EJCRIM
European Journal
of Case Reports
in Internal Medicine

A CASE OF PNEUMOCOCCAL PERIAORTITIS: PERIAORTITIS IS NOT ALWAYS AUTOIMMUNE

Georges El Hasbani[1], John Wilson[2], Kenneth Warrington[1]

[1] Division of Rheumatology, Department of Medicine, Mayo Clinic, Rochester, USA
[2] Division of Infectious Diseases, Department of Medicine, Mayo Clinic, Rochester, USA

Corresponding author's e-mail: george.hasbany@lau.edu

Received: 16/06/2025
Accepted: 30/06/2025
Published: 23/07/2025

Conflicts of Interests: The Authors declare that there are no competing interests.
Patient Consent: Written informed consent was obtained from the patient prior to writing the manuscript.
This article is licensed under a Commons Attribution Non-Commercial 4.0 License

How to cite this article: El Hasbani G, Wilson J, Warrington K. A case of pneumococcal periaortitis: periaortitis is not always autoimmune. *EJCRIM* 2025;**12**:doi :10.12890/2025_005633

ABSTRACT

Introduction: Periaortitis is a rare inflammatory condition with both infectious and non-infectious aetiologies, often presenting a diagnostic challenge. A comprehensive evaluation—including history, physical examination, imaging, and a broad infectious work-up—is essential, as negative blood cultures do not rule out infection, and premature use of glucocorticoids may be harmful in cases of infectious periaortitis.

Case description: We report the case of a 70-year-old man presenting with flank pain and periaortitis, in whom positron emission tomography/computed tomography (PET/CT) scan revealed moderate-to-severe ^{18}F-fluorodeoxyglucose (FDG) uptake. Despite negative cultures, a Karius test and urine antigen confirmed *Streptococcus pneumoniae* as the causative agent. The patient underwent successful open surgical repair of a mycotic pararenal abdominal aortic aneurysm, followed by targeted antibiotic therapy.

Discussion: Pneumococcal periaortitis is a rare condition with few reported cases, though *S. pneumoniae* has been implicated in various vascular infections including mycotic aneurysms, and diagnostic challenges persist, especially when blood cultures are negative. The Karius Spectrum™, despite its cost and limited guidance for use, and FDG-PET/CT imaging have emerged as helpful tools in identifying infectious aetiologies, with high maximum standardized uptake value values favouring infection over autoimmune causes, as seen in this case.

Conclusion: Infectious periaortitis should be suspected when there is a high uptake of FDG on PET/CT prompting an infectious disease work-up which may include a Karius test.

KEYWORDS

Periaortitis, infections, Karius Spectrum test, PET scan

LEARNING POINTS

- Periaortitis may have an autoimmune aetiology; however, an infectious cause should always be considered, particularly when there is high ^{18}F-fluorodeoxyglucose uptake on positron emission tomography/computed tomography imaging.
- *Streptococcus pneumoniae* is a rare cause of periaortitis and has been more commonly reported in association with mycotic aneurysms.
- Microbial cell-free deoxyribonucleic acid testing, such as the Karius test, may be a useful tool for identifying specific bacteria, especially when blood cultures are negative.

EFIM
European Federation of Internal Medicine

Publisher
smc media srl

© EFIM 2025 - European Journal of Case Reports in Internal Medicine - Doi: 10.12890/2025_005633

INTRODUCTION/BACKGROUND

Periaortitis is a spectrum of systemic inflammatory conditions characterized by chronic inflammation extending into the periaortic space[1].

Diagnosing periaortitis is often challenging and typically requires laboratory studies, imaging, and often histological evaluation[2]. The two broad categories of aetiologies for periaortitis are infectious and non-infectious. Among infectious causes, *Staphylococcus* and *Salmonella* species are the most commonly isolated microorganisms[3]; but additional infectious aetiologies include *Listeria monocytogenes*, syphilis, tuberculosis and other select bacteria. Non-infectious causes are diverse and include IgG4-related disease, retroperitoneal fibrosis, systemic autoimmune rheumatic disorders, and small-vessel vasculitides.

We present the case of a 70-year-old man who presented with flank pain and was found to have circumferential wall thickening of the infrarenal aorta on abdominal computed tomography angiogram (CTA), with subsequent moderate-to-severe focal ^{18}F-fluorodeoxyglucose (FDG) uptake at the same site. Despite an initially negative infectious disease workup, in depth testing ultimately resulted in a diagnosis of infectious periaortitis due to *Streptococcus pneumonia*.

CASE DESCRIPTION

A 70-year-old man with a medical history of coronary artery disease status post-coronary artery bypass grafting, hypertension, and hyperlipidaemia presented to the hospital with a 2-week history of fatigue, chills, and left flank pain. His review of systems was otherwise unremarkable, and he was afebrile on presentation.

On physical examination, a few erythematous, tender lesions were noted on the tips of his fingers *(Fig. 1)*. There was no evidence of synovitis, temporal artery tenderness, or abdominal tenderness.

