



Case Report

A Fatal Case of Multiple Nocardial Brain Abscesses Mistaken For Metastatic Brain Tumor

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Summary

Brain abscess can easily be confused with metastatic tumors mainly due to the similarities in the magnetic resonance imaging (MRI) appearances. Nocardial brain abscesses are extremely rare and account for about 2% of all brain abscesses. Nocardial infections can spread contiguously or hematogenously. Misdiagnosis may influence treatment as well as survival. Herewith, we discuss the radiologic findings, mechanisms of spread and treatment strategies of a patient harboring multiple nocardial abscesses who was misdiagnosed as metastatic brain tumor and administered radiation therapy. We concluded that in cases with unilateral multiple ring-enhanced lesions on MRI without biopsy and histopathological evaluation, brain abscesses should be taken into consideration.

Key words: Nocardia, Abscess, Radiotherapy, Metastatic tumor, Misdiagnose

Metastatik Beyin Tümörü Zannedilen Fatal Seyirli Multipl Nokardiyal Beyin Apsesi Olgusu

Özet

Beyin apseleri manyetik rezonans (MR) görüntülerindeki benzerlikler nedeni ile metastatik beyin tümörleri ile kolaylıkla karışabilir. Nokardiyal beyin apseleri oldukça nadir görülür ve tüm beyin apselerinin %2'sini oluşturur. Nokardiyal enfeksiyonlar komşuluk veya hematojen yolla yayılabilirler.

Burada metastatik beyin tümörü yanlış tanısı konularak, radyoterapi uygulanan multipl nokardiyal beyin apseli bir hastanın tedavi stratejileri, yayılma mekanizmaları ve radyolojik bulgularını tartıştık. Sonuç olarak MR görüntülemesinde, tek taraflı multipl periferik halkasal tarzda kontrastlanma gösteren, biyopsi alınmamış ve histopatolojik değerlendirilmesi yapılmamış vakalarda beyin apsesi olasılığı dikkate alınmalıdır.

Anahtar Kelimeler: Nokardiya, Apse, Radyoterapi, Metastatik tümör, Yanlış tanı

INTRODUCTION

Nocardia is a gram-positive, partially acid-fast, aerobic actinomycete found in soil and decaying vegetables. It can cause local and disseminated infection in both normal

and immunocompromised patients⁽³⁾. Nocardial brain abscesses are extremely rare and account for about 2% of all brain abscesses⁽¹⁰⁾. Although they are usually presented as a single lesion, approximately one-third of the cases have multiple brain

lesions⁽⁷⁾. It may be difficult to distinguish multiple brain abscesses from metastatic tumors. This can delay the proper management and may raise mortality rates⁽⁵⁾.

We report a fatal case of a patient with multiple nocardial brain abscesses, who was misdiagnosed as metastatic brain tumor and irradiated.

CASE PRESENTATION

A 52-year old man was referred to our hospital with a diagnosis of metastatic brain tumor in an unconsciousness state. On admission, his Glasgow Coma Scale was 5 points. The patient had been admitted to a hospital three weeks ago with a complaint of headache. At that time, he had had right hemiparesis. His brain MRI had revealed multiple lesions on the left hemisphere, and these lesions had been considered to be metastatic tumors. Therefore, radiotherapy had been initiated. After the third day of radiotherapy treatment, the patient's neurological status had worsened and radiotherapy had been stopped. The patient had been followed up in the intensive care unit. After five days, he was referred to our hospital for further investigation and management.

A new brain MRI of the patient revealed multiple ring-enhanced lesions on the left side (Figure 1). The restricted diffusion of

