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Case Report

MRSA endocarditis with coronary sinus abscess causing transient complete atrioventricular block: A rare case

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Summary

Infective endocarditis complicated by a coronary sinus abscess is extremely rare and can lead to conduction issues. We report a 63-year-old hemodialysis patient with Methicillin-resistant Staphylococcus aureus infective endocarditis who developed complete atrioventricular block. Transesophageal echocardiography and cardiac computed tomography showed vegetations on the posterior mitral annulus, severe mitral regurgitation, and a coronary sinus abscess. Atrioventricular conduction recovered spontaneously, probably due to abscess drainage into the left atrium. Despite surgery, the patient died from cardiogenic shock. This case highlights the diagnostic and therapeutic challenges of periannular complications.

Keywords: Complete atrioventricular block, Coronary sinus abscess, Infective endocarditis, Multimodality imaging

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Introduction

Infective endocarditis remains a serious condition, particularly in patients with comorbidities such as chronic kidney disease and prior cardiac surgery.[1] Periannular abscess formation is a well-recognized complication that increases mortality and often predicts the need for urgent surgery.[1,2] While aortic root and mitral annular abscesses have been reported, involvement of the coronary sinus is extraordinarily rare and scarcely described in the literature.[2,3]

Conduction disturbances in infective endocarditis (IE) — especially new-onset complete AV (Atrioventricular) block — typically reflect direct extension of infection into the conduction system and are usually irreversible, often necessitating permanent pacing.[2,4] Most reported cases involve aortic root or septal abscesses; few describe spontaneous recovery of AV conduction.[2-4] Multimodal imaging, including Transesophageal Echocardiogram (TEE) and cardiac Computed Tomography (CT), is essential for detailed assessment of abscess extent and surgical planning.[1,5]

Case Presentation

A 63-year-old male patient presented to the emergency department with chest pain radiating to the left arm. His medical history was significant for chronic kidney disease on hemodialysis, hypertension, and CABG performed in 2012. The admission electrocardiogram showed sinus rhythm. Transthoracic echocardiography revealed a left ventricular ejection fraction of 60%, mild left ventricular hypertrophy, and moderate mitral regurgitation associated with marked mitral annular calcification (MAC). Due to an elevated troponin T level of 140 ng/L, coronary angiography was performed, demonstrating complex lesions in the left anterior descending artery (LAD), Right Coronary Artery (RCA), and Saphenous Vein Graft (SVG)–diagonal branch. Percutaneous intervention to the SVG–diagonal branch was planned during the same session.

During follow-up, the patient developed complete AV block, and a temporary transvenous pacemaker was implanted (Figure 1). While being monitored in the coronary intensive care unit, laboratory evaluation revealed elevated C-reactive protein, anemia, and bacteremia with growth of Methicillin-resistant Staphylococcus aureus (MRSA) and coagulase-negative staphylococci. Broad-spectrum antibiotic therapy with meropenem and vancomycin was initiated. During this period, the patient developed an intracerebral hematoma (Figure 2A-B).

To investigate the source of infection, TEE was performed and demonstrated multiple vegetations attached to the posterior mitral annulus on a heavily calcified background, a pseudoaneurysmal structure, and severe mitral regurgitation due to perforation at the medial mitral commissure. In addition, the entire coronary sinus was filled with a heterogeneous, semisolid mass consistent with an abscess, with a mobile vegetative component measuring approximately 3 cm protruding into the right atrium. Thickening of the membranous septum suggestive of infectious involvement was also noted (Figure 3A–D, Supplementary file 1, Video 1, Supplementary file 2, Video 2). These findings were consistent with infective endocarditis. The presence of a coronary sinus abscess was subsequently confirmed by cardiac CT (Figure 4A–D).

