

Case Report

Concurrent Nocardia Related Brain Abscess and Semi-Invasive Pulmonary Aspergillosis in an Immunocompetent Patient

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We describe here the first case of a concurrent brain abscess caused by *Nocardia spp.* and semi-invasive pulmonary aspergillosis in an immunocompetent patient. After one year of appropriate antimicrobial therapy and surgical drainage of the brain abscess, the nocardia brain abscess and pulmonary aspergillosis have resolved.

Key Words : Brain nocardiosis · Semi-invasive pulmonary aspergillosis · Immunocompetent.

INTRODUCTION

Nocardia spp. was first described by Nocard in 1888 as a fungus and was further classified as a gram-positive, aerobic bacterium that belongs to the genus *Nocardia*, order Actinomycetales⁴⁾. The central nervous system (CNS) is the most commonly involved site in disseminated nocardiosis. CNS involvement has been recognized in over 44% of all cases of systemic nocardiosis in one large study¹⁾. *Nocardia* cerebral abscesses are rare and generally occur in patients with defects in cell-mediated immunity. Nocardial abscesses account for 2% of brain abscesses and may occur as an isolated CNS lesion without evidence of extracranial disease, or as part of a disseminated infection in association with pulmonary or cutaneous disease¹¹⁾. Insidious presentations are often mistaken for neoplasia because of the paucity of clinical and laboratory signs of bacterial inflammation; the silent invasion and persistence make diagnosis and management more difficult. If a patient with cerebral nocardiosis has multiple pulmonary nodules, we presume that they reflect a pulmonary nocardiosis.

Here, we report the first case of concurrent nocardial abscess and semi-invasive pulmonary aspergillosis in an immunocompetent patient.

CASE REPORT

A 62-year-old woman presented with a 10-day history of headache and progressive right hemiparesis. There was no known underlying disease. A contrast-enhanced magnetic resonance imaging of the brain revealed rim enhancing lesions with associated edema located in the left cingulate gyrus and right parietal lobe (Fig. 1). A craniotomy was performed to drain the abscess. The obtained thick, yellow purulent material yielded Gram-positive bacilli with branching fine filamentous forms, identified as *Nocardia* species. The fungus was not detected by culture technique using drained abscess fluid. Treatment with trimethoprim-sulfamethoxazole (TMP-SMX) was initiated post-operatively. During the post-operative management, two pulmonary nodules were detected incidentally (Fig. 2A). We considered the pulmonary nodules to be nocardiosis at that time, and did not perform any further diagnostic procedures. After one month of

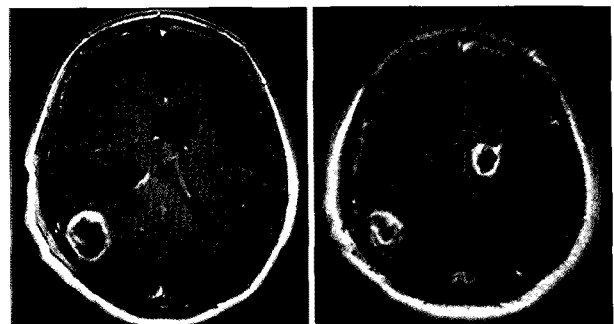


Fig. 1. Magnetic resonance imaging of brain. T1 weighted enhanced sagittal image shows rim enhancing lesions with associated edema located in the left cingulate gyrus and right parietal lobe.

• Received : July 9, 2010 • Revised : October 19, 2010
• Accepted : April 18, 2011
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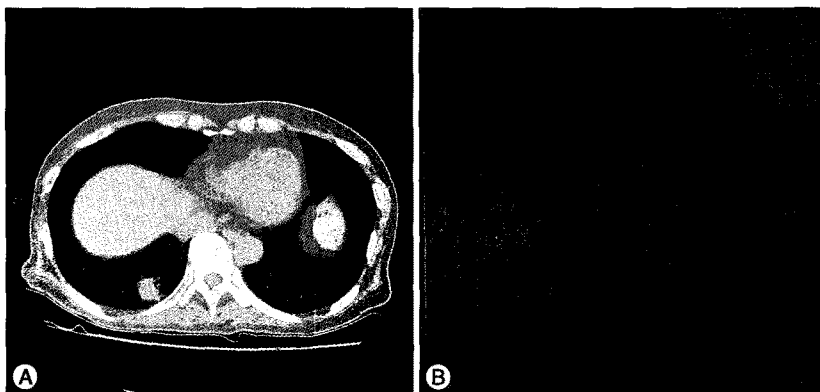


Fig. 2. A : Chest CT revealed nodules with surrounding halo sign in lungs. B : Tissue-invasive fungal hyphae (arrow) are shown on the histopathology of the pulmonary nodules (H&E stain, $\times 400$; scale bar=50 μm). CT : computed tomography.



