

## FUNGAL BRAIN ABSCESS MIMICKING HIGH GRADE GLIOMA. CLINICAL CASE

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**Key words:** brain abscess, fungal infection.

### Summary

Intracranial brain abscess is a recess of pus in the brain [1]. Abscess may have single or multiple lesions in various regions of the brain [1-4]. Pus is surrounded by abscess wall or capsule. The most common cause of brain abscess is bacteria, as fungal infection usually occurs in patients with history of immunosuppression. However half of fungal infection cases, patients had no risk factors, adjacent disease or known immunosuppression. Fungal brain abscess is rare source of brain abscess but frequently fatal and even for patients with no immunosuppression [4-7]. Infection to the central nervous system spreads in several different ways. Hematogenous path from the lungs, gastrointestinal tract, or directly from the sinuses, orbits and retro-parapharyngeal [4].

In this article we present a clinical case, where we first of all suspected brain tumor for the patient but later this diagnosis was denied by histological findings, which brought us new diagnosis fungal brain abscess.

### Case report

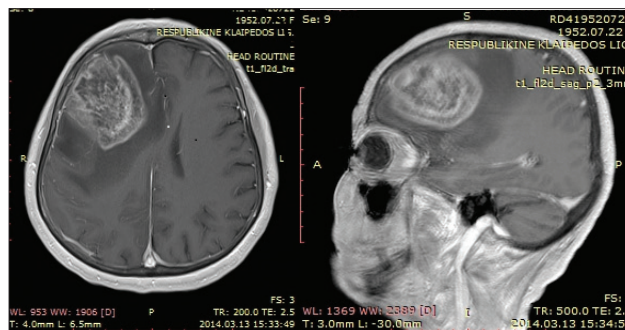
A 62-year-old female was admitted to Klaipėda's University Hospital on 14th March 2014 from hospital with no neurosurgical team on-board. At arrival patient was complaining with a headache, episodes of loss of consciousness, tenacity, left side limbs weakness, dizziness. And those symptoms were persisting for more than 3 months. There was no history of fever or headache or focal neurological deficit, no respiratory, no gastrointestinal tract symptoms and all physical examinations before were normal.

First patient's neurological evaluation was done in hospital where it was taken by ambulance after repeated loss of consciousness and examined by neurologist on duty. After full examination, head CT (Computer tomography) was done. CT demonstrated hypodense lesion in the right frontal lobe and patient was transferred to neurological department, since findings on CT were mimicking brain tumor.

In few days MRI (Magnetic resonance tomography) of the brain was done it showed a cerebral ring enhancement, a high signal on T2W images with little perifocal edema, radiologist's conclusion was brain tumor (picture 1).

Seeing that despite treatment patient was getting worse, she was transferred to Klaipėda's University Hospital, Neurosurgery department. On arrival patient was complaining having headache, dizziness, impaired balance and coordination, left limb paresis. Since all the physical evaluation and radiological analysis was done before admitting to the Neurosurgical department, just regular blood analysis was done and no leukocytosis, thrombocytopenia, was found, just slightly anemia.

Patient was operated on 19th March 2014, no irregularities comparing to ordinary neoplasia extirpation was seen and there were no indications to take the crop. Removed mass was sent to histological evaluation. Patient woke up normally with no additional neurological deficit. Postoperative CT was done after six hours and showed no postoperative hemorrhage (picture 2). After one day in ICU (Intensive care unit) was transferred back to Neurosurgical department and physiotherapy was initiated. In the early postoperative period left paresis regressed, gait and balance improved.



