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Occipital Brain Abscess with Obstructive Hydrocephalus Caused by Streptococcus anginosus in a 24-Year-Old Male: A Case Report

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Abstract

Background: Brain abscesses are severe intracranial infections with significant morbidity and mortality. The *Streptococcus anginosus* group (SAG), known for its abscess-forming potential in deep tissues, rarely causes central nervous system (CNS) infections.

Case Presentation: We report a 24-year-old immunocompetent male presenting with high-grade fever, headache, vomiting, and confusion. Imaging revealed a right occipital lobe abscess with obstructive hydrocephalus. Cerebrospinal fluid culture grew *S. anginosus*, confirming the diagnosis. The patient underwent emergency insertion of an external ventricular drain and received empirical meropenem and vancomycin, later de-escalated to cefotaxime based on sensitivity testing. Follow-up imaging demonstrated complete abscess resolution after six weeks of antibiotic therapy.

Discussion: This case represents, to our knowledge, the first documented *S. anginosus* brain abscess in Saudi Arabia. The pathogen's ability to produce tissue-invasive enzymes and biofilms contributes to its virulence. While streptococci are frequently isolated from brain abscesses in the region, species-level identification is often lacking, leading to underreporting of SAG-related infections. Early neuroimaging, microbiological identification, and combined surgical-antibiotic management are crucial for favorable outcomes.

Conclusion: *S. anginosus* should be considered a potential cause of brain abscesses, even in healthy individuals. Routine species-level microbiological analysis is essential for accurate diagnosis, targeted therapy, and improved epidemiological understanding.

Introduction

Although streptococcal species have been implicated in brain abscesses in Saudi Arabia, specific cases involving *S. anginosus* have not been reported. Previous studies from tertiary centers in the Kingdom have identified streptococci as common isolates in brain abscesses; however, none have identified SAG species as the causative pathogen.[1,2]

We report what is, to our knowledge, the **first documented case in Saudi Arabia** of a brain abscess caused by *S. anginosus* complicated by obstructive hydrocephalus in an otherwise healthy young male.

Case Report

History: A 24-year-old Bangladeshi male with no known comorbidities presented to the emergency department on June 9, 2025, with a 5-day history of high-grade fever, severe generalized headache, vomiting, and altered consciousness. However, he had no history of convulsions or differential body weakness. The patient reported no nasal discharge, cough, chest pain, or respiratory difficulties. Furthermore, he had no history of dysphagia, sore throat, or dental pain, and he denied abdominal pain, swelling, or diarrhea.

Clinical findings: On general examination, the patient's temperature was 37.9°C, with a pulse rate of 113 beats per minute and blood pressure of 120/80 mmHg. Additionally, skin examination revealed no rash. The patient was conscious but confused, with a Glasgow Coma Score of 14/15. Neck stiffness was present, along with positive Kernig's and Brudzinski's signs. However, no focal neurological deficits were observed.

Diagnostic assessment: Laboratory tests revealed a leukocyte count of 29.1 $\times 10^3/\mu L$ (neutrophilic predominance), a C-reactive protein level of 125.79 mg/L, and sterile blood cultures. The cerebrospinal fluid (CSF) was turbid with elevated protein (48.8 mg/dL), neutrophilic pleocytosis (65.4%), and normal glucose. CSF cultures performed using the automated BACTEC FX system grew *S. anginosus*, while the viral polymerase chain reaction (PCR) panel was negative.

Imaging: Brain CT performed on June 9, 2025 (**Figure 1**) demonstrated dilated supra-tentorial ventricular system involving the lateral and third

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ventricles with associated periventricular low attenuation more evident surrounding the occipital horns of lateral ventricle suggesting trans-ependymal edema. Magnetic resonance imaging (MRI) performed on June 11, 2025 (**Figure 2A, B and C**) confirmed a right occipital lobe abscess measuring 3.3 x 8.1 x 7.3 mm, with perilesional edema and associated dilatation of the lateral and third ventricles, consistent with obstructive hydrocephalus.

