

Case report

Neuroimaging features of cerebral aspergillus abscess: Case report

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Abstract

Background: With the global growth of immunocompromised patients, the incidence rate of aspergillus infections in central nervous system increased accordingly. Aspergillus abscess is a typical phenotype of aspergillus infections in central nervous system, and is tended to be confused with tumors. Neuroimaging features with careful observation and detailed history-taking can help to make final diagnosis.

Case description: We report a case of central nervous system aspergillus abscess which was misdiagnosed as tumor before surgical operation. The patient had diabetes and chronic bronchitis history for many years and received treatment for lobar pneumonia half a year ago. According to examinations of CT and MRI, isodensity or isointensity mass were shown on nonenhanced scanning, and honeycomb-like enhanced with mild crenate-like rim were shown on enhanced scanning. On follow-up MRI study after surgical operation, the similar neuroimaging features were shown in the recurrent lesion.

Conclusion: Cerebral aspergillus abscesses possess some degree neuroimaging features on traditional CT/MR imaging. Combined with patient's clinical history, CT/MRI examination could facilitate early diagnosis of aspergillus abscesses in central nervous system.

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Keywords: Aspergillus; Brain abscess; CT; MRI

1. Introduction

Aspergillus fumigatus is a fungal organism with a wide-spread distribution in the nature. Although the CNS (central nervous system) aspergillus infections are uncommon, the prevalence is upgrading with the increasing amount of immunocompromised/weakened immune system patients in the whole global. Here, we report neuroimaging features from a 58-year-old man who received surgical operation for a solitary tumor but finally diagnosed as aspergillus abscess.

2. Case report

A 58-year-old male was admitted in hospital due to headache for 2 weeks with nausea, vomit, and left limb weakness progression for 5 days. The patient suffered constitutional weakness with 3-year history of diabetes and 40-year history of chronic bronchitis. About half a year ago, he suffered lobar pneumonia and was hospitalized to receive treatment for more than 2 months. Medical examination indicated 36.4 °C of body temperature, dullness, hemiparalysis of left limb, decreased muscular tension to level III, and negative meningeal irritation sign. Laboratory examination revealed $6.3 \times 10^9/L$ white blood cells (WBC), decreased lympholeukocyte ratio to 12.4%, and 7.49 mmol/L serum glucose (reference value is 3.6–6.1 mmol/L).

The patient received CT (computed tomography) scan and MR (magnetic resonance) imaging with very short interval time. Cranial nonenhanced CT (NECT) showed an isodensity mass relative to gray matter located in the right basal ganglia,

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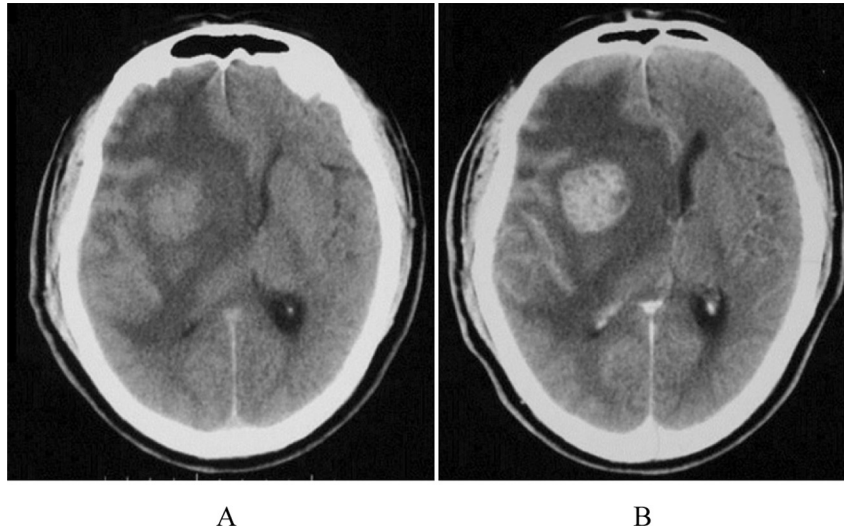