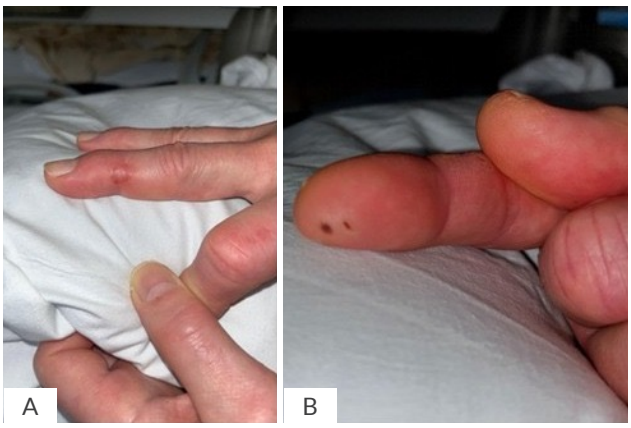


Figure 1. Digital tip erythematous lesions.

Comprehensive laboratory studies revealed elevated inflammatory markers *(Table 1)*. CTA of the chest, abdomen, and pelvis with intravenous (IV) contrast demonstrated marked circumferential wall thickening of the infrarenal aorta with surrounding inflammatory changes and small lymph nodes *(Fig. 2)*. A mural thrombus with associated ulceration at the level of the infrarenal aorta was also noted. FDG-positron emission tomography (PET) imaging (skull to mid-thigh) showed moderate to severe focal FDG uptake at the infrarenal aorta with a maximum standardized uptake value (SUVmax) of 7.8 *(Fig. 3)*. A repeat CTA of the abdomen and pelvis performed 4 days later demonstrated increased confluence and density of the inflammatory changes around the infrarenal aorta, along with progression of the ulceration within the atherosclerotic plaque on the right wall of the dilated infrarenal abdominal aorta. Both transthoracic and transoesophageal echocardiograms were negative for

Test	Results	Reference range
Haemoglobin (g/dl)	11.2	12-16
WBC (×10^9/l)	7	4-10
Platelet (×10^9/l)	195	150-400
CRP (mg/l)	46.3	<5
Erythrocyte sedimentation rate (mm/h)	50	2-20
Creatinine (mg/dl)	0.87	0.75-1.25
LFTs	Normal	-
ANCA	Negative	-
Serum IgG4 (mg/dl)	9	2-120
Blood cultures	Negative growth after 5 days	-
Fungal cultures	Negative growth after 5 days	-

Abbreviations: WBC, white blood cells; CRP, C-reactive protein; LFTs, liver function tests; ANCA, antineutrophil cytoplasmic antibody.

Table 1. Pertinent blood work results.



Figure 2. Axial view of computed tomography chest abdomen pelvis angiogram with intravenous contrast showing marked circumferential wall thickening of the infrarenal aorta with surrounding inflammatory changes and small lymph nodes (white arrow).

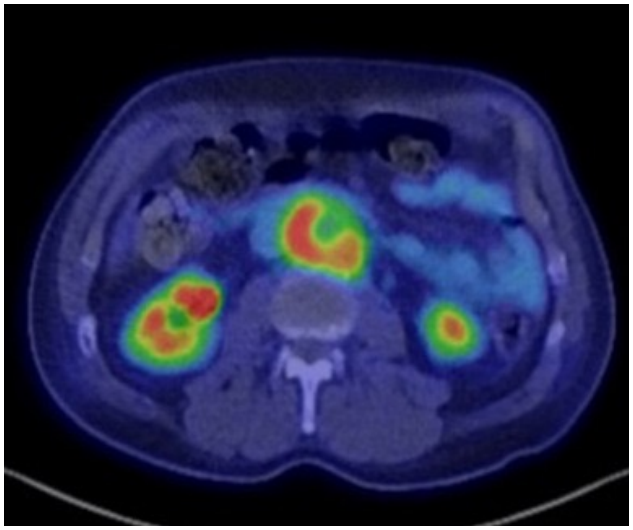


Figure 3. Positron emission tomography-computed tomography whole body fluorodeoxyglucose (FDG) scan showing moderate to severe focal FDG uptake at the infrarenal aorta.

vegetations. Eventually, a Karius Spectrum™ test (Karius, Inc. USA) returned positive for *Streptococcus pneumoniae.* Urine antigen testing for *S. pneumoniae* was also positive.

The patient underwent open surgical repair of the infected mycotic pararenal abdominal aortic aneurysm, with reconstruction using aorto-aortic and aorto-right renal artery bypass via a midline transperitoneal approach. Pre-operative blood cultures and intraoperative aortic tissue cultures were negative. However, tissue histology of the resected aortic tissue identified active chronic inflammation with Gram positive cocci identified and consistent with bacterial infection. Broad range polymerase chain reaction performed on the surgically resected aortic tissue was positive for *S. pneumoniae* and consisted with the Karius and urine antigen findings. He was therefore treated with intravenous ceftriaxone 2 g daily for 6 weeks followed by oral antimicrobial suppression.

DISCUSSION

While pneumococcal aortitis has been reported in about 53 cases in the literature[4], pneumococcal periaortitis has been less commonly reported.

