

A Case Report of Cerebellar Abscess Caused by *Bacteroides fragilis*

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Abstract 50 year old female patient who has headache, dizziness, and nausea-vomiting was admitted to neurosurgery clinic, and an image that was suggestive of an abscess was detected in the cerebellum by means of MRI (Magnetic resonance imaging). This cerebellar abscess was resected together with capsule by right paramedian suboccipital craniotomy, and ceftriaxone and metronidazole treatment was ordered empirically. In the microbiological examination by Gram stain, no micro-organisms were seen. Microorganism was detected on the anaerobic culture and was identified as *B. fragilis*. Metronidazole was susceptible according to the antibiotic susceptibility test results, so this treatment was continued. The patient was discharged by healing. In diagnosis and treatment of these kinds of patients, it should be considered that *B. fragilis* can be cause of abscess in the brain.

Keywords: brain abscess, anaerobic bacteria, *Bacteroides fragilis*

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1. Introduction

Anaerobic bacteria can be isolated from the human body as a component of the normal flora. These bacteria are mostly saprophytic microorganisms, may be cause anaerobic infection in the condition that has predisposing factor. [1] Anaerobic infections are usually endogenous origin, can be cause infections as brain abscess with the effect of a variety of predisposing factors and *Bacteroides* spp. often was isolated from clinical specimens. [2] Abscess drainage, debridement of devitalized tissue, providing of the air contact with opening the closed tissue infections, and surgical procedures as removing of obstructions are primary approaches in the treatment of anaerobic infections [3,4].

In the cases as brain abscess, in the case of infection agent of anaerobic bacteria, failures to identify infectious agent have been experienced due to difficulties in isolation and identification of these bacteria and clinical approaches. [3,4] In this case report, it is emphasized that *B. fragilis* might be cause of brain abscess.

2. Case Report

50 year old female patient who has headache, dizziness, and nausea-vomiting was admitted to neurosurgery clinic. In the medical history, she expressed that her ear discharge complaint has been continuing for a long time, and radical mastoidectomy operation was performed in

section of ear, nose and throat diseases of our hospital about a month ago. It was learned that the pathological diagnosis was cholesteatoma (MRI "Magnetic Resonance Imaging" image is in Figure 1).



Figure 1. MR image of the patient with the diagnosis of cholesteatoma

The patient's neurological examinations were intact with physical examination. Annular type contrast enhancement image that was suggestive of an abscess which is compressing the fourth ventricle due to edema was detected by means of cranial MRI with contrast on the right ponto-cerebellar angle localization (Figure 2, Figure 3). This cerebellar abscess was resected together with capsule by right paramedian suboccipital craniotomy, and ceftriaxone and metronidazole treatment was ordered empirically.

5ml abscess sample were inoculated by injector to the BACTEC Plus Anaerobic F (Becton Dickinson, Maryland, USA) flask and after, abscess sample were inoculated to

blood agar, EMB (eosin methylene blue) agar, and Schaedler agar (in an anaerobic environment) medium, and they were incubated at 37°C. In addition Gram stain was performed.

In the microbiological examination by Gram stain, no micro-organisms were seen. Bacterial growth wasn't observed on the blood agar, EMB agar, and Schaedler agar medium. When positive signal were taken from the appliance, the subculture were performed to Schaedler agar medium for anaerobic isolation, and were performed to blood agar and EMB agar for aerobic isolation.

In the subcultures, bacterial growth was not observed in aerobic environment and was observed in anaerobic environment. The isolated anaerobic bacterium was identified as *B. fragilis*, by using conventional methods and the API 20 A panel, and An-Ident Discs tests. Antimicrobial susceptibility testing was performed by E test methods (Figure 4). *B. fragilis* was susceptible to imipenem, metronidazole, piperacillin/tazobactam, clindamycin, and cefoxitin, and was resistant to penicillin G. Metronidazole was susceptible according to the antibiotic susceptibility test results, so this treatment was continued. The result of the treatment was a complete cure and recovery of the patient. The patient was discharged by healing.



Figure 2. MR image of the patient with a diagnosis of abscess

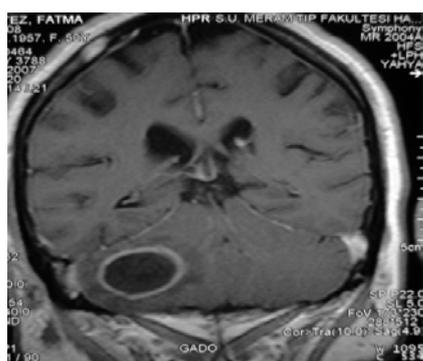


Figure 3. MR image of the patient with a diagnosis of abscess



Figure 4. The performed E test for antimicrobial susceptibility testing

Additionally, predisposing factors that may be cause of brain abscess were also evaluated. There are chronic otitis media and cholesteatoma in the patient's medical history as predisposing factors of cerebellar abscess. Sinusitis, dental abscesses, meningitis, hematogenous focus as lung abscess, empyema, bronchiectasis, arteria-venous malformation, and esophageal varices, but predisposing factors could not be defined. The patient was not immunocompromised and had no previous history of alcohol abuse, malnutrition. In the end of the evaluation, any condition other than chronic otitis media and cholesteatoma could not be determined.

