

Giant cell aortitis masquerading as intramural hematoma

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ABSTRACT

Giant cell aortitis is a rare cause of acute aortic syndrome. We describe the cases of two patients who had presented with chest pain, hypertension, and computed tomography angiographic evidence of mural thickening typical of thoracic aortic intramural hematoma. Although the patients' symptoms improved with hypertension control, elevated inflammatory markers and persistent fever to 103°F raised concern for an inflammatory etiology. Empiric steroids were administered, resulting in prompt cessation of fever and decreasing inflammatory markers. The findings from temporal artery biopsies were positive in both patients. Follow-up axial imaging after 2 weeks of steroid therapy revealed improvement in aortitis with decreased wall thickening. Giant cell aortitis should be considered in patients presenting with acute aortic syndrome in the setting of elevated inflammatory markers and noninfectious fever. (*J Vasc Surg Cases and Innovative Techniques* 2020;6:694-7.)

Keywords: Giant cell arteritis; Intramural hematoma; Noninfectious fever

Giant cell arteritis is an inflammatory disorder that typically affects medium and large arteries in older adults. Aortic involvement occurs in ~25% of affected patients and can lead to aneurysm formation or dissection.^{1,2} Most reported cases of giant cell aortitis (GCA) have involved the ascending aorta and aortic arch, based on histologic examination of specimens retrieved during open repair.³ In the current era of endovascular intervention, direct tissue examination is not always possible, and the diagnosis relies on reported clinical criteria⁴ and the findings from imaging studies. More distal aortic involvement has been reported in individuals who meet these conditions.^{2,3} Although GCA is an uncommon cause of acute aortic syndrome,^{4,5} early recognition and diagnosis are important because early steroid administration can decrease inflammation, neuro-ophthalmic complications, and, possibly, mortality.^{1,2,6} We present the cases of two patients with GCA of the thoracic aorta appearing as intramural hematoma (IMH). Both patients gave written informed consent to use their data for educational purposes.

CASE REPORT

Patient 1. A 63-year-old man with chronic hypertension presented after the sudden onset of severe, mid-and upper back pain. On arrival to the emergency department, the patient's recorded blood pressure (BP) was 200/105 mm Hg, and his temperature was 98.6°F. Physical examination disclosed normal upper and lower extremity pulses. The laboratory test findings were remarkable for a white blood cell (WBC) count of $17 \times 10^9/L$. Computed tomography angiography (CTA) demonstrated a large rim of high density surrounding the descending thoracic and abdominal aorta consistent with an IMH (Fig 1). The patient was admitted to the hospital for BP and heart rate (HR) control using continuous intravenous esmolol and nicardipine. Although the patient's vital signs were maintained within the standard parameters of a systolic BP of 100 to 120 mm Hg and HR of <70 beats/min, the patient became acutely confused on hospital day 2 and required intubation for deteriorating respiratory status. A brain magnetic resonance imaging study confirmed numerous embolic strokes in bilateral hemispheres. Shortly thereafter, the patient experienced daily fever spikes to 103°F. A total of eight sets of blood cultures, two assays for *Treponema* antibodies, and a QuantiFERON TB assay (Qiagen, Hilden, Germany) were all negative. No other source of infection could be identified, and the WBC count had decreased to normal. C-reactive protein (CRP) was elevated at 220 mg/L (normal, 0-8 mg/L), and the erythrocyte sedimentation rate (ESR) was elevated at 112 mm/h (normal, 0-20 mm/h), prompting concern for primary aortitis. Assays for autoantibodies (antinuclear antibodies, antineutrophil cytoplasmic antibodies, myeloperoxidase antibody, proteinase 3 antibody, IgG subclass, hepatitis B core and surface antigen, and hepatitis C antibody) were negative. After empiric high-dose steroids were administered, the patient rapidly defervesced. A temporal artery biopsy was performed, which demonstrated segmental transmural scarring suggestive of healed arteritis (Fig 2). The patient continued receiving 30 mg of prednisone daily, with