During follow-up, while the temporary pacemaker was still in place, the patient's rhythm spontaneously reverted

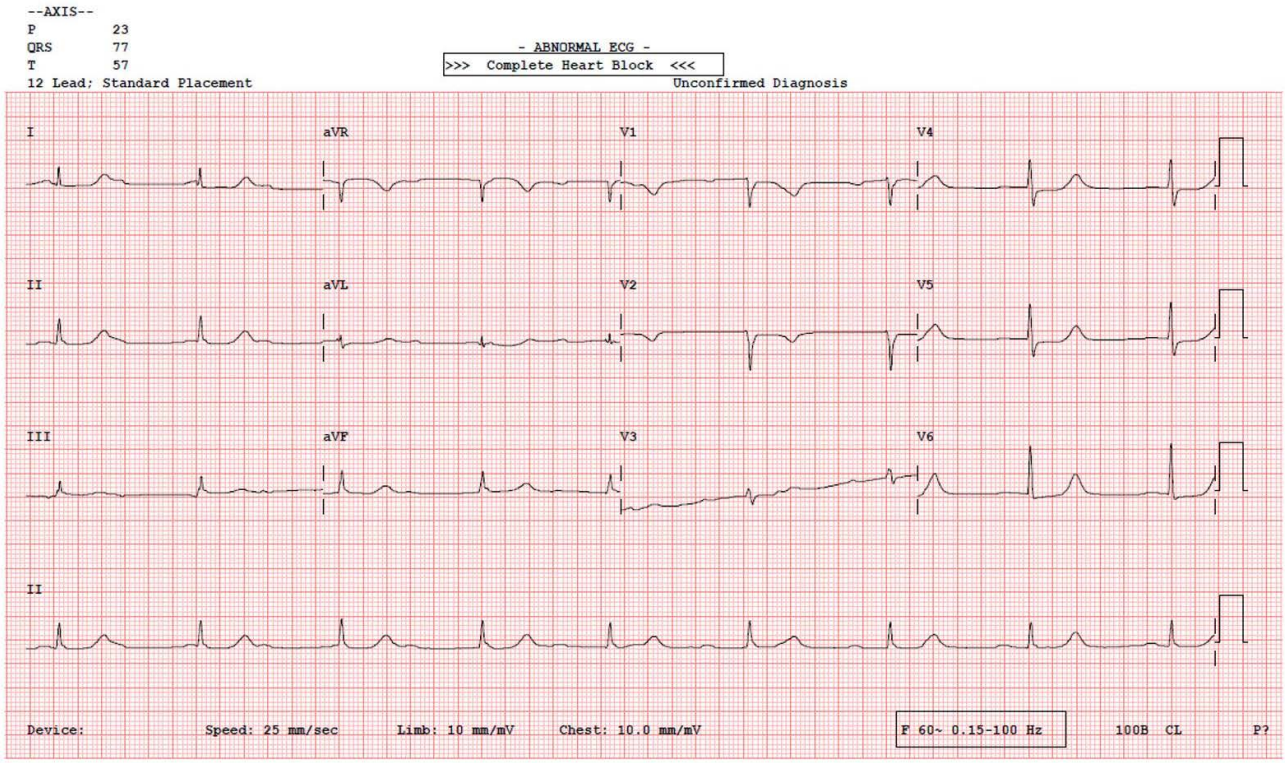

Figure 1. Electrocardiography showing complete atrioventricular block on day 2 of hospitalization

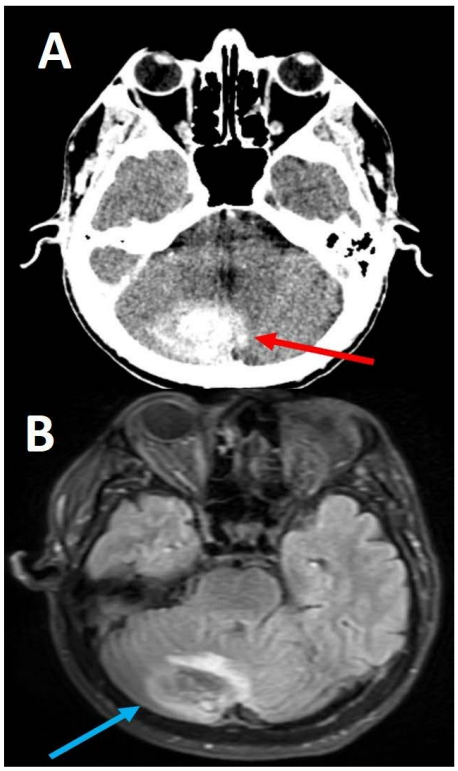

Figure 2. A) Brain CT Axial view and B) Brain MRI axial view with fluid-attenuated inversion recovery (FLAIR) sequence demonstrating intracerebral hematoma

