

Case Report

Nocardial brain abscess in an immunocompromised old patient: a case report and review of literature

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Abstract: Background: Nocardial brain abscess is a rare central nervous system (CNS) infection with high morbidity and mortality. The infection is acquired through inhalation or direct contact with the bacteria, and could spread through blood transmission. Nocardial brain abscess is usually associated with immunocompromised patients, but sometimes may appear in healthy individuals. Treatment is based on stereotactic aspiration or surgical resection, and antibiotics therapy for several months. Clinical presentation: We presented one case of nocardial brain abscess treated at our department with review of the literature. The patient was 65-year-old with ANCA polyangitis. She had oral methylprednisolone tablets treatment for over 6 months. The patient was treated with surgical evacuation and long-term antibiotics. The patient recovered well at discharge. Conclusion: Nocardial brain abscess is a rare CNS infection that needs to be differentiated from other brain lesions. It could occur in immunocompromised patients or healthy individuals. Treatment includes surgical intervention and long-term antibiotics therapy.

Keywords: Nocardia, brain abscess, CNS infection

Introduction

Nocardial brain abscess is a rare central nervous system (CNS) infection, comprising only 1% to 2% of all cerebral abscesses, but its mortality rate (31%) is considerably greater than others (<10%) [1]. Nocardial brain abscess mainly occurs in immunocompromised patients, but also sometimes affects healthy individuals. Nocardial infection is usually caused by inhalation or direct infection with *Nocardia*, with CNS infection through blood transmission [2]. Here, we report one case of nocardial brain abscess that has been treated at our institution.

Case presentation

A 65-year-old female patient with ANCA polyangitis, complaining of slurred speech, headache and weakness of right side limbs. She had over 6 months oral treatment of methylprednisolone tablets for ANCA polyangitis. Brain computed tomography (CT) and magnetic resonance imaging (MRI) scan showed a left temporal-

parietal lesion with obvious brain edema, and peripheral ring enhancement after contrast administration (**Figure 1**). We also did PET/CT scan for the patient to rule out the possibility of metastatic tumor. The pre-operation diagnosis was highly suspected as brain abscess. The patient suffered from severe intracranial hypertension due to the lesion. Thus she underwent craniotomy and brain abscess resection. During the operation, lots of abscess liquid was aspirated from the lesion (**Figure 2A**). Nocardial bacteria were cultured from the abscess specimen (**Figure 2B** and **2C**). The patient recovered well after operation without neurological deficits, and then discharged for 3 months antibiotics therapy of intravenous ceftriaxone and oral sulfamethoxazole. The follow-up brain CT scan showed the lesion was disappeared (**Figure 1H**).

Discussion

Nocardia is a gram positive aerobic filamentous bacteria found in soil and water, belongs to the family of *Mycobacteriaceae*, and characterized

