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CASE REPORT

Bartonella Infection and *Streptococcus constellatus* Infective Endocarditis Complicated with Cardiac Arrest: A Case Report and Literature Review

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Background: Infective endocarditis (IE) is a severe infectious disease affecting the endocardium and cardiac valves, caused by various pathogens. Among numerous pathogenic microorganisms, *Staphylococcus aureus* is the most common, followed by other streptococci such as *Streptococcus viridans* and enterococci. *Bartonella*, a Gram-negative, fastidious parasitic bacillus, is a rare causative agent of IE *Streptococcus constellatus*, belonging to the *Streptococcus milleri* group, commonly colonizes oral cavity, upper respiratory tract, and gastrointestinal tract, which can cause infections when host immunity is impaired. This study demonstrates a surviving case of infective endocarditis caused by *Streptococcus constellatus*, initially illustrating cardiac arrest and *Bartonella* infection.

Case Presentation: A 59-year-old male with a history of *Bartonella* infection post-cat scratch presented progressive vision loss and dyspnea. Admitted to the emergency department, he suffered sudden cardiac arrest, necessitating CPR and intubation before transferring to the ICU. Multidisciplinary evaluation confirmed infective endocarditis (IE), and he was implemented a successful valve replacement surgery. Pathogen identification via high-throughput sequencing of valve tissue revealed *Streptococcus constellatus*. The patient received targeted anti-infective therapy, mechanical ventilation, and cardiopulmonary support, laying solid foundations for successful extubation and transfer for further specialized care.

Conclusion: *Bartonella* and *Streptococcus* are rare etiologies of infective endocarditis. This case underscores the vital role of intensive care in managing infective endocarditis resulted from cardiac arrest, as well as the challenges and significance of a multidisciplinary approach to such complex conditions. Furthermore, it highlights the critical utility of high-throughput sequencing in pathogen identification and guiding antimicrobial therapy optimization.

Keywords: cardiac arrest, *Bartonella*, *Streptococcus constellatus*, infective endocarditis, high throughput sequencing technology

Introduction

Infective endocarditis (IE) is a severe multisystem infection involving the endocardial surface, particularly heart valves.[1,2] It is a rare but life-threatening condition with an annual incidence of ~3 per 100,000 and a 30-day mortality rate of up to 30%.[3,4] *Streptococcus viridans* is the most common cause of community-acquired IE in native valves, while *Staphylococcus aureus* predominates in hospital-acquired cases. IE caused by rare pathogens is increasingly recognized.[3–5] *Bartonella*, an intracellular bacterium, can persist in the bloodstream, causing erythrocyte parasitism and diseases such as cat-scratch disease (CSD), chronic bacteremia, and endocarditis.[6,7] Oral commensals, including *Streptococcus constellatus* which is a rare IE pathogen often colonizing the pharynx, are also significant contributors.[8,9] We illuminate a case of a male patient who developed cardiac arrest following *Bartonella* infection and was ultimately

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diagnosed with *Streptococcus constellatus*-induced IE, laying emphasis on the significance of intensive care, multidisciplinary management, and high-throughput sequencing in pathogen identification.

Case Presentation

Fifteen days prior to admission, a 59-year-old male patient sustained a scratch on the dorsum of his right foot from a pet cat (without skin breakage). The following day, he experienced an apparent decline in vision in his right eye and sought medical attention in a local hospital. Fundus examination confirmed uveitis in the right eye. High-throughput sequencing of aqueous humor yielded negative results, but serum immunofluorescence testing confirmed *Bartonella* infection (Figure 1). Eleven days before admission, the patient began oral doxycycline (100 mg twice daily). Nevertheless, on the seventh day of treatment, he developed exertional dyspnea and respiratory distress, which deteriorated on day 10, prompting emergency presentation to our hospital. In course of evaluation in the emergency department, the patient suffered sudden cardiac arrest. Cardiopulmonary resuscitation (along with the return of spontaneous circulation after 15 minutes), endotracheal intubation, and mechanical ventilation were initiated, after which he was transferred to our intensive care unit for further management.

