Case Report

Cerebral Aspergillosis in a Diabetic Patient Leading to Cerebral Artery Occlusion and Ischemic Stroke: A Case Report and Literature Review

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Cerebral aspergillosis is a rare and highly fatal hematogenous infection most commonly found in immune compromised patients. From the onset of neurologic symptoms, the median reported rate of survival is between 5 and 9 days. Compounded with increased hemorrhagic risks and the lack of specificity in both clinical presentation and traditional imaging, a fast and noninvasive method of definitive diagnosis is necessary if there is to be any hope for positive outcomes. We describe the case of a 50-year-old female diabetic with a history of otitis media, an uncharacterized inflammatory nasopharyngeal process, and prior ischemic strokes who presented with a new cerebral infarction in the setting of an angioinvasive fungal infection of the large cerebral arteries. We also present a literature review of aspergillosis detection and treatment in hopes that future cases will be diagnosed in a timely manner and more patients may be saved. **Key Words:** Cerebral aspergillosis—stroke—angioinvasive aspergillosis—carotid occlusion.

Cerebral aspergillosis (CA) is a relatively rare form of angioinvasive fungal infection most often seen in immune compromised individuals.[1] The angioinvasive nature of *Aspergillus* greatly increases the risk of intraoperative hemorrhage, rendering biopsy and direct diagnosis risky in many cases.[2] Here, we describe a 50-year-old patient with a new cerebral infarction in the setting of an angioinvasive fungal infection of the large cerebral arteries and a literature review on contemporary diagnostic and treatment approaches.

Case Study

A 50-year-old female with a past history of diabetes, hypertension, hyperlipidemia, chronic otomastoiditis, recent left ear infection status after tympanic tube placement, and progressive hearing loss presented to an outside hospital with headache, mild confusion, and slurred speech. Workup revealed an acute left parieto-occipital ischemic stroke, and the patient was transferred to our institution for higher level of care. On arrival the patient had normal vital signs. The general examination was unrevealing. Neurologically the patient was fully oriented with normal attention and concentration and had anisocoria (right pupil: 3 mm; left pupil: 5 mm), left VI cranial neuropathy, right homonymous hemianopsia, and dysarthria. Review of magnetic resonance imaging

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disclosed the known left hemispheric ischemic stroke along with inflammatory changes at the skull base and mastoid cells with no evidence of extension into the brain parenchyma. Magnetic resonance angiography demonstrated a complete occlusion of the proximal left internal carotid artery (ICA) and left posterior cerebral artery. The left middle cerebral artery showed decreased enhancement and was served by cross flow from the right side via the anterior communicating artery. The right ICA and the rest of the intracranial vessels were intact. Hypercoagulable workup was unrevealing, and transthoracic echocardiogram was negative for vegetations. Glycosylated hemoglobin was 7.7% and low-density lipoprotein (LDL) cholesterol was 59 mg/dL. Further assessment via head and neck computed tomography showed mild ethmoid sinus fullness, opacification of the left mastoid air cells, and nasopharyngeal asymmetry with inflammatory changes extending into the left Eustachian tube. Nasopharyngeal biopsy demonstrated a chronic inflammatory infiltrate and granulomatous reaction without evidence of active infection. A left mastoidectomy was performed; excision contents revealed granulation tissue and normal flora but stained negative for fungal elements. The patient refused additional workup and was released on antibiotic treatment for otitis media and aspirin. She was also offered a close neurologic follow-up, which was not observed.

Two months later the patient presented with new onset of confusion and headache. Blood pressure on arrival was 146/106 mm Hg, pulse 110 bpm, respiration 24, and oral temperature 36.8°C. The general examination was unremarkable with no clinical evidence of systemic embolism or obvious infection. Neurologically, the patient was oriented to place and name, somnolent but arousable to tactile stimuli, and able to follow 1-step commands. She demonstrated paucity of spontaneous speech and had limited participation with the interview. Cranial nerve evaluation showed partial central left VII palsy and the known left VI cranial neuropathy and homonymous hemianopsia. There were no focal motor or sensory deficits, and the gait was steady. Infectious workup revealed urinary tract infection but negative blood cultures and chest X-ray. Electroencephalogram showed diffuse bifrontal slowing but no epileptiform discharges. Magnetic resonance imaging confirmed paranasal sinus disease and new areas of ischemia within the left posterior cerebral artery vascular territory. Imaging also revealed a new area of flow limiting stenosis at the cervical/petrous junction of the right ICA and abnormal enhancement surrounding the vessel walls of the entirety of the left ICA (Fig 1).

Following a 10-minute hypotensive event during the imaging procedure, the patient became unresponsive and an emergent head computed tomography showed early infarction in the region of the left Sylvian fissure. Extensive infarcts in bilateral cerebral hemispheres and deep gray matter led to diffuse left hemispheric edema with subfalcine and transtentorial herniation. Ischemic changes were also visualized in the brain stem; patient was terminally extubated per wishes of family and pronounced dead on hospital day 6.

Pathology Findings

An autopsy was performed and showed cerebral edema and subfalcine and transtentorial herniation. Sections from the skull base, including internal carotid canal contents and sphenoid sinus contents demonstrated angioinvasive fungal infection involving large arteries, associated with thrombosis and necrotizing acute and chronic inflammation. The fungal organisms demonstrated septated and homogenous hyphae of uniform width, with parallel contours and dichotomous branches arising at an acute angle. Conidial heads were absent. Sections from the brain demonstrated cerebral arteriosclerosis,

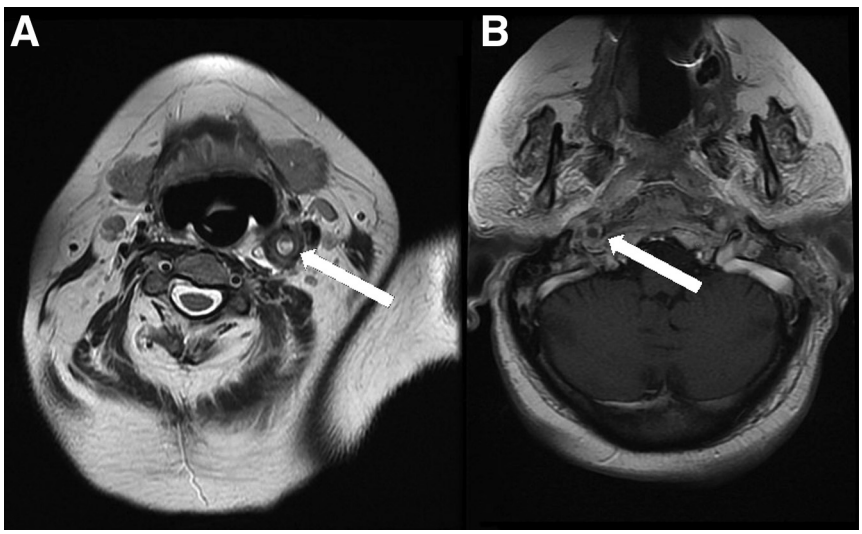

Figure 1. *(A) Magnetic resonance (MR) image showing enlargement and abnormal T2 signal along the left internal carotid artery (ICA) suggestive of thrombus within the vessel. (B) MR image demonstrating narrowing and enhancement of the right ICA at the cervical/petrous junction.*