

Case Report

Central nervous system aspergillosis in an immunocompetent patient

Şükran Köse, Gülsün Çavdar, Süheyla Serin Senger, Gülgün Akkoçlu

Infectious Diseases and Clinical Microbiology Clinic, Tepecik Education and Research Hospital, Izmir, Turkey

Abstract

Aspergillus sp. is a fungus that is very common in nature and may cause invasive disease with high mortality, especially in immunosuppressed patients. Here we present a case of central nervous system (CNS) aspergillosis in a previously healthy immunocompetent patient. A 23-year-old female was admitted to hospital with the complaints of headache, blurred vision, and double vision. In her cranial magnetic resonance imaging, abscess and paranchymal edema were observed in the left frontal lobe, and biopsy was performed with endoscopic nasal operation. The pathology result was consistent with aspergillus infection. It should be remembered that although CNS aspergillosis generally occurs in immunosuppressed patients, it may also rarely be diagnosed in immunocompetent individuals.

Key words: aspergillus; immunocompetent patient; central nervous system

J Infect Dev Ctries 2011; 5(4):313-315.

(Received 5 August 2010 - Accepted 20 November 2010)

Copyright © 2011 Kose *et al.* This is an open-access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Introduction

Aspergillus sp. is a fungus that is very common in nature and may cause an invasive disease with high case fatality rate, especially in immunosuppressive patients [1]. Major risk factors for aspergillus infection include neutropenia and corticosteroid use [2]. Central nervous system (CNS) aspergillus is very rare in immunocompetent patients. The infections mostly occur through hematogenous dissemination from a focus, such as lung infection, or rarely through direct extension from the paranasal sinuses [3,4]. The most common symptoms include progressive headache, weakness or paraesthesia, and altered mental state [5]. The diagnosis and treatment of invasive CNS aspergillosis is very difficult. Early diagnosis is important for a successful treatment. Here we present a case of CNS aspergillosis in a previously healthy immunocompetent patient.

Case report

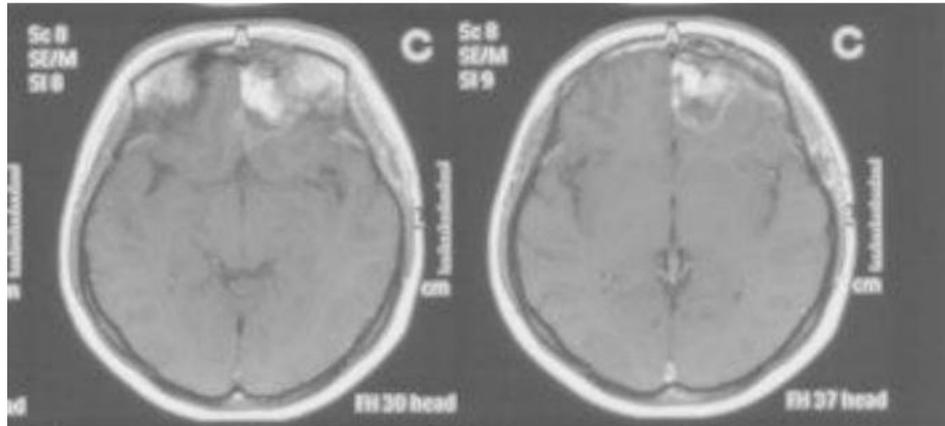
A 23-year-old female was admitted to hospital with the complaints of headache persisting for approximately six months. She stated that the complaints of blurred vision and double vision were added recently. She had no known disease and no apparent immune deficiencies. No pathology was found in her physical examination. Initial neurologic examination did not reveal any abnormalities. Her laboratory results were as follows: white cell count,

11.000/ μ l; sedimentation rate, C-reactive protein, peripheral smear and biochemical tests were all in normal range. HIV test was negative; IgG and subtypes and CD4 and CD8 counts were normal. In her cranial magnetic resonance imaging (MRI), abscess surrounded by severe paranchymal edema was observed in the left frontal lobe (Figure 1). A biopsy was performed with endoscopic nasal operation. The biopsy material showed inflammatory granulation tissue and microabscesses containing a large number of hyphae with 45 degree angulations and spores. The pathology result was consistent with aspergillus infection. Voriconazole (6 mg per kilogram intravenously twice a day on day 1, followed by 4 mg per kilogram intravenously twice daily) was initiated. The patient was operated and the lesion was resected. After a year of treatment, voriconazole was discontinued since the lesion totally disappeared on MRI without any complications.

Discussion

The occurrence of fungal infections increased in the last decade due to the increase in the life span of the immunosuppressive patients [6]. Fungal infections of the central nervous system mostly result from systemic circulation secondary to lung infection, and may result from the direct extension

Figure 1. MRI showing abscess surrounded by severe paraneural edema in the left frontal lobe.



from the paranasal sinuses [7]. Most fungi cause basal meningitis or intraparenchymal abscesses; however, direct extension from the cribriform plate can cause necrohemorrhagic lesions in the base of the frontal lobe. A study performed by Murthy *et al.* reported that central nervous system aspergillosis resulted from the direct extension from the paranasal sinuses in 76% of cases [8]. We consider that the CNS aspergillus infection in our patient resulted from neighboring tissues following chronic sinusitis even though the patient had no immunosuppressive condition.

