**Case Report**

**Nocardia Brain Abscess in a Liver Transplant Recipient**

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**INTRODUCTION**

Brain abscesses after organ transplantation are rare, however, they are known to result in the high mortality and morbidity. In a review, the incidence of brain abscess is 0.6% among liver transplant recipients, and patients with brain abscess shows a mortality rate of 20% and high morbidity, including seizures (up to 80%), altered mentality, and focal neurological deficits. Fungi are the predominant organisms in the immunocompromised host and usually arise by hematogenous dissemination from the lung. Aspergillus species are the most common respiratory pathogens, 10% of which disseminates to the brain.

**Nocardia** species, as a nonfungal organism, are the rare cause of brain abscess and *N. farcinica* brain abscess is much rare. Only a single case has been reported in Korea. Here, we report on a case of *N. farcinica* brain abscess in a liver transplant recipient, following *Aspergillus fumigatus* pneumonia.

**CASE REPORT**

A 43-year-old man was admitted for the evaluation and treatment of sudden altered mentality in June 2008. He had been diagnosed as hepatitis B virus-related liver cirrhosis 12 years before and had undergone liver transplantation from a living donor in September 2007. After the surgery, he has been taking immunosuppressive (tacrolimus and prednisolone) and antiviral agents (adefovir and lamivudine). Post-transplantation clinical course has been uneventful until April 2008, with neither transplant rejection nor serious infectious diseases. Two months prior to the admission, he was diagnosed as *Aspergillus fumigatus* pneumonia, and was prescribed amphotericin B for 3 weeks, resulting in complete recovery.

He suffered from headache and blurred vision a month ago and rigidity of the legs which made him unable to walk a week ago. His mentality became drowsy a day ago. At admission, he was semicomatose and hemiparetic on the left side. Brain computed tomographic scan and magnetic resonance (MR) imaging demonstrated a 4×4-cm multiloculated rim-enhancing lesion with massive perilesional edema which was presumed to be a brain abscess (Fig. 1).

To achieve etiologic diagnosis and reduction of mass effect, craniotomy and removal of the lesion was performed. During the operation, non-odorous and creamy pus was drained from two cavities. The lesion could be easily dissected from the surrounding brain and was completely removed. After surgery, the patient became alert but right homonymous hemianopsia and rigidity of the legs which made him unable to walk a week persisted. On the pathologic examination, the lesion was found to be organizing abscess with necrosis and fibrosis (Fig. 2). The microbiological studies revealed that the etiologic agent was *Nocardia farcinica*.

He was treated with intravenous trimethoprim-sulfamethoxazole (TMP/SMX) 1,920 mg every 8 hour (15 mg/kg/day) and ceftiraxone 2 gm every 12 hour for 2 weeks and then with intravenous TMP/SMX for additional 3 weeks. During the antibiotic treatment, he also received immunosuppressive and antiviral therapies although prednisolone was reduced from 30 mg to 5 mg. During the second week of the treatment, he developed progressive thrombocytopenia probably caused by TMP/SMX. Instead of withdrawing the drug, platelet concentrates were trans-
Fig. 1. A: Brain magnetic resonance (MR) imaging. A multiloculated rim-enhancing lesion with perilesional edema is observed in the right occipital lobe with a significant mass effect. B: Follow-up MR imaging. There is no residual enhancing lesion and no edema in the right occipital lobe at 2 months after operation.

Fig. 2. Pathologic examination of brain tissue. There is chronic active inflammation with reactive gliosis (H&E staining, x400).

fused, and his platelet count was maintained in the range of 50,000/uL to 100,000/uL. He also developed hyperkalemia (6.0 mmol/L) which thought to be due to TMP/SMX medication. It was controlled with oral kalimate administration.

After 6 weeks of rehabilitation, he was discharged home in a state of walker ambulation. The follow-up MR images 2 months after operation demonstrated no residual brain abscess. The antibiotic treatment with TMP/SMX was continued up to 12 months after operation. The patient achieved good recovery in 15 months after operation.

DISCUSSION

*Nocardia* species are soil-borne aerobic actinomycetes, and most of human infections have been caused by *Nocardia asteroides* and *brasiliensis*13. *Nocardia* brain abscesses account for about 1% to 2% of all brain abscesses, and most of them occur as a primary lesion with no evidence of extracranial lesions16. Overall, the mortality associated with brain abscesses is estimated to be 10%-15%, however, cerebral nocardiosis shows the fatality rate of 30%-67. Half of the affected patients are immunocompromised.

To our knowledge, cases of brain abscess caused by *N. farcinica* have been reported less than 20 in number13,8,10,22,24. This is the second case report of *N. farcinica* brain abscess in Korea. It is unique in that the brain abscess was preceded by *Aspergillus fumigatus* pneumonia with a 2-month interval. Diagnosis of nocardial respiratory infection is difficult because of the slow growth of the bacteria and the presence of normal flora in the culture11. If the patient had not undergone operation for the brain lesion, he might have been treated with an antifungal agent, such as amphotericin B, which was used for treatment of the previous pneumonia. We confirmed that the etiologic organism was *N. farcinica* by the microbiological study. After successful surgical removal of the lesion and the etiologic diagnosis, we could start an appropriate antimicrobial therapy, including TMP/SMX, which led to a satisfactory outcome in the present case.

Due to the good tolerance and excellent penetration into the cerebrospinal fluid space, TMP/SMX is the preferred initial treatment option for *N. farcinica* brain abscesses. Amikacin, carbapenem, sulfonamide, minocycline, ciprofloxacin, or a third-generation cephalosporin are also reported to be effective14,16,17. In this case, the platelet count number was decreased to 50,000 /uL during the antimicrobial therapy. The sulfamethoxazole component of TMP/SMX is known to be one of the most common causes of isolated leukopenia or thrombocytopenia11. However, majority of them have safely continued to receive TMP/SMX with resolution of the adverse reactions, either spontaneously or with a supportive care with drugs, such as anti-histamine, anti-lytic, or corticosteroid therapy6. Our patient responded well to corticosteroid therapy and platelet transfusion. Antimicrobial therapy is often continued for many months after apparent cure because of high relapse rate. If the brain is involved or the patient is immunosuppressed, the treatment should be continued for 12 months12,15.

CONCLUSION

In immunocompromised patients who present with a brain abscess, it is important to know that various organisms, including *N. farcinica*, can cause the lesion, irrespective of the previous infections. In this case, we confirmed the etiologic agents, and achieved a good outcome through surgical removal of the mass lesion and adequate antibiotic treatment.

References