

Pulmonary Septic Emboli Following Endocarditis: A Case Report

Abdulla Samman¹, Amal Babi²

¹Faculty of Medicine, University of Kalamoon, Aleppo, Syria

²Faculty of Medicine, Aleppo University, Aleppo, Syria

Email: abduillasamman@gmail.com

How to cite this paper: Samman, A. and Babi, A. (2025) Pulmonary Septic Emboli Following Endocarditis: A Case Report. *Open Journal of Clinical Diagnostics*, 15, 1-7. <https://doi.org/10.4236/ojcd.2025.151001>

Received: February 12, 2025

Accepted: March 21, 2025

Published: March 24, 2025

Copyright © 2025 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background: This case underscores the severe complications that can result from neglected infectious diseases, particularly in countries affected by war and disaster, where health services and follow-up for suspected illnesses are compromised. Right-sided endocarditis including tricuspid valve injury is rare, mainly seen in drug users. Delayed diagnosis and treatment can result in severe complications. **Case Presentation:** A young Caucasian man complains of chronic inflammatory symptoms and has recently developed unexplained pulmonary abscesses. Through various diagnostic investigations (TTE, TEE, CT), it was found that he has endocarditis affecting the tricuspid valve. **Conclusion:** Infective emboli are considered one of the significant complications of cases of infective endocarditis, which require collaborative efforts among various medical specialties to ensure good outcomes. Timing for surgical intervention in mechanical complications from neglected injuries is crucial, as global guidelines dictate the ideal surgical timing.

Keywords

TTE: Transthoracic Echocardiography, TTE: Transesophageal Echocardiography, TB: Tuberculosis, IE: Infective Endocarditis, TVR: Tricuspid Valve Replacement, IVDU: Intravenous Drug Users, NDU: Non-Drug User

1. Background

Chronic infectious conditions can result in significant complications, occasionally necessitating surgical intervention. Right-sided IE, a relatively uncommon condition, accounts for 10% - 15% of all IE cases [1], and frequently requires comprehensive pulmonary and surgical management in conjunction with cardiac therapy. The risk of septic pulmonary embolism is about 34% to 55% in patients with

vegetations > 1 cm [2]. It is not unusual to identify atypical pathogens that demand specialized culture media for accurate diagnosis and specific antibiotic coverage [3].

2. Case Presentation

Clinical History

A 16-year-old Caucasian male presented to the clinic with a chief complaint of hemoptysis persisting for several days. He reported no significant medical or familial history of illness. However, he disclosed a history of heavy smoking and random use of antibiotics from various classes, alongside vitamins, without medical supervision. The patient is a secondary school student, NDU and is not taking any chronic medications.

The patient described a progressive weight loss of approximately 18 kg over the preceding three months, coupled with a marked decrease in appetite. He reported recurrent fever, night chills, and a productive cough characterized by sticky yellow sputum, recently tinged with blood. Additionally, he developed exertional dyspnea over the last two weeks.

Clinical Examination

On physical examination, the patient appeared pale, emaciated, and in evident respiratory distress at rest. Key findings included Vital Signs: Pulse rate of 110 beats per minute, blood pressure of 100/55 mmHg, oxygen saturation of 98%, and a temperature of 39°C.

Cardiac Findings: A pronounced systolic murmur was audible in the epigastric area. Jugular venous pressure was elevated, and pitting edema was present in the lower extremities. Other Findings: Extremities were cold and pale.

Investigations

Electrocardiogram: Sinus tachycardia with partial right bundle branch block, without specific pathological changes.

Laboratory Tests: Evidence of acute inflammation and elevated atrial natriuretic hormone levels (**Table 1**).

Table 1. LABs Progression.

Inflammatory marker/normal index	Upon admission	After three days of empirical antibiotic coverage	After two weeks of Imipenem-Cilastatin
CRP < 10 mg/L	255	237	18
WBC 4,000 - 11,000 cells/ μ L	23,000	21,500	13,800
D-Dimer < 0.5 mg/L	1.9	1.7	0.8
PCT < 0.05 ng/mL	2.9	2.6	0.3

Imaging by Chest X-ray revealed multiple homogeneous oval densities in both lung fields. Chest CT scan showed cavitations in the right lower lobe (**Figure 1**),

with infiltrations at the lung base. The left lung displayed an air cyst with fibrotic shadows at the base (**Figure 2**).

