



SHORT ORIGINAL ARTICLE / *Neuroradiology*

Subtentorial cerebral nocardiosis in immunocompetent patients: CT and MR imaging findings



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KEYWORDS

Nocardia;
MRI;
Computed tomography;
Cerebral abscess;
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Abstract

Purpose: To describe the clinical presentation and computed tomography (CT) and magnetic resonance imaging (MRI) appearances of subtentorial nocardia cerebral abscesses developing in immunocompetent patients.

Patients and methods: The clinical findings and the results of CT and MRI examinations of three immunocompetent patients with nocardiosis located initially only in the subtentorial region were studied. Three patients underwent CT examination and two patients had MRI.

Results: Clinically, two patients had cerebellar syndrome and the third had meningism with fever. The diagnosis of nocardiosis was bacteriologically confirmed by demonstrating the organism in lumbar puncture fluid in one patient and by an aspiration biopsy of the abscess in the other two. Two of the patients improved under targeted antibiotic therapy whereas the third patient died. The main imaging features of the lesions were a multiloculated appearance with peripheral enhancement after intravenous administration of iodinated contrast material on CT and a multicystic appearance on MRI, with a peripheral hypointense rim on T2-weighted images, a relatively minor mass effect and a multiloculated appearance on gadolinium-chelate enhanced T1-weighted images.

Conclusion: The clinical presentation of cerebral nocardiosis is relatively non-specific. A microcystic lesion surrounded by hypointensity on T2-weighted MR images with a multiloculated pattern after gadolinium chelate administration on T1-weighted MR images in association with a relatively minor mass effect should suggest this diagnosis even if the lesion is single and in the absence of immunosuppression.

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Abscesses due to *Nocardia*, a Gram-positive filamentous bacteria account for approximately 2% of all cerebral abscess. A single subtentorial location is even rarer, making the diagnosis difficult. *Nocardia* predominantly affects immunosuppressed patients [1] although it is not particularly rare for immunocompetent patients to be affected by the disease and these patients usually respond well to targeted antibiotic therapy pending that the diagnosis is suggested by the results of imaging examination [2,3]. On the basis of three clinical cases investigated in our institution, we wished to report the clinical presentation and imaging features of subtentorial abscesses due to nocardia in immunocompetent patients.

Case reports

Patient 1

A 64-year-old woman with no remarkable past history developed hypoesthesia on the right side of her face and cerebellar symptoms. MR imaging examination of the brain performed at 1.5 Tesla showed a right cerebellar and middle cerebellar peduncular lesion with homogeneous and hyperintense appearance on fluid attenuated inversion recovery (FLAIR) images and a microcystic appearance surrounded by an peripheral hypointense rim on T2 weighted images

(turbo spin echo, repetition time (TR)/echo time (TE): 4059/100 ms). A moderate mass effect was seen (Fig. 1). The lesion showed marked hyperenhancing peripheral rim after intravenous administration (IV) of gadolinium chelate, featuring a target appearance with central cystic area, resulting in a multiloculated appearance. The lesion was hyperintense on diffusion-weighted imaging ($b = 1000 \text{ s/mm}^2$, TR/TE: 8300/92 ms), but with no drop in the apparent diffusion coefficient. In this regard, the ADC value was $1.33 \times 10^{-3} \text{ mm}^2/\text{s}$, corresponding to increase of 50% compared to the apparently healthy contralateral side. Spectroscopy showed a moderate rise in the choline peak with a choline/NAA ratio of close to 1 and no lactate, lipid or amino acid peak. Chest, abdominal and pelvic CT was normal and lumbar puncture was negative. Listeriosis was suspected and empirical therapy was started with amoxicillin, sulfamethoxazole-trimethoprim and corticosteroids, which initially produced some imaging improvement. Six months later, the patient developed headaches and a homonymous hemianopia found to be a second, left occipital, site of disease.

Lumbar puncture demonstrated cerebral nocardiosis, with a positive polymerase chain reaction for *Nocardia* species. The patient subsequently recovered on antibiotic therapy with imipenem and sulfamethoxazole-trimethoprim.

