

CASE REPORT

Infected Ruptured Pseudo-aneurysm in Descending Aorta; a Case Report

Morteza Sanei Taheri^{1*}, Sayyed Mojtaba Nekooghadam², Zahra Sadat Tabatabaei¹, Sahar Rezaei¹

1. Department of Radiology, School of Medicine, Shahid Beheshti University of Medical Sciences, Shohada-e-Tajrish Hospital, Tehran, Iran

2. Department of Internal Medicine, School of Medicine, Shahid Beheshti University of Medical Sciences, Shohada-e-Tajrish Hospital, Tehran, Iran

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Abstract: Aortitis is the inflammation of the aortic wall. It can be caused by both infectious and non-infectious etiologies. Mycotic aneurysm is a rare, serious medical condition and typically requires prompt treatment with antibiotics, surgical intervention, or endovascular procedures to prevent rupture and complications. Here we reported, a 66-year-old male patient with a medical history of diabetes and hypertension, who presented to the emergency department (ED) with left-sided hemiplegia. Brain magnetic resonance imaging (MRI) revealed infarction in the right parietooccipital and left occipital lobes, demonstrating an embolic pattern. Laboratory analysis revealed elevated levels of erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and white blood cell (WBC). In order to investigate the possibility of sepsis, a non-contrast chest computed tomography (CT) scan was performed, which showed a soft tissue density surrounded by gas in the posterior mediastinum; for which the rupture of esophagus and infected aorta pseudoaneurysm were among differential diagnoses. To confirm the diagnosis, CT angiography was ordered. The infected ruptured pseudo-aneurysm(s) was confirmed and patient underwent thoracotomy surgery.

Keywords: Aneurysm, false; Aneurysm, infected; Brain infarction; Computed tomography angiography; Rare diseases; Case reports

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1. Introduction

Aortitis is the inflammation of the aortic wall. It can be caused by both infectious and non-infectious etiologies. Bacteria such as *Streptococcus pyogenes*, *Streptococcus pneumoniae*, *Staphylococcus*, and *Salmonella* species are the most prevalent infectious causes. In contrast, giant cell arteritis, Takayasu arteritis, and different rheumatological diseases are the most common non-infectious types and causes of arteritis (1, 2).

Infectious aortitis (IA) is a rare and life-threatening cardiovascular disease. Early diagnosis and timely intervention are crucial for reducing mortality associated with mycotic aortic aneurysms (MAAs); however, early diagnosis is challenging due to the nonspecific symptoms. Some cases are diagnosed at an advanced stage or after developing complications, such as rupture or aortic fistula.

Current imaging modalities, including computed tomography (CT) scan, magnetic resonance imaging (MRI), and 18F-fluorodeoxyglucose (FDG) positron emission tomography (PET)/CT scan could be used in detecting infected aneurysms in clinically suspicious cases (3). Doppler ul-

trasonography allows noninvasive assessment for infected aneurysms in the peripheral arteries. Imaging features of infected aneurysms include a lobulated vascular mass, an indistinct irregular arterial wall, perianeurysmal edema, and a perianeurysmal soft-tissue mass. Perianeurysmal gas, aneurysmal thrombosis, aneurysmal wall calcification, and disrupted arterial calcification at the site of the infected aneurysm are uncommon findings (4). Saccular aneurysms (especially those with lobulated contour) with rapid expansion or development and adjacent mass, stranding, and/or fluid in an unusual location are highly suspicious for an infected aneurysm (5). Here we present a case of infected ruptured pseudo-aneurysm in descending aorta, who presented to the emergency department (ED) with left-sided hemiplegia.

2. Case presentation

A 66-year-old male patient with a medical history of diabetes and hypertension, presented to the ED with left-sided hemiplegia. Brain MRI revealed infarction in the right parietooccipital and left occipital lobes, demonstrating an embolic pattern (Figure 1a, b). In order to investigate the source of emboli echocardiography was performed, which indicated moderate to severe systolic dysfunction (ejection fraction 30%) and global hypokinesia, mild left ventricle hypertrophy, mild mitral valve regurgitation, mild tricuspid regurgitation, normal pulmonary artery pressure, and normal right ventri-

*Corresponding Author: Morteza Sanei Taheri; Department of Radiology, Shohada-e-Tajrish Hospital, Tajrish Square, Shahr-dari Avenue, Tehran, Iran. Phone: +989121260976, Email: saneim@gmail.com, ORCID: <https://orcid.org/0000-0002-8881-9058>.

