

Intracranial blastomycosis mimicking high-grade neoplasm on magnetic resonance imaging and spectroscopy

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ABSTRACT

We describe a case of posterior fossa blastomycosis in an immunocompetent patient that mimicked high-grade neoplasm on neuroimaging. Histological analysis confirmed blastomycosis. Because the neuroimaging characteristics of intracerebral blastomycosis can be confused for neoplasm, these lesions must be confirmed histologically before initiating aggressive treatment for presumptive high-grade neoplasm. To our knowledge, it is the first description of a neoplasm mimic on MRS in the setting of intracranial blastomycosis.

Key words: Blastomycosis, malignancy, spectroscopy

INTRODUCTION

Intracranial blastomycosis is not uncommon in endemic areas. However, an isolated infratentorial lesion mimicking as high grade neoplasm in imaging has not been reported previously.

CASE REPORT

The patient is a 72-year-old female with a 3-week history of progressive vertigo and ataxia. Computed tomography (CT) of the head showed a left cerebellar mass lesion with edema and significant mass effect on fourth ventricle resulting in obstructive hydrocephalus [Figure 1]. Magnetic resonance imaging showed a heterogeneously enhancing left cerebellar mass with extensive surrounding edema, mass effect on the brainstem, fourth ventricle, and aqueduct resulting in hydrocephalus [Figure 2]. Laterally, the mass extended to the dural surface with focal dural enhancement. Diffusion images demonstrated two small focal areas of restricted diffusion. Magnetic resonance spectroscopy showed increased lipid/lactate, decreased N-acetyl aspartate, and increased choline [Figure 3]. Choline is a cell membrane

marker and is increased in neoplastic lesions related to cell membrane turnover. N-acetyl aspartate is a neuronal marker and is decreased with loss of neuronal viability, which is typical of neoplasms. Lipid/lactate is associated with necrosis. Therefore, a high-grade neoplasm was suspected from imaging findings. Workup for metastatic disease including chest and abdominal CT was negative.

The patient underwent image-guided left retromastoid craniotomy and resection of the lesion. Histology revealed fragments of cerebellum with abundant mixed acute and chronic inflammation and fungal organisms morphologically consistent with *Blastomyces* species. The specimen was negative for malignancy. The patient was treated with IV amphotericin B.



Figure 1: Computed tomography of the head showed a left cerebellar hypodense mass lesion with edema and significant mass effect on fourth ventricle

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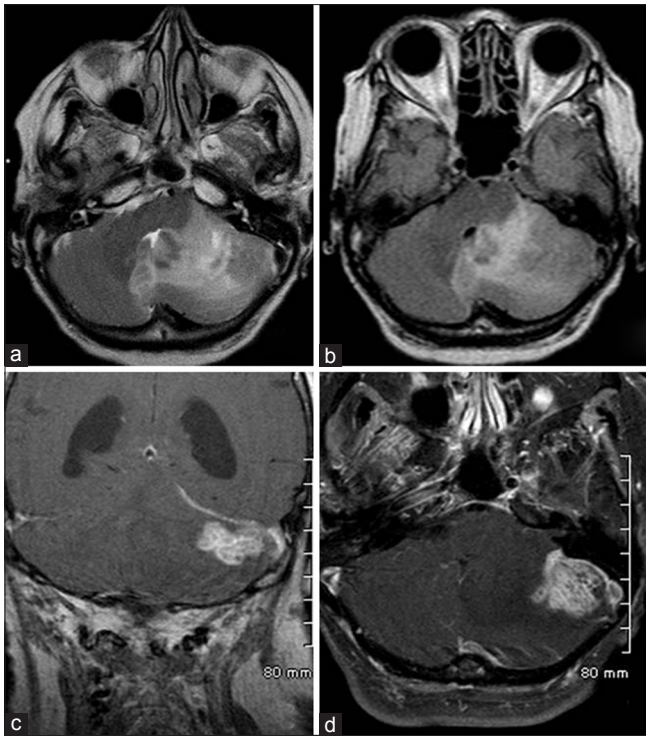


Figure 2: T2-weighted magnetic resonance imaging (a, b) showed a heterogeneously hyperintense lesion in the left cerebellar hemisphere with extensive surrounding edema, mass effect on the brainstem, fourth ventricle and aqueduct. Post-contrast T1-weighted coronal (c) and axial (d) images showing heterogeneous mass like post-contrast enhancement of cerebellar lesion and obstructive hydrocephalus

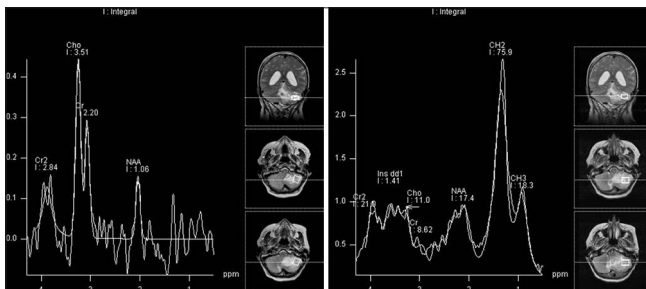


Figure 3: Magnetic resonance spectroscopy showing increased lipid/lactate, decreased N-acetyl aspartate and increased choline suggesting a high grade neoplasm

DISCUSSION

Blastomyces dermatitidis is a fungal pathogen that commonly presents as a pulmonary infection. Primary infection of the lungs occurs due to inhalation of spores. Soil is the reservoir for human infection. Extrapulmonary disease is likely due to hematogeneous spread. Central nervous system involvement can occur directly from paranasal sinuses and orbit or it can be hematogeneous. Extrapulmonary sites of involvement in decreasing frequency are the skin, bones, and genitourinary system.^[1] Central nervous system involvement is seen in 5-10% of extrapulmonary blastomycosis as described in literature.^[1-3] This fungal

infection is prevalent in many areas of USA and Canada. Areas known to be endemic in the USA include the Mississippi and Ohio River basins as well as regions along the Great Lakes and the St. Lawrence River.^[1]

Extrapulmonary infection may be associated with sub-clinical pneumonia or normal chest radiograph,^[2,4] as seen in our patient.

Most fungi enter the body by inhalation or through skin abrasions. *Candida albicans* is an exception, being the normal inhabitant of the intestinal tract. Inhalation of the fungal spores is the main mechanism for blastomycosis. Intracranial blastomycosis presents as sub-acute or chronic meningitis, encephalitis, parenchymal brain abscesses, or granulomas. The patient may present with symptoms of stroke or myelopathy.^[5] Diagnosis of blastomycosis depends on demonstration of the organism in body fluids, tissue samples, or culture. Serodiagnosis is not optimal.^[6] Our patient was otherwise in good health and was not immunosuppressed. Differential considerations for the lesion seen in our patient included high-grade primary brain neoplasm followed by a solitary metastatic lesion. The patient had no known primary malignancy.

CONCLUSIONS

In an endemic area in the proper clinical setting and with an unusual radiological appearance, the possibility of blastomycosis should be considered an unlikely differential for a mass-like parenchymal brain lesion.

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