Upon ICU admission, the patient was mechanically ventilated under sedation with a temperature of 36.4°C, heart rate of 85 bpm, and blood pressure of 124/76 mmHg. Cardiac auscultation demonstrated grade 2–3 systolic murmurs over the mitral and aortic areas. Echocardiography demonstrated vegetations on both valves, mild aortic stenosis with severe than grievous regurgitation, severe mitral regurgitation with moderate or severe stenosis, biatrial and biventricular enlargement, severe tricuspid regurgitation, and moderate pulmonary hypertension, collectively consistent with infective endocarditis. Blood samples were sent for high-throughput sequencing, and management included mechanical ventilation, sedation, neuroprotective hypothermia, and volume optimization. Guided by IE guidelines and clinical pharmacy input, Bartonella infection was taken into account. Empirical therapy included vancomycin (1 g IV q12h) and ceftriaxone (2 g IV daily), and supplemented with doxycycline (100 mg NG q12h) and rifampin (600 mg NG daily) for Bartonella coverage, which was planned for 4–6 weeks. A multidisciplinary team recommended delaying surgery for one week's post-cardiac arrest due to risks of myocardial edema, embolization, and surgical complications. Serial echocardiograms and contrast-enhanced CT of the head, chest, and abdomen were intended to assess vegetation stability and exclude contraindications. The patient had well-controlled hypertension on nifedipine sustained-release tablets (30 mg daily) and

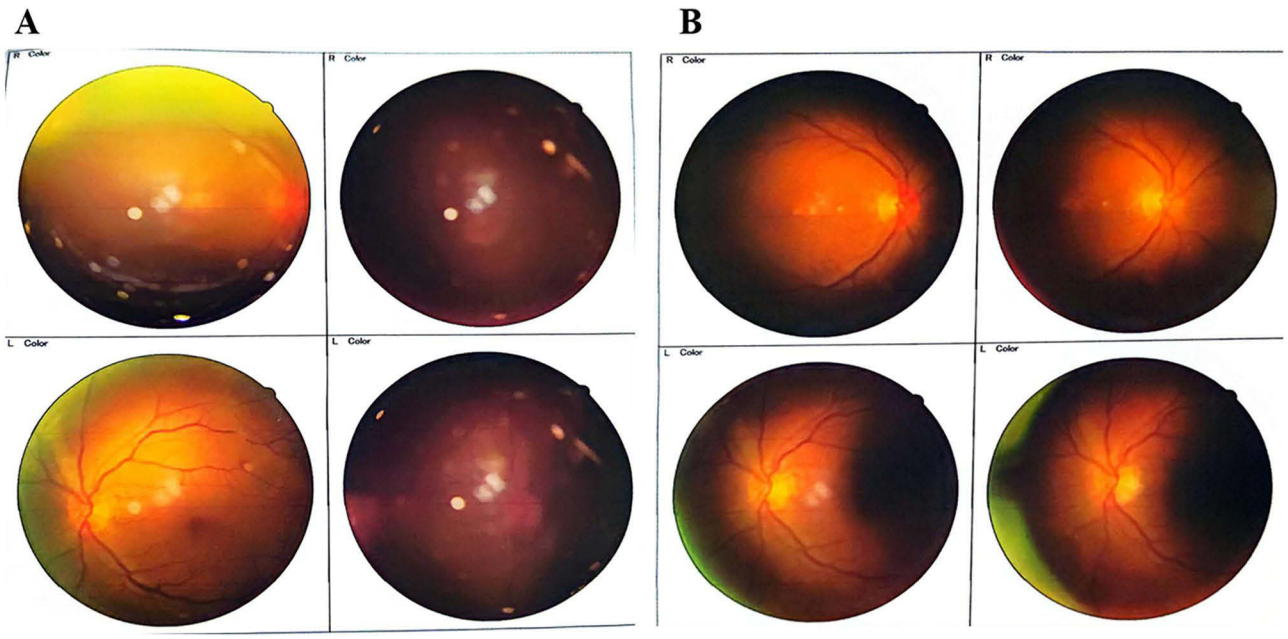

Figure 1 The changes of papilla and retina in both eyes after cat scratches (**A**) The first day after the injury, (**B**) Injured for one week.