the lesions on diffusion-weighted MRI was suspected to be multiple brain abscesses (Figure 2). Brain MRI of the patient also showed hyperintensity consistent with otitis media in the left middle ear cavity and erosive changes on the left tegmen tympani (Figure 3). The chest x-ray of the patient revealed no pathology. Detailed investigation of the patient's history revealed that he had experienced a left ear infection six weeks ago. There were no pathology suppressing the patient's immune system and AntiHIV test was also found negative. Since the history and radiological-clinical findings of the patient were compatible with multiple cerebral abscesses, we decided to perform surgical intervention for definitive diagnosis and treatment. A large craniotomy was carried out for decompression. Easily accessible temporal lobe lesion was evacuated and purulent abscess material was drained. Gram stain of purulent abscess material showed us polymorphonuclear leucocytes and numerous beaded, branching, filamentous, gram positive bacilli (Figure 4). *Nocardia* spp. was isolated from the culture of abscess material. He was given sulfamethoxazole, metronidazole, and trimethoprim at early postoperative period. Unfortunately, our patient did not respond to medical treatment and died on the twenty-fourth postoperative day.

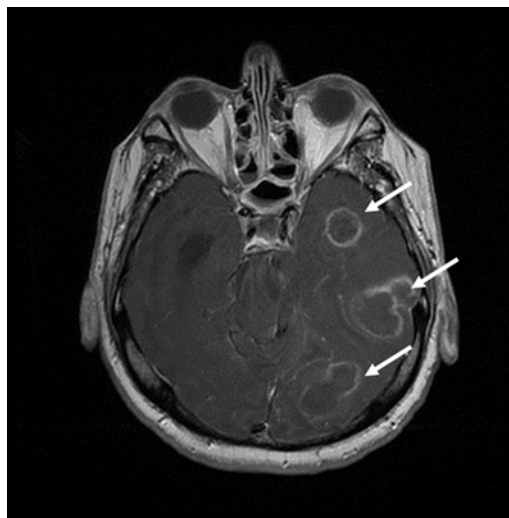


Figure 1: T1 weighted axial brain MRI. Note the ring enhancement with multiple lesions on the left side of the brain (Arrows).

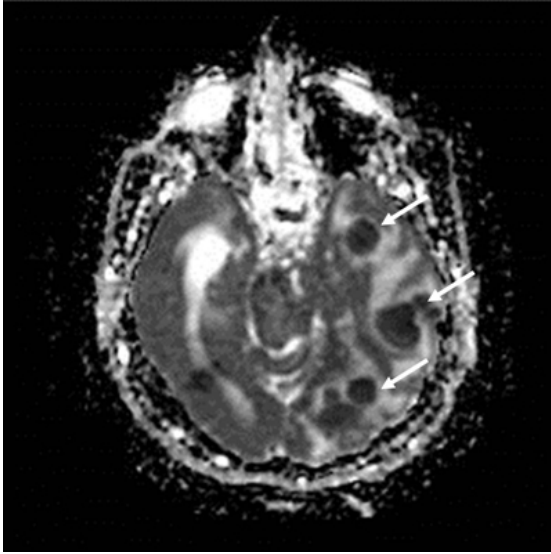


Figure 2: The diffusion-weighted image of axial brain MRI. Restricted diffusion within the center of the lesions indicates multiple brain abscesses (Arrows).

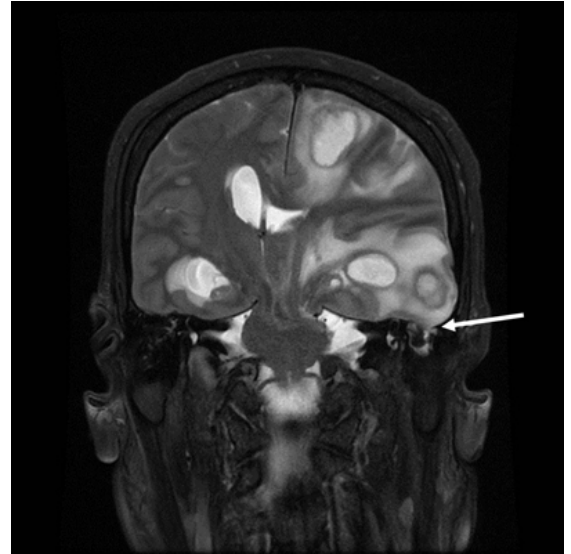


Figure 3: Coronal T2 weighted image shows hyperintensity consistent with otitis media at the left middle ear cavity and erosive changes on the left tegmen tympani (Arrow).

