Cerebral Aspergilloma Mimicking Tumoral Mass: A Diagnostic Dilemma

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ABSTRACT

Intracranial aspergillosis infection is very rare in immunocompetent patients. Among its varied presentations a solitary intracranial mass is very uncommon. It is usually misdiagnosed as tumor or abscess. A high index of clinical suspicion coupled with an early diagnosis can potentially be life saving. Because of its rarity in the immunocompetent patient and difficultly in preoperative diagnosis we illustrate this case.

Key words: Aspergilloma; immunocompetent; magnetic resonance imaging

Introduction

Intracranial aspergillomas are almost always a clinical surprise. It presents with non-specific clinical and radiological features and frequently mistaken for brain tumors or abscess. Pre-operative diagnosis of intracranial aspergilloma is often overlooked and is difficult clinically and radiologically. Here, we are reporting a unique case of intracranial aspergilloma in an immunocompetent patient mimicking a tumoral mass on conventional magnetic resonance imaging (MRI) and magnetic resonance spectroscopy (MRS) and conclude that it should be considered as differential diagnosis in cases of solitary intracranial mass with atypical features.

Case Report

A 32-year-old afebrile woman presented with the complaints of progressive headache of 2 to3 weeks duration. She had a history of mild cough and chest pain also. On neurological examination, the patient was oriented to time, person and place. Funduscopic examination revealed bilateral papilledema more on the left side. On cranial nerve examination, there was anosmia of the left nostril. Other aspects of neurological examination (muscle power, deep tendon reflexes and cerebellar tests, plantar and proprioceptive reflexes) were intact. Her chest examination shows mild fine and coarse rales with inspiratory wheezes. General examination of the patient was unremarkable. No abnormal swelling or lump was noted on the head and neck and elsewhere in the body. Cardiac examination reveals no evidence of murmur, gallop or thrill. Normal S1/S2 noted. Abdominal examination revealed no evidence of distension and rigidity. Normal bowel sounds were heard on auscultation. No evidence of pallor, edema or icterus was noted. Her renal and liver function tests were within normal limit. Blood examination including complete as well as differential blood cell counts and Immunological tests, including immunoglobulin levels (immunoglobulin G, immunoglobulin M, immunoglobulin A) were within normal limits. Fasting blood sugar level was within normal limits. Serological test for human immunodeficiency virus and other viral markers were negative.

There were no past medical history for tuberculosis, diabetes, bone marrow or solid organ transplantation and malignancy. The history of steroid or other immunosuppressive drug consumption was negative. No significant past surgical history was noted.

She subsequently underwent computed tomography (CT) and MRI Brain for headache and neurological findings and chest X-ray for respiratory symptoms.

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CT of the head revealed a large isoattenuating mass lesion with central hypodensity in left frontal lobe showing marked enhancement with surrounding hypodense edema causing mass effect over the adjacent left lateral ventricle [Figure 1].

MRI of the brain revealed a relatively defined moderately enhancing T2 heterogeneous iso to hypointense lesion with disproportionate perilesional edema in left frontal region causing mass effect and mild midline shift [Figure 2]. MRS revealed elevated choline and lipid lactate peak on multi-voxel and single-voxel [Figure 3]. Paranasal sinuses and temporal bones were unremarkable. Considering the imaging findings on CT and magnetic resonance (MR) with elevated choline and lactate peak on MRS, possibility of lymphoma, metastasis or inflammatory granuloma were considered.

Chest X-ray revealed a radiopaque lesion in left hilum. Further evaluation with CT thorax revealed inadequately enhancing soft-tissue density lesion in the superior segment of lower lobe of the left lung [Figure 4]. Subsequently, bronchoscopy was performed; however, transbronchial fine needle aspiration cytological (FNAC) and lavage for cytology were non-contributory. The percutaneous CT guided FNAC from the lung lesion revealed nonspecific inflammatory cells without evidence of malignancy. Positron emission tomography revealed no significant increased metabolic activity. For more specific diagnosis, CT guided biopsy from the lung lesion was performed.

