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Rhinocerebral mucormycosis: a case series

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ABSTRACT

Background: The study is aimed to evaluate the role played by predisposing conditions like diabetes mellitus and precipitating factors like renal failure are discussed briefly here.
Methods: The prospective study of treatment of rhinocerebral mucormycosis on dialysis for renal failure without control subjects was evaluated. Subjects were patients with uncontrolled diabetes with renal failure presenting with rhinocerebral mucormycosis. Complete blood count, renal function tests, CT scan of paranasal sinuses and brain, nasal endoscopy and biopsy was done in all the 10 patients.
Results: Seven patients were on long term dialysis except one patient who was on dialysis for the first time. Amphotericin was started for all 10 patients. Seven patients who were on long term dialysis did not recover from mucormycosis and succumbed to death (70% patients showed 30.71±17.18 days prognosis). Three patients (30% patients), who were not on dialysis and had a lesser degree of renal failure, responded to aggressive antifungal and surgical debridement treatment, and recovered from infection.
Conclusions: Mucormycosis in patients on dialysis is fatal. Improvement in renal function is a favourable prognostic factor for the successful treatment of mucormycosis.

Keywords: Amphotericin, Liposomal amphotericin, Dialysis, Renal failure

INTRODUCTION

Rhinocerebral mucormycosis is a rare and fatal infection of nasal cavity and sinuses.[1] It rarely affects otherwise healