Cerebral Pythiosis: A Case Report of *Pythium insidiosum* Infection Presented with Brain Abscess

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**ABSTRACT**

*Pythium insidiosum*, a fungus-like organism, infects both animals and humans, causing a life-threatening infectious condition called pythiosis. Human pythiosis is an uncommon condition, but an emerging disease in the tropical regions of the world. It can be both localized and systemic forms, involving vascular structures. Most patients with arterial pythiosis have underlying hemoglobinopathy, i.e. thalassemia. We here reported a thalassemic patient suffering from cerebral pythiosis (left common carotid pythiosis arterial aneurysms, septic embolisms evolving to brain abscess over the left anterior cerebral artery territory). The prognosis of cerebral pythiosis is very poor because this condition is rapidly progressive in nature, no effective antibiotics, and requires an adequate surgical debridement to control infection. (*J Infect Dis Antimicrob Agents* 2011;28:129-32.)

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CASE REPORT

A 27-year-old man, a worker in Department of Forestry, developed toothache at the left upper molars 3 months ago, followed by nasal congestion with whitish discharge from the left nostril. At that time, he had had no fever, cough and bleeding per nostril. However, chronic left maxillary sinusitis was diagnosed. Oral antibiotics were commenced and nasal irrigation was performed without any clinical improvement. Three weeks before admission, he developed high grade fever. One week later, he complained of occipital headache and funny feelings, followed by a focal seizure starting at right hand, and then he developed secondarily generalized tonic-conic seizures lasting for one minute. He was sent to an emergency department of a general hospital. Right facial palsy and hemiparesis were observed since then. Computed tomography scan of the brain was performed. A 5 x 6 cm hypodensity lesion was noted over the left frontoparietal region. Brain abscess was diagnosed. Intravenous ceftriaxone 4 g/day and metronidazole 1,500 mg/day were prescribed. One week after a conservative treatment using antibiotics, fever was still persisted and right-sided weakness had worsened. Then, antibiotics were changed to imipenem 2 g/day and the patient was referred to our hospital.

Personal and past medical history: This patient was diagnosed with beta-thalassemia haemoglobin E disease. He was performed splenectomy due to a car accident 13 years ago. His regular medication was only oral-deferasirox 500 mg/day for heme chelating agent. The pertinent physical findings at admission were high grade fever (39-41°C), drowsiness, significant left carotid bruit, right facial palsy and spastic right hemiparesis.

Initially, a fungal infection, esp. mucormycosis, the one of our differential diagnoses as a maxillary sinus was involved. Although, we could not identify this organism from a sinus operation, amphotericin B was prescribed. He had no clinical improvement in a subsequent week, so surgical intervention was considered. Magnetic resonance (MR) imagings (MRI) and MR angiography (MRA) brain were performed. MRI brain showed a large rim-enhancing brain lesion over the left hemisphere (Figure 1A, 1B). MRA showed multiple aneurysms and an arterial dissection at left common and internal carotid arteries, so conventional angiography was performed to confirm these abnormal vascular findings (Figure 1C). According to his hemoglobinopathic co-morbidity, Pythium infection was considered. Therefore, his serum was tested for antibody against pythiosis using 3 different techniques, which were Enzyme-linked immunosorbant assay, immunodiffusion and Western blot. The results of all the tests were positive.

While waiting for the neurosurgical treatment, double carotid stents were inserted to left carotid artery to rescue cerebral circulation with a temporary neurological improvement. We also prescribed itraconazole, terbinafine and P. insidiosum antigen immunotherapy via subcutaneous route, but the patient still had septic symptoms, and eventually died from brain herniation. Autopsy revealed generalized brain swelling with gross pus at left frontal area. The left common and internal carotid arteries also found 2 cm in diameter of aneurysm without obvious clot or thrombosis observed. The pus Wright’s stains showed thin-walled hyphae with infrequently septate and branching (Figure 1D). Tissue culture from his brain confirmed the diagnosis of pythiosis by isolating the organism and proof by Polymerase chain reaction (PCR) with specific primers in the COX II region.

DISCUSSION

Pythiosis is a life-threatening infectious disease caused by the fungus-like organism. Patients usually
Figure 1. Showing MRI, left carotid angiography and Pus Wright stain.

1A: Axial FLAIR MRI brain demonstrates hypersignal intensity lesion over the left fronto-parietal region (arrow) and extensively involved corpus collosum (arrow head).

1B: Sagittal T1W MRI brain with gadolinium enhancement reveals a large irregularly rim enhancing lesion (arrow) over the left cerebral hemisphere with satellite surrounding small lesions (arrow head).

1C: Left carotid angiography shows multiple aneurysms (arrow) and a dissection (arrow head) over the left common and proximal internal carotid arteries.

1D: Pus Wright’s stain highlights multiple thin-walled hyphae with infrequently septate and branching (arrow).
present with infection of the arteries that commonly involve lower extremities, eyes, or cutaneous/subcutaneous tissues. The clinical manifestations are divided into cutaneous/subcutaneous pythiosis, vascular pythiosis, ocular pythiosis and miscellaneous pythiosis or pythiosis of unusual type. Human pythiosis was usually reported in individuals with underlying thalassemia and paroxysmal nocturnal hemoglobinuria. Vascular pythiosis is a disease associated with high mortality. Most of the reported patients survived through radical surgery. Without complete eradication of the etiologic agent from the infected tissues, however, survival beyond 6 months is rare.

The definite diagnosis of pythiosis is a positive culture of this pathogen from infected tissues. The available serodiagnostic tests include the immunodiffusion test, enzyme-linked immunosorbant assay (ELISA), and Western blot method. The immunodiffusion test has a high specificity, but it has a very low sensitivity. ELISA and Western blot method have been developed to overcome the low sensitivity of the immunodiffusion test, with a test specificity of being higher. The PCR amplification and sequencing analysis is available and useful for an identification of the pathogen in the clinical specimens or in the hyphal mat from the culture specimens.

A radical excision is the main treatment option for cure from pythiosis. Nevertheless, we couldn’t eradicate infected brain tissue as well as infected carotid arteries in our patient because of the area of brain and carotid artery involvements were harmful to resection. The primary pythiosis lesion from left carotid arteries would continuously produced septic embolisms to anterior cerebral territories as well as other adjacent areas. He subsequently died from brain herniation and septic processes. Cerebral pythiosis should be one of the differential diagnoses of brain abscess in hemoglobinopthic patients. Early recognition and prompt surgical treatment should be considered to reduce mortality or morbidity of pythiosis.

References