

*Prikaz slučaja /  
Case report*

**STREPTOCOCCUS CONSTELLATUS BRAIN  
ABSCESS IN IMMUNOCOMPETENT  
24-YEAR-OLD MALE: – Case report and  
review of literature**

**STREPTOCOCCUS CONSTELLATUS  
MOŽDANI APSCES KOD  
IMUNOKOMPETENTNOG 24-GODIŠNJEG  
MUŠKARCA: – Prikaz slučaja i pregled litera-  
ture**

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**Key words**

Brain abscess; Streptococcus constellatus;  
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**Ključne reči**

Apsces mozga; Streptococcus constellatus;  
Imunokompetentni; Prikaz slučaja.

**Abstract**

Brain abscesses are life-threatening infections that still present serious clinical challenge despite advancements in diagnostic and therapeutic techniques. *Streptococci* are group of bacteria most commonly cultured from immunocompetent patients with bacterial brain abscess, especially the *Streptococcus anginosus/milleri* group. These bacteria normally reside in the oral cavity, intestines and female genital tract and they have a proclivity for abscess formation. Abscesses are usually presented as single lesions most often located in frontal and temporal lobes that are seen on CT examination of the head as lesions with ring enhancement after intravenous administration of contrast, surrounded by zone of edema. Here, authors present a case of an immunocompetent 24-year-old male who developed a *S. constellatus* brain abscess. The patient was treated with a combination of surgical resection and antimicrobial therapy with good outcome.

**INTRODUCTION**

Brain abscesses are life-threatening infections that even despite advancements in diagnostic and therapeutic techniques still present serious clinical challenge. In developed countries, community acquired brain abscesses are rare with estimated incidence of 1-2% [1]. *Streptococci* are the bacteria most commonly cultured from patients with bacterial brain abscess. These bacteria, especially the *Streptococcus anginosus* group (*Streptococcus anginosus*, *Streptococcus constellatus* and *Streptococcus intermedius*) normally reside in the oral cavity, appendix, and

female genital tract, and they have a proclivity for abscess formation [2]. Here, authors present a case of an immunocompetent 24-year-old male who developed a *S. constellatus* brain abscess with consecutive treatment applied.

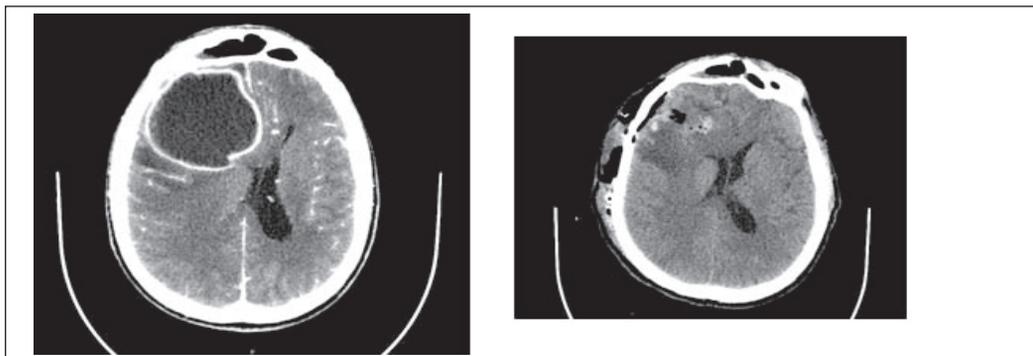
**CASE REPORT**

A 24-year-old man admitted to Clinic of Neurosurgery, University Clinical Centre of Vojvodina due to headache and lightheadedness that started 3 days prior to admission. Upon admission he was neurologically assessed Glasgow coma score 15 without neurological deficit, but during the initial examination, his neurological status got progressively

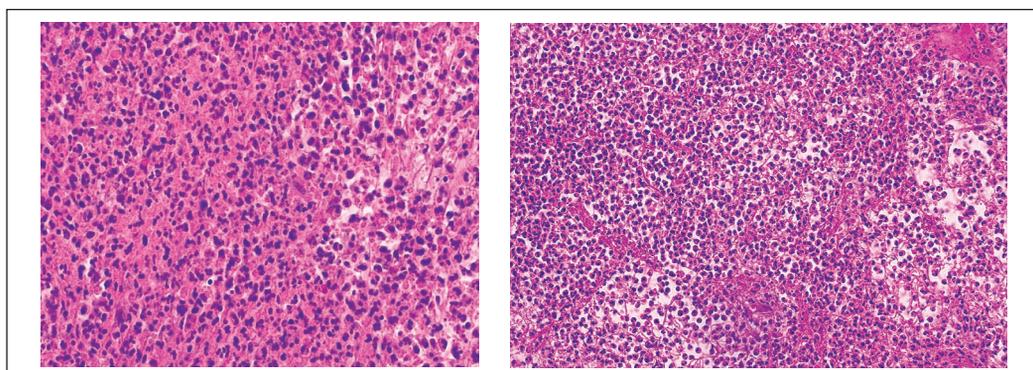
worse as patient went to comatose state where he was assessed as GCS 3 with fixed dilated pupils, and hence was sedated and intubated. This was followed by Computed tomography (CT) of the head that showed a 60.71x65.23x52mm lesion in the right frontal lobe with rim enhancement after administration of intravenous agent surrounded by a zone of white matter edema as well as collection of fluid in right maxillary sinus (Fig. 1). According to imaging characteristics of the cerebral lesion, brain abscess was suspected but glioblastoma couldn't be excluded as well. CT of the head was followed by CT of chest cavity and abdomen which showed no sign of pathological lesions.