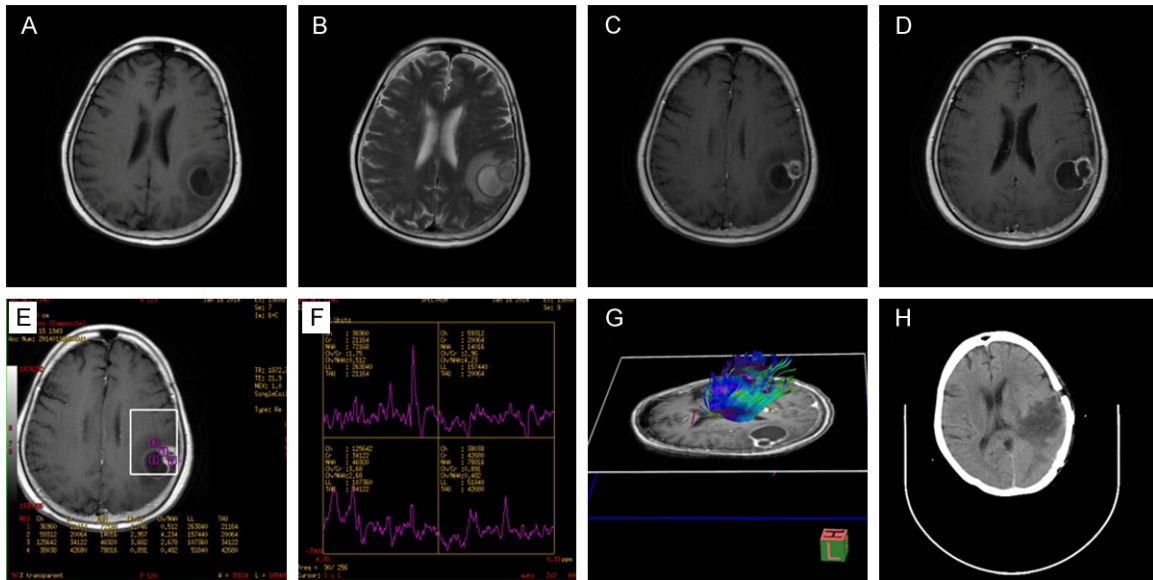


Figure 1. A case of brain abscess: A-D: A lesion with obvious brain edema and ring enhancement was found on left parietal lobe. E, F: Brain magnetic resonance spectroscopy (MRS) didn't indicate brain tumor characteristics. G: Diffusion tensor imaging (DTI) neuro-navigation was used to preserve the conductive bundle function during the operation. H: Post-operative follow-up brain CT showed the lesion disappeared.

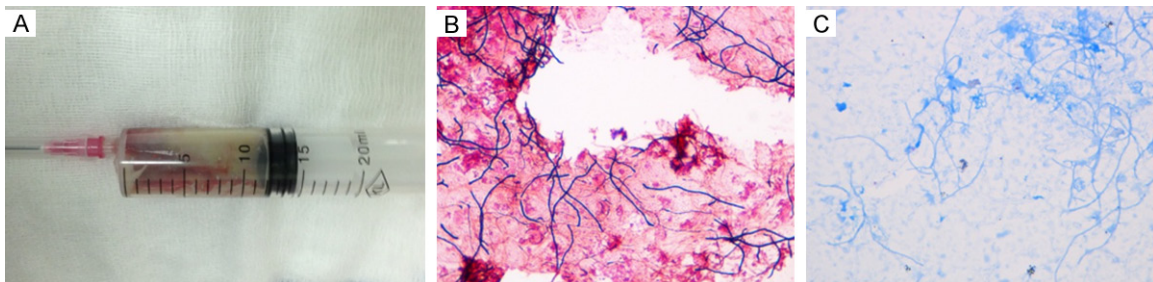


Figure 2. Nocardial brain abscess: A: Much abscess liquid was withdrawn from the brain abscess. B: The bacteria were Gram staining positive with filamentous. C: The bacteria were negative for acid staining.

by a peptidoglycan composed of mesodiaminopimelic acid, arabinose and galactose [3]. Nocardial brain abscess mainly occurs in immunocompromised hosts, such as HIV patients [2], organ transplant recipients or immunosuppressive treatment, for example, long-term steroid therapy [4, 5], just like the case in our report. However, cerebral nocardial infection sometimes could occur in immunocompetent hosts, and they do not have any predisposing factors according to the published literature [6-8].

Nocardia infection is acquired through inhalation or direct contact with the bacteria, causing primary pulmonary or skin disease. Involvement of brain infection occurs through blood dissem-

ination [3]. CNS infection could appear in the form of meningitis or brain abscess. However, nocardial brain abscess is uncommon CNS infection and usually doesn't exhibit definite infective symptoms, such as fever, or accompanied by other system infections, like the patient in our report. Most nocardial brain abscesses are located at supratentorial lobe and sometimes they could be multiple lesions [9]. It should be differentiated from glioma or metastatic tumor [10].

Nocardial brain abscess is associated with high morbidity and mortality. Mortality rates are around 30%, compared to 10% for other bacterial abscesses [1]. Thus, the diagnosis opportunity is very important. Diagnosis is based on

tissue pathology and bacteriological cultures. Gram stains show thin gram positive, weakly acid-fast branching filaments (**Figure 2**).

Treatment of nocardial brain abscesses is consisted of surgery and antibiotics therapy. In general, brain abscess larger than 25 mm diameter should be aspirated to confirm the diagnosis, regardless of the immune status of the patient [9], and those patients who show neurological deterioration or an increase of the abscess size may need repeated aspirations or craniotomy for surgical resection. The patient suffered from intracranial hypertension in our case. Thus, the surgical resection was performed. After operation, treatment with intravenous antibiotics for 3 to 6 weeks and then oral treatment for 12 months is recommended [9]. Ceftriaxone and sulfamethoxazole (SMZ) now are the most widely used antibiotics for this kind of case.

Conclusion

In conclusion, *Nocardia* species are Gram-positive, aerobic, non-motile, urease and catalase positive bacilli that form branching hyphae. The majority of patients with these infections are immunocompromised, but infection could occur without any predisposing factors as well [11-13]. We reported a case of primary brain abscess with nocardia infection in an immunocompromised old patient here. Early diagnosis and surgical intervention is significant for the patient. She was successfully treated by surgery and long-term antibiotics therapy. The post-operative images showed good resolution of the abscess, and the patient acquired well clinical recovery.

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Disclosure of conflict of interest

None.

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