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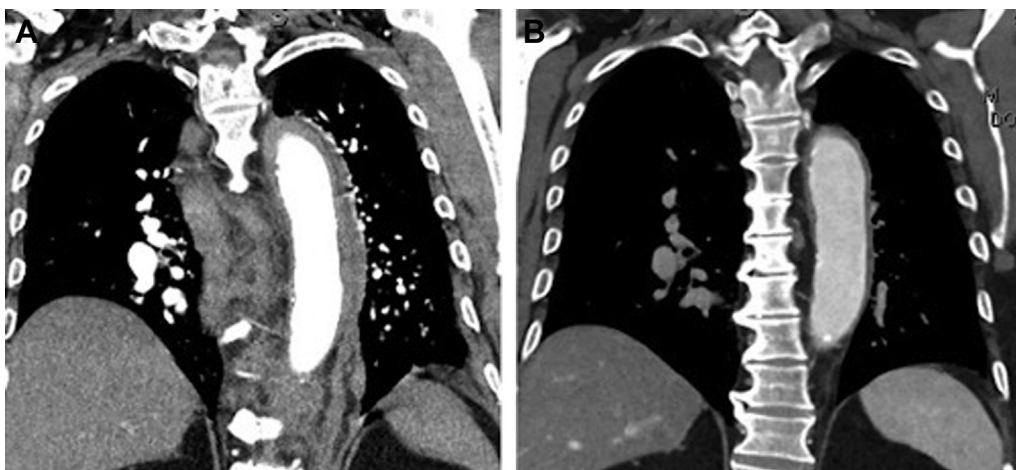


Fig 1. Coronal computed tomography angiograms of the thoracic aorta in patient 1 demonstrating wall thickening and surrounding inflammation suggestive of intramural hematoma (IMH). **A**, Admission study. **B**, Follow-up study after 3 months of immunotherapy.

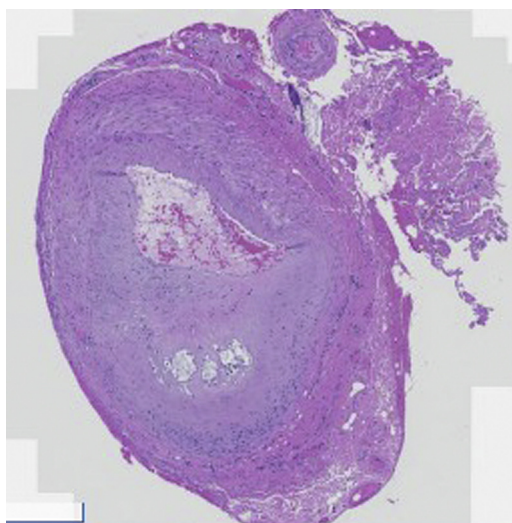


Fig 2. Microscopic image of temporal artery biopsy in patient 1 showing hematoxylin and eosin stain at 2× magnification. Note the full-thickness fibrosis of the vessel wall with associated loss of the internal lamina and neovascularization. Segmental transmural scarring of the vessel wall was observed, suggestive of healed arteritis.

normalization of the CRP level and ESR after 6 weeks of therapy. He made a slow, but steady, recovery and was discharged to a rehabilitation center on hospital day 47. At 5 months of follow-up, the patient was asymptomatic and living at home. The steroid dose had been tapered to 10 mg daily. Late imaging studies demonstrated decreased wall thickening in the thoracic and abdominal aorta (Fig 1, B).