The Karius Spectrum™ is a blood test utilizing metagenomic sequencing to identify microbial cell-free DNA from over 1,200 human pathogens and has a reported clinical sensitivity of 93.7% (95% confidence interval [CI], 84.5–98.2%) and specificity of 40.0% (95% CI, 34.3–45.9%) when compared to initial blood cultures[5]. There is no clear guidance in the literature regarding when to perform the Karius Spectrum™ test in the setting of negative blood cultures, and the high assay cost may prohibit more frequent use. In our case, the patient presented with erythematous lesions on the fingertips, suggestive of emboli secondary to cardiac vegetations. However, both transthoracic echocardiogram and transesophageal echocardiogram were negative. Although *S. pneumoniae* is a less common cause of peri- and endovascular aortitis, pneumococcal infections have been shown to induce the release of vascular endothelial growth factor and corresponding increase in vascular permeability and associated inflammation propagation[6].

^{18}F-fluorodeoxyglucose-positron emission tomography (FDG-PET) has been a useful tool for detection of inflammatory changes in large-vessel vasculitis[6] and periaortitis[8]. FDG-PET/CT scan shows higher uptake (activity) in areas of infection compared to autoimmune diseases[9]. The median SUVmax in IgG4-aortitis-positive regions has been reported at 3.7 [1.6–5.5][10]. In contrast, our patient demonstrated moderate to severe focal FDG uptake with an SUVmax of 7.8, which is more suggestive of an infectious process rather than an autoimmune aetiology.

CONCLUSION

The diagnosis of periaortitis is challenging, particularly in differentiating between infectious and non-infectious aetiologies. In-depth evaluation for infection is essential prior to considering glucocorticoid treatment for periaortitis. The combination of FDG-PET findings and advanced microbial cell-free DNA testing (Karius Spectrum™ test) may provide essential information in identifying *S. pneumoniae* infection as an underlying aetiology for periaortitis. Early recognition and targeted antimicrobial therapy, followed by surgical intervention, may provide a favourable clinical outcome.

REFERENCES

1. Stone JR, Bruneval P, Angelini A, Bartoloni G, Basso C, Batoroeva L, et al. Consensus statement on surgical pathology of the aorta from the Society for Cardiovascular Pathology and the Association for European Cardiovascular Pathology: I. *Inflammatory diseases. Cardiovasc Pathol* 2015;**24**:267-278. doi: 10.1016/j.carpath.2015.05.001
2. Marvisi C, Accorsi Buttini E, Vaglio A. Aortitis and periaortitis: The puzzling spectrum of inflammatory aortic diseases. *Presse Med* 2020;**49**:104018. doi: 10.1016/j.lpm.2020.104018
3. Ducasse E, Calisti A, Speziale F, Rizzo L, Misuraca M, Fiorani P. Aortoiliac stent graft infection: current problems and management. *Ann Vasc Surg* 2004;**18**:521-526. doi: 10.1007/s10016-004-0075-9
4. Cartery C, Astudillo L, Deelchand A, Moskovitch G, Sailler L, Bossavy JP, et al. Abdominal infectious aortitis caused by Streptococcus pneumoniae: a case report and literature review. *Ann Vasc Surg* 2011;**25**:266.e9 - 16. doi: 10.1016/j.avsg.2010.07.014
5. Babady NE. Clinical Metagenomics for Bloodstream Infections: Is the Juice Worth the Squeeze? *Clin Infect Dis* 2021;**72**:246-248. doi: 10.1093/cid/ciaa041
6. van Der Flier M, Coenjaerts F, Kimpen JL, Hoepelman AM, Geelen SP. Streptococcus pneumoniae induces secretion of vascular endothelial growth factor by human neutrophils. *Infect Immun* 2000;**68**:4792-4794. doi: 10.1128/IAI.68.8.4792-4794.2000
7. Blockmans D. The use of (18F)fluoro-deoxyglucose positron emission tomography in the assessment of large vessel vasculitis. *Clin Exp Rheumatol* 2003;**21**:S15-22.
8. Salvarani C, Pipitone N, Versari A, Vaglio A, Serafini D, Bajocchi G, et al. Positron emission tomography (PET): evaluation of chronic periaortitis. *Arthritis Rheum* 2005;**53**:298-303. doi: 10.1002/art.21074
9. Pijl JP, Nienhuis PH, Kwee TC, Glaudemans AWJM, Slart RHJA, Gormsen LC. Limitations and Pitfalls of FDG-PET/CT in Infection and Inflammation. *Semin Nucl Med* 2021;**51**:633-645. doi: 10.1053/j.semnuclmed.2021.06.008
10. Yabusaki S, Oyama-Manabe N, Manabe O, Hirata K, Kato F, Miyamoto N, et al. Characteristics of immunoglobulin G4-related aortitis/periaortitis and periarteritis on fluorodeoxyglucose positron emission tomography/computed tomography co-registered with contrast-enhanced computed tomography. *EJNMMI Res* 2017;**7**:20. doi: 10.1186/s13550-017-0268-1