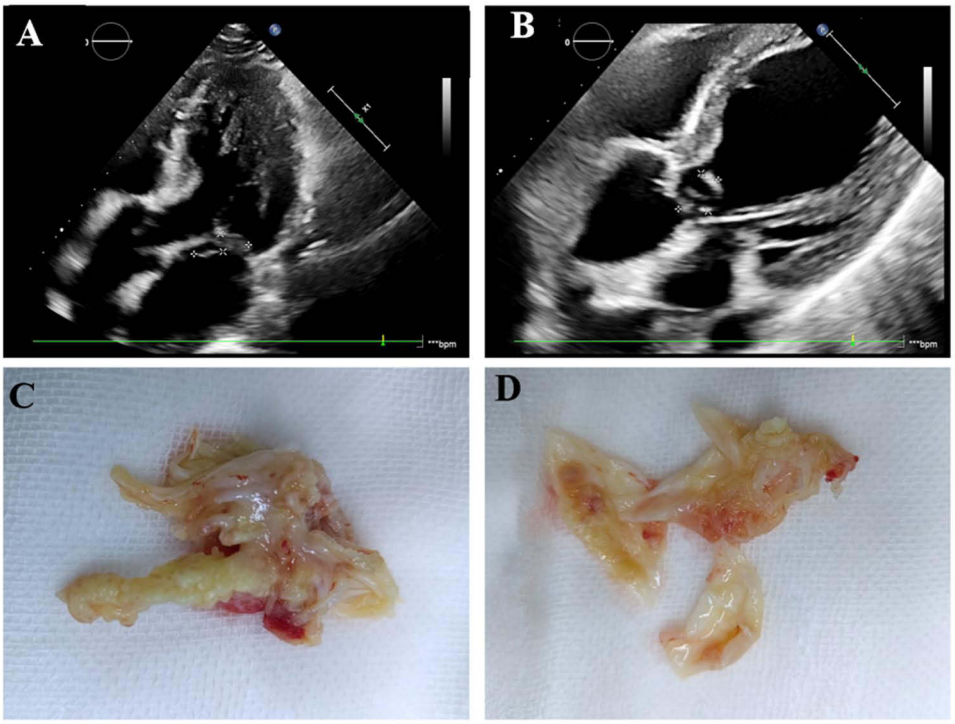

Figure 2 The ultrasound images of mitral and aortic valves (**A** and **B**). The surgical resection tissues of the mitral valve and the aortic valve (**C** and **D**).

had no cardiac history. Preceding the cat scratch, he experienced intermittent low-grade fever (max 37.8°C) treated with traditional medicine, with no oral or gingival inflammation.

Three blood cultures were negative, but high-throughput sequencing identified Streptococcus constellatus, probably influenced by prior antibiotics, though Bartonella infection remained a consideration. Antimicrobial therapy was continued alongside a negative fluid balance strategy to optimize cardiac load. Fluid intake was adjusted daily based on urine output, CVP, and PICCO monitoring. Sedation was stopped after 48 hours' post-ICU admission, and the patient regained full consciousness. A tracheostomy was performed on day 4 due to prolonged intubation needs. After preoperative optimization, the patient underwent aortic and mitral valve replacement under cardiopulmonary bypass on day 8 (Figure 2). Valve tissue was sent for high-throughput sequencing, pathology (showing fibrinoid necrosis with acute/chronic inflammation, Figure 3 and Table 1), and cultures (minimal Gram-positive cocci on aortic valve smear; all cultures negative). Postoperatively, the patient returned to the ICU for ongoing care. The antimicrobial regimen was maintained, with added low-molecular-weight heparin (4000 IU SC q12h) for anticoagulation. Hemodynamic management involved inotropes (dopamine/dobutamine, titrated to BP/HR), diuretics (furosemide 20–40 mg IV daily), and PICCO-guided volume control. Vancomycin levels were monitored to ensure therapeutic range.

On the second postoperative day, the patient was conscious and can cooperate as instructed. Serial critical care ultrasounds showed gradual improvement of the heart together with successful removal of drainage tube, and a project began regarding the process of patients gradually discontinuing the use of ventilators until they completely stopped using them. During disengagement from the ventilator, the patient's delirium improved with the aid of medication and family support. By the end of day 22, the patient was successfully extubated and transferred to a specialized ward for further care.