Because of the CT findings in maxillary sinus a puncture of right maxillary sinus was done which revealed fetid, purulent discharge that was obtained for microbiological and pathological analyses which also came positive for *S. constellatus*. After this procedure, oral surgeon removed 14, 15, 16, 18<sup>th</sup> teeth because they were recognized as primary source of infection.

Patient was extubated on the second postoperative day and was neurologically assessed Glasgow coma score 15 without neurological deficit. He was released after two weeks from the Department of Neurosurgery University Clinical Centre of Vojvodina to Regional hospital where his antimicrobial treatment was continued.



**Figure 1.** Confluent ring enhancing lesion in right frontal region in axial plane on CT scan of the head / **Figure 2.** State after a surgical treatment of brain abscess, early postoperative CT scan in axial plane.

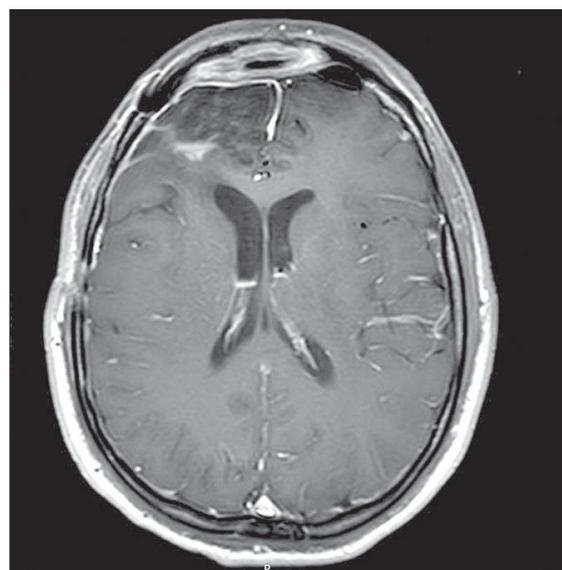


**Figure 3.** Area of necrosis with surrounding inflammatory infiltrate and dilated blood vessels seen on microscopic examination.

Taking into consideration dimensions of the lesion and clinical state of the patient, a decision was made to remove the lesion surgically. Right frontal craniotomy was performed followed by corticotomy that revealed pus-like fluid. Samples were obtained for microbiological and pathological analyses. Postoperatively patient was stationed in the Intensive Care Unit. Antimicrobial therapy was ordained (meropenem, vancomycin, metronidazole).

An early postoperative CT scan showed complete removal of the lesion, without surgical complications (Fig. 2). Echocardiography was performed as a way of further radiological examination to investigate if there was another focus of infection. It showed no pathological lesions.

Pathological examination of the surgical specimen revealed fragments of brain tissue with zones of necrosis and infiltration with white blood cells, highly suggestive of brain abscess (Fig. 3). Bacteriological investigation revealed gram-positive -haemolytic Lancefield Group F non-spore, non-motile, catalase negative cocci which indicates that found bacteria was *S. constellatus*.



**Figure 4.** Follow-up MRI examination of the head after one year with no sign of relapse of the disease

The follow up brain magnetic resonance imaging (MRI) done one year after the treatment revealed no sign of relapse of the disease (Fig. 4).

### DISCUSSION

*Streptococci* are group of bacteria most commonly cultured from patients with bacterial brain abscess, especially the *Streptococcus anginosus/milleri* group that contains *S. anginosus*, *S. constellatus*, *S. intermedius*. These bacteria normally reside in the oral cavity, intestines and female genital tract and they have a proclivity for abscess formation [2].

Although this patient was presenting *Glasgow Coma Scale (GCS)* of 3 upon admission to the hospital, he had full recovery (*GCS* of 15 without any neurological deficit), which was surprising considering that studies have shown that *GCS* lower than 12 is usually associated with worse outcome. However the lack of immunodeficiency and clinically significant comorbidities were good prognostic factors as previously stated by Arlotti *et al.* [3,4].