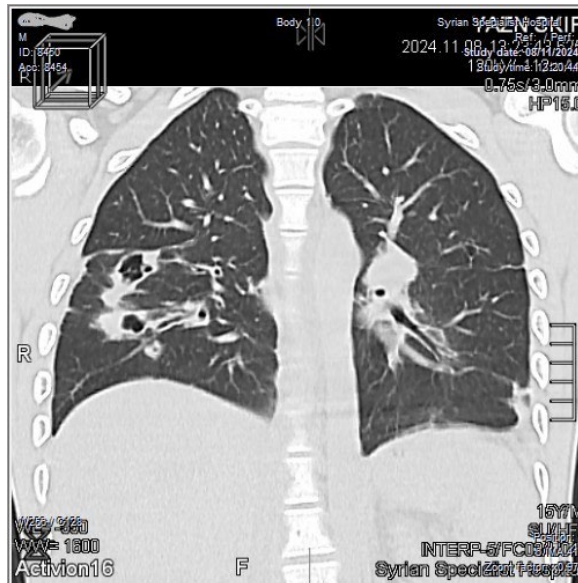


Figure 1. An axial CT coronal image of the chest reveals cavitary tissue densities with prominent inflammatory infiltrates, particularly in the middle lobe of the right lung.

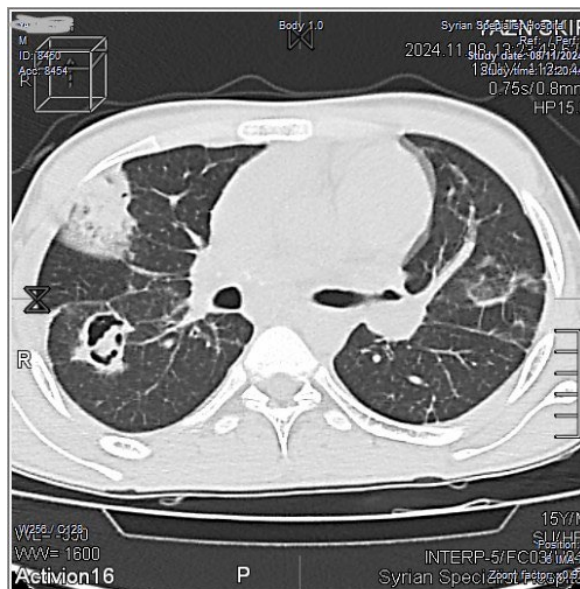


Figure 2. Axial CT chest image showing cross-section with peripheral, serrated tissue densities predominantly in the lower lobes, especially the right lung.

Cardiac Echocardiography: Identified mobile, heterogeneous masses attached to the tricuspid valve leaflets (**Figure 3**), causing severe regurgitation (**Figure 4**). Associated findings included dilation of the right chambers (**Figure 5**), pulmonary hypertension (55 mmHg), and mild pericardial effusion. No signs of valve dehiscence, perforation, or abscess were noted (**Figure 6**). The pulmonary valve

and trunk appear normal in shape, while the left chambers seem normal in terms of size and dimension. The motion of the left ventricle walls appeared normal.



Figure 3. Axial CT chest image showing cross-section with peripheral, serrated tissue densities predominantly in the lower lobes, especially the right lung.

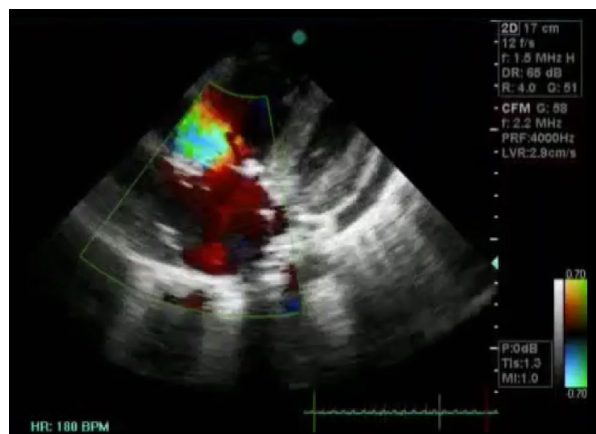


Figure 4. Echocardiography PLA view shows the regurgitation jet due to the vegetations.



Figure 5. Echocardiography PLA view shows the dimensions of the big vegetation.