Discussion

Infective endocarditis (IE) is a relatively rare but highly morbid and mortal condition, primarily caused by *Staphylococcus aureus* or *Streptococcus* species.[5] With the increasing diversity of causative microorganisms, the nature and characteristics of IE have evolved, and cases caused by rare pathogens are gaining heightened attention in the medical community.[5–8,10] This report presents a complex clinical case: a patient initially infected with *Bartonella*, who

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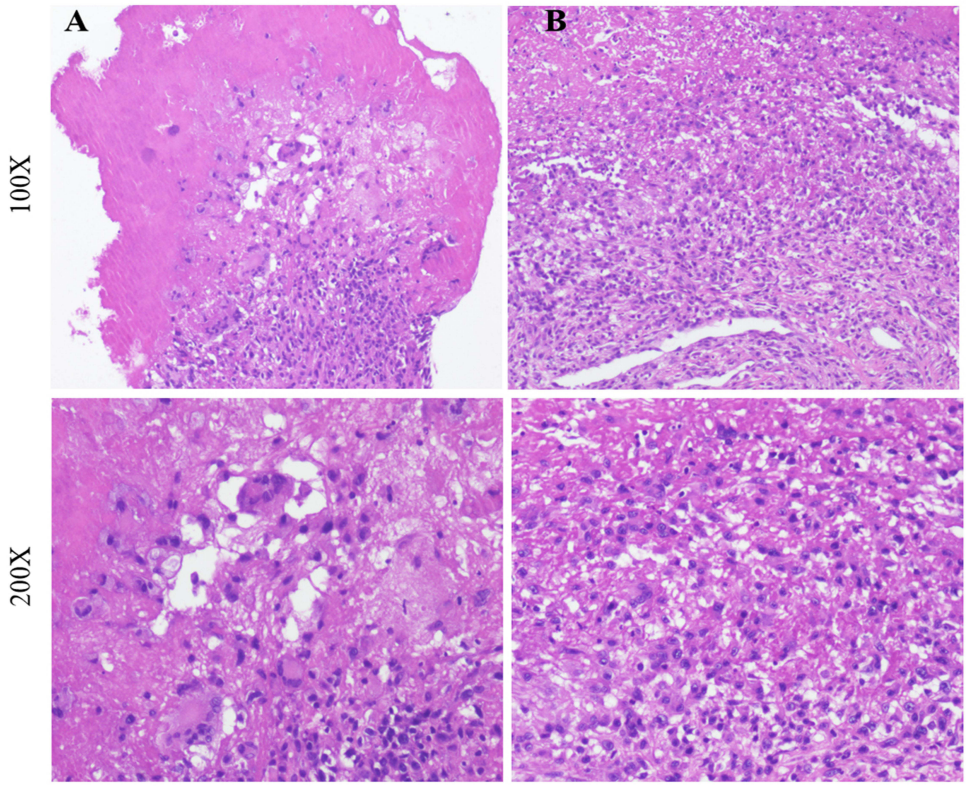

Figure 3 The pathological sections of mitral and aortic valves (**A**) Mitral valve, (**B**) Aortic valve.

subsequently suffered cardiac arrest and was ultimately diagnosed with *Streptococcus constellatus*-induced IE. The diagnostic and therapeutic journey emphasizes the challenges inherent in managing such intricate cases.

Bartonella, a rare IE pathogen transmitted via animal scratches or insect bites, can cause prolonged erythrocytic bacteremia, for clinical severity often linked to the host's immune status.[6,7] This patient developed ocular symptoms, including visual impairment. After a cat scratch, *Bartonella* infection was confirmed by fundus examination and serum immunofluorescence testing. This lays stress on diverse routes and manifestations of *Bartonella* infection since endocarditis is a potential severe complication.[11] This case exhibits a unique presentation of early-onset severe ocular manifestations (notably uveitis) preceding delayed cardiac symptoms, creating substantial diagnostic complexity. After *Bartonella* confirmation, doxycycline was initiated. Nonetheless, exertional dyspnea and respiratory distress developed during treatment, possibly due to *Bartonella* progression, drug side effects, or disease advancement. The patient subsequently deteriorated, who suffered cardiac arrest in the emergency department, and necessitated resuscitation along with intubation, and was transferred to the ICU on mechanical ventilation. IE was strongly suspected based on history, examination, and tests. Blood cultures and high-throughput sequencing were performed. Guided by IE guidelines and *Bartonella* considerations, a broad-spectrum antimicrobial regimen (vancomycin, ceftriaxone, doxycycline, rifampin) was initiated.[12] Supportive measures, including mechanical ventilation, sedation, analgesia, and neuroprotective hypothermia, were employed to stabilize the patient and optimize surgical timing.

Table 1 The Number and Relative Abundance of Bacterial Sequences

	Blood	Mitral Valve	Aortic Valve
Streptococcus constellatus	**17**	**5800**	**15660**
Filifactor alocis	**–**	**38**	**58**
Johnsonella ignava	**–**	**5**	**6**

Pathogens causing infective endocarditis (IE) often have fastidious growth requirements, resulting in low blood culture positivity. PCR-based detection of pathogen DNA from excised valve tissue is now the most effective diagnostic method.[5,6,13,14] In this case, preoperative and postoperative blood cultures were negative. High-throughput sequencing of blood, mitral, and aortic valve tissues recognized *Streptococcus constellatus* as the causative agent. *Streptococcus* species are the second most common IE pathogens.[5,13,15] *Streptococcus constellatus*, part of the normal urogenital, oral, and gastrointestinal flora, acted as an opportunistic pathogen in this case. It is known for tissue invasion and abscess formation but rarely causes hematogenous infections, making it an exceedingly rare IE pathogen.[9,16,17] Zamasry et al reported a sudden death case where autopsy confirmed *Streptococcus constellatus*-induced IE.[10] Clinical presentation of *Streptococcus constellatus*-associated IE is nonspecific, potentially including fever, cough, and malaise.[9,10,12] The patient reported low-grade fever in the month before the animal scratch but denied cough, oral, or gingival diseases.

Echocardiography illustrated mitral and aortic valve vegetations with severe regurgitation and restricted opening, confirming surgical indications. As per the 2016 AATS IE guidelines, prompt surgery is recommended for severe complications.[18] However, in course of post-cardiac arrest and resuscitation, the patient faced high risks of myocardial edema and vegetation embolization, which increased surgical complexity. A multidisciplinary team assessed surgical tolerance and recovery potential, devising a detailed plan. To rule out contraindications, preoperative evaluations included dynamic echocardiography and contrast-enhanced CT of the head, chest, and abdomen.

The surgery successfully replaced the damaged valves, enhancing cardiac function. Negative bacterial and fungal cultures of the valvular tissue further corroborated the diagnostic accuracy of high-throughput sequencing. Postoperative care included antimicrobial therapy, inotropes, diuretics, volume optimization, nutrition, anticoagulation, and rehabilitation. Delirium during recovery was actively managed, and the patient was successfully weaned off ventilation and transferred to a specialized ward with support from family.

Conclusion

The successful management of this case was attributed to accurate diagnosis, rational therapeutic strategies, timely surgical intervention, meticulous postoperative care, and a multidisciplinary collaborative approach. Additionally, high-throughput sequencing played a pivotal role in early pathogen identification and guiding targeted antimicrobial therapy, demonstrating its significant clinical utility.

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

The study has been approved by the Committee of Research Ethics of Army Medical Center of PLA, and informed consent was obtained from the patient's wife and daughter. We obtained written consent from the patient's relatives/children for the following reasons: First, the patient was in critical condition during our department with intubation. Second, after surgery, the patient was still very weak/delirious. Finally, according to the opinions of the patient's wife and daughter, considering that the patient experienced severe illness and had poor mental and physical endurance, the written consent was not obtained directly from the patient for the above reasons.

Consent for Publication

Written informed consent for publication of the clinical details were obtained from the patient's wife and daughter.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that they have no competing interests in this work.

