



Simultaneous bilateral choroidal neovascularization associated with *Staphylococcus aureus* infective endocarditis: A case report

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ABSTRACT

Purpose: To report a case of simultaneous bilateral choroidal neovascularization (CNV) associated with *Staphylococcus aureus* infective endocarditis.

Observations: A 35-year-old man presented with acute visual impairment 14 days after cardiac surgery for acute infective endocarditis caused by methicillin-susceptible *S. aureus*. Fundus photography, fluorescein angiography, optical coherence tomography (OCT), and OCT angiography confirmed the presence of a single CNV area in the right eye and three CNV areas in the left eye. Treatment with intravitreal aflibercept resulted in an improvement in the visual acuity in both eyes.

Conclusion and Importance: The findings from this case highlight the importance of monitoring visual symptoms in patients with infective endocarditis. CNV can result in vision loss when it involves the macula; therefore, prompt diagnosis is important. Intravitreal anti-vascular endothelial growth factor injection can be an effective treatment in such cases. To the best of our knowledge, this is the first report of simultaneous bilateral CNV associated with infective endocarditis.

1. Introduction

Infective endocarditis is a life-threatening infection of the heart valves or endocardium.¹ The incidence of visual disturbance in patients with endocarditis is approximately 5%.² Causes of visual disturbance include Roth's spots, retinal artery occlusion, subretinal abscesses, endophthalmitis, choroiditis, and optic neuritis.^{3–11} Unilateral choroidal neovascularization (CNV) has also been reported.^{12–14} Till date, however, simultaneous bilateral CNV associated with infective endocarditis has not been reported. Here we report a rare case involving a middle-aged man who developed simultaneous bilateral CNV associated with *Staphylococcus aureus* infective endocarditis.

2. Case report

A 35-year-old man with a history of chronic otitis media presented with fever, dizziness, and fatigue. His body temperature was 39.4 °C, heart rate was 112 beats/minute (tachycardia), and systolic/diastolic blood pressure was 55/41 mmHg (hypotension). A blood test showed an

increased C-reactive protein (CRP) level (11.95 mg/dL) and leukocytosis (17,470/mm³). Transthoracic echocardiography revealed vegetation (16 × 7 mm) at the anterior commissure of the mitral valve. Two sets of blood cultures grew methicillin-susceptible *S. aureus*, and the patient was diagnosed with sepsis associated with acute infective endocarditis. One day after his presentation, a cardiothoracic surgeon performed mitral valve replacement surgery, following which the patient received daily treatment with intravenous cefazolin (6 g) in 3 divided doses every 8 hours for 7 days. His fever gradually subsided.

Fourteen days after surgery, the patient reported acute onset of visual disturbance in both eyes. Examination revealed a decreased visual acuity (VA) of 20/50 in the right eye and 30/50 in the left eye (previous VA was 20/20 in both eyes). The anterior chamber and vitreous were quiet in both eyes. Fundus examination revealed a round, elevated, yellowish lesion with hemorrhage at the fovea in the right eye and white, round spots at the posterior pole in the left eye (Fig. 1). Fluorescein angiography (FA), spectral-domain (SD) optical coherence tomography (OCT; SD-OCT), and OCT angiography confirmed the presence of a single CNV area with exudation in the right eye and three

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Fig. 1. Color fundus photographs for the right (A) and left (B) eyes of a 35-year-old man with bilateral choroidal neovascularization (CNV) associated with *Staphylococcus aureus* infective endocarditis. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

CNV areas in the left eye (Fig. 2). Indocyanine green angiography (ICGA) for both eyes revealed distinct CNV networks in the early phase and multifocal hypofluorescent lesions in the late phase (Fig. 3).

The patient received a single intravitreal injection of aflibercept, an anti-vascular endothelial growth factor (VEGF), in each eye. Fundus photography performed 2 months after treatment demonstrated CNV inactivation with no exudation in both eyes (Fig. 4). The bilateral visual acuity was 20/20. There was no recurrence for 2 years after treatment.