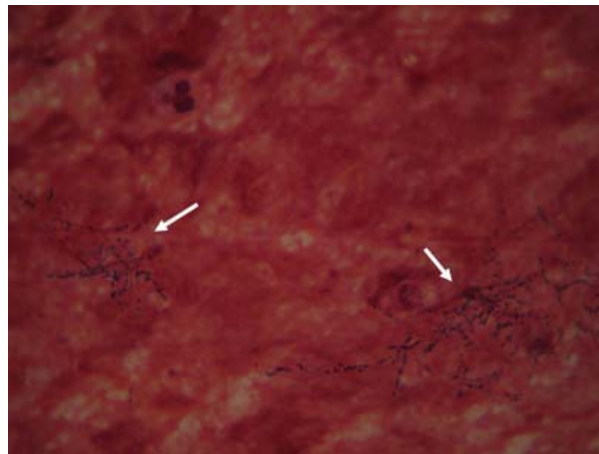


Figure 4: Gram stain of the brain abscess material. Branching filamentous gram-positive bacilli reported as nocardiosis (Arrows) (Gram staining, x1000).

DISCUSSION

Even though Nocardial brain abscesses are a rare central nervous system (CNS) infection, it is more prevalent in immunocompromised patients. However, the reports of nocardial infections observed in immunocompetent patients are increasing, in accordance with our patient^(6,8). There are two main spread of nocardial infections. These are contiguous and hematogenous spreads. Although the

likely mechanism of contiguous spread is phlebitis spreading from the petrous bone to the brain by the superior or inferior petrosal sinus^(12,9), hematogenous infections spread to the brain by arterial system⁽¹¹⁾. A transient bacteriemia bypasses the filtering action of the lungs and directly seed the brain⁽¹⁾. In our case the infection probably spread contiguously through the petrous bone due to otitis media.

The symptoms and signs of brain abscess are generally not pathognomonic, and can easily be confused with metastatic tumors mainly due to the similarities in the MRI appearances⁽⁵⁾. The ring-enhancement with the contrast-enhanced T1 weighted image of the brain MRI suggests to us a cerebral metastases or abscess. Restricted diffusion on the diffusion-weighted image (DWI) of a brain MRI should be suspected as a possibility of brain abscess^(4,2). Restricted diffusion might be related to the high viscosity and cellularity of the pus, which causes restriction of water proton mobility⁽⁵⁾. On the other hand, metastatic brain tumors with restricted diffusion within the necrosis have also been reported^(5,14). Therefore, restricted diffusion might be a characteristic, but not a pathognomic sign for brain abscess⁽⁵⁾. In our case, we were not able to evaluate the patient's first brain MRI from the referring hospital. Restricted diffusion appearance on the DWI of his brain MRI, which was performed at our radiology unit indicated a suspicion for the diagnosis of multiple brain abscesses. Unilateral localization of these lesions together with a middle ear infection history and the MRI findings at the same site supported the diagnosis of multiple brain abscesses. Because surgical excision is more appropriate in certain situations⁽¹³⁾, we decided to operate the patient.

Although multiple nocardial brain abscesses have considerably high mortality rates (66%), there is a possibility of cure with timely surgical intervention and appropriate antimicrobial treatment^(6,15). In this case, multiple cerebral lesions on brain MRI were misdiagnosed as metastatic tumor and the patient was administered radiotherapy. Delay in the definitive diagnosis in this presented case probably eliminated the chance of cure.

CONCLUSION

In cases with unilateral multiple ring-enhanced lesions on MRI without biopsy and histopathological evaluation, brain

abscesses should be taken into consideration.

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Received by: 25 April 2014

Revised by: 03 September 2014

Accepted: 11 September 2014

The Online Journal of Neurological Sciences (Turkish) 1984-2014

This e-journal is run by Ege University
Faculty of Medicine,
Dept. of Neurological Surgery, Bornova,
Izmir-35100TR

as part of the Ege Neurological Surgery
World Wide Web service.

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Journal of Neurological Sciences (Turkish)

Abbr: J. Neurol. Sci.[Turk]

ISSNe 1302-1664

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