Fig. 3. Magnetic resonance imaging of brain. T1 weighted enhanced sagittal image shows a decreased brain abscesses in left cingulate gyrus and right parietal lobe.

treatment with TMP-SMX, a follow-up computed tomography (CT) scan of the chest revealed that the pulmonary nodules increased in size. Brain magnetic resonance images on the same time revealed that nocardial abscess had decreased (Fig. 3). Fine-needle aspiration of the pulmonary nodules was performed and histopathological examination of the specimen showed tissue invasion of fungal hyphae consistent with *Aspergillus spp* (Fig. 2B). Itraconazole was added to the TMP-SMX treatment. The chest CT-scan performed 4-months later showed complete resolution of the pulmonary aspergillosis. Treatment with TMP-SMX was continued for 12 months, and resolution of the brain abscess was confirmed.

DISCUSSION

Nocardia and *Aspergillus* may be considered as opportunistic pathogens that cause serious diseases in the setting of organ transplantation, lymphoreticular neoplasia, alcoholism, diabetes mellitus, chronic pulmonary disorders, and long-term corticosteroid use¹. Although a nocardial brain abscess generally occurs in immunosuppressed hosts, several cases of immunocompetent patients have been reported^{5,6,10}. Chronic necrotizing pulmonary aspergillosis (CNPA), a type of semi-invasive pulmonary aspergillosis, usually affects patients with underlying chronic lung dis-

eases and patients who are mildly immunocompromised due to diabetes mellitus, alcoholism, chronic liver diseases, and malnutrition⁹. Pieroth et al.¹² reported concurrent cerebral nocardiosis and sino-orbital aspergillosis in patients with myelodysplastic syndrome. Coexistence of pulmonary aspergillosis and nocardiosis has been reported in immunocompromised patients^{3,7,8}. The patient in this report did not have any local or systemic abnormalities of the immune system. The coexistence of nocardiosis and aspergillosis in an immunocompetent patient has not been previously reported.

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The pathogenesis of a nocardial brain abscess was presumed to be by hematogenous spread from the lungs. Nocardial pulmonary disease is the predominant clinical presentation of this infection, with more than 40% of reported cases presenting with findings in the lungs¹¹. Mortality rates have been reported as high as 78% with any *Nocardia spp*. infection and 90% in patients that present with a nocardial cerebral abscess. Currently, the mortality is believed to be a function of the patient's immune status. One study reported 20% mortality rate in immunocompetent patients versus 55% mortality in immunocompromised patients⁶.

Because nocardial abscesses are thick walled and multilocular, craniotomy is usually required. The mortality of patients undergoing craniotomy (24%) is less than half of those that undergo aspiration (50%) or drainage alone (30%)⁸. The patient in this report did well one year after the craniotomy and medical treatment.

CNPA was first described in two reports in 1981 and 1982. CNPA is an indolent, destructive process of the lungs caused by the invasion of *Aspergillus* species (usually *A.fumigatus*). This entity is different from aspergilloma or invasive pulmonary aspergillosis in that there is local invasion of the lung tissue and a chronic process that progresses slowly over months to years; there is no vascular invasion or dissemination to other organs¹². Patients with CNPA usually present with fever, cough, sputum production, and weight loss of one to six months duration. A minority of the patients may be asymptomatic. The chest X-rays usually show an infiltrative process in the upper lobes of the lungs or the superior segments of the lower lobes.

Treatment with antifungal medications is indicated once the diagnosis is made. The response to therapy with amphotericin B is generally favorable. Therapy with itraconazole has emerged as an effective alternative treatment. Our patient was successfully treated with oral itraconazole. The long-term prognosis, of patients with CNPA, has not been well-documented. In the original series, 73% of the patients were alive one to two years following therapy, and the majority of deaths were due to other causes².

CONCLUSION

We report here the first case of concurrent brain abscess caused by *Nocardia spp.* and semi-invasive pulmonary aspergillosis in an immunocompetent patient without underlying bronchopulmonary problems or systemic disease. These diagnoses should be kept in mind in patients presenting with suggestive signs and symptoms even if they are not immunocompromised.

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