3. Discussion

Anaerobic bacteria can be isolated from various abscess samples. In the treatment of these infections, surgery is the most important approach and it is utilized to drain abscesses and debride necrotic tissues. However, correct identification of causative organism and accurate antibiotic selection are essential to the management of infection. Serious and persistent complications can occur if the inadequate management of infections [4,5].

Ndoyeet al. [6] reported that posterior cranial fossa abscesses were bacterial origin and some of them are associated with otitis media. They explained that one of the species of bacteria isolated from abscess sample was *B. fragilis*.

Marina et al. [7] isolated *Bilophila wadsworthia*, *Bacteroides fragilis*, *Prevotella oris*, *Prevotella buccae* and *Peptostreptococcus anaerobius* in the brain abscess. They reported that craniotomy was performed, the abscess was excised, penicillin and metronidazole treatment was initiated, and the patient healed as a result of treatment.

Cox et al. [8] isolated *Proteus mirabilis*, *Bacteroides fragilis*, *Clostridium hastiforme* in the developing brain abscess after the suppurative otitis media. In this case, percutaneous drainage had been tried three times, after failure, the abscess had been excised by craniotomy.

Jang et al. [9] determined frontal lobe lesions which are consistent with abscesses by CT scan at a patient who admitted to the hospital with headache after dental treatment. They drained the abscess by stereotactic catheter insertion, and isolated *Streptococcus sanguis*, *Peptostreptococcus*, and *Bacteroides* species by culture method, and administered metronidazole intravenously. Treatment had been continued for several months and has emerged a variety of neurological conditions.

Shimohata et al. [10] reported that brain abscess due to *Fusobacterium necrophorum* in a 78-year-old healthy man. In this case patient had developed convulsion although he did not have any signs of meningitis. Difficulties had experienced to rule out the possibility of metastatic brain tumor; the patient's condition had provisionally diagnosed as symptomatic epilepsy secondary to brain abscess. Craniotomy had been performed to evacuate the abscess. After the operation, patient has been treated with appropriate antibacterial agents.

Tokatlı et al. [11] isolated *Bacteroides* species and gram positive micrococci in cerebellar abscess that was aspirated during mastoidectomy. Chloramphenicol and penicillin G were applied intravenously as treatment for the meningitis before operation. Metronidazole, 500 mg

qid per oral, was added to the therapy after the isolation of *Bacteroides* species.

Tezel et al. [12] did not identify reasons for occurrence of cases in 28% of cases of intracranial abscess. Surgical and medical treatment had been applied in all cases, and culture tests had been performed. Bacteria could be isolated in 19 cases while bacteria could not be isolated in 10 cases by culture test. While facultative anaerobic bacteria isolated in 14 cases, anaerobic bacteria (*B. fragilis* in two cases) were isolated in 5 cases. The treatment was revised according to the results of antibiotic susceptibility testing.

Doğan and Baysal [13] reported that *B. fragilis* was isolated as the most common anaerobic bacteria in abscess samples in their hospital and all isolates were susceptible to metronidazole. In the empirical treatment of this case, metronidazole has been preferred for treatment of anaerobes; ceftriaxone has been preferred for treatment of other bacteria.

As seen in the above-mentioned cases, some of the difficulties are experienced in the management of brain abscess. Anaerobic bacteria are often caused infections by endogenous origin. So isolation and identification of bacteriae were difficult [1,2,3]. In addition, experiences for identification of these bacteria are limited for many laboratories. This situation has forced clinicians to use empirical therapy.

As a result, infections caused by anaerobic bacteria exhibit various clinical manifestations in patients with brain abscess. In addition, diagnosis and treatment may be difficult due to failure pathogen microorganisms isolation. Drainage of abscesses and debridement of necrotic tissues are the essential approach in the treatment of these infections [3,4,5]. In this case, the abscess was excised with capsule and the medical treatment was administered. While mixed microorganisms are generally isolated from abscesses, a single microorganism was isolated in this case. Chronic otitis media associated with cholesteatoma was thought to be predisposing risk factors.

In Conclusion, in diagnosis and treatment of these kinds of patients, it should be considered that *B. fragilis* can be cause of abscess in the brain.

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