

Gas in the Wall: Emphysematous Aortitis in an HIV-Positive Patient

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Abstract

Introduction: Emphysematous aortitis is a rare and potentially fatal form of infectious aortitis characterized by the presence of gas within the aortic wall, often due to gas-producing pathogens. Immunocompromised patients, including those with HIV, are particularly susceptible.

Case Presentation: We report the case of a 42-year-old HIV-positive male presenting with acute chest and back pain, fever, and hypotension. Laboratory results revealed elevated inflammatory markers and leukocytosis. Contrast-enhanced CT demonstrated circumferential thickening of the descending thoracic aorta with multiple foci of intramural gas and periaortic soft tissue stranding, consistent with emphysematous aortitis. Blood cultures identified *Clostridium perfringens*.

Intervention and Outcome: The patient underwent emergency surgical debridement with *in situ* aortic graft placement and received broad-spectrum intravenous antibiotics. Postoperative recovery was initially complicated by systemic inflammatory response, but follow-up imaging demonstrated resolution of the infection. He remained stable under long-term suppressive antibiotic therapy.

Conclusion: This case highlights the importance of early cross-sectional imaging for prompt diagnosis and management of emphysematous aortitis in immunocompromised patients. Multidisciplinary care is essential to prevent catastrophic outcomes, particularly in high-risk populations.

Keywords: Aortic Infection; *Clostridium perfringens*; CT Imaging; Emphysematous Aortitis; Gas-Forming Organisms; HIV; Immunocompromised Host; Infectious Aortitis; Mycotic Aneurysm; Vascular Infection

Introduction

Infectious aortitis is an uncommon but life-threatening cause of aortic inflammation. Among its rare subtypes, emphysematous aortitis is defined [1] by the presence of gas within or adjacent to the aortic wall, indicating infection by gas-forming organisms such as *Clostridium*, *Escherichia coli*, or *Klebsiella* species. The condition carries a high risk of aortic rupture and death if not promptly treated.

Immunosuppressed patients, including those with advanced HIV infection, are particularly vulnerable. HIV-related immune dysfunction, especially with CD4 counts below 200 cells/mm³, predisposes patients to atypical and severe infections. In these individuals, early clinical suspicion combined with prompt imaging can be lifesaving [1-4].

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Computed tomography (CT) is the diagnostic modality of choice [2,3], revealing characteristic findings such as aortic wall thickening, periaortic fat stranding, and gas within or around the aorta.

We report an illustrative case of emphysematous aortitis caused by *Clostridium perfringens* in an HIV-positive patient, highlighting key imaging features and management principles.

Case Presentation

A 42-year-old man with a 6-year history of HIV infection on antiretroviral therapy presented to the emergency department with sudden-onset severe chest and upper back pain, associated with fever (39.4°C), chills, nausea, and malaise for two days. He denied any trauma or drug use.

On examination, the patient was tachycardic (heart rate: 112 bpm), hypotensive (BP: 88/56 mmHg), and febrile. Oxygen saturation was 97% on room air. Cardiopulmonary and abdominal exams were unremarkable except for diffuse abdominal tenderness.

Laboratory tests are summarized in table 1.

Parameter	Patient Value	Reference Range
WBC count	16,700/mm ³ (neutrophilia)	4,000–10,000/mm ³
CRP	242 mg/L	< 10 mg/L
Procalcitonin	5.3 ng/mL	< 0.5 ng/mL
Lactate	3.1 mmol/L	0.5–2.2 mmol/L
CD4 count	184 cells/mm ³	500–1,600 cells/mm ³
HIV viral load	1,200 copies/mL	Undetectable in treated patients

Table 1: Laboratory findings of the patient with comparison to reference ranges.

Imaging findings

Contrast-enhanced CT of the chest and abdomen demonstrated a segmental circumferential thickening of the descending thoracic aorta with multiple foci of intramural gas and adjacent periaortic soft tissue inflammation. No aortic aneurysm or rupture was seen. These findings were consistent with emphysematous aortitis (Figure 1 and 2).

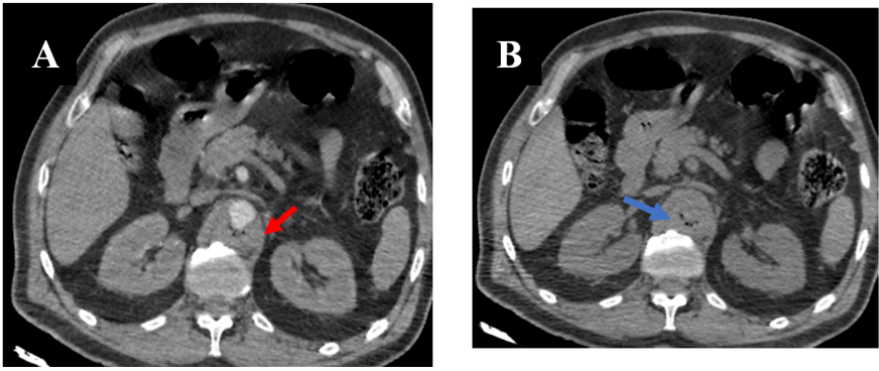


Figure 1: Axial abdominal CT images.

