Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 3 [11] October 2014: 86-89

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD
Global Impact Factor 0.533
Universal Impact Factor 0.9804

ORIGINAL ARTICLE

Mucormycosis; Clinical Manifestation, Diagnosis and Management; Study of Nine Cases

Babak Gavam[1],Morteza Aghahasani[1],Mohamad Reza Hafezi Ahmadi[2],Samira Mis Ghavam[3],Ehsan Hosseini[4]

1. Infectious Disease and Tropical Medicine Research Center,Shaheed Beheshti Medical University,Tehran, Iran
2. Department of Pathology, Faculty of Medical science,Ilam University,Ilam,Iran
3. Department of Cardio-vascular Disease,Faculty of Medical science,Ilam University,Ilam,Iran
4. Department of Physiology, Faculty of Veterinary, Ilam University,Ilam,Iran

ABSTRACT

Mucormycosis is an uncommon infection that afflicts severely immunocompromised patients and those with poorly controlled diabetes mellitus. In a retrospective study we evaluated nine cases of mucormycosis in several tertiary care hospitals in Tehran, Iran during several years. Clinical manifestations, diagnosis including laboratory and radiologic study, management including surgical and medical interventions were evaluated.
Keywords: Mucormycosis, Diagnosis and Management

Received 11.05.2014 Revised 10.06.2014 Accepted 12.09. 2014

INTRODUCTION

Mucormycosis is an uncommon infection that afflicts severely immunocompromised patients and those with poorly controlled diabetes mellitus. A recent increase in the incidence of mucormycosis at many transplant centers has been linked to the introduction and widespread use of voriconazole prophylaxis in these high-risk populations [1]. It is a rapidly progressive fungal infection which usually occurs in immunocompromised individuals, and is characterized by soft tissue destruction and invasion of blood vessels [2]. It can produce an aggressive and sometimes fatal soft tissue infection seen most commonly in immunocompromised individuals. Eradication consists of surgical resection and antifungal chemotherapy [3]. Several conditions such as hematologic malignancy (leukemia, lymphoma, myeloma), solid organ transplantation, diabetes mellitus, corticosteroid therapy, or chemotherapy predispose patients to infection [4].

MATEREIALS AND METHODS

In a retrospective study we evaluated nine cases of mucormycosis in several tertiary care hospitals in Tehran, Iran during several years. Clinical manifestations, diagnosis including laboratory and radiologic study, management including surgical and medical interventions were evaluated.

RESULTS

In this study there were six cases of rhinocerebral mucormycosis, one case of pulmonary mucormycosis, one case of pelvic mucormycosis and one case of isolated cerebral mucormycosis. Four cases (44.5%) had past medical history of diabetes mellitus (DM), one case (11.1%) had history of DM, SLE (systemic lupus erythematosus) and immunosuppressant therapy for SLE, in one case (11.1%) DM was detected for the first time after presentation of mucormycosis and the patient did not know about her diabetes mellitus. In one case (11.1%) the only risk factor was pregnancy. In two cases (22.2%) no risk factor for mucormycosis were found.

All of six cases with rhinocerebral mucormycosis were presented with swelling and erythema of periorbital area, ptosis, chemosis and decreased vision. Paranasal CT scan showed multiple sinuses involvement in all 6 cases. Brain CT scan with contrast showed subdural effusion in left parietal lobe with hypodense area in left

frontal lobe in favor of brain abscess and adjacent ischemia in case 1, enhancement of tentorium in favor of basal cisterna arachnoiditis in case 2. Brain CT scan was normal in cases 3 and 4. Brain CT scan of case 5 showed subdural effusion in left parietal lobe. Brain MRI showed frontal lobe cerebritis in case 6.

For all six patients surgical debridement of involved sinuses was performed and necrotic tissue was respected. Exentration of involved eye was performed in cases 1, 2 and 5. For all of them amphotericin B started. Case 1 developed brain abscess. Vancomycin, ceftazidime and metronidazole was added to amphotericin B, but the patient's level of consciousness decreased after two days and expired. Case 2 developed meningitis that confirmed by lumbar puncture. Vancomycin and meropenem was added but level of consciousness decreased and the patient expired. Case 3 and 4 responded to amphotericin B and Erythema and edema of periorbita, area disappeared and general condition improved. Case 5 who developed brain abscess did not respond to medical and surgical treatment and expired. Case 6 with cerebritis did not respond to vancomycin and meropenem and amphotericin B and expired.