Computed tomography (CT) is usually the first diagnostic method used after onset of neurological symptoms in general population. In case of a brain abscess, it shows single or multiple lesions with ring enhancement after intravenous administration of contrast, surrounded by zone of edema. This type of lesions are usually single lesions most often located in frontal (31%) and temporal (28%) lobes [1].

Magnetic resonance imaging of the brain is more sensitive in the distinction between different types of intracranial lesions. Additional tools and sequences that can be used in

diagnostics of intracranial lesions as well as in the following-up the effect of therapy, are magnetic resonance proton spectroscopy (MRS) and diffusion weighted imaging (DWI) [5-7].

Polymerase chain reaction (PCR) is a test widely used in identification of type of bacteria that causes abscess (and other types of infections) by amplification of specific genetic markers [1].

Surgical intervention over medical management was appropriate for the patient given the large size of the abscess. After successful surgical treatment, antimicrobial therapy can be ordained as a follow up therapeutic step, which was done in the case of this patient considering the lingering maxillary sinus infection and active infections in the oral cavity. Studies show that *S. anginosus* group continues to respond well to penicillin G and cephalosporines [2,8].

### CONCLUSION

*S. constellatus* is still to this day an important pathogen in immunocompetent patients who develop brain abscess, usually following infections of the oral cavity or sinuses. This case demonstrates the significance of timely treatment in this group of patients and shows that with combination of rapid surgical treatment and follow-up antimicrobial therapy even in the patients with predictors of worse outcome treatment could be highly successful.

### Sažetak

Apscesi mozga su životno ugrožavajuća stanja koja i dalje predstavljaju značajan klinički problem uprkos novim otkrićima u medicini kako u dijagnostici, tako i samim terapijskim metodama. Smatra se da su najčešći uzročnici apscesa mozga kod imunokompetentnih pacijenata bakterije iz grupe Streptokoka i to najčešće *Streptococcus anginosus/milleri* grupa. Ove bakterije predstavljaju saprofitnu floru usne duplje, gastrointestinalnog trakta i ženskih genitalnih organa i imaju afinitet ka formiranju apscesa. Ove lezije su najčešće samostalne, iako mogu biti i multiple, i najčešće se nalaze u frontalnom, a zatim u temporalnom režnju mozga. Na CT pregledu glave se prikazuju kao multiple ili jedinstvene lezije čija ivica (tačnije kapsula) povećava svoj denzitet nakon primene intravenskog kontrasta, okružena zonom hipodenziteta koja odgovara okolnom edemu mozga. U ovom radu, autori prikazuju slučaj imunokompetentnog, mladog, dvadesetčetvorogodišnjeg bolesnika kod kog je otkriven streptokokni apsces mozga. Bolesnik je lečen kombinacijom hirurškog lečenja i primenom antibiotske terapije sa dobrim krajnjim ishodom.

### REFERENCES

1. Brouwer, et al. Clinical characteristics of brain abscess: systematic review and meta-analysis. *Neurology*. 2014; 806-13.
2. Gae-Banacloche JC, Tunkel AR. Brain Abscess. In: Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases Elsevier. Inc 2020. p.1248-61.
3. Arlotti, et al. Consensus document on controversial issues for the treatment of infections of the central nervous system: bacterial brain abscesses. *Int J Infect Dis*. 2010;14:S79-92.
4. Smiljan T, et al. Dexamethasone administration and mortality in patients with brain abscess: a systematic review and meta-analysis. *World Neurosurg*. 2018;115:257-63.
5. Cartes-Zumelezu FW, Stavrou I, Castillo M, Eisenhuber E, Knosp E, Thurnher MM. Diffusion-weighted imaging in the assessment of brain abscesses therapy. *AJNR Am J Neuroradiol*. 2004 Sep;25(8):1350-7.
6. Stojanovska Medic M, Kozic D, Bjelan M, Vulekovic P, Vuckovic N, Vukovic B, Kovacev Zavisic B. Pituitary abscess with unusual clinical course. *Acta Clin Croat*. 2016;55:650-4.
7. Karan M, Vuckovic N, Vulekovic P, Rotim A, Lasica N, Rasulic L. Nocardial brain abscess mimicking lung cancer metastasis in immunocompetent patient with pulmonary nocardiosis: a case report. *Acta Clin Croat*. 2019;58:540-5.
8. Mamelak AN, Mampalam TJ, Obana WG, Rosenblum ML. Improved management of multiple brain abscesses: a combined surgical and medical approach. *Neurosurgery*. 1995;36(1):76-85.

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