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Concomitant laboratory analysis revealed elevated levels of erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and white blood cell (WBC). Table 1 shows the laboratory findings of the patient. These findings suggested an ongoing inflammatory process and just one positive blood culture with *Escherichia coli* (*E. coli*) was identified and according to its sensitivity, antibiotic therapy was started.

To investigate the source of sepsis, a non-contrast chest CT scan was performed, which showed a soft tissue density surrounded by gas in the post-mediastinum; for which the rupture of esophagus and aorta pseudoaneurysm complications were among differential diagnoses (Figure 2a, b).

To confirm the diagnosis, CT angiography scan was ordered, which demonstrated two lobulated pseudoaneurysms in descending aorta that were surrounded by gas (Figure 3a, b).

Due to patient test results (mentioned above) and the findings in CT angiography, we highly suspected that the pseudoaneurysm(s) is mycotic in origin. So, the patient underwent emergent thoracotomy surgery.

During a complex procedure and according to the surgical report, about 1-liter hemothorax in both sides was detected, aortic wall was necrotic, and infected ruptured pseudoaneurysms in descending aorta were discovered.

Following Axillo-femoral bypass and aortic ligation, the patient went through debridement of infected tissue and the thoracic esophagus was explored, which was intact. Post operation, he was transferred to the Intensive Care Unit (ICU). Unfortunately, after one day the patient developed a multi-organ dysfunction and expired.

3. Discussion

Infectious aortitis (IA) is a rare and life-threatening cardiovascular disease. Currently, the mean age at which patients present with mycotic aneurysms is reported to be between 55 and 60 years. Comorbidities, such as diabetes mellitus, hypertension, intravenous drug use, and immune suppression, are frequently present as well. The association with infective endocarditis is less common (6).

The aorta, as a major blood vessel, is more resistant to damage or destruction compared to other body blood vessels. However, a few factors can weaken the aortic wall, cause aneurysms, and also predispose the aorta to infectious etiologies. Those factors include uncontrolled diabetes mellitus or hypertension, cancer, iatrogenic inoculation as a result of surgical intervention or the use of medical equipment or devices in and around the aorta, atherosclerotic diseases, vascular malformations, and medial cystic necrosis of the vascular wall. The causes due to which aortitis occurs include hematogenous seeding of an existing intimal injury, septic emboli, direct spread from an infectious site, and bacterial inoculation. Still, it can be challenging to identify the primary source of infection (2, 7).

Dissections of the ascending thoracic aorta may cause sudden severe aortic regurgitation, myocardial ischemia or in-

farction; those in the descending or abdominal aorta may cause renal failure if the renal arteries are occluded. Rupture results in massive internal hemorrhage and hypovolemic shock (8).

Patients with aortic aneurysms and bacteremia should be presumed to have infected aneurysms until proven otherwise. Negative blood culture results in patients with suspected infected aortic aneurysms are insufficient to rule out the diagnosis, and tissue culture may occasionally be necessary to establish the diagnosis.

In patients with atherosclerosis, sepsis, and bacteremia, bacterial aortitis should be suspected, and cross-sectional imaging with CT angiography or magnetic resonance angiography (MRA) should be performed to confirm the diagnosis and locate the source of infection (6). The primary imaging method is contrast-enhanced CT where these diseases classically show abnormalities of wall thickness, vascular diameter and wall density. Additional imaging can be performed with MRI, and recently PET CT has been shown to be a helpful adjunct. It is important to highlight that peripheral brain infarcts involving multiple vascular territories could have a proximal source and most likely the heart (9).

Radiologists should be familiar with the most common manifestations of aortitis because imaging can be critical in the initiation of appropriate management and therapy. Delineation of the extent of the aneurysm is essential to decide between simple prolonged antibiotic therapy versus surgical management, such as resection of the diseased segment, debridement of periaortic tissue, or abscess drainage. Untreated mycotic aneurysms of the aorta have a poor outcome, with high mortality from rupture (50% of cases) or uncontrolled septic complications (1, 10).

