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Case Report

# Infectious aortic aneurysms: A case report and review of cases from the Middle East and North Africa (MENA) region

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ABSTRACT

An infectious aortic aneurysm is a rare disease entity. We report a challenging case of a 29-year-old male presenting with chest pain and constitutional symptoms. The patient was found to have three pseudoaneurysms of the aorta on imaging, significant pathological findings of necrotizing granulomatous lymphadenitis from a supraclavicular lymph node biopsy, and a highly suggestive clinical picture of tuberculous aortitis. He was referred to vascular surgery for intervention and discharged on antituberculous therapy for 6 months. To the best of our knowledge, only five cases of tuberculous aortic aneurysms have been reported from the Middle East and North Africa (MENA) region, all with favorable outcomes. A high index of suspicion, early detection, and prompt intervention are essential in managing such cases.

## Introduction

An infectious aortic aneurysm (IAA) is a rare entity and can be of bacterial, viral, or fungal etiology. It is estimated that only 1 to 3% of all aneurysms have an infectious origin. This disease carries a high risk of rupture, and hence, mortality [1]. The most common etiological microorganisms that have been identified are Staphylococcus spp. and Salmonella spp [1]. Other identified microorganisms include Treponema pallidum, Mycobacterium spp., Pseudomonas aeruginosa, Listeria, Klebsiella, E. coli, Clostridium, Campylobacter, H. influenzae, Yersinia, Acinetobacter, Brucella, and fungi [1,2]. In tuberculosis (TB), involvement of the aorta among all cardiac structures is the rarest (0.3%) [2]. TB aortic aneurysm (TBAA) formation occurs in almost half of all patients with TB aortitis, with both mycotic and pseudoaneurysms cases being reported [2]. The first case was described by Weigert in 1882, and since then, the field has witnessed tremendous development in diagnostic and management strategies, which helped improve the prognosis of the disease [3]. In this report, we present a case of a patient with a presumable diagnosis of TBAA from the United Arab Emirates. We also present clinical characteristics and outcomes of published cases of TBAA and IAA from the Middle East and North Africa (MENA) region.

## Case

A 29-year-old Pakistani male presented to the emergency department with a 1-year history of constitutional symptoms (fever, night sweats, and 20 kg weight loss) associated with chest and back pain and abdominal discomfort. The patient had a history of multiple hospitalizations due to presumed typhoid fever over the past several years. On admission, laboratory results revealed leukocytosis (11.8 x $10^9$/l), microcytic hypochromic anemia (hemoglobin 90 g/l, mean corpuscular volume 67 fL), thrombocytosis (568 x $10^9$/l), C-reactive protein of 170 mg/l, erythrocyte sedimentation rate of >119 mm/hour, and two sets of negative blood cultures. In the setting of the history of possible typhoid fever acquired in Pakistan, empiric treatment with meropenem therapy was initiated. Computed tomography angiography (CTA) revealed a circumferential wall thickening of the descending aortic wall extending to the level of the renal arteries, stable pseudoaneurysm originating from the aortic root at the level of the right coronary sinus, and two pseudoaneurysms originating from the distal aortic arch and proximal descending aorta on the inferior side with severe stenosis of the right coronary artery due to the mass effect (Figure 1a–c). Infectious workup showed a negative QuantiFERON TB test with low mitogen response, indicating a possible false negative result. Additional infectious workup was

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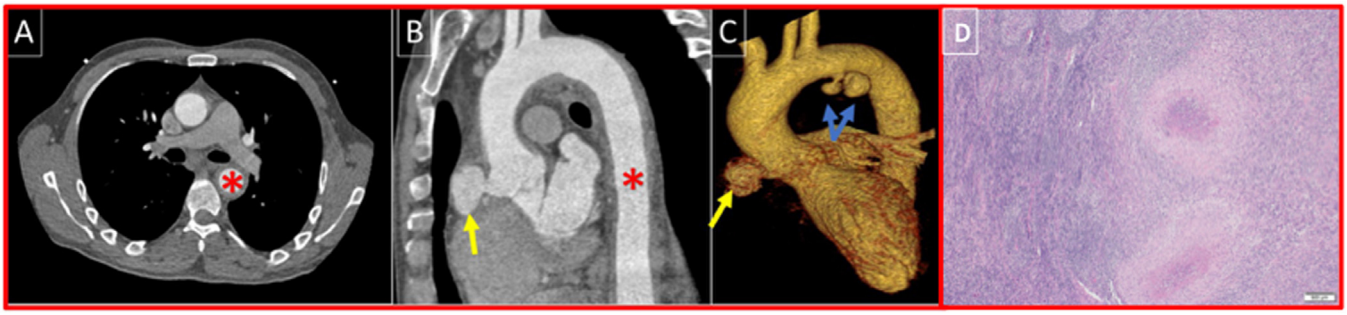