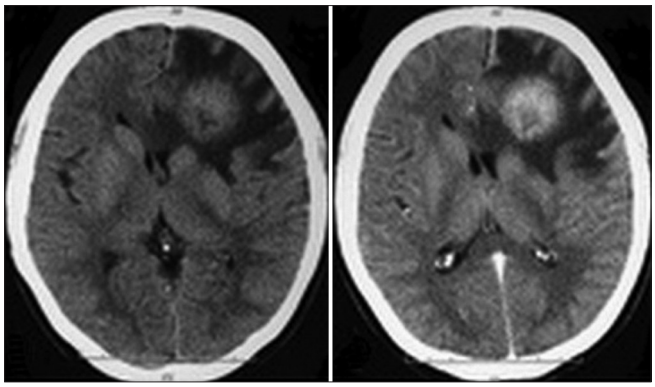

Figure 1: Plain and contrast computed tomography head shows hyperdense enhancing mass in left frontal region adjacent to left lateral ventricle with surrounding edema and mass effect

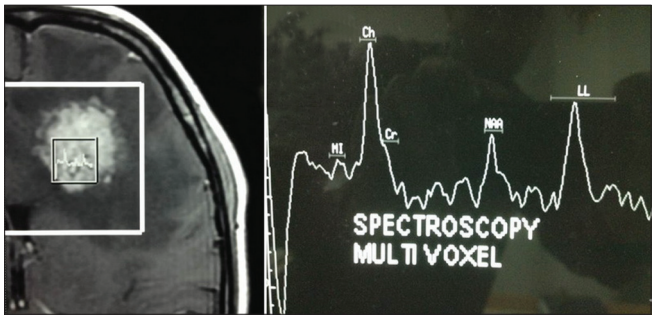

Figure 3: Magnetic resonance spectroscopy reveals elevated choline and lipid lactate peak

This revealed filamentous hyphae consistent with Aspergillosis. Results from a repeat biopsy after 2 weeks were similar.

Patient was started on the systemic antifungal therapy (Voriconazole 200 mg twice daily). There was no regression in the headaches and papilledema even after 4 weeks of antifungal treatment. Radiologically, there was no significant interval changes noted in brain imaging. As patient started complaining of visual disturbances and worsening cranial symptoms, she underwent craniotomy and total excision of the lesion. Intraoperatively, firm to hard avascular mass seen in left frontal lobe with well-defined plane between the lesion and the surrounding brain parenchyma. No fluid or pus could be aspirated from the mass. No hemorrhage was seen. Gross total excision of the mass was carried out [Figure 5]. Post-operative CT scans showed no residual enhancing lesion [Figure 6]. Microscopic examination of H and E–stained specimen reveals multiple well-formed granulomas, showing central areas of necrosis

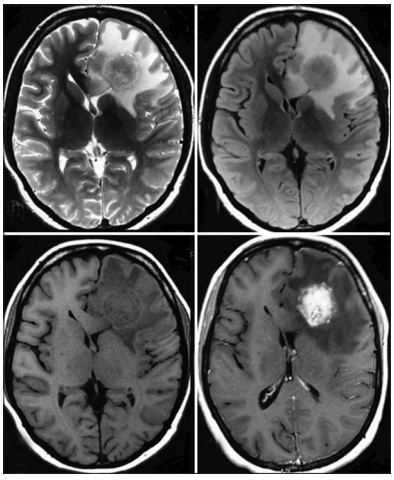

Figure 2: Plain and contrast magnetic resonance images shows rounded mass lesion with central and peripheral hypointensity on T2 weighted images in left frontal region showing moderate enhancement with surrounding edema and mass effect