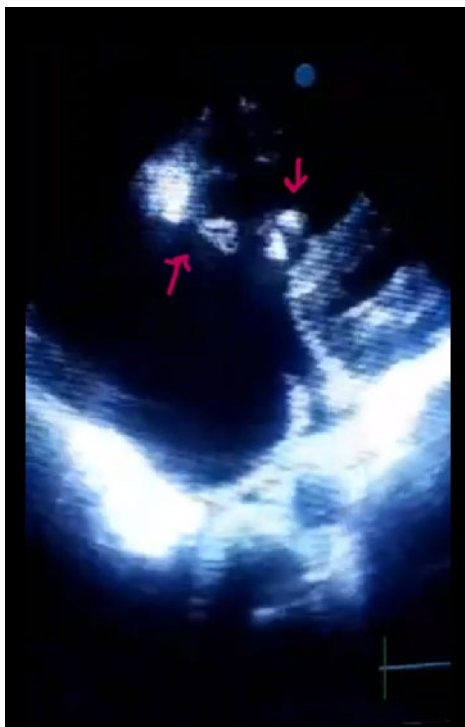


Figure 6. Transesophageal echocardiography reveals two vegetations attached to the tricuspid valve leaflets.

The differential diagnosis sequentially excludes diseases such as tuberculosis, community-acquired pneumonia, and brucellosis. Further microbiological tests, including blood cultures and tuberculosis investigations (Ziehl-Neelsen stain and IGRA), were negative “This may be due to prior antibiotic treatment or the presence of a rare organism that necessitates specialized culture media”. Bronchoscopy findings were non-specific. Malignant diseases are unlikely to cause morbidity at this young age. However, the tumor markers in the laboratory were normal. There are no symptoms indicating autoimmune diseases, such as oral thrush, joint pain, or skin rash. The eye examination “via fundoscopy” showed no pathological findings, and the fingers and skin were normal. The patient’s family reported no symptoms of congenital heart disease; he did not experience shortness of breath, cyanosis, or palpitations during childhood. Additionally, reviews of echocardiogram images at different stages revealed no signs of atrial septal defects or valve abnormalities.

Management and Outcome

The patient was initiated on empirical therapy for infective IE with Vancomycin (20 mg/kg TID) and Gentamicin (3 mg/kg OD). Due to the lack of improvement in inflammatory markers, treatment was switched to Imipenem-Cilastatin (500 mg every six hours) [4]. After two weeks, the patient’s condition improved, with a reduction in the size of pulmonary abscesses.

Given the extent of tricuspid valve damage caused by infectious vegetations, the patient underwent TVR with a PERICARBON MORE™ CORCYM biologic

stented mitral valve. Surgical replacement was required due to damage to the tricuspid valve leaflets and mechanical wear of the valve ring, as repair techniques were not applicable in this advanced case. Postoperatively, antibacterial therapy was continued for three months. Serial chest CT scans demonstrated progressive resolution of pulmonary abscesses and normalization of lung parenchyma. Given the reported relapse rates of up to 10% during recovery [5], regular follow-ups were performed using echocardiography to measure the gradient across the tricuspid valve, functional valve assessment and monitor pulmonary pressure.

After regular follow-ups post-surgery, the patient resumed normal daily activities. General fatigue subsided, and recovery markers indicated he regained his pre-illness weight. A pulmonary function test conducted several months later showed normal lung capacity and volumes. In the recovery phase, the patient was shocked by the causes of his injury and the rapid decline in his condition. He also expressed great happiness at his recovery following a lifestyle change prompted by severe symptoms.

Pathological Findings

Histopathological examination revealed non-specific inflammatory changes with severe fibrosis. Tissue culture identified *Pseudomonas aeruginosa* (MacConkey Agar forms non-lactose fermenting and colorless colonies.), a gram-negative bacterium commonly associated with intravenous drug users (IVDU), although this patient did not report intravenous drug use (NDU) [6].

