

Case Report

Multiple Brain Abscesses due to *Nocardia* in an Immunocompetent Patient

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Abstract

Nocardia cerebral abscesses are rare intracranial lesions. They account for only 1% to 2% of all brain abscesses. They are important in immunocompromised patients, but rarely occur in immunocompetent hosts. Here, we present a case of multiple primary brain abscesses with *Nocardia* in an immunocompetent patient, who was treated successfully with oral antibiotic therapy.

Keywords: Brain abscess, immunocompetent, *Nocardia*

Cite this article as: Alijani N, Mahmoudzadeh S, Hedayat Yaghoobi M, Gerami shoar M, Jafari S. Multiple brain abscesses due to *Nocardia* in an immunocompetent patient. *Arch Iran Med.* 2013; **16**(3): 192 – 194.

Introduction

Nocardia is a genus of weakly staining gram-positive bacillus. *Nocardia* species form partially acid-fast beaded branching filaments.¹ They are found worldwide in the soil where they degrade the organic matter.²

The infection is usually acquired by inhalation, and therefore the pulmonary form is the most common clinical feature.³ However, nocardiosis in the central nervous system (CNS) may occur as an isolated intracranial lesion or as a part of disseminated infection.⁴

Nocardia intracranial abscesses are rare and generally occur in immunocompromised patients as an acute medical emergency,⁵ but they are extremely rare in immunocompetent hosts.⁶ *Nocardia* cerebral abscesses account for only 1% to 2% of all cerebral abscesses,⁷ but carry considerably higher mortality rates of 55% and 20% in immunocompromised and immunocompetent patients, respectively.⁸

Here, we describe an immunocompetent patient in whom *Nocardia* had caused multiple cerebral abscesses without pulmonary infection.

Case Report

In July 2011, a 31-year-old female was referred with a complaint of constant headache for the past six months. The initial reason for hospitalization was a history of three days right upper monoparesis and tremor accompanied by headache six months ago. By the time of admission in our center, the physical examination including neurological evaluation was unremarkable. The white blood cell count and blood sugar level were normal. The serologic test for human immunodeficiency virus (HIV) was negative. Serum immunoglobulin levels (IgG, IgM, and IgA) were within normal range. Chest X-ray and computed tomography (CT) scan of the

thorax were clear. Abdominal ultrasound did not reveal any site of infection. Coronal CT scan of the paranasal sinuses demonstrated a deviation in the nasal septum. A contrast-enhanced CT scan of the brain revealed at least four ring-enhancing hypodense lesions in the parietal lobes with surrounding edema. A magnetic resonance imaging (MRI) showed multiple intracranial lesions at both temporoparietal regions at white-gray junction with low-signal capsule which were seen to be associated with marked peripheral vasogenic edema and most of them shows thick ring enhancement and solid enhancement in contrast-enhanced images (Figure 1).

In diffusion-weighted (DW) images had enhancing lesion shows restriction finding are highly suggestive of multiple brain abscesses (bacterial or fungal). The neurosurgeons decided for diagnostic craniotomy. A total excision of an abscess was performed, but the gram stain and routine aerobic culture were negative. The pathology report came back nondiagnostic due to insufficient sampling. So, she was treated with vancomycin 1gr BD, ceftriaxone 2gr BD, and metronidazole 500mg TDS. Twenty-one days later, she underwent another surgical drainage of the abscess. The microbiologic examination of the specimen showed partial acid-fast and beaded branching filaments (Figure 2). Cultures yielded *Nocardia*. Therapy with trimethoprim-sulfamethoxazole (TMP-SMX) 15mg/kg/day and ceftriaxone 2gr BD was started immediately and continued for 30 days. We observed an initial improvement in her headaches after 10 days of therapy. She was discharged from the hospital and home therapy was done with TMP-SMX 15mg/kg/day. Currently, for one year after the second surgery, the patient has no symptoms and we discontinue her treatment.

Discussion

Nocardia spp. was described by Nocard in 1888 and classified as a gram-positive, aerobic bacterium.⁹ This is responsible for localized or disseminated infection that affects mainly immunocompromised patients.¹⁰ It can occur in immunocompromised patients such as AIDS, solid organ and hematopoietic stem cell transplantation, hematologic and solid organ malignancies, and chronic systemic steroid use.¹¹

The respiratory tract is the main organ that is involved in nocardiosis infection; this involvement occurs in more than 40%

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Accepted for publication: 13 June 2012