References

1. Ronak R, Klein JL. Infective endocarditis: a contemporary update. *Clin Med*. 2020;20(1):31–35. doi:10.7861/clinmed.cme.20.1.1
2. Wang Y, Zhao W, Lu J, et al. Recurrent acute ischemic stroke after infective endocarditis caused by streptococcus constellatus: first case report and analysis of the case series. *J Stroke Cerebrovascular Dis*. 2018;27(8):e180–e189. doi:10.1016/j.jstrokecerebrovasdis.2018.03.021
3. Mostaghim AS, Lo HYA, Khardori N. A retrospective epidemiologic study to define risk factors, microbiology, and clinical outcomes of infective endocarditis in a large tertiary-care teaching hospital. *SAGE Open Med*. 2017;5:2050312117741772. doi:10.1177/2050312117741772
4. Murdoch DR, Corey GR, Hoen B, et al. Clinical presentation, etiology, and outcome of infective endocarditis in the 21st century: the international collaboration on endocarditis-prospective cohort study. *Arch Intern Med*. 2009;169:463–473. doi:10.1001/archinternmed.2008.603
5. Holland TL, Baddour LM, Bayer AS, Hoen B, Miro JM, Fowler VG. Infective endocarditis. *Nat Rev Dis Prim*. 2016;2:16059. doi:10.1038/nrdp.2016.59
6. Okaro U, Addisu A, Casanas B, et al. Bartonella species, an emerging cause of blood-culture-negative endocarditis. *Clin Microbiol Rev*. 2017;30(3):709–746. doi:10.1128/CMR.00013-17
7. Angelakis E, Raoult D. Pathogenicity and treatment of Bartonella infections. *Int J Antimicrob Agents*. 2014;44(1):16–25. doi:10.1016/j.ijantimicag.2014.04.006
8. Concistrè G, Chiaramonti F, Miceli A, et al. Mitral and aortic valve endocarditis caused by a rare pathogen: streptococcus constellatus. *Interact Cardiovasc Thorac Surg*. 2012;14(6):889–890. doi:10.1093/icvts/ivs032
9. Carretero RG. Cerebellar abscesses, infective endocarditis and bacteraemia due to a rare pathogen: streptococcus constellatus. *BMJ Case Rep*. 2017;2017:bcr–2017–221374. doi:10.1136/bcr-2017-221374
10. Byramji A, Gilbert JD, Byard RW. Sudden death as a complication of bacterial endocarditis. *Am J Forensic Med Pathol*. 2011;32(2):140–142. doi:10.1097/PAF.0b013e31821984fb
11. Breitschwerdt EB, Maggi RG, Bradley JM. Bartonella species in blood of immunocompetent persons with animal and arthropod contact. *Emerg Infect Dis*. 2008;14(6):950–957. doi:10.3201/eid1306.061337
12. Baddour LM, Wilson WR, Bayer AS, et al. Infective endocarditis in adults: diagnosis, antimicrobial therapy, and management of complications: a scientific statement for healthcare professionals from the American Heart Association. *Circulation*. 2015;132(15):1435–1486. doi:10.1161/CIR.0000000000000296
13. Wilson W, Taubert KA, Gewitz M, et al. Prevention of infective endocarditis: guidelines from the American heart association: a guideline from the American heart association rheumatic fever, endocarditis, and Kawasaki disease committee, council on cardiovascular disease in the young, and the council on clinical cardiology, council on cardiovascular surgery and anesthesia, and the quality of care and outcomes research interdisciplinary working group. *Circulation*. 2007;116(15):1736–1754. doi:10.1161/CIRCULATIONAHA.106.183095
14. Cahill TJ, Baddour LM, Habib G, et al. Challenges in infective endocarditis. *J Am Coll Cardiol*. 2017;69(3):325–344. doi:10.1016/j.jacc.2016.10.066
15. Enrico F, Cristina IM, Rosario E, et al. Pseudo-aneurysm of mitro-aortic intervalvular fibrosa (MAIVF): a rare complication of aortic valve endocarditis diagnosed by cardiac MRI. 2013. doi:10.13140/gj.2.1.5120.4889
16. Willcox M. Potential pathogenic properties of members of the "Streptococcus milleri" group in relation to the production of endocarditis and abscesses. *J Med Microbiol*. 1995;43(6):405-410. doi:10.1099/00222615-43-6-405
17. Siegman-Igra Y, Azmon Y, Schwartz D. Milleri group streptococcus—a stepchild in the viridans family. *Eur J Clin Microbiol Infect Dis*. 2012;31(9):2453–2459. doi:10.1007/s10096-012-1589-7
18. Sebastian SA, Co EL, Mehendale M, et al. Challenges and updates in the diagnosis and treatment of infective endocarditis. *Curr Prob Cardiol*. 2022;47(9):101267. doi:10.1016/j.cpcardiol.2022.101267