**Picture 1.** MRI showing a cerebral ring enhancement, a high signal on T2W images with little perifocal edema. Coronal view on the left and sagittal view on the right



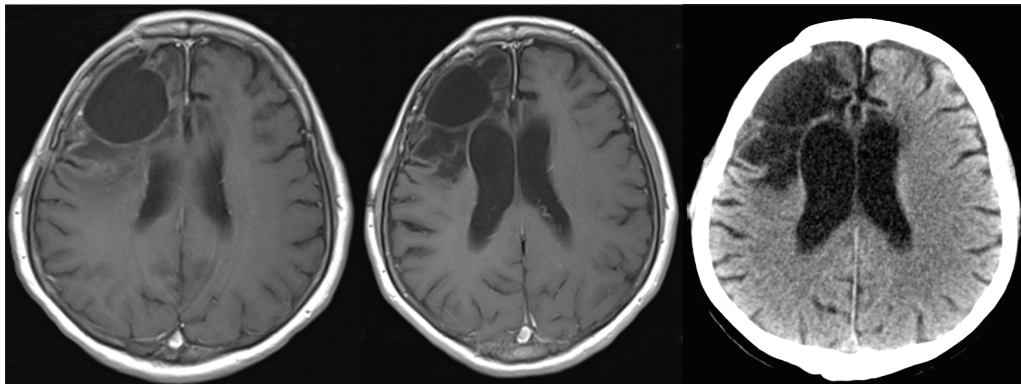
**Picture 2.** Postoperative CT showing that lesions mass effect is reduced and no postoperative hemorrhage



**Picture 3.** We see originated cyst in operated lodge area, causing compression of the brain and mass effect dislocating central brain structures



**Picture 4.** Cyst content is removed and lesions mass effect is reduce



**Picture 5.** MRT done after 6 month **Picture 6.** MRT after 18 months **Picture 7.** Head CT after 27 months

In few days after operation, fungal abscess diagnosis came up and it made us change treatment path. We stopped treating what we thought was brain tumor and looked to fungal infection treatment options. Infectionist recommended Fluconazole 300mg per day until staying inpatient and six weeks outpatient.

On the 16th day after the operation, patient became disoriented, stopped walking, eating, communicating, left side paresis came out. Emergency head CT was performed and it showed – originated cyst in operated lodge area, causing compression of the brain and mass effect dislocating central brain structures (picture 3). Patient was reoperated, cyst content was removed and cysts area was connected to basal cisterns (picture 4). Neurological deficit regressed.

Patient's follow up MRT was done after 6 and 18 months (pictures 5,6). After 27 months head CT was done and showed no progression (picture 7). After 2016 June patient

stopped coming to follow up.

### Discussion

Fungal infections of the brain are not assigned to a group of recorded diseases, so precise numbers of sick people throughout the world is unknown. In general, fungi are found everywhere, but several forms have specific geographical spread compared with the other. There are more than 100,000 different types of fungal species and only a few hundred of them are pathogenic for humans. 10-15% human pathological fungi are able to produce systemic CNS mycosis. Fair pathogenic fungi are as follows: Blastomycetes, Coccidioides, Paracoccidioides, Histoplasma, Sporothrix and others. They produce clinical lesions in normal individuals and then provide long term immunity to the patients recovered from the active infections. Therefore recurrence is noted. Fungal infection usually develops in the

second and third decade of life. It is more common disease among men [10,11].

Infection to the CNS spreads in several different ways. Hematogenous path from the lungs, gastrointestinal tract, or directly from the sinuses, orbits and retro-parapharyngeally. Direct spreading can be determined by during trauma, applying intensive care procedures, intracranial surgery. Determining the etiological matter as fungal and not bacterial is essential, as antibacterial therapy is ineffective against fungi and CNS mycoses. Worthless selection of antibacterial therapy increases mortality and mortality [4].

The most common CNS infection - brain abscess. Less common, but occurs - meningitis, encephalitis, myelitis, arachnoiditis. Hemiparesis and headache are the most frequently mentioned complaints. 70-80% of cases abscess is solitary and in 52% of cases most common localization is frontal. Multiple abscesses most frequently appear in immunosuppressive patients [6,12]

Determination diagnosis in these patients is a significant challenge for doctors because the agent can not always be determined from blood or CSF (Cerebrospinal fluid). Specific molecular tests is needed. Surgical diagnostic approach consists of open abscess extirpation or biopsy with pus aspiration. Plus open operation gives us live view under microscope so we are to differentiate between necrotic lesions or pus. Radiological diagnosis based on MR imaging, indicating ring-like enhancement, a high signal on T2W images with perifocal edema and foci of restricted diffusion [8].