Patient 2. A 70-year-old woman presented with severe substernal chest pain. The patient had a temperature of 98.9°F and BP of 150/90 mm Hg on arrival to the emergency department. The physical examination findings and admission laboratory test

results were unremarkable, except for a slightly elevated D-dimer level. CTA demonstrated a thickened aortic wall beginning in the ascending aorta and extending to the infrarenal aorta, suggestive of IMH (Fig 3, A). Thickening also extended into the innominate and proximal common carotid arteries, raising the possibility of aortitis. After admission for BP and HR control, the patient experienced daily fever spikes to 103°F, which continued despite administration of empiric antibiotics. The WBC count increased to $13 \times 10^9/L$; however, no infectious etiology was identified. Four sets of blood cultures, an assay for *Treponema* antibodies, and a QuantiFERON TB assay (Qiagen) were all negative. The CRP level was elevated at 210 mg/L (normal, 0-8 mg/L), and the ESR was elevated at 65 mm/h (normal, 0-20 mm/h), prompting further concern for aortitis. The patient developed a new occipital headache. Assays for auto-antibodies (antinuclear antibodies, antineutrophil cytoplasmic antibodies, myeloperoxidase antibody, proteinase 3 antibody, IgG subclass, DNA double-stranded antibodies, rheumatoid factor, hepatitis B core and surface antigen, and hepatitis C antibody) were negative. A temporal artery biopsy demonstrated segmental transmural scarring of the vessel wall suggestive of healed arteritis. After administration of prednisone 40 mg daily, the patient rapidly defervesced, and the inflammatory marker levels normalized. At 1 year of follow-up, the patient was asymptomatic and living at home. The steroid doses had been tapered, with tocilizumab as maintenance therapy. Late imaging studies demonstrated a decrease in the wall thickening of the thoracic aorta (Fig 3, B).

DISCUSSION

GCA is a rare condition that requires high clinical suspicion for diagnosis. The current diagnosis of giant cell arteritis requires fulfillment of three of five of criteria set by the American College of Rheumatology, including age >50 years; new-onset headache; temporal artery abnormality; elevated ESR >50 mm/h; and abnormal

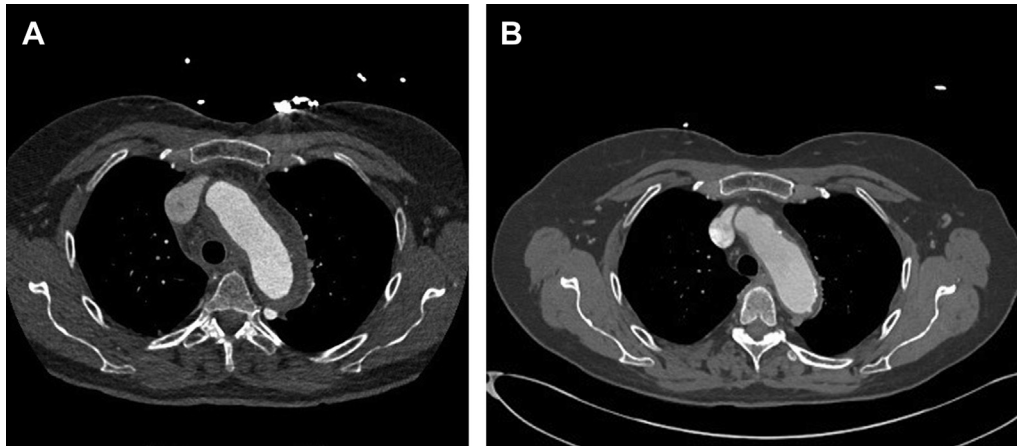


Fig 3. Axial computed tomography angiograms of the thoracic aorta in patient 2 demonstrating wall thickening and surrounding inflammation suggestive of intramural hematoma (IMH). **A**, Admission study. **B**, Late follow-up study after 11 months of immunotherapy.