4. Conclusions

In conclusion, we wanted to highlight the critical aspects of mycotic aneurysms and most important imaging findings, and emphasize the vitality of early diagnosis and intervention. All physicians should be aware of clinical presentations and imaging manifestations of infectious aortitis, which needs interdisciplinary collaboration. Advances in imaging techniques and therapeutic strategies are crucial in improving patient outcomes.

5. Declarations

5.1. Acknowledgments

None.

5.2. Conflict of interest

None

5.3. Funding

None

5.4. Authors' contribution

All authors passed four criteria for authorship contribution based on recommendations of the International Committee of Medical Journal Editors.

5.5. Using artificial intelligence chatbots

None.

5.6. Ethical considerations

All patient data (extracted from the hospital records) were obtained with due respect to privacy and in compliance with the governing regulations on patient confidentiality. Patient information used in the article has been anonymized and de-identified to safeguard patient privacy.

References

- Restrepo CS, Ocazonez D, Suri R, Vargas D. Aortitis: imaging spectrum of the infectious and inflammatory conditions of the aorta. *Radiographics*. 2011;31(2):435-51.
- Abdelazeem B, Kambalapalli S, Lahmar A, Yousaf A, Kusz H. Infectious Aortitis: Case Report and Literature Review. *Cureus*. 2022;14(3):e23198.
- Zhang N, Xiong W, Li Y, Mao Q, Xu S, Zhu J, et al. Imaging features of mycotic aortic aneurysms. *Quant Imaging Med Surg*. 2021;11(6):2861-78.
- Lee WK, Mossop PJ, Little AF, Fitt GJ, Vrazas JI, Hoang JK, et al. Infected (mycotic) aneurysms: spectrum of imaging appearances and management. *Radiographics*. 2008;28(7):1853-68.
- Macedo TA, Stanson AW, Oderich GS, Johnson CM, Panneton JM, Tie ML. Infected aortic aneurysms: imaging findings. *Radiology*. 2004;231(1):250-7.
- Bley TA, François CJ. Inflammatory and Infectious Vascular Disorders. In: Abbara S, Kalva SP, editors. *Problem Solving in Cardiovascular Imaging*. Elsevier; 2013. p. 412-22.
- Huang YK, Chen CL, Lu MS, Tsai FC, Lin PL, Wu CH, et al. Clinical, microbiologic, and outcome analysis of mycotic aortic aneurysm: the role of endovascular repair. *Surg Infect (Larchmt)*. 2014;15(3):290-8.
- Fisk M, Peck LF, Miyagi K, Steward MJ, Lee SF, Macrae MB, et al. Mycotic aneurysms: a case report, clinical review and novel imaging strategy. *Qjm*. 2012;105(2):181-8.
- Adam A, Dixon AK, Gillard JH, Schaefer-Prokop C. Neurovascular Diseases. In: Jones BP, Hall CBO, Mehta A, editors. *Grainger Allison's Diagnostic Radiology*. Elsevier; 2015. p. 1442.
- Litmanovich DE, Yıldırım A, Bankier AA. Insights into imaging of aortitis. *Insights Imaging*. 2012;3(6):545-60.