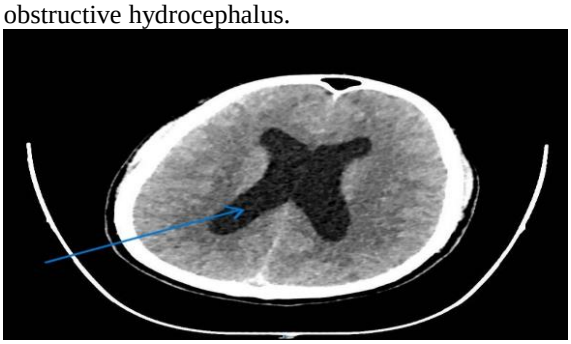

Figure 1. CT brain without contrast: Dilated supra-tentorial ventricular system involving the lateral and third ventricles with associated periventricular low attenuation more evident surrounding the occipital horns of lateral ventricle suggesting trans-ependymal edema.

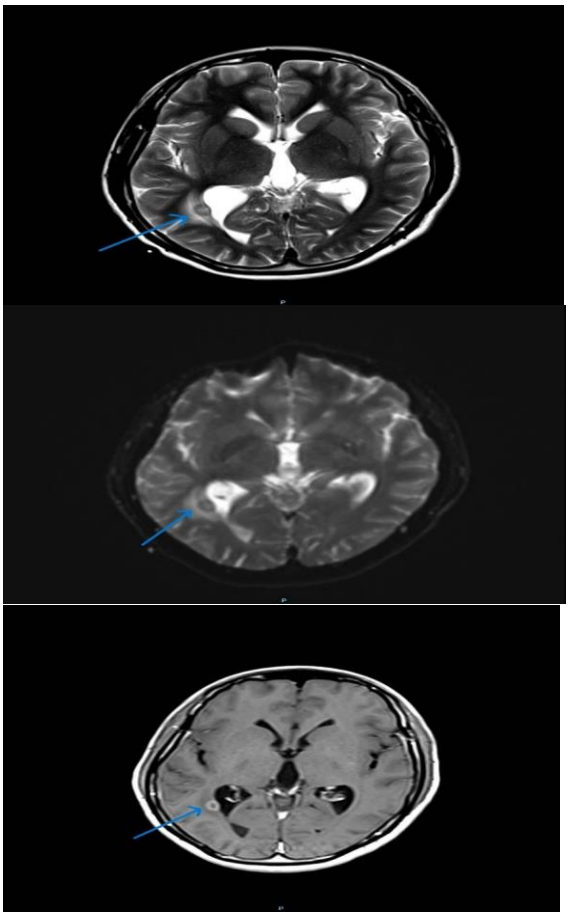

Figure 2. MRI brain showing a right occipital lobe abscess. (A) T2-weighted image demonstrates a hyperintense lesion with surrounding edema. (B) Diffusion-weighted image reveals restricted diffusion within the cavity. (C) Post-contrast T1-weighted image shows a smooth ring-enhancing wall consistent with a cerebral abscess.

Therapeutic intervention: The patient was immediately admitted and administered intravenous meropenem and vancomycin. Following an emergency neurosurgical consultation, an external ventricular drain (EVD) was inserted on the same day to relieve intracranial pressure. CSF clture and sensitivity testing confirmed susceptibility to cefotaxime and amoxicillin. Based on these results, antibiotic therapy was subsequently narrowed to intravenous cefotaxime (2 g every 8 h) on June 11, 2025.

Follow-up and outcome: The patient's condition gradually improved with normalization of inflammatory markers and corresponding improvement in neurological status. Follow-up imaging on July 1, 2025 (**Figure 3**), revealed resolution of the abscess. The EVD was removed on **3 July 2025**, and the patient was discharged from inpatient care on July 7, 2025, with instructions for outpatient follow-up. He received 2 weeks of intravenous cefotaxime, followed by oral amoxicillin (1 g every 8 h), completing a total of 4 weeks of inpatient antibiotic therapy. The patient was subsequently discharged on **oral amoxicillin for 2 weeks, completing a 6-week course of antibiotic therapy. The patient** remained under neurosurgical observation for a possible ventriculoperitoneal shunt in case hydrocephalus recurred. The clinical course of the patient is summarized in **Table 1**.

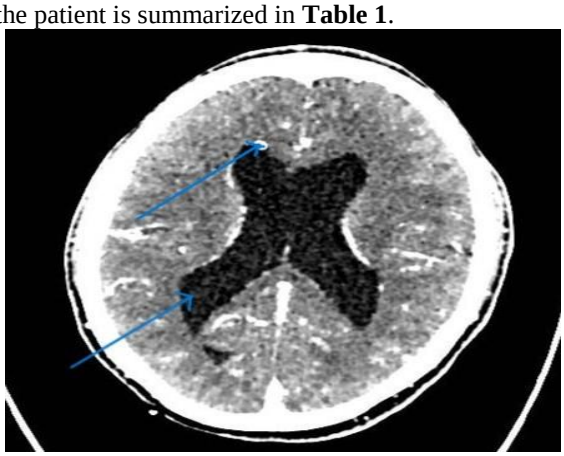

Figure 3. CT brain with contrast: The previously observed right periventricular space-occupying lesion is no longer visible.