One of our patients was a 32 year-old pregnant woman who developed fever after cesarean section. Sonography of abdomenopelvis showed a large mass in pelvic area. Magnetic resonance imaging (MRI) of pelvis with and without contrast was done that demonstrated septated nonenhancing cyst like lesion in right anterior aspect of pelvis with compression on bladder. With impression of malignancy and for better evaluation the mass excised and was evaluated pathologically. The result of pathology was negative for malignancy and showed broad nonseptated hyphal elements in favor of mucormycosis. The result of culture confirmed the diagnosis. Intravenous Amphotericin B started for her without improvement. The patient's fever continued and her condition did not change. Amphotericin B discountined and Posaconazole started. Fever disappeared and general condition gradually improved. Course of posaconazole completed and the patient was discharged from hospital with good condition and follow up.

One of our patients was a 33year-old woman with dental infection with no response to antibiotic therapy. She developed sinus involvement extending to orbit thereafter. Paraclinic evaluation was done and showed changes in favor of mucormcosis. Exentration of globe was done. Pathologic study showed hyphae of mucor that confirmed by culture. The patient also developed pulmonary symptoms. Bronchoalveolar lavage showed mucoral in smear and culture. Posoconazole started for her with good response.

The case 9 was a 46 year-old woman known case of diabetes mellitus with chief complaint of headache, fever and swelling of right posterior auricular area with erythema and hotness. Brain CT scan was performed that showed a brain abscess in right temporoparietal lobe. Smear of drained abscess showed broad nonseptated hyphae and culture result was mucoral agent. Amphotericin B was started. Despite several days after amphotericin B infusion, fever continued and ESR did not changed. Amphotericin B discontinued and posaconazole was started. Fever disappeared and ESR decreased and the patient was discharged with good general condition.

For all of patients smear and culture was performed and diagnosis of mucormycosis was confirmed.

Table 1 shows summary of clinical manifestation, treatment and outcome of our patients.

Table 1. Summary of nine cases of mucormycosis in our study

Case numbe	Involved orga	Risk factor	treatment	surger	Culture confirmatio	Outcom
1	Rhinocerebral	None	Amphotericin	Yes	Yes	Expired
2	Rhinocerebral	DM	Amphotericin	Yes	Yes	Expired
3	Rhinocerebral	DM	Amphotericin	Yes	Yes	Survive
4	Rhinocerebral	DM	Amphotericin	Yes	Yes	Survive
5	Rhinocerebral	DM	Amphotericin	Yes	Yes	Expired
6	Rhinocerebral	DM, SLE, immunosuppressan	Amphotericin	Yes	Yes	Expired
7	Pelvis	Pregnancy	Posaconazole	Yes	Yes	Survive
8	Lung	None	Posaconazole	Yes	Yes	Survive
9	CNS	DM	Posaconazole	Yes	Yes	Survive

DISCUSSION

Mucormycosis is an increasingly frequent life-threatening infection caused by opportunistic fungal organisms of the class Zygomycetes. The pathognomonic feature is the presence of invasive aseptate mycelia that are larger than other filamentous fungi with the hyphae exhibiting right angle and haphazard branching. Usually classified as rhinocerebral, disseminated, and cutaneous types, this classification serves as important predictor of pathogenesis and outcome. These occur mostly in immunosuppressed patients including individuals with diabetes and patients with organ transplants and hematologic malignancies [5]. In fact it usually occurs among patients with poorly controlled diabetes mellitus (especially those with

ketoacidosis), solid malignancies, iron overload or extensive burns, in patients undergoing treatment with glucocorticosteroid agents, or in patients with neutropenia related to haematologic malignancies [6]. Mucormycosis can involve systems such as rhinocerebral [7], pulmonary [8], gasterointestinal [9], cardiac [10], and also skin [11], face [12], sino-orbital [13] and nasal cartilage [14]. Early diagnosis of mucormycosis is essential for efficacious anti-fungal treatment and prevention of irreversible spread of mucormycosis to vital organs [15]. The diagnosis of mucormycosis can only be confirmed by pathological and mycological examination of biopsy specimens. These requirements conflict with the need for urgent treatment with surgical debridement, amphotericin B and control of the underlying pathology (16). The keys to successful therapy include suspicion of the diagnosis and early recognition of the signs and symptoms, correction of underlying medical disorders such as ketoacidosis, and aggressive medical and surgical intervention [17]. Standard therapy for invasive mucormycosis includes parenteral amphotericin B in combination with radical debridement of infected tissues. Early diagnosis and treatment are of paramount importance. Unfortunately, long-term survival is poor owing to the prohibitive morbidity and mortality rates associated with the medical and surgical therapies. Posaconazole is a novel, extended-spectrum triazole oral antifungal agent with documented success in the treatment of patients with invasive mucormycosis [18]. A poor prognosis is primarily related with uncontrolled underlying disease. Surgical debridement is essential for a good prognosis, but timely intervention and complete aggressive debridement are not always needed in all patients. The patient who had slowly progressive disease also survived after conventional medical management and limited surgical debridement [19].