**Figure 1.** Imaging findings of this case. (a) CTA aorta (axial plain) showing thickened descending aortic wall consistent with an inflammatory process (asterisk). (b) CTA aorta on modified sagittal plane showing pseudoaneurysm originating from the right coronary sinus (yellow arrow) and thickened descending aortic wall (asterisk). (c) 3D rendering of the aortic root, ascending aorta, and aortic arch showing pseudoaneurysm in the aortic root originating from the right coronary sinus (yellow arrow). In addition, there are two pseudoaneurysms revealed on the distal aortic arch, and the proximal descending aorta on the lesser curvature (blue arrows). (d) Supraclavicular lymph node biopsy demonstrating necrotizing granulomatous lymphadenitis. CTA, computed tomography angiography.

negative for syphilis, brucella, HIV, and viral hepatitis. Our differential diagnosis included Takayasu arteritis, giant cell arteritis, and other large vessel vasculitis/aortitis forms. Still, due to the age of onset, ethnicity, epidemiology, and clinical picture, infectious aortitis remained the primary differential diagnosis.

The patient underwent bronchoscopy with bronchoalveolar lavage and an excisional biopsy of the right supraclavicular node, which showed no organisms in the acid-fast bacilli smears, negative Mycobacterium tuberculosis polymerase chain reaction, and negative Nocardia culture. However, it demonstrated necrotizing granulomatous lymphadenitis. Given the clinical picture, epidemiologic factors, and pathologic findings the patient was diagnosed with IAA, presumably TBAA, and pharmacologic treatment with antitubercular therapy (ATT) with isoniazid 300 mg daily, rifampin 600 mg daily, ethambutol 1200 mg daily, and pyrazinamide 1500 mg daily was started. Following this hospital course, the fever was resolved, and C-reactive protein decreased to 45 mg/l. He was referred for a vascular surgical assessment with repeated imaging, given possible therapeutic intervention addressing the large pseudoaneurysms. Unfortunately, the patient left our care against medical advice, stating his desire to receive services elsewhere. He was discharged on four drug ATT for 2 months, with an eventual transition into a two-drug regimen of isoniazid 300 mg daily and rifampin 600 daily for 4 months. The patient completed his treatment course and was doing well clinically at 18 months follow-up.

## Discussion

Currently, there are no unified criteria for diagnosing IAA, and clinicians rely on a combination of clinical, biomarkers, imaging, and intraoperative findings. Given the wide variation in presenting symptoms and the high risk of rupture, IAA carries a poor prognosis and requires a high index of clinical suspicion. Clinical manifestations of IAA range from being asymptomatic to those related to their mass effect on adjacent organs, including chest or back pain, hoarseness, stridor, and dysphagia [3].

CTA of the aorta is a highly sensitive modality that can help diagnose and determine the dimensions and characteristics of an aneurysm and its proximity to neighboring structures [4]. In this case, CTA revealed multiple aortic pseudoaneurysms. Moreover, the right supraclavicular node biopsy revealed necrotizing granulomatous lymphadenitis, highly suspicious for infectious aortitis secondary to tuberculosis. Definitive diagnosis of the disease is usually based on findings of caseating granulomatous lesions in the resected aorta and microbiological confirmation [5], but this was not feasible in our case as the patient left against medical advice before a decision on the need of surgical intervention was made.

In case of TBAA, the standard treatment is surgical reconstruction plus prosthetic graft implantation or an extra-anatomic bypass in addition to ATT [2]. We identified five published cases of TBAA from the MENA region (Supplementary Table 1) [6–10]. Four of them were from Morocco, and one from Saudi Arabia. There was no difference in either the age or gender distribution of these cases. Chest pain, abdominal pain, and shortness of breath were the most encountered presentations. In addition, 60% of these cases involved the abdominal aorta. In contrast to our case, surgical resection, grafting, or endovascular interventions were performed with favorable outcomes in nearly all these cases. Regarding other causative microorganisms, we identified reported cases of Staphylococcus spp. and Salmonella spp. IAA from the MENA regions. We summarized them in Supplementary Table 2 [11–14]. Most patients required a combination of surgical and medical treatment with prolonged antimicrobial therapy to achieve clinical remission. For instance, Al-Tawfiq and Khougeer [12] described a case of a 71-year-old male who was initially admitted as a case of Salmonella bacteremia but later complained of fever and back pain and was diagnosed with aneurysmal dilatation of the abdominal aorta with evidence of extraluminal leakage beyond the wall. He eventually underwent resection and grafting of the abdominal aortic aneurysm, along with a prolonged course of antibiotics. At follow-up, he had negative blood cultures with improvement in his inflammatory markers and intact anastomotic lines on repeated CT scan.

## Conclusion

Infectious involvement of the aorta is rare and constitutes a diagnostic challenge. We report a case with highly suggestive epidemiologic, clinical, imaging, and pathological features of TBAA. High index of suspicion, early detection, and prompt intervention are essential in managing such cases.

## Declarations of Competing Interest

The authors have no competing interests to declare.

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## Ethical approval

Not required.

## Author contributions

All authors contributed to this manuscript and reviewed its the final version.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.ijregi.2023.12.001.

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