Discussion

S. anginosus, a member of the SAG alongside *S. intermedius* and *S. constellatus*, is known for its abscess-forming potential in deep tissues, including the liver, lungs, and brain.[4] CNS involvement is rare but can lead to severe complications, including obstructive hydrocephalus.[3,5] The pathogenesis of *S. anginosus* involves the production of tissue-invasive enzymes, such as hyaluronidase, and the formation of biofilms, both of which enhance its ability to evade host immune defences and contribute to abscess

persistence.[6,7] Although most brain abscesses are polymicrobial, monomicrobial infections caused by SAG are increasingly reported, particularly in immunocompetent patients.[5]

In Saudi Arabia, streptococcal brain abscesses are common. However, species-level identification is rare, potentially underestimating *S. anginosus*'s role.[1,2] To our knowledge, this is the first published case from Saudi Arabia describing a brain abscess caused by *S. anginosus*. A search of PubMed, Embase, and Saudi Medical Journal (January 2000–July 2025) using terms "Streptococcus anginosus," "brain abscess," and "Saudi Arabia" yielded no prior reports, confirming the novelty of this case. Previous studies from Saudi Arabia have reported streptococci in 38% of brain abscess cultures in the Eastern Province and 23% in Riyadh; however, none have specifically identified *S. anginosus.*[1,2] This case underscores the need for routine species-level microbiological identification to enhance epidemiological data and guide targeted therapies in Saudi Arabia.

Differential diagnoses for this patient included *Staphylococcus aureus* and polymicrobial abscesses, both common causes of brain abscesses; however, these were excluded by CSF culture, which identified *S. anginosus* as the sole pathogen.[3]

Globally, *S. anginosus* brain abscesses have been linked to hematogenous spread or contiguous infections, with recent reports emphasizing the role of advanced imaging in early diagnosis.[8] No definitive source of infection was identified. Occult dental or sinus infections were considered but not detected, likely due to the absence of symptoms and limited dental imaging. Routine dental or sinus imaging in future cases may facilitate more accurate source identification.

Obstructive hydrocephalus, an uncommon but serious complication, is likely attributed to a mass effect or ventricular inflammation caused by the abscess.[3,5] MRI remains the diagnostic modality of choice due to its superior sensitivity in detecting ring enhancement and perilesional edema.[3] Immediate neurosurgical interventions, such as EVD insertion, are critical for managing increased intracranial pressure.

Antibiotic therapy should be guided by culture and sensitivity, with cefotaxime or ceftriaxone as the first-line agents for *S. anginosus*.[5] Empirical broad-spectrum antimicrobial therapy is often initially warranted to treat common pathogens, including anaerobes and resistant gram-positive organisms, as demonstrated in this case using meropenem and vancomycin.[9] The patient received a 6-week antibiotic course, consistent with the typical 6–8 week duration for brain abscess treatment, tailored according to the clinical and imaging resolution.[3,5] Neurosurgical drainage via EVD or aspiration is essential when intracranial pressure increases or hydrocephalus develops.[3]

This case underscores the underrecognized role of *S. anginosus* in CNS pathology, even among immunocompetent individuals. Clinicians in Saudi Arabia and globally should consider *S. anginosus* in the differential diagnosis of brain abscesses, particularly when complications such as hydrocephalus are present. Prompt recognition, early neuroimaging, accurate microbiological identification, targeted antibiotic therapy, and timely surgical intervention are critical for achieving favorable outcomes. Future studies should investigate *S. anginosus* prevalence in Saudi Arabia to address potential underdiagnosis and improve clinical management.

Conclusion

S. anginosus should be considered in the differential diagnosis of brain abscesses, even in immunocompetent patients. Early neuroimaging, microbiological identification, appropriate antibiotic therapy, and timely neurosurgical intervention are essential to prevent complications such as hydrocephalus and improve patient outcomes. Routine species-level identification of brain abscess cultures may enhance the detection of *S. anginosus* and contribute to improved patient outcomes.

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Declarations

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Consent: Written informed consent was obtained from the patient for publication.

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