Fig. 1. An isodensity round mass located in right basal ganglia on axial NECT scanning. (A) Note obvious surrounding edema and mass effect. The lesion appeared honeycomb-like clustered rings enhancement after contrast material injection (B). The border was not smooth, with crena-like shape.

with prominent low-attenuation cerebral edema. The right lateral ventricle was compressed and deformed, and the median line structure shifted to the opposite side due to the mass effect. After following contrast administration, a honeycomb-like heterogeneous round lesion with clustered obvious enhanced rings was depicted (Fig. 1). Brain MR imaging showed an isointensity mass on both T1WI and T2WI, compared with cortex. Moreover, ill-defined margin, extensive surrounding edema, and space occupying effect were strongly presented. T1WI-enhancement scanning showed the mass was intensively enhanced, with clusters of small enhanced rings that made the lesion look like a “honeycomb”. The lesion size was 3.1 cm × 3.0 cm × 2.9 cm (anteroposterior × transverse × suprainferior diameters). There was no infectious evidence of paranasal sinuses and temporal apophyses (Fig. 2). Preoperative diagnosis was malignant glioma or metastatic tumor.

Gross findings during surgical operation included a toughening mass with grayish-red and grayish-yellow cream inside, and a glial reaction zone between the lesion and adjacent brain.

Twice frozen section during surgery had the same result of fungus infection with gross necrosis, inflammatory reaction, and glial cell proliferation within periphery brain tissue (Fig. 3). Based on postoperative bacterial culture, cerebral aspergillus abscess was concluded as final diagnosis.

Ten month after the surgical operation, the patient was readmitted in hospital due to complaint of headache and weakness. Thereafter, the recurrent lesions were detected on follow-up MR images (Fig. 4).

3. Discussion

Intracranial aspergillosis is one of manifestation patterns of deep aspergillus infection, present in approximate 20–30% of fungal cerebral abscesses [1]. Aspergillus

abscesses usually occur in the presence of predisposing factor (eg, diabetes, malignant tumor, AIDS, long term usage of antibiotics/glucocorticoid) [2,3], and some cases can undergo multiple predisposing factors simultaneously. Aspergilli generally affect immunocompromised patients, although the infection can involve immunocompetent people occasionally. Hematogenous spread from lung aspergillosis to the CNS, as well as direct invasion from the paranasal sinuses and temporal apophyses, are common routes of intracranial aspergillosis. Some patients were infected after bone marrow transplantation or solid organ transplantation, even resulted from operation or trauma. Kourkoumpetis TK [4] reviewed 123 CNS aspergillosis cases and revealed that 27.6% cases had primary paranasal sinuses infection foci, 26.8% cases had primary lung lesions, whereas 22% cases had no obvious primary organ involvement. Yong-bo Yang [5] reported 15 cases of intracranial aspergillus abscesses, all of the cases had primary foci of infection in paranasal sinuses, temporal apophyses or lungs. And 7 cases had history of long term usage of antibiotics, 3 cases required steroid treatment for a long time. So, the medical history which can reflect the immunocompromise state and/or predisposing factors is very important for the right diagnosis. In the case we reported here, only solitary brain lesion without infection evidences of paranasal sinuses and temporal apophyses, as well as weak understanding of the disease and ignoring of clinical history, result in the misdiagnosis.

Beside lung, brain is the mostly involved organ [2,3], and lesions can occur in any lobe of cerebrum, basal ganglia or cerebellum. When aspergilli affected the brain, patients can present nonspecific symptoms such as headache, fever, altered mental status, and seizure. The intracranial aspergillus infection can occur as multiform and various stages of lesions in meninges, brain parenchyma and/or vessels, solitary or multiple foci. Single aspergillus abscess cases, although not rare, are more troublesome for making right preoperative diagnosis,

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