REFERENCES

1. Pongas GN, Lewis RE, Samonis G, Kontoyiannis DP. Voriconazole-associated zygomycosis: a significant consequence of evolving antifungal prophylaxis and immunosuppression practices? Clin Microbiol Infect. 2009 Suppl 5:93-7.
2. Cantatore-Francis JL, Shin HT, Heilman E, Glick SA. Primary cutaneous zygomycosis in two immunocompromised children. Pediatr Dermatol. 2007;24(3):257-62.
3. Moran SL, Strickland J, Shin AY. Upper-extremity mucormycosis infections in immunocompetent patients. J Hand Surg Am. 2006;31(7):1201-5.
4. Vetrone G, Grazi GL, Ercolani G, Ravaioli M, Faenza S, Enrico B, Tumietto F, Pinna AD. Successful treatment of rhinomaxillary form of mucormycosis infection after liver transplantation: a case report. Transplant Proc. 2006 Jun;38(5):1445-7.
5. Islam MN, Cohen DM, Celestina LJ, Ojha J, Claudio R, Bhattacharyya IB. Rhinocerebral zygomycosis: an increasingly frequent challenge: update and favorable outcomes in two cases. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2007;104(5):e28-34.
6. Rapidis AD. Orbitomaxillary mucormycosis (zygomycosis) and the surgical approach to treatment: perspectives from a maxillofacial surgeon. Clin Microbiol Infect. 2009 Suppl 5:98-102.
7. Martín-Moro JG, Calleja JM, García MB, Carretero JL, Rodríguez JG. Rhinoorbitocerebral mucormycosis: a case report and literature review. Med Oral Patol Oral Cir Bucal. 2008;13(12).
8. Ben-Ami R, Luna M, Lewis RE, Walsh TJ, Kontoyiannis DP. A clinicopathological study of pulmonary mucormycosis in cancer patients: extensive angioinvasion but limited inflammatory response. J Infect. 2009;59(2):134-8.
9. Zhao Y, Zhang Q, Li L, Zhu J, Kang K, Chen L. Primary Cutaneous Mucormycosis Caused by Rhizomucor variabilis in an Immunocompetent Patient. Mycopathologia. 2009 Jun 27. [Epub ahead of print].
10. Shah S, Suresh PV, Maheshwari S, Rao S. Cardiac mucormycosis with T-cell immunodeficiency. Indian Pediatr. 2009;46(3):257-9.
11. Zhao Y, Zhang Q, Li L, Zhu J, Kang K, Chen L. Primary Cutaneous Mucormycosis Caused by Rhizomucor variabilis in an Immunocompetent Patient. Mycopathologia. 2009 Jun 27. [Epub ahead of print].
12. Piazza RC, Thomas WL, Stawski WS, Ford RD. Mucormycosis of the face. J Burn Care Res. 2009;30(3):520-3
13. Chitsaz S, Bagheri J, Mandegar MH, Rayatzadeh H, Razavi J, Azadi L. Extensive sino-orbital zygomycosis after heart transplantation: a case report. Transplant Proc. 2009;41(7):2927-9.
14. Fahimzad A, Chavoshzadeh Z, Abdollahpour H, Klein C, Rezaei N. Necrosis of nasal cartilage due to mucormycosis in a patient with severe congenital neutropenia due to HAX1 deficiency. J Investig Allergol Clin Immunol. 2008;18(6):469-72.
15. Belfiori R, Terenzi A, Marchesini L, Repetto A. Absidia Corymbifera in an immune competent accident victim with multiple abdominal injuries: case report. BMC Infect Dis. 2007;7:46.
16. Pipet A, Mallet JP, Marty C, Sandron D, Benard L, Leberre JY, Thibaut F, Morin O, Bettembourg A. Pulmonary mucormycosis: difficulties in diagnosis and treatment. Rev Mal Respir. 2007;24(5):617-21.
17. Rapidis AD. Orbitomaxillary mucormycosis (zygomycosis) and the surgical approach to treatment: perspectives from a maxillofacial surgeon. Clin Microbiol Infect. 2009 Suppl 5:98-102.
18. Mezhir JJ, Mullane KM, Zarling J, Satoskar R, Pai RK, Roggin KK. Successful Nonoperative Management of Gastrointestinal Mucormycosis: Novel Therapy for Invasive Disease. Surg Infect (Larchmt). 2009 Jun 1. [Epub ahead of print]

19. Baradkar VP, Mathur M, Taklikar S, Rathi M, Kumar S. Fatal rhino-orbito-cerebral infection caused by Saksenaea vasiformis in an immunocompetent individual: first case report from India. Indian J Med Microbiol. 2008;26(4):385-7.

CITATION OF THIS ARTICLE
Babak G, Morteza A, Mohamad R H A, Samira M G,Ehsan H. Mucormycosis; Clinical Manifestation, Diagnosis and Management; Study of Nine Cases. Bull. Env. Pharmacol. Life Sci., Vol 3 [11] October 2014: 86-89