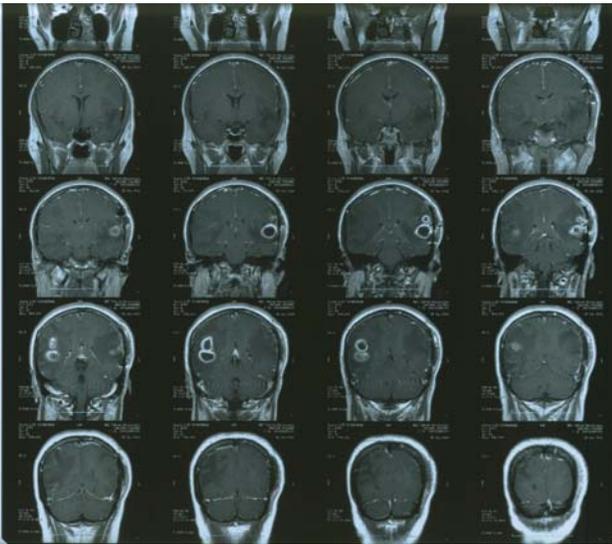


Figure 1. Multiple intracranial lesions at both temporoparietal regions at white- gray junction with low- signal capsule are seen which are associated with marked peripheral vasogenic edema.

of cases.¹² In most patients, disseminated nocardiosis is from the lung and frequently affected CNS, skin, and soft tissues. This type is usually seen in severely immunocompromised patients. Therefore, in immunosuppressed patients, involvement of the CNS should be ruled out even without neurologic symptoms. Nocardial abscesses may occur as an isolated lesion, but they are usually multiple. This progresses and causes neurologic deficits.¹³ The differential diagnoses are bacterial infections, fungal infections, and malignancies. The clinical manifestation of nocardiosis is non-specific.¹⁴ For diagnosis of *Nocardia*, we should isolate organisms from a species. *Nocardia* organisms have prolonged incubation (up to two weeks).¹⁵ Direct smears of *Nocardia* show gram-positive, beaded, fine right-angled branching filaments that are usually acid-fast.¹⁶ Our patient presented with a three-day history of right upper monoparesis and tremor accompanied by headache for six-months. So, we did a contrast-enhanced CT scan of the brain that showed at least four ring-enhancing hypodense lesions in the parietal lobes with surrounding edema. An MRI showed multiple intra-axial lesions at both temporoparietal regions at white-gray junction with low-signal capsule which were seen to be associated with marked peripheral vasogenic edema. A total excision of an abscess was performed, but it didn't help the diagnosis. So, she was treated as bacterial brain abscesses with vancomycin, ceftriaxone, and metronidazole, but she didn't feel well. Twenty-one days later, she underwent another surgical drainage of the abscess. The microbiologic examination of the specimen showed partial acid-fast and beaded branching filaments. Cultures yielded *Nocardia*.

Sulfonamide is the drug of choice for treatment of nocardiosis. Monotherapy with sulfonamide is associated with high mortality and relapse especially in patients with brain abscess.¹⁷ Therefore, combination therapy is recommended for patients with disseminated or severe nocardiosis.¹ Experts in this field recommended TMP-SMX, amikacin, and ceftriaxone or imipenem.¹⁰ Treatment is continued for several weeks intravenously, and then after clinical improvement, changed to oral therapy. The duration of treatment depends on the immune status and site of involvement. Pul-

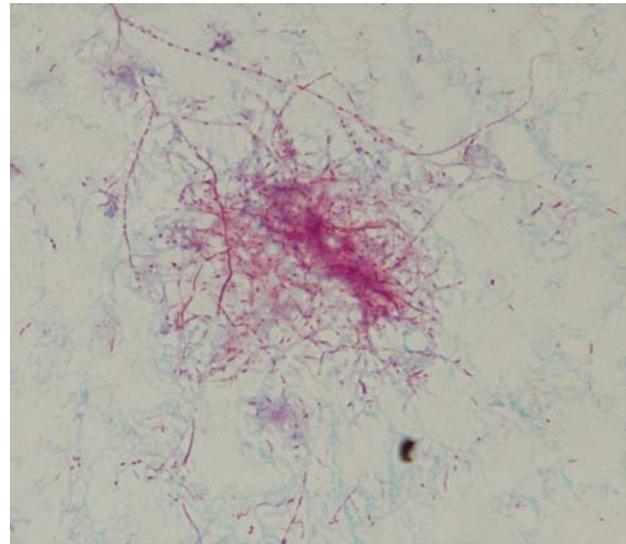


Figure 2. The microbiologic examination of the specimen showed partial acid- fast and beaded branching filaments

monary and disseminated nocardiosis without CNS involvement are treated for six months, but patients with CNS involvement should be treated for a year or longer depending on clinical and radiologic responses.¹⁸ Some nocardiosis require surgery, especially in brain abscesses.¹⁹ Mortality rates are high especially in CNS involvement.²⁰ Our patient was treated with TMP-SMX and ceftriaxone for 30 days, and then she was discharged and home therapy was done with TMP-SMX. For one year after the second surgery, the patient has no symptoms and we discontinue her treatment.

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