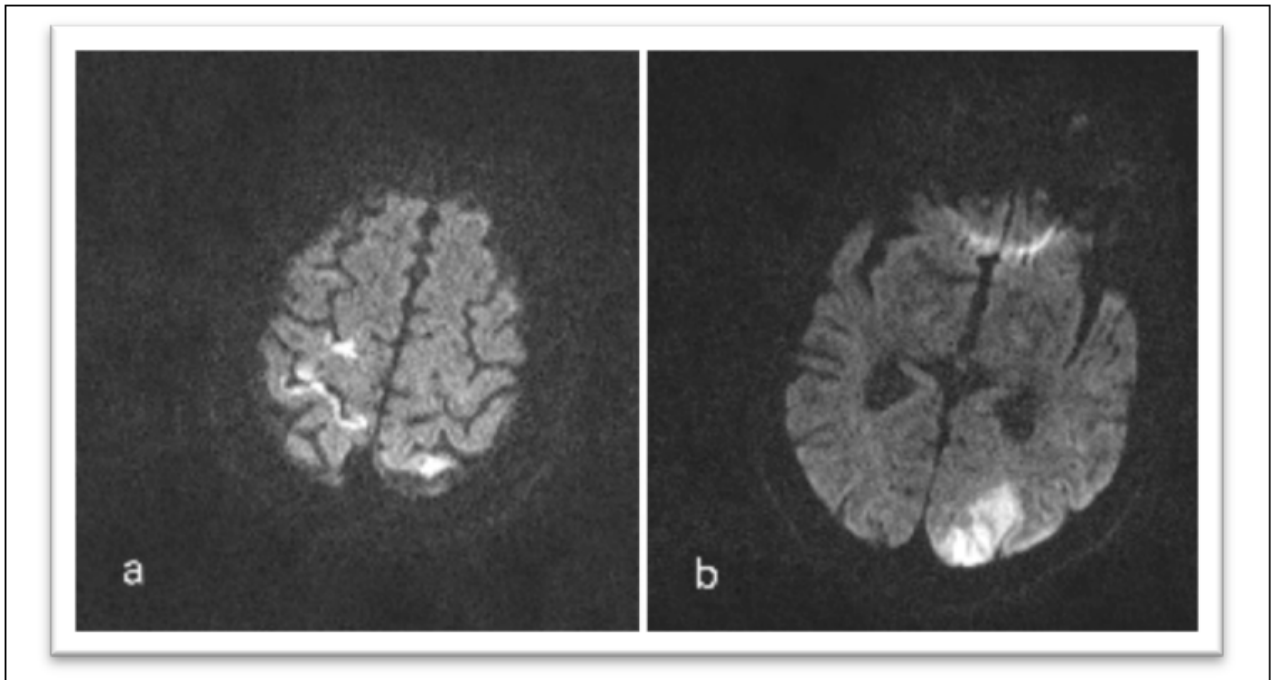


Figure 1: a, b Brain magnetic resonance imaging (Diffusion-weighted imaging (DWI) Sequence) demonstrating diffusion restriction involving the right and left parietal (a) and left occipital lobe(b) in favor of acute infarction with embolic pattern.

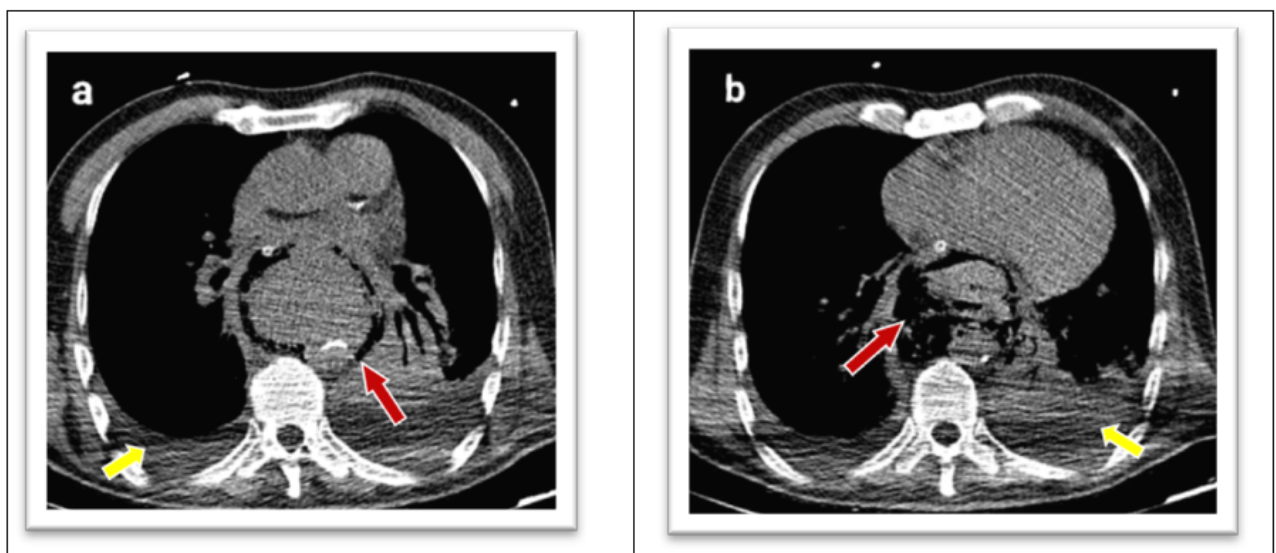


Figure 2: a, b Chest computed tomography scan without contrast (axial plane) showing soft tissue density surrounded by gas in the post-mediastinum (red arrows) and pleural effusion on both sides (yellow arrows).