3. Discussion

Ocular manifestations are relatively common in patients with infective endocarditis. Although CNV associated with infective endocarditis has been reported,^{12–14} to our knowledge, this is the first case of simultaneous bilateral CNV associated with infective endocarditis. Most ocular manifestations of infective endocarditis result from thromboembolism or septic embolism in the retinal and choroidal circulations.¹ Ocular manifestations tend to occur during the first 2 weeks after the initiation of antibiotic treatment,¹⁵ although the reason for CNV development remains unclear. One possibility is that focal ischemia or inflammation in the choroid due to microembolisms identified by FA and ICGA results in increased VEGF production and subsequent emergence of CNV lesions. This theory is supported by the findings in the present case, where a single intravitreal anti-VEGF injection effectively inactivated CNV and improved the patient's vision immediately after administration.

In the present case, methicillin-susceptible *S. aureus* was the cause of infective endocarditis, which is most commonly caused by this bacterial species (31%).¹⁶ No clear relationship has been identified between the presence of specific ocular lesions and particular bacteria. However, in previous studies, 9% patients with *S. aureus* bacteremia exhibited ocular involvement.¹⁷ The development of unilateral CNV has also been observed in a patient with prosthetic valve endocarditis caused by *S. aureus* infection.¹³ Therefore, patients with infective endocarditis associated with *S. aureus* are likely to exhibit a higher risk of ocular complications.

4. Conclusions

In conclusion, we reported the first case, as per our knowledge, of simultaneous bilateral CNV associated with *S. aureus* infective endocarditis. The findings from the case highlight the importance of monitoring visual symptoms in patients with infective endocarditis. Because CNV can result in loss of vision when it involves the macula, prompt diagnosis is important. Intravitreal anti-vascular endothelial growth factor injection can be an effective treatment in such cases.

Patient consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

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Authorship

All authors attest that they meet the current ICMJE criteria for authorship.

Declaration of competing interest

None.