to sinus rhythm. This phenomenon was attributed to spontaneous drainage of the abscess into the left atrium (LA), relieving pressure on the AV node. After radiological resolution of the intracranial hematoma and approval from the neurosurgery team, the patient underwent mitral valve replacement with a 29-mm bioprosthetic valve and Coronary artery bypass graft (CABG) to the RCA. Veno-arterial extracorporeal membrane oxygenation (VA ECMO) support was initiated during the same operation. However, the postoperative course was complicated by cardiac tamponade and cardiogenic shock. Despite intensive supportive therapy, the patient died on postoperative day six.

Discussion

Periannular extension represents a severe form of IE and is most commonly associated with *Staphylococcus aureus* infection. Abscess formation typically involves the aortic root or the mitral annulus and is strongly linked to adverse outcomes, including conduction disturbances and the need for urgent surgery. In contrast, a coronary sinus abscess is exceedingly rare, with only sporadic reports in the literature.

Previous case reports have described MRSA IE associated with severe MAC and periannular abscess formation, emphasizing the diagnostic challenge posed by acoustic shadowing on echocardiography. Yamamoto et al. demonstrated that advanced TEE techniques were necessary to identify annular abscesses in this setting.[6] However, in those cases, abscesses were confined to the mitral annulus, without involvement of the coronary sinus or conduction abnormalities. Our case differs in that it demonstrates direct extension of infection into the coronary sinus, reflecting a more aggressive and anatomically unusual disease pattern.

New-onset complete AV block is a well-recognized marker of invasive IE. Brown et al. reported complete AV block due to septal abscess and purulent pericarditis,[7] and Thomas et al. described mitral valve IE presenting

