Hospital, Georges Pompidou Hospital, and St Joseph Hospital, Paris, France). Patients with both aortitis and active tuberculosis were considered to have TA. Aortitis was defined by (1) aortic mural thickening (>3 mm) associated with aneurysm, ectasia, dilation, stenosis, or occlusion of the

From the Département de Médecine Interne,[a] Département de Chirurgie Vasculaire,[e] Département de Radiologie,[g] and Département d'Epidémiologie, Biostatistiques et Recherche Clinique,[h] Hôpital Bichat, Université Paris Diderot, PRES Sorbonne Paris Cité, Assistance Publique Hôpitaux de Paris; the Département de Chirurgie Cardiovasculaire[b] and Département de Pathologie,[i] Hôpital Européen Georges Pompidou, Université Paris Descartes, PRES Sorbonne Paris Cité, Assistance Publique Hôpitaux de Paris; the Département de Médecine Interne[c] and Département de Chirurgie Vasculaire,[d] Hôpital Pitié-Salpêtrière, Université Pierre et Marie Curie, Assistance Publique Hôpitaux de Paris; the Département de Médecine Interne, Hôpital Foch, Suresnes[f]; and the INSERM U1149,[j] and the Département Hospitalo-Universitaire FIRE (Fibrosis, Inflammation and Remodeling in Renal and Respiratory Diseases),[k] Paris.

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Correspondence: Karim Sacre, MD, PhD, Department of Internal Medicine, Bichat Hospital, APHP 46 rue Henri Huchard, Paris 75018, France (e-mail: karim.sacre@aphp.fr).

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aorta and its branches or periaortic soft tissue changes by computed tomography (CT) angiography[3] and (2) inflammatory changes of the aortic wall according to pathologic analysis when surgery was performed.[4] Tuberculosis disease was defined as active according to current diagnostic and classification criteria.[5] The date of TA diagnosis was arbitrarily defined as the first day of antituberculosis treatment.

Patients hospitalized during the same period for tuberculosis disease without aortitis were also analyzed as a control series. The International Classification of Diseases, Tenth Revision codes for tuberculosis disease (A150, A151, A156, A158, A159, A160, A161, A162, A163, A165, A167, A168, A169, A170, A180, A181, A182, A183, A184, A185, A188, A199) were used for screening of patients. Data were extracted from the French diagnosis-related groups-based information system (PMSI) databases.

Data collection. Demographic, medical history, laboratory, imaging, pathologic findings, treatment, and follow-up data were extracted from medical records. Descriptive statistics included the mean (standard deviation) or median (minimum-maximum) as appropriate for continuous variables and frequency (percentage) for categorical variables.

Ethical statement. Our study is a retrospective human noninterventional study. According to the Public Health French Law (articles L 1121-1-1 and L 1121-1-2), approval from an Institutional Review Board and written consent are not required for human noninterventional studies. For ethical consideration, however, patients were informed that data collected in medical records might be used for research study in accordance with the privacy rule. The study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki.

RESULTS

Characteristics of patients. Eighteen patients were identified between 2003 and 2015. Seven patients were excluded because diagnosis criteria for TA were not met (n = 4) or data were missing (n = 3). Patients who did not meet diagnosis criteria for TA had aortitis due to *Mycobacterium bovis* after bacille Calmette-Guérin treatment for bladder cancer (n = 1), typical atherosclerotic aneurysm with a past history of cured tuberculosis (n = 1), and Takayasu arteritis involving aortic tributaries associated with a positive test result of QuantiFERON-TB Gold (Quest Diagnostics, Madison, NJ) as the only clue for tuberculosis (n = 2). Eleven patients (8 women) were eventually studied.

The median age at TA diagnosis was 44.6 years (16-75 years). All but one patient had lived in tuberculosis endemic countries: Congo, Ivory Coast, Haiti, Guinea, Madagascar, former Yugoslavia, Morocco, and Algeria. No patient had human immunodeficiency virus infection. Five patients suffered underlying comorbid conditions including diabetes (n = 2), cirrhosis (n = 1), chronic kidney disease (n = 1), and inflammatory colitis (n = 1). The median delay between the onset of the first symptom and TA diagnosis was 18 (0-36) months.

ARTICLE HIGHLIGHTS

- **Significance:** This report discusses treatment options for a rare form of aortitis due to tuberculosis.
- **Type of Research:** Retrospective case series
- **Take Home Message:** Tuberculosis may cause aortitis, leading to stenosis or pseudoaneurysm formation. Of 11 patients, all had antituberculosis therapy, 8 had surgery, and 7 received steroid treatment. No patient died during a follow-up of 4 years.
- **Recommendation:** Surgery is effective in treating aortic pseudoaneuryms or stenosis associated with tuberculosis. Steroids may help to limit progression of aortic disease.
- **Strength of Recommendation:** 2. Weak
- **Level of Evidence:** C. Low or very low

At disease onset, patients reported weight loss (n = 8), fever (n = 4), cough (n = 2), abdominal pain (n = 1), or chest pain (n = 2). Five patients presented with upper limb (n = 1) or lower limb (n = 4) claudication. At physical examination, vascular findings were asymmetric blood pressure (n = 3), diminished or absent pulse in the lower limbs (n = 3), and pulsatile cervical mass (n = 1). Other features included swollen lymph nodes (n = 6), nodular erythematous eruption of the lower legs (n = 4), and uveitis (n = 1). Blood C-reactive protein levels were raised in eight (of nine tested) patients (median, 50 mg/L [15-211]; Table I).

Diagnosis of TA. Tuberculosis was active in all cases. The diagnosis of tuberculosis was suspected because of clinical presentation at disease onset and chest CT scan findings including enlarged or necrotic mediastinal lymph nodes (n = 3), nodular opacities (n = 2), diffuse miliary opacities (n = 1), and pleuritis (n = 1). Of note, findings on chest CT scan were normal in 5 patients.

The QuantiFERON-TB Gold test was performed in seven patients and the result was positive in five. The tuberculin skin test response was always positive when it was performed (n = 7).

Aortic CT angiography displayed aortic pseudoaneurysm (n = 7) but also aortic stenosis (n = 2; Fig 1). The size of the pseudoaneurysms ranged from 20 to 84 mm. An increased segmental thickening of the aorta wall thickness was seen in all but two cases. Isolated aortic thoracic lesions, in either the ascending (n = 2) or descending (n = 2) thoracic aorta, were observed in four cases. Isolated abdominal aortitis was found in two patients. Panaortic (ie, both thoracic and abdominal aorta) lesions were observed in five cases. Aortic primary

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