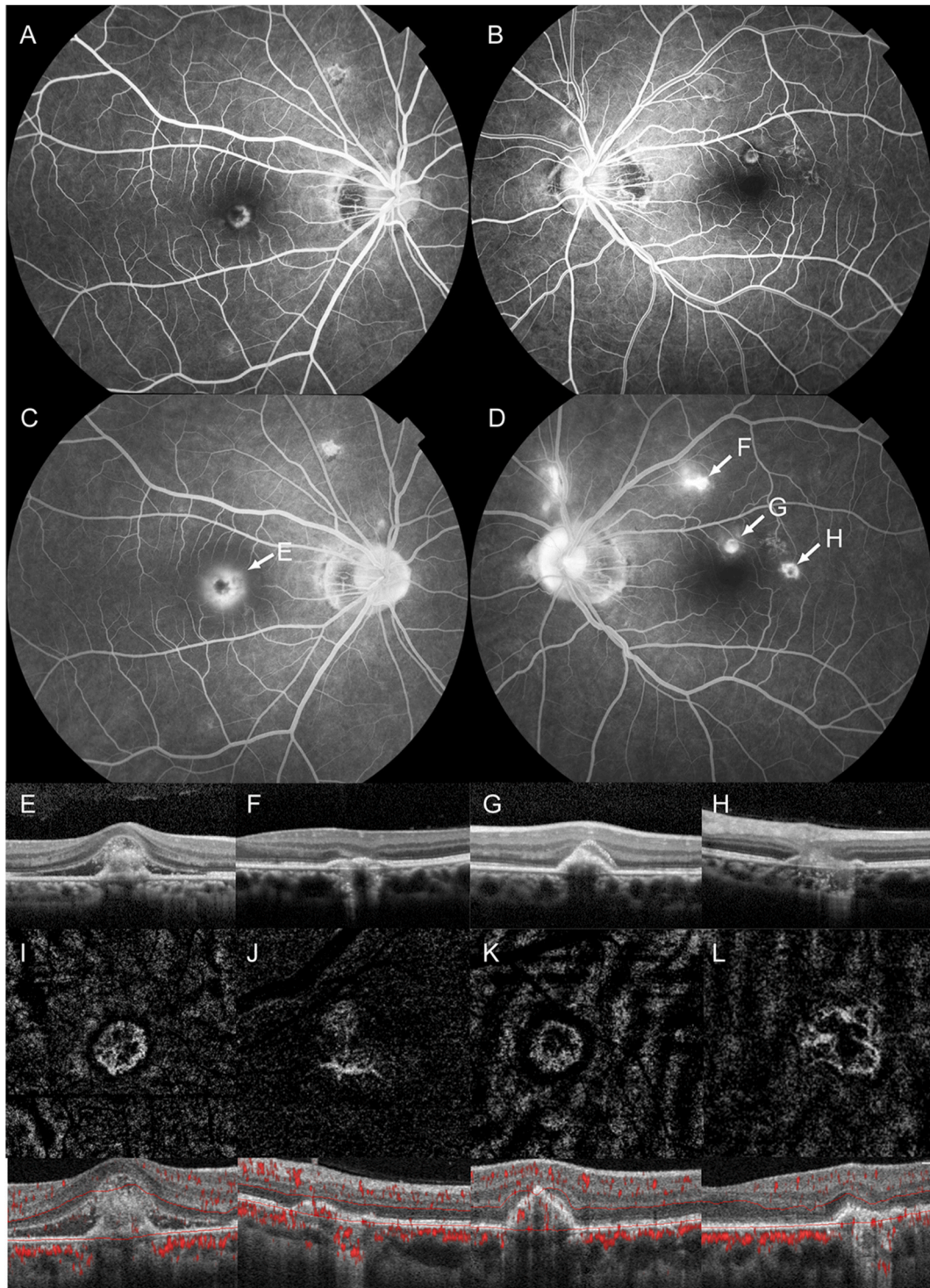


Fig. 2. Fluorescein angiography (A–D), spectral-domain optical coherence tomography (E–H), and optical coherence tomography angiography (I–L) images of (E)–(H) for a 35-year-old man with bilateral choroidal neovascularization (CNV) associated with *Staphylococcus aureus* infective endocarditis. Optical coherence tomography angiography confirms the presence of one CNV area in the right eye and three CNV areas in the left eye.