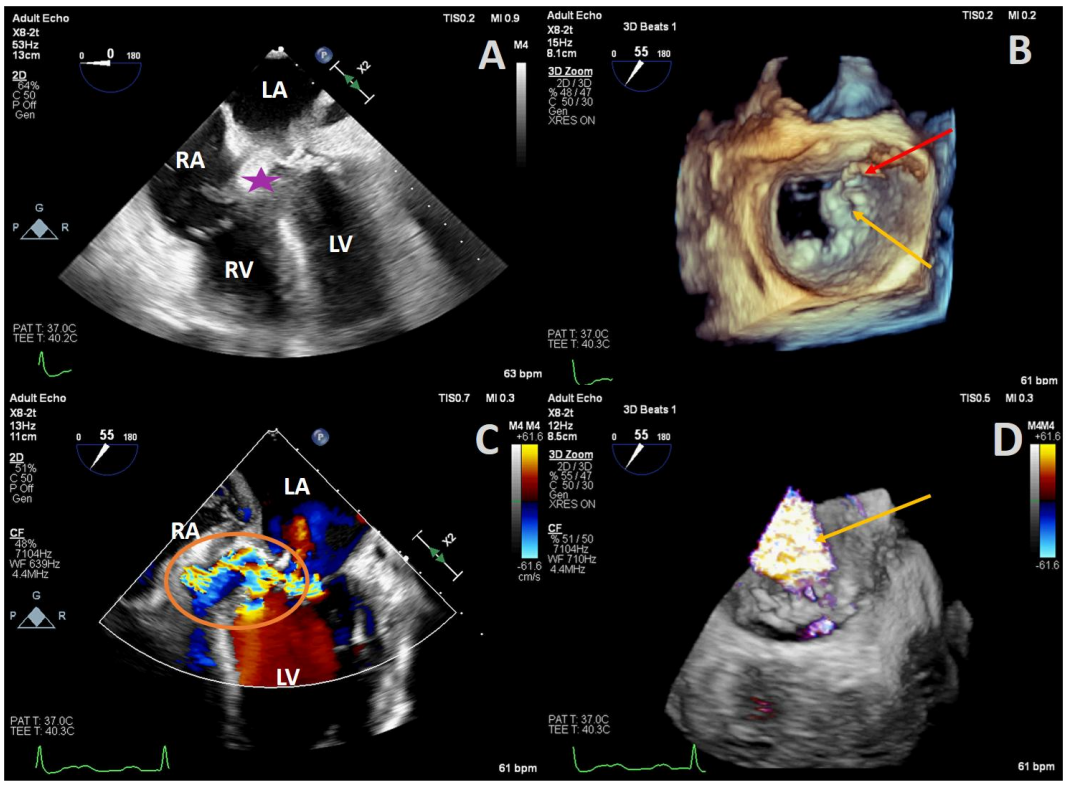

Figure 3. A) Lower esophageal four-chamber view showing coronary sinus abscess (purple star) with a vegetative extension into the right atrium. B) 3D en-face view demonstrating mitral annular perforation at the medial commissure, severe mitral annular calcification, and attached vegetations (red and yellow arrows). C) Bicommissural color Doppler view showing a pseudoaneurysm at the posteromedial commissure of the mitral valve and annulus (orange circle). D) 3D color Doppler imaging revealing severe mitral regurgitation originating from the perforated mitral annulus(orange arrow)