In our presented a clinical case, radiological images and the clinical manifestation was more similar to glioma than abscess. Nodular heterogeneity on contrast injection, mimicked the images seen in the high-grade tumor. Therefore surgery or biopsy of derivative is necessary for diagnosis confirmation [8].

As the disease is relatively rare, its treatment is not standardized. Surgical and combination drug therapy is usually recommended [1,10,13]. Full solitary abscess removal prognostically better than just abscess aspiration, unless we have multiple brain abscesses, and in functionally active zones [3,6].

Antifungal drug combination therapy Amphotericin B, 5-flucytosine and itraconazole is associated with better survival rates. Voriconazole can be used as an alternative to itraconazole because it penetrates the cerebrospinal fluid and brain. Medication and duration is not yet completely clear, since the registration of patients taking medication did not survive long, but a few more survivors treated with voriconazole 12 months. [9]. In our case fluconazole was chosen. Some of these drugs are nephrotoxic and renal monitoring is required.

The forecast for this disease is poor. Mortality untreated patients up to 100%. Results treated somewhat more optimistic, but mortality rates remain high from 65% to 73%, despite aggressive treatment. [6,7,9,10,12]. Interestingly, the mortality rate was not significantly different between immunosuppressive and nonimmunosuppressive patients (75 vs. 71%) [12,17]. Multiple brain abscesses are more poor prognostic factor than the solitary abscess. [4,7].

### Conclusion

Fungal abscess is rare disease, despite that very aggressive and with high mortality rate. Complete resection and sufficient antifungal therapy are the most recommended option for patients with fungal abscess. Unfortunately, in our case, we were unable to identify the infectious agent on the first and second operating time. Further studies are necessary to find more effective antifungal treatment for these resistant infections. Detailed research of pathophysiology, etiology and prognostic factors may lead to better survival rate.

Intracranial fungal mass lesions usually occur in immunosuppressive people but easily may appear in immunocompetent people and without any known primary focus. They can radiologically mimic CNS tumours. Intraoperative squash cytology might help in these cases.

The patient with known immunosuppression condition and detected of solitary or a multiple formations the brain parenchyma, similar to abscesses, with microhemorrhage, ring-like enhancement, subarachnoid hemorrhages, it is important to suspect fungal infection and do more clinically important analyses when fungal abscess diagnosis comes up and start early antifungal treatment. The combination of clinical, radiological, laboratory findings, and professionals from different fields in cooperation of multidisciplinary teams can optimize patient care and succeed.

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**GALVOS SMEGENŲ ABSCESSAS, IMITUOJANTIS  
 DIDELIO PIKTYBIŠKUMO GLIALINIŲ NAVIKĄ.  
 KLINIKINIS ATVEJIS**

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Raktažodžiai: grybelinė infekcija, smegenų abscesas.  
 Santrauka

Galvos smegenų abscesas yra pūlingas darinys, susiformavęs smegenyse. Abscesas gali būti vienoje ar keliuose skirtingose galvos smegenų srityse [1]. Susiformavęs galvos smegenų abscesas dažniausia būna inkapsuluotas. Dažniausiai minimi galvos smegenų absceso sukėlėjai yra bakterijos, o grybelinės infekcijos etiologija labiau pasitaikanti imunosupresinėje būklėje esantiems pacientams. Tačiau pusė sirgusių galvos smegenų abscesu neturėjo gretutinių ligų ar rizikos faktorių. Grybelinė galvos smegenų infekcija - reta liga, tačiau dažniausiai letali, nors ir imuninė sistema gali būti nepažeista [14,17,23]. Infekcijos patekimas į centrinę nervų sistemą galimas keliais skirtingais keliais. Hematogeniniu keliu iš plaučių, virškinimo trakto ar tiesiogiai iš prienosinių ančių, akiduobių, užryklinio tarpo [5].

Šiame straipsnyje pateikiamas klinikinis atvejis paciento, kuriam pirmiausia buvo įtartas navikinis galvos smegenų susirgimas, kuris vėliau buvo paneigtas ir histologiškai nustatyta grybelinio galvos smegenų absceso diagnozė.

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Gauta 2016-11-04