Cerebral Actinomycosis: Unusual Clinical and Radiological Findings of an Abscess

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We report a case of cerebral actinomycosis in a 69-year-old immunocompetent woman. The patient showed a progressive worsened mental status for one week. MRI examination showed an increased size of multiple enhancing nodular lesions associated with mild perilesional edema. We performed an open biopsy for the right frontal enhancing lesion. The intraoperative finding showed a yellowish friable lesion that was not demarcated with normal tissue. Pathologically, an actinomycotic lesion with sulfur granules and inflammatory cells was diagnosed. We report an unusual case of diffuse involvement of cerebral actinomycosis. The presence of the uncapsulated friable lesion that consisted mainly of foamy macrophages and lymphocytes could explain the unusual radiological features.

Key Words: Actinomycosis · Cerebral abscess · MR imaging.

INTRODUCTION

Actinomycosis is an indolent, slowly progressive infectious disease caused by an organism of the Actinomyces species. Actinomycosis of the central nervous system (CNS) is usually secondary to hematogenous spread from a primary infection in the lung, abdomen or pelvis or by an extension of oral-cervicofacial disease. In cerebral actinomycosis, the clinical presentation and conventional radiological findings are similar to typical findings in pyogenic abscesses. For immunocompromised patients, local or disseminated actinomycotic abscesses may develop.

We report a case of cerebral actinomycosis in a 69-year-old immunocompetent woman. This patient had rapidly progressive symptoms and unusual radiological findings as compared with previously reported cases of brain actinomycosis.

CASE REPORT

A 69-year-old woman with no significant medical history was admitted to our institution with a confused mental status. An initial brain MRI scan showed the presence of multiple small round or ovoid lesions in the periventricular white matter of the cerebral hemispheres. These lesions were hypointense as seen on T1-weighted images and hyperintense as seen on T2 weighted images. No associated edema and diffusion restriction were evident. Subsequently, the patient had a rapidly progressive worsened mental state for one week, with the patient in a semi-coma. A follow-up brain MRI examination performed one week later showed an increased size of the lesions and mild perilesional edema (Fig. 1A-D). As seen on contrast enhanced T1-weighted images, the lesions showed ring or nodular enhancement and there was no diffusion restriction (Fig. 1E, F, G). 1H-MR spectroscopy showed an increased choline level and elevated lactate and lipid peaks, which could be seen in both tumefactive demyelinating lesions and a high grade tumor (Fig. 1H).

The provisional diagnosis was multiple sclerosis, neurocysticercosis or metastases. There was no metabolic evidence of a malignancy based on torso PET-CT findings. Cerebrospinal fluid analysis showed a WBC count of 3 cells/mL, protein level of 36 mg/dL and a glucose level of 98 mg/dL. The opening pressure was 13 cmH₂O. An enzyme linked immunosorbent assay was negative for the diagnosis of neurocysticercosis.

We performed an open biopsy for the right frontal enhancing mass among them. The intraoperative finding showed a yellowish friable uncapsulated lesion that was not well demarcated with normal tissue and there was no necrotic pus within the mass (Fig. 2A). Pathologically, the enhancing lesion was mostly composed of foamy macrophages that were immunopositive...
shown on follow-up MRI exam (Fig. 3). Despite the radiological improvement, the patient did not obey by commands.

DISCUSSION

Actinomycosis is a noncontagious, slow suppurative bacterial infection caused by *Actinomices israelii* [2, 4]. These organisms are classified as gram-positive, non-acid fast branching filamentous bacteria with anaerobic or microaerophilic requirements. Actinomycosis of the CNS may present as a brain abscess, meningitis or meningoencephalitis, a subdural empyema, an actinomycotic meningitis and a spinal and cranial epidural abscess [6, 8, 10, 12, 16]. Actinomycosis of the CNS is usually secondary to hematogenous spread from a primary infection in the lung, abdomen or pelvis. However, extension from foci of an infection in the ears, paranasal sinuses and cervicofacial regions may proceed along connective tissue planes or through foramina located at the base of the skull, causing focal infection of the CNS or diffuse basilar meningitis.

Clinical symptoms are usually mild and nonspecific as the interval from the onset of symptoms to diagnosis is typically long comparing to a typical pyogenic brain abscess [13]. The clinical features are indistinguishable from features of pyogenic infec-
of amino acids, lactate, alanine, acetate, pyruvate and succinate.

MR spectroscopic features of abscesses include elevated peaks of creatine and choline\(^1\). In our case, there was an increased choline level, normal NAA level and elevated lactate and lipid peaks in contrast to the spectroscopic features for brain abscesses. Typical proton MR spectroscopic features for tumefactive demyelinating lesions include an elevated choline peak and reduced NAA signal. A fulminant tumefactive demyelinating lesion may show high choline and low NAA signals as well as the presence of lactate, similar to the findings for the present case\(^1\).

We report a case of diffuse involvement of cerebral actinomycosis in an immunocompetent patient. Based on the imaging findings, it was difficult to distinguish cerebral actinomycosis from other causes. The presence of the uncapsulated friable lesion that consisted mainly of foamy macrophages and lymphocytes could explain the unusual radiological features.

**CONCLUSION**

In this case, it was difficult to make a preoperative diagnosis because rapidly progressive symptom and unusual radiological findings compared with previously reported actinomycosis cases. We report a rare case of cerebral actinomycosis that presented unusual clinical and radiological finding, with special interest on its neuroradiologic features.

**References**