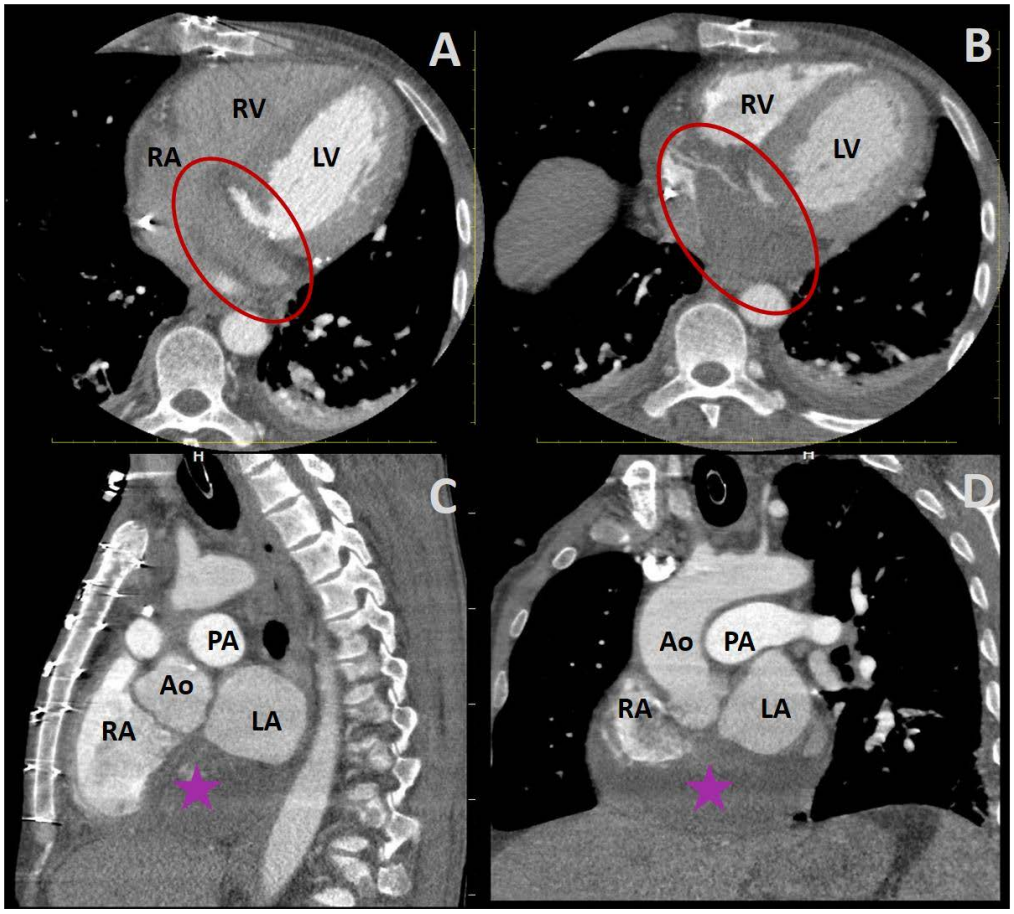

Figure 4. Cardiac computed tomography imaging.A–B) Axial, C) sagittal, and D) coronal views demonstrating a coronary sinus filled with an abscess (red-yellow circles and purple-red stars)

with AV block secondary to inflammatory extension toward the conduction system.[4] In these reports, AV block was persistent. In contrast, our patient experienced spontaneous recovery of AV conduction, a phenomenon rarely described in IE and, to our knowledge, not previously reported in association with a coronary sinus abscess.

Alternative mechanisms of conduction disturbance in IE include septic coronary embolism with myocardial abscess formation, leading to irreversible conduction system damage.[2] Unlike those cases, the conduction abnormality in our patient was most likely caused by extrinsic compression of the AV nodal region by the coronary sinus abscess, rather than direct myocardial destruction. The spontaneous restoration of AV conduction supports a dynamic and potentially reversible mechanism, possibly related to partial drainage of the abscess.

Reports of coronary sinus involvement in IE are extremely limited. Isolated cases have described coronary sinus vegetations, usually in right-sided IE and without abscess formation or conduction disturbances.[3] Our case expands the known spectrum by demonstrating that coronary sinus infection can progress to true abscess formation with mass effect on adjacent conduction tissue, resulting in clinically significant arrhythmia.

Imaging played a critical role in diagnosis and management. While TEE remains the cornerstone for identifying IE complications, its limitations include acoustic shadowing from severe calcification and restricted visualization of posterior or extracardiac structures. In this case, cardiac CT was essential for confirming the coronary sinus abscess, defining its extent, and guiding surgical planning. This approach is consistent with growing evidence supporting CT as a complementary imaging modality in complex IE.[5]

Conclusion

Overall, this case is unique due to the combination of MRSA bacteremia, coronary sinus abscess formation, transient complete AV block, and multimodality imaging guidance. Despite the unfavorable outcome, it provides important insights into rare anatomical involvement and reversible conduction disturbances in advanced IE.

This case report has several limitations. First, there is no direct histopathological evidence demonstrating the effect of the abscess on the AV node. Second, the exact timing of the presumed drainage of the abscess into the LA and its temporal relationship with the resolution of the AV block could not be definitively established.

Authors' Contribution

Conceptualization: Duygu İnan.
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Resources: Ufuk Yıldız.
Supervision: Duygu İnan.
Visualization: Yelda Saltan Özateş.
Writing- original draft: Orkun Canbolat.
Writing- review & editing: Alev Kılıçgedik.

Competing Interests

The authors have no conflicts of interest to declare.

Ethical Approval

Written informed consent was obtained from the participant for anonymized patient information to be published in this article.

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Intelligence Use Disclosure

This article has not utilized artificial intelligence (AI) tools for research and manuscript development, as per the GAMER reporting guideline.

Supplementary Files

Supplementary file 1, Video 1. Mid-to-lower esophageal bicommissural biplane view showing mitral annular pseudoaneurysm and perforation, vegetations on the mitral valve, annular calcification, and coronary sinus abscess.
Supplementary file 2, Video 2. Mid-esophageal biplane color Doppler view demonstrating systolic flow within the pseudoaneurysm and a severe mitral regurgitation jet originating from the perforated mitral annulus.

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