arterial biopsy findings. The presence of three criteria yields a sensitivity of 93.5% and specificity of 91.2% for giant cell arteritis.⁴ Our specific cases met the criteria for age, an elevated ESR, and abnormal temporal artery biopsy findings. We acknowledge that the pathologic findings of transmural scarring on the temporal artery biopsies are nonspecific and fall into the category of “healed arteritis.” It remains controversial whether these findings support a diagnosis of giant cell arteritis. However, the diagnosis relies on clinical criteria and can be assumed even in patients with negative temporal artery biopsy findings, because $\leq 40\%$ of patients with giant cell arteritis will have negative biopsy findings.⁷ In addition to GCA, the differential diagnosis includes infectious etiologies (including syphilis and Q fever) and noninfectious etiologies related to autoimmune diseases (giant cell arteritis, Horton disease, Takayasu arteritis, rheumatoid arthritis, systemic lupus erythematosus, ankylosing spondylitis, Wegener granulomatosis, Cogan syndrome, Behçet disease, and sarcoidosis). The workup for these disorders has been previously reported.^{8,9}

In the present report, we have described our experience with two patients who presented with acute aortic syndrome. The distinguishing feature, which raised suspicion for an atypical etiology of their aortic disease, was the presence of fever without an infectious source. This prompted further investigation of a rheumatologic disorder with testing of serum inflammatory markers. Pulse dose steroids resulted in the resolution of the fevers within 24 hours of administration. Glucocorticoids play a central role in the treatment of giant cell arteritis and represent the optimal initial therapy. Most patients will require extended treatment with steroids for many months to years to achieve remission. To decrease the risk of the long-term side effects associated with steroid therapy, steroid-sparing regimens, including methotrexate and other immunosuppressive agents such as tocilizumab, have been recommended.¹⁰

Although clinical improvement was consistent in the present patients, elevated inflammatory markers can persist for weeks to months, requiring further therapy with adjunctive immunosuppressive or immunomodulatory drugs. Despite aggressive treatment, some evidence has shown that vasculitis can persist, because it has been found at autopsy.¹ In addition to prompt diagnosis and treatment, long-term surveillance is key for these patients. Some investigators have recommended using positron emission tomography (PET) for the assessment of disease activity in GCA. However, PET alone cannot distinguish wall thickening, arterial stenosis, luminal thrombosis, or aneurysmal degeneration. Therefore, CTA or magnetic resonance angiography should be used with PET as complementary tests to evaluate patients with aortitis at the initiation of steroids.⁹

Despite the decrease in aortic inflammation documented in the present study, the risk of late complications, including aneurysmal degeneration and dissection, persists for many years. A study by Kermani et al² showed that, despite immunosuppressive treatment, the incidence of aneurysmal degeneration and dissection increase over time, typically occurring 5 years after the initial diagnosis of GCA. Although the ideal duration of follow-up has not yet been determined, it is reasonable to consider the use of serial imaging studies for the life of the patient.

Operative interventions for late complications of GCA have been reported. The vast majority of reported experience relates to GCA of the ascending aorta, with patients undergoing open surgery and aortic replacement for late dissections or aneurysms. Patients should be in clinical remission before elective surgery is performed. Scant experience is available regarding late complications of GCA of the descending thoracic aorta. Although open operations were once considered the standard of care, isolated reports have suggested early

success with endovascular treatment.¹¹ To the best of our knowledge, no studies have reported on interventions for vascular complications from GCA of the descending thoracic aorta during the acute phase. However, endovascular options would seem desirable in these circumstances because of the reduced manipulation of inflamed tissues.⁹ Overall, patients with aortic involvement have an increased risk of death compared to those without aortic involvement, mostly from cardiovascular or pulmonary causes. Although the high mortality associated with complications of aortic dissection plays a central role, Kermani et al² have speculated that additional deaths occur because the inflammatory disease process shares pathways with processes that cause ischemic and nonischemic cardiomyopathy.

Based on our experience, we advocate for a rheumatologic workup of patient who presents with acute aortic syndrome and fevers of unknown origin. These patients require aggressive medical management to control inflammation and minimize further changes to the aorta, with continued follow-up to monitor for potential complications and degeneration.

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