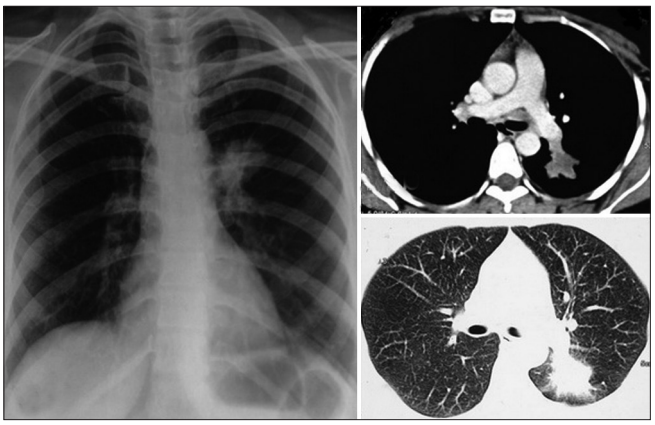

Figure 4: X-ray and computed tomography chest shows irregularly marginated soft-tissue attenuation mass lesion with peripheral halo in the left lower zone

within fibrocollagenous connective tissue. The periodic acid-shiff and Grocott methenamine silver stain revealed many septated fungal hyphae along with fine basophilic calcification was present in some of the more densely fibrotic areas.

Patient continued to be on systemic antifungal therapy considering the final diagnosis of aspergilloma in lung and brain. Follow-up CT of the chest show a significant response and the reduction of the lung lesion. After the duration of 6 months of therapy, the lung lesion has completely resolved [Figure 7].

Discussion

Fungal infection of central nervous system (CNS) is a dreadful diagnosis and often comes as clinical surprise. Most of the cerebral aspergilloma are confused with tumors and tuberculoma on imaging as seen in our case; however, histopathological diagnosis is the ultimate requirement for confirmation as in our case. Aspergillosis is the most common fungal infections of CNS with average reported one case per year. It often gives variable and non-specific clinical and radiological presentation. The predominant symptoms involve headache, vomiting and cranial-nerve-related symptoms while rare symptoms are fever, nasal congestion and seizures; however, our case has presented with a history of progressive headache that can be seen in various intracranial mass; hence, clinical symptoms are not very contributory as in our case. Common signs include papilledema with cranial neuropathy, focal neurological and meningeal signs; however, our case had papilledema on fundoscopic examination without focal neurological deficit except for mild anosmia on the left nostril. Solitary aspergilloma in an immunocompetent patient is a rare entity.[1,2] Two-third of cases have some predisposing factors like deranged immunological status with diabetes mellitus being the most common while one-third of cases have no predisposition; however, the immunological status and blood sugar level was normal in our case as documented by blood picture and immunoglobulin levels. Poor nutritional status, indiscriminate use of steroids, antituberculous drugs and parasitic infestations may be the hidden predisposing factors in immunocompetent patients,[3] none of these predisposing factor was elicited in our patient even after taking extensive detail history.

Frontal area of CNS is the most common site affected as seen in our case followed by the parasellar region. Primary Intracranial aspergilloma are rare even in immunocompromised patients. The intracranial aspergilloma are usually followed by primary infection of the paranasal sinuses, mastoid and lung and in our case, lung was the probable hematogenous source of intracranial aspergilloma. Hence, it is justified that extensive and thorough examination of these primary sites are mandatory whenever there is suspicious case of intracranial aspergillomas. The intracranial aspergilloma presents with variable radiological appearance like that of granuloma, meningitis, mycotic aneurysm, infarcts and tumors. It was mimicking tumoral mass in our case. On imaging, usual cerebral fungal lesions are multiple with