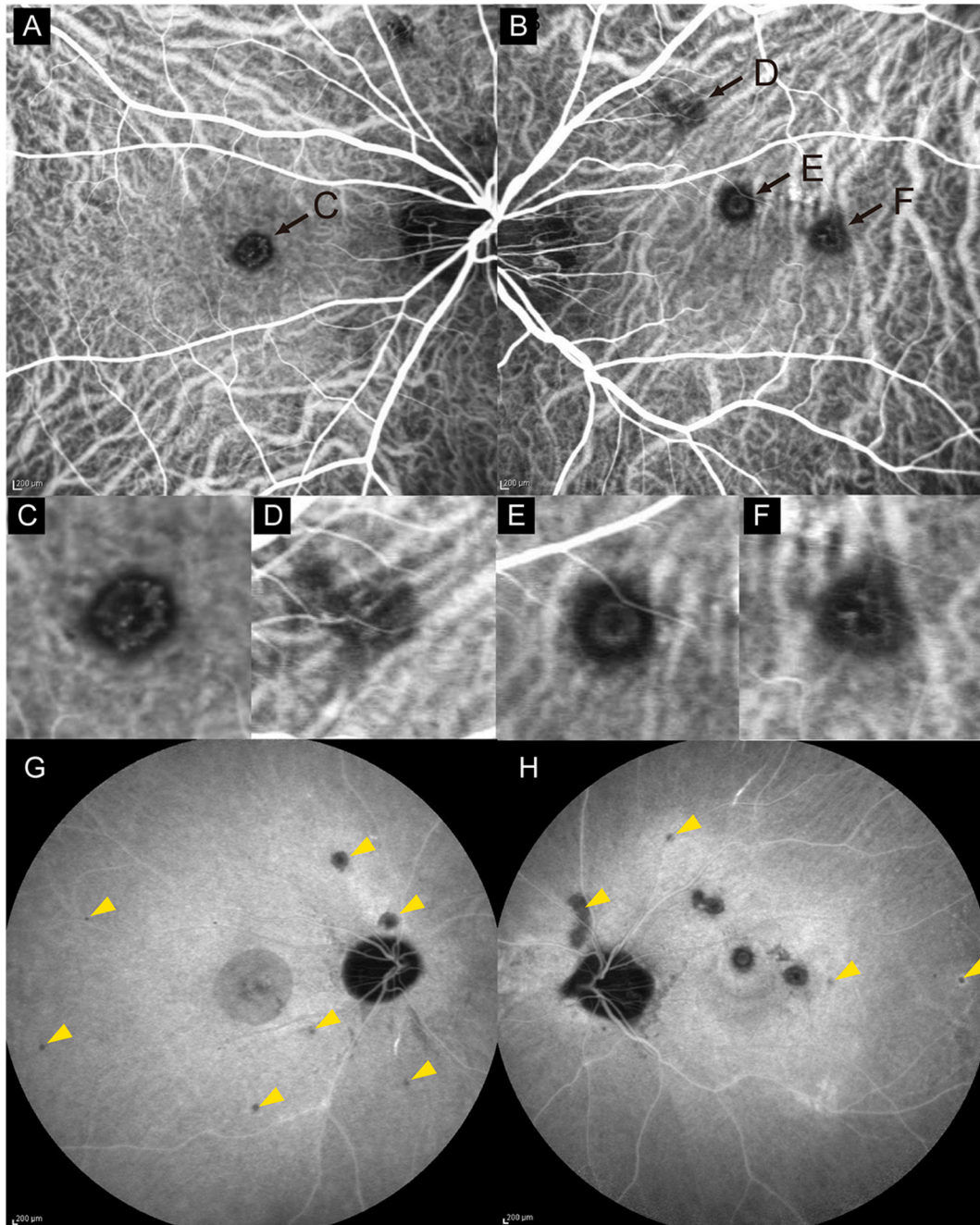


Fig. 3. Indocyanine green angiography (IGCA) findings for a 35-year-old man with bilateral choroidal neovascularization (CNV) associated with *Staphylococcus aureus* infective endocarditis Early-phase IGCA (A, B) reveals distinct CNV networks (arrows, C-F), while late-phase ICGA (G, H) shows multifocal hypofluorescent lesions in both eyes (yellow arrowheads). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

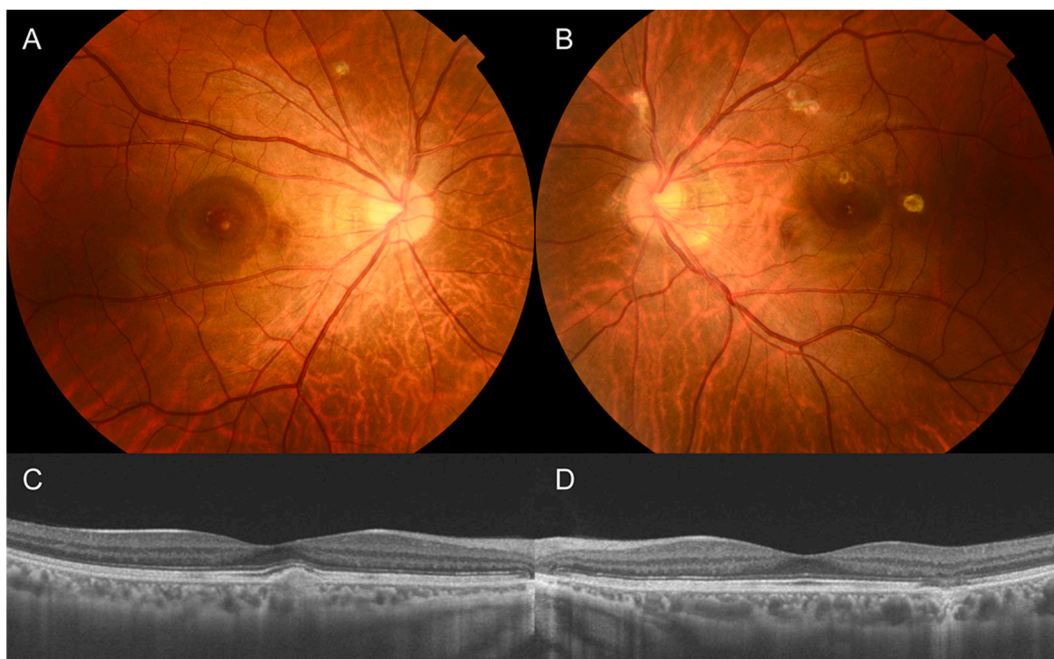


Fig. 4. Fundus photograph (A, B) and spectral-domain optical coherence tomography at the fovea (C, D) obtained at 2 months after treatment (intravitreal aflibercept) for a 35-year-old man with bilateral choroidal neovascularization (CNV) associated with *Staphylococcus aureus* infective endocarditis. The image shows inactivation of CNV with no exudation in both eyes.

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