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-cervico-facial 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. 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 unencapsulated friable lesion that consisted mainly of foamy macrophages and lymphocytes could explain the unusual radiological features.

Key Words: Actinomycosis · Cerebral abscess · MR imaging.
FIG. 1. Radiological findings (pretreatment). These lesions are hypointense as seen on T1-weighted images and hyperintense as seen on T2-weighted images with mild perilesional edema (A–D). The lesions show ring or nodular enhancement and there is no diffusion restriction (E, F and G). 1H-MR spectroscopy shows an increased choline level, decreased N-acetylaspartate level and elevated lactate and lipid peaks (H).

DISCUSSION

Actinomycosis is a noncontagious, slow suppurative bacterial infection caused by *Actinomices israeli* [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 abscess 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 [5,13]. The clinical features are indistinguishable from features of pyogenic infec-
...absent signals of amino acids, lactate, alanine, acetate, pyruvate and succinate. MR spectroscopic features of abscesses include elevated peaks...

Brain abscesses have distinct spectroscopic findings that allow differentiation of the lesions from other entities. 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.

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 unencapsulated 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

1. Adeyemi OA, Gottardi-Littell N, Muro K, Kane K, Flaherty JP: Multiple brain abscesses due to Actinomyces species. Clin Neurol Neurosurg 110: 847-849, 2008
2. Alday R, Lopez-Ferro MO, Fernandez-Guerrero M, Ruiz-Barnés P: Spinal intrathecal empyema due to Actinomyces species. Acta Neurochir (Wien) 101: 159-162, 1989
3. Al-Oakili RN, Krejza J, Wang S, Woo JH, Melhern ER: Advanced MR imaging techniques in the diagnosis of intraxial brain tumors in adults. Radiographics 26 Suppl 1: S173-S189, 2006
4. Běbrová E, Lochmann O, Tichy M, Nyc O: [Actinomyces viscosus in subdural empyema.] Česk Epidemiol Mikrobiol Immunol 43: 21-22, 1994
5. Brown JR: Human actinomycosis. A study of 181 subjects. Hum Pathol 4: 319-330, 1973
6. Brunner J, Piat J, Brun Y, Sindou M, Fischer C, Perrin G: Actinomycotic brain abscess. Neurochirurgie 26: 31-38, 1980
7. Ebisu T, Tanaka C, Umeda M, Kitamura M, Naruse S, Higuchi T, et al.: Discrimination of brain abscess from necrotic or cystic tumors by diffusion-weighted echo planar imaging. Magn Reson Imaging 14: 1113-
1116, 1996
8. Edwards C, Elliott WA, Randall KJ: Spinal meningitis due to Actinomyces bovis treated with penicillin and streptomycin. J Neurol Neurosurg Psychiatry 14: 134-136, 1951
9. Guzman R, Barth A, Lövblad KO, El-Koussy M, Weis J, Schroth G, et al.: Use of diffusion-weighted magnetic resonance imaging in differentiating purulent brain processes from cystic brain tumors. J Neurosurg 97: 1101-1107, 2002
10. Powers JM, Dodds HM: Primary actinomycosis of the third ventricle -- the colloid cyst. A histochemical and ultrastructural study. Acta Neuropathol 37: 21-26, 1977
11. Saindane AM, Cha S, Law M, Xue X, Knopp EA, Zagzag D: Proton MR spectroscopy of tumefactive demyelinating lesions. AJNR Am J Neuroradiol 23: 1378-1386, 2002
12. Schwartz DG, Christoff N: Actinomycosis with cerebral and probable endocardial involvement. J Mt Sinai Hosp NY 27: 23-27, 1960
13. Smego RA Jr: Actinomycosis of the central nervous system. Rev Infect Dis 9: 855-865, 1987
14. Smego RA Jr, Foglia G: Actinomycosis. Clin Infect Dis 26: 1255-1261, 1998
15. Wang S, Wolf RL, Woo JH, Wang J, O’Rourke DM, Roy S, et al.: Actinomycotic brain infection: registered diffusion, perfusion MR imaging and MR spectroscopy. Neuroradiology 48: 346-350, 2006
16. Wickbom GI, Davidson AJ: Angiographic findings in intracranial actinomycosis. A case report and consideration of pathogenesis. Radiology 88: 536-537, 1967