A: Axial unenhanced CT image. B: Axial contrast-enhanced CT image (arterial phase) showing a fusiform aneurysm of the abdominal aorta with irregular contours, marked mural thickening with peripheral enhancement (Red arrow), intra mural gas (Blue arrow), and infiltration of the surrounding perivascular fat consistent with an infected aneurysm.

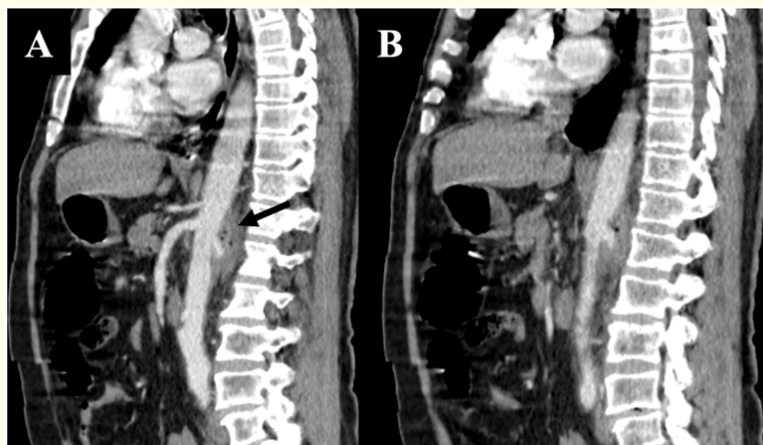


Figure 2: Sagittal reformatted abdominal CT images.

A and B: Sagittal reformatted CT images revealing intramural and peri-aneurysmal gas collections (Arrow), in keeping with emphysematous aortitis in an immunocompromised HIV-positive patient.

Microbiology

Blood cultures grew *Clostridium perfringens*, a gram-positive anaerobic *Bacillus* capable of gas formation through carbohydrate fermentation.

The patient was started on empirical intravenous piperacillin-tazobactam and vancomycin. Urgent surgical debridement of the infected aortic segment was performed via left thoracotomy, followed by placement of acryopreserved allograft. Intraoperative findings included necrotic aortic wall segments and purulent exudate.

Postoperatively, the patient was transferred to the ICU. He required vasopressor support for 48 hours and remained febrile for three days. He completed a 6-week course of intravenous antibiotics and was transitioned to oral amoxicillin-clavulanic acid for secondary prophylaxis. A follow-up CT at 3 months showed no signs of recurrent infection or graft complications.

Discussion

Emphysematous aortitis is a rare manifestation of infectious aortitis and is associated with extremely high morbidity and mortality. The presence of intramural or peri-aortic gas is pathognomonic and implies infection with gas-forming bacteria, most frequently *Clostridium* species.

The pathogenesis involves direct microbial invasion of the aortic wall, leading to necrosis, inflammation, and gas production. The gas may dissect through the media or collect within aneurysmal segments. The majority of reported cases occur in patients with compromised immune function, including diabetes mellitus, malignancy, or immunosuppressive therapy.

HIV-positive patients may present atypically. In this case, a relatively preserved CD4 count did not preclude a severe vascular infection. The early use of contrast-enhanced CT allowed rapid identification of intramural gas [4], guiding timely surgical and medical interventions. Alternative imaging modalities such as MRI or PET-CT are less practical in emergency settings.

Management typically involves the combined use of broad-spectrum intravenous antibiotics with anaerobic coverage, emergency surgical resection of the infected aortic segment with or without graft placement, and prolonged or long-term antibiotic suppression, particularly in immunocompromised patients. Mortality can exceed 50% in cases of delayed intervention or aortic rupture. In our patient, prompt diagnosis and a multidisciplinary approach led to a favorable outcome.

Only a handful of cases of *Clostridium perfringens*-related emphysematous aortitis have been reported [5]. This case adds to the limited literature and reinforces the diagnostic value of imaging in high-risk patients.

Conclusion

Emphysematous aortitis is a diagnostic and therapeutic emergency. It must be considered in immunocompromised patients with acute chest or abdominal pain and signs of systemic infection. The presence of gas within the aortic wall on CT is a red flag warranting immediate intervention. Early imaging, appropriate antimicrobial therapy, and surgical management are essential to improve outcomes.

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: El Mehdi Dhamnia Jr., Rania Benkaddour Jr., Kaoutar Imrani Sr., Ittimade Nassar.

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Drafting of the manuscript: El Mehdi Dhamnia Jr., Rania Benkaddour Jr., Kaoutar Imrani Sr., Ittimade Nassar.

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Supervision: Kaoutar Imrani Sr., Ittimade Nassar.

Human Subjects

Informed consent for treatment and open access publication was obtained or waived by all participants in this study.

Conflicts of Interest

In compliance with the ICMJE uniform disclosure form, all authors declare the following: Payment/services info: All authors have declared that no financial support was received from any organization for the submitted work.

Financial Relationships

All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

Other Relationships

All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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