3. Discussion and Conclusion

IE caused by *Pseudomonas aeruginosa* is a rare but highly aggressive form of endocarditis associated with high morbidity and mortality. *P. aeruginosa* is a Gram-negative, non-fermenting bacterium known for its intrinsic antibiotic resistance and ability to form biofilms, making treatment challenging [7]. Accounts for 2% - 5% of all cases of Gram-negative endocarditis. Most commonly affects IVDU, patients with prosthetic heart valves, and those with healthcare-associated infections (e.g., catheters, hemodialysis, or prior cardiac surgery). IVDU-associated IE has a better prognosis than prosthetic valve endocarditis [8], but the relapse risk is high due to biofilm formation and intrinsic resistance mechanisms [9]. The absence of pathogen identification before surgery significantly hampers understanding the infection prior to intervention. Furthermore, atypical presentations complicate rapid diagnosis. Most global studies, compared to medical literature, highlight two primary causes of tricuspid valve inflammation: IVDU and central venous catheter infections. These infections often resulted in high mortality rates. Some cases demonstrate significant vegetations in the right atrium, which appeared as mobile masses. Surgical intervention was necessary in most instances. *Staphylococcus aureus* was the commonly implicated organism, and traditional antibiotics were effective in the majority of cases. This case underscores the importance of thorough clinical evaluation and multidisciplinary management in patients presenting with hemoptysis and systemic manifestations. Early identifi-

cation and treatment of underlying infections are critical to preventing complications such as severe valve damage and pulmonary sequelae. We should suspect infective endocarditis in prolonged, unexplained infections with non-specific symptoms, particularly when significant pulmonary manifestations are present. In conclusion, this clinical case highlighted a major complication of a serious infectious disease that is often challenging to diagnose early due to the overlap of general inflammatory symptoms. Thus, it is crucial to emphasize the need for early diagnosis, beginning with clinical suspicion and supported by available diagnostic tools.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Shmueli, H., Thomas, F., Flint, N., Setia, G., Janjic, A. and Siegel, R.J. (2020) Right-Sided Infective Endocarditis 2020: Challenges and Updates in Diagnosis and Treatment. *Journal of the American Heart Association*, **9**, e017293. <https://doi.org/10.1161/jaha.120.017293>
- [2] Abubakar, H., Rashed, A., Subahi, A., Yassin, A.S., Shokr, M. and Elder, M. (2017) Angiovac System Used for Vegetation Debulking in a Patient with Tricuspid Valve Endocarditis: A Case Report and Review of the Literature. *Case Reports in Cardiology*, **2017**, Article 1923505. <https://doi.org/10.1155/2017/1923505>
- [3] Akinosoglou, K., Apostolakis, E., Marangos, M. and Pasvol, G. (2013) Native Valve Right Sided Infective Endocarditis. *European Journal of Internal Medicine*, **24**, 510-519. <https://doi.org/10.1016/j.ejim.2013.01.010>
- [4] Delgado, V., Ajmone Marsan, N., de Waha, S., Bonaros, N., Brida, M., Burri, H., *et al.* (2023) 2023 ESC Guidelines for the Management of Endocarditis. *European Heart Journal*, **44**, 3948-4042. <https://doi.org/10.1093/eurheartj/ehad193>
- [5] Chu, V.H., Sexton, D.J., Cabell, C.H., Barth, R.L., Pappas, P.A., Singh, R.K., *et al.* (2005) Repeat Infective Endocarditis: Differentiating Relapse from Reinfection. *Clinical Infectious Diseases*, **41**, 406-409. <https://doi.org/10.1086/431590>
- [6] Schranz, A.J., Fleischauer, A., Chu, V.H., Wu, L. and Rosen, D.L. (2019) Trends in Drug Use-Associated Infective Endocarditis and Heart Valve Surgery, 2007 to 2017. *Annals of Internal Medicine*, **170**, 31-40. <https://doi.org/10.7326/m18-2124>
- [7] Mahfuzah, M.N., Amanina, F., Vicky, A., Fairuz, S. and Zahrul, L.A. (2024) *Pseudomonas aeruginosa* Infective Endocarditis and Biofilm Challenges: Confronting the Barriers. *Medical Journal of Malaysia*, **79**, 232.
- [8] Kim, J.B., Ejiofor, J.I., Yammine, M., Ando, M., Camuso, J.M., Youngster, I., *et al.* (2016) Surgical Outcomes of Infective Endocarditis among Intravenous Drug Users. *The Journal of Thoracic and Cardiovascular Surgery*, **152**, 832-841. <https://doi.org/10.1016/j.jtcvs.2016.02.072>
- [9] Straw, S., Baig, M.W., Gillott, R., Wu, J., Witte, K.K., O'regan, D.J., *et al.* (2019) Long-term Outcomes Are Poor in Intravenous Drug Users Following Infective Endocarditis, Even after Surgery. *Clinical Infectious Diseases*, **71**, 564-571. <https://doi.org/10.1093/cid/ciz869>