Aspergillus infection of paranasal sinuses is rare. However, the number of reported cases increased significantly in the last decade. Aspergilloma was identified as an etiological agent in 10% of the patients with chronic sinusitis, and it was observed more in women (64%) than in men. Infections are often confined to a single sinus and generally maxillary was the most involved sinus followed by sphenoidal sinus infections [9]. The infection can manifest especially in patients who have undergone bone marrow or solid organ transplantations, in immune-compromised patients with hematological malignancies and acquired immune deficiency, and rarely in immunocompetent patients, as in our case [10]. The clinical presentation in immunosuppressed patients is non-specific and mild, and symptoms include headache as in sinusitis, rhinorrhea, nasal obstruction, and fever. The diagnosis is difficult in asymptomatic infections. Rapid infiltration to neighbor tissues such as the orbital and frontal areas is typical, and computed tomography (CT) is recommended to show the bone destruction. Magnetic resonance imaging (MRI) is generally recommended for meningeal or intraparenchymal

involvement and for the early diagnosis of intracranial vascular occlusion. The definitive diagnosis is made with histological tests. The hyphae appearance with branches of 45 degrees is a typical and specific finding for aspergillus infection [11]. A soft tissue density that forms bone destruction in the left olfactory sulcus was observed by paranasal sinus CT in our case. The commonly recommended treatment is voriconazole for CNS aspergillus infection. Case fatality rates range between 28% to 86%, despite high-dose antifungal treatment and radical surgery. The other treatments are amphotericin-B, itraconazole, caspofungin and posaconazole. Amphotericin-B is one of the preferred antifungals; however, its therapeutic use is limited because of its adverse effects, including renal and hepatic toxicity, anemia, fever and electrolyte abnormalities [12]. In a study performed by Herbrecht *et al.* (2002), voriconazole and amphotericin-B were compared in invasive aspergillus. In the 12th week of therapy, the partial or complete success rate was 53% for voriconazole and 32% for amphotericin-B. Based on these results, many authors accepted that efficacy and survival rate is higher with voriconazole in invasive aspergillus [13]. It should be remembered that although CNS aspergillosis generally occurs in immunosuppressed patients (such as cancer patients, organ transplant recipients, diabetes mellitus), it may also rarely occur in immunocompetent individuals.

References

1. Palanisamy A, Chao SD, Fouts M, Kerr D (2005) Central nervous system aspergillosis in an immunocompetent patient: cure in a hospice setting with very high-dose itraconazole. *Am J Hosp Palliat Care* 22: 139-144.
2. Siddiqui AA, Shah AA, Bashir SH (2004) Craniocerebral aspergillosis of sinonasal origin in immunocompetent

- patients: clinical spectrum and outcome in 25 cases. *Neurosurgery* 55: 602-611; discussion 611-603.
3. Green M, Wald ER, Tzakis A, Todo S, Starzl TE (1991) Aspergillosis of the CNS in a pediatric liver transplant recipient: case report and review. *Rev Infect Dis* 13: 653-657.
 4. Robinson MR, Fine HF, Ross ML, Mont EK, Bryant-Greenwood PK, et al. (2000) Sino-orbital-cerebral aspergillosis in immunocompromised pediatric patients. *Pediatr Infect Dis J* 19: 1197-1203.
 5. Bozkurt MK, Ozcelik T, Saydam L, Kutluay L (2008) [A case of isolated aspergillosis of the maxillary sinus]. *Kulak Burun Bogaz Ihtis Derg* 18: 53-55.
 6. Marinovic T, Skrlin J, Vilendecic M, Rotim K, Grahovac G (2007) Multiple *Aspergillus* brain abscesses in immunocompetent patient with severe cranio-facial trauma. *Acta Neurochir (Wien)* 149: 629-632; discussion 632.
 7. Cho YS, Lee DK, Hong SD, Oh WS (2007) Intracranial aspergillosis involving the internal auditory canal and inner ear in an immunocompetent patient. *AJNR Am J Neuroradiol* 28: 138-140.
 8. Murthy JM, Sundaram C, Prasad VS, Purohit AK, Rammurti S, et al. (2000) Aspergillosis of central nervous system: a study of 21 patients seen in a university hospital in south India. *J Assoc Physicians India* 48: 677-681.
 9. Chao TK (2004) Triple discrete fungus balls of the paranasal sinuses. *Otolaryngol Head Neck Surg* 131: 1014-1015.
 10. Garcia RJ, Troya P, Edwards C (2006) Invasive aspergillosis with central nervous system dissemination in a presumably immunocompetent, non-neutropenic patient: case report and review. *South Med J* 99: 607-610.
 11. Maiorano E, Favia G, Capodiferro S, Montagna MT, Lo Muzio L (2005) Combined mucormycosis and aspergillosis of the oro-sinonasal region in a patient affected by Castleman disease. *Virchows Arch* 446: 28-33.
 12. Alobid I, Bernal M, Calvo C, Vilaseca I, Berenguer J, et al. (2001) Treatment of rhinocerebral mucormycosis by combination of endoscopic sinus debridement and amphotericin B. *Am J Rhinol* 15: 327-331.
 13. Herbrecht R, Denning DW, Patterson TF, Bennett JE, Greene RE, et al. (2002) Voriconazole versus amphotericin B for primary therapy of invasive aspergillosis. *N Engl J Med* 347: 408-415.

Corresponding author

Gülsün Çavdar

İzmir Tepecik Eğitim ve Araştırma Hastanesi

İnfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Kliniği, 35110
Yenişehir, İZMİR, TURKEY

Telephone: +90 232 469 6969-1719

Fax: +90 232 433 0756

Email: gakincioglu@hotmail.com

Conflict of interests: No conflict of interests is declared.