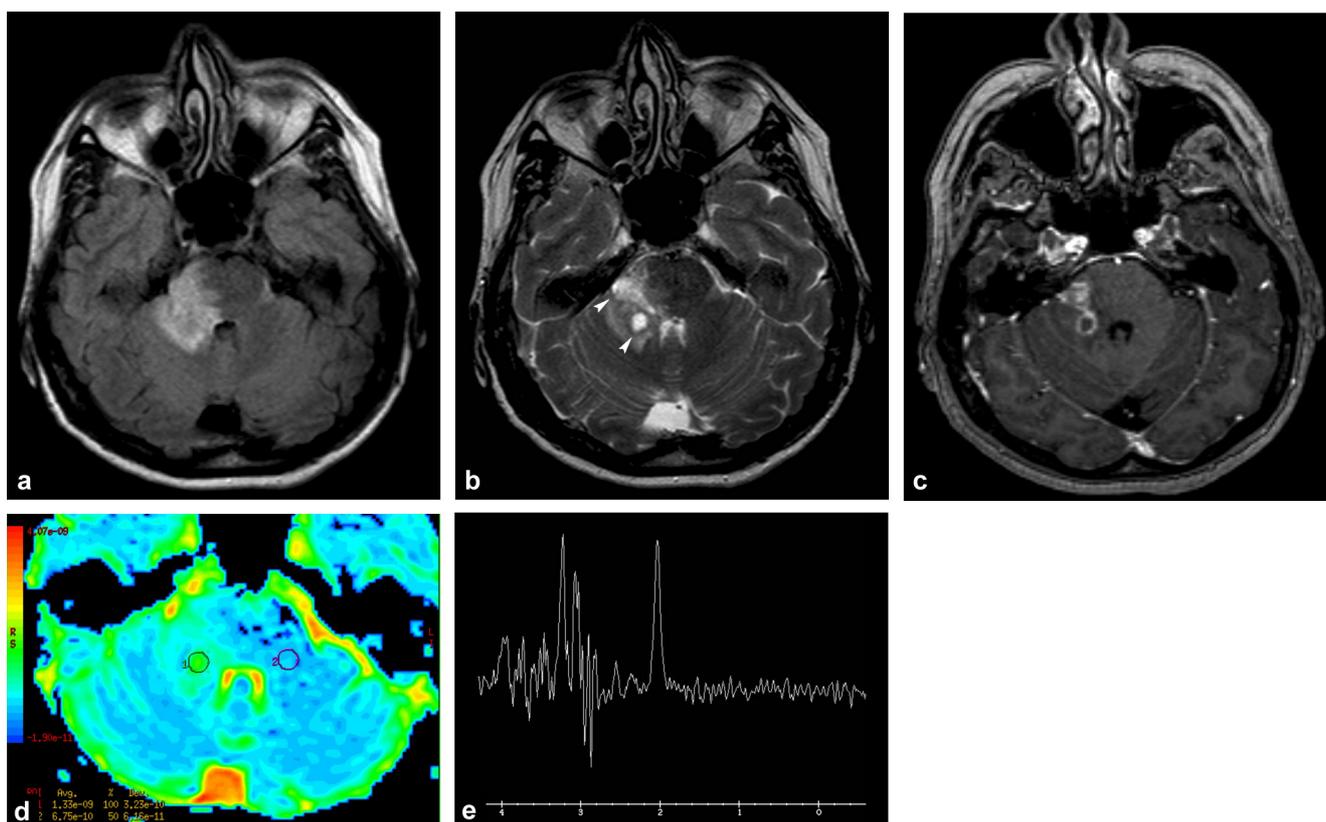


Figure 1. Cerebral MRI in patient 1: a: axial FLAIR image shows middle cerebellar peduncular and right sided cerebellar lesion with a homogeneous hyperintensity; b: T2-weighted TSE axial image (TR/TE: 4059/100 ms) reveals cystic areas exhibiting pronounced hyperintensity with a peripheral hypointense line (arrowheads); c: T1-weighted gradient-echo axial image after IV of gadolinium chelate (TR/TE: 7.1/3.2 ms) shows multiloculated appearance (arrowhead); d: diffusion weighted image ($b = 1000 \text{ s/mm}^2$, ADC mapping) shows increased ADC value within the lesion with an ADC of $1.33 \times 10^{-3} \text{ mm}^2/\text{s}$ (region of interest in green); e: spectroscopy (TE = 144 ms) shows moderately raised choline peak, choline/NAA ratio close to 1.

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