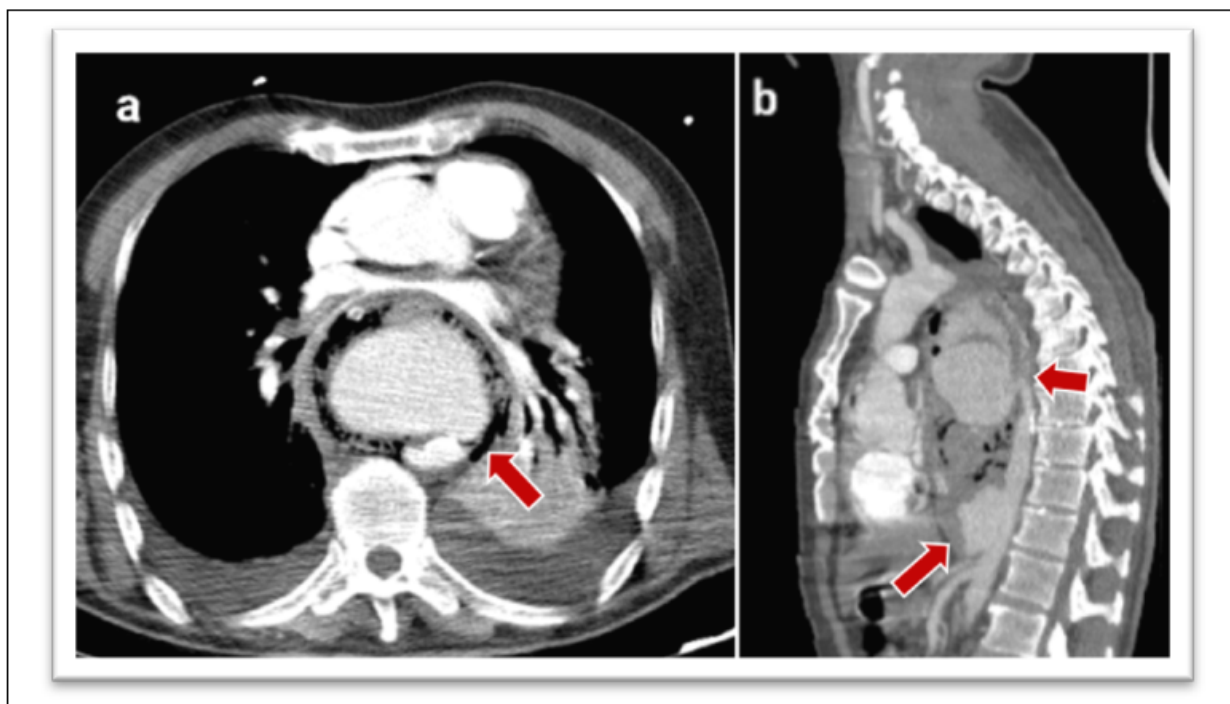


Figure 3: a, b Aorta computed angiography (axial and sagittal planes) showing lobulated pseudoaneurysm(s) surrounded by gas in descending aorta (red arrows).

Table 1: laboratory findings of the patient

Parameter	Day 1	Day 2	Day 3	Reference range
WBC (10 ³ /uL)	17.6	27.7	23.6	4.50-11.00
Neutrophils (%)	95	90	91.9	<50 Yrs: up to 15
ESR (mm/hour)	55	55	48	50_85 Yrs: up to 20
CRP (mg/L)	-	>150	>150	Up to 10
Blood sugar (mg/dl)	758	369	423	Up to 140
Blood urea nitrogen (mg/dl)	89.47	-	147.73	15-45
Creatinine (mg/dl)	1.51	-	1.93	0.5-1.5
Blood culture	-	E.coli	No Growth	-
Urine culture	No Growth	-	-	-

WBC: white blood cell count; CRP: C reactive protein; ESR: erythrocyte sedimentation rate.