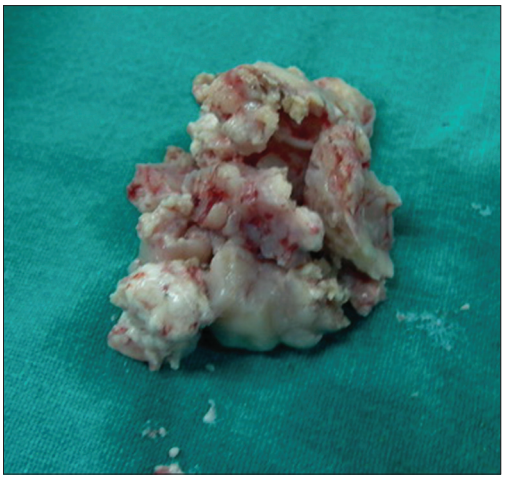

Figure 5: Gross specimen of left frontal mass

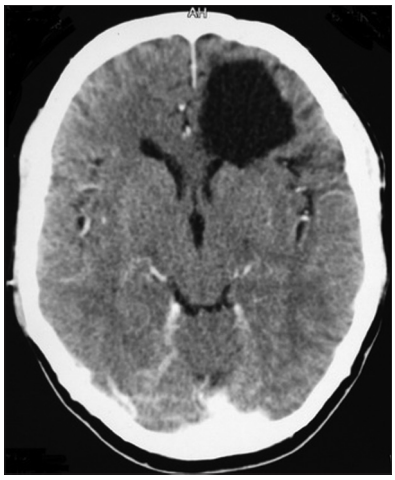

Figure 6: Post-operative follow-up computed tomography head shows no residual enhancing lesion

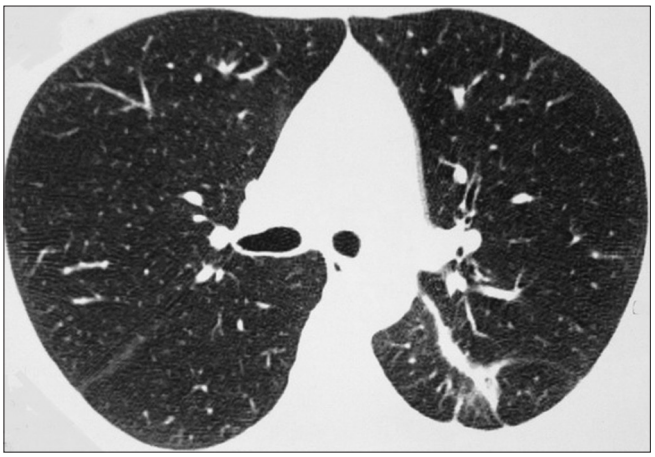

Figure 7: Follow-up computed tomography chest reveals marked regression in the size of lung lesion

infarction or hemorrhage in a random distribution due to the angioinvasive nature. In an immunocompetent patient solitary cerebral aspergilloma are usually due to granuloma formation secondary to an immune reaction as seen in our case. Hemorrhage occurs in approximately 25% of lesions and contrast material enhancement is usually vague or absent. Low signal intensity is often seen in the periphery of the lesions on T2-weighted MR images. This finding corresponds partially to areas of hemorrhage. Cerebral aspergillus infection contain dense population of hyphal elements peripherally with relative paucity of fungal elements centrally, features that explain the distinct peripheral T2 hypointensity. In the present case, the lesion had low T2 signal intensity within the core as well as in the periphery corresponding histologically to areas of coagulative necrosis and hemorrhage from vascular occlusion by fungi. MRS of intraparenchymal fungal lesions is nonspecific and reveals elevated choline and lactate peaks with suppression of other metabolites.[4] Our case reveals the similar MR spectra.

Imaging findings in pulmonary aspergillosis may be nonspecific. It may present as soft-tissue attenuation mass within a lung cavity or mucoid impaction and bronchiectasis with endobronchial mass appearance on CT imaging. Similar imaging features were seen in our case.

Our case is an example of the rare presentation of fungal infection. Hence, we conclude that preoperative diagnosis of cerebral fungal lesion is difficult and is frequently missed or delayed. Proper clinical, radiological and hematological evaluation with direct histopathological examination and culture are the ultimate requirement for final diagnosis of the aspergilloma. In these patients high index of suspicion, aggressive approach of diagnosis with timely and vigorous neurosurgical treatment and antifungal treatment is indicated for proper removal of the infection. Antifungal systemic treatment for CNS and source of infection should be the mainstay of treatment later on.

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