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Nocardia abscessus-related intracranial aneurysm of the internal carotid artery with associated brain abscess: A case report and review of the literature

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Summary *Nocardia* infections primarily begin in the lungs and spread hematogenously to other sites in the body. Thus, a *Nocardia* brain abscess is not a completely uncommon occurrence. However, a *Nocardia* brain abscess complicated by a middle cerebral artery and infectious intracranial aneurysm is a very rare clinical entity. We present a case of an infectious intracranial aneurysm with an associated *Nocardia* brain abscess that required surgical intervention and resection. The patient was an immunocompetent 60-year-old male who presented with a chief complaint of headache and was found to have an infected intracranial aneurysm and cerebral abscess. He underwent drainage of the abscess with subsequent resection of the infected aneurysm. Cultures from both the blood vessel and brain tissue grew *Nocardia abscessus*. He was successfully treated with 6 weeks of ceftriaxone and high-dose trimethoprim—sulfamethoxazole. Infectious intracranial aneurysms of the brain caused by *Nocardia* are rare occurrences, and only a single previous case has been described in the literature. The outcomes of this condition can be catastrophic if it is not treated with a combination of surgery and intravenous antibiotics. The guidelines for the management of this infection are not well defined at this time.
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Introduction

Nocardia is a gram-positive, strictly aerobic bacteria and that causes at least six forms of disease in humans that include pulmonary, systemic, extrapulmonary, cutaneous, and central nervous system (CNS) nocardioses [1]. CNS nocardiosis is usually secondary to lung or systemic nocardiosis, but cases of primary CNS infections have been found, and brain abscesses are the characteristic lesions of this type of infection [1,2]. Much like CNS nocardiosis, infectious intracranial aneurysms are rare and are more closely associated with patients who are immunocompromised or have infective endocarditis [3]. Thus, the occurrence of both an infectious intracranial aneurysm and a brain abscess is very rare, and there is only a single case of documented *Nocardia*-associated aneurysm in the literature prior to this case [4]. We present a case of an immunocompetent 60-year-old male with an intracranial *Nocardia* aneurysm and associated *Nocardia* brain abscess who required surgical intervention and resection.

Case report

A 60-year-old male with a benign past medical history presented with headaches, fatigue, memory loss, and behavioral abnormalities for 2—3 weeks before admission. The temporal headaches were worsening significantly with no associated fever or chills. The patient was a relatively healthy male who lived at home and did not drink, smoke or use drugs. His travel history was unremarkable. In a recent physical performed by his primary care physicians, no evidence of any obvious underlying disease processes, such as cancer, diabetes or HIV, was found. A review of systems was negative with the exception of persistent headaches. On physical exam, his vital signs were stable, his temperature was 97.2 °F, blood pressure was 130/70, and his pulse 88 beats per minute and he had no neurological deficits. A subsequent CT scan revealed an abscess in the brain.

MRI revealed a ring-enhancing lesion and a possible abscess next to the aneurysm (Fig. 1). CT angiogram revealed a clearly outlined internal carotid aneurysm (Fig. 2). His laboratory data included a white blood cell count of 4.0×10^9 per liter, hemoglobin and hematocrit levels of 14 g/dl and 44%, respectively, and a platelet count of 257×10^9 per liter. A CD4 count and IgG were normal, and blood cultures were negative. An echocardiogram and chest X-ray were normal. He underwent a stereotactic aspiration of the abscess,

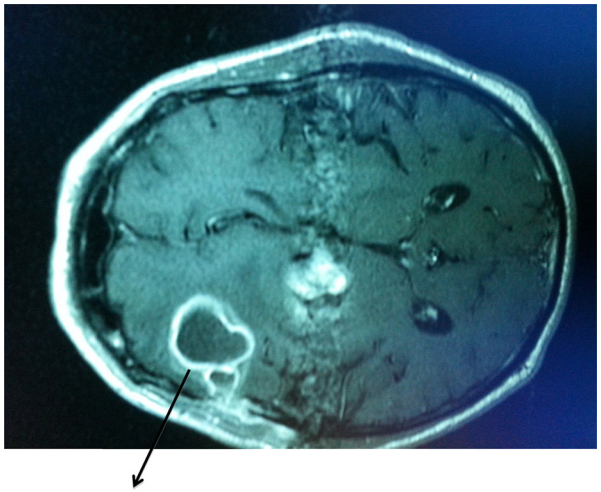

Figure 1 MRI illustrating a ring-enhancing abscess.

which grew *Nocardia abscessus*. The identification and confirmation of the pathogen was performed using the 16s rRNA full sequencing method. The pathogen was susceptible to the following antimicrobial agents: cefotaxime, ceftriaxone, imipenem, amikacin, and sulfonamides. With a diagnosis of a primary CNS *Nocardia* infection, he was treated with intravenous injections of ceftriaxone (2 g IV every 12 h) for a total period of 4 weeks but did not improve and continued to experience headaches without neurological deficits. A repeated MRI did not reveal any worsening of the abscess, but because the patient was not clinically improving and still experiencing headaches, fatigue and memory loss, he underwent drainage of the

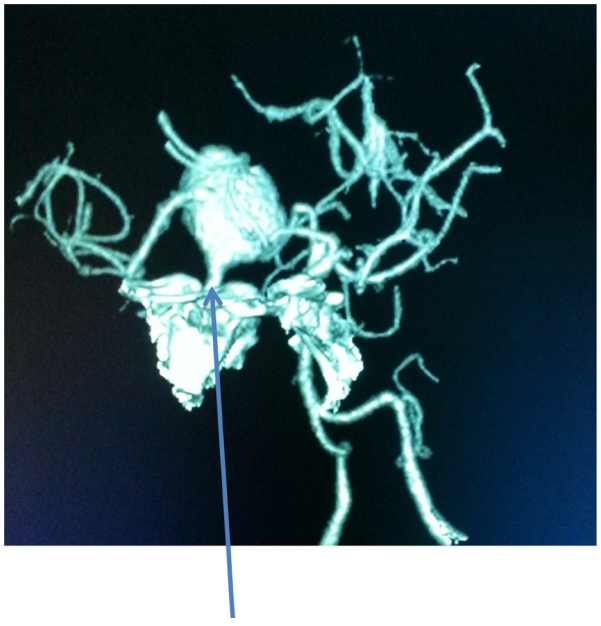

Figure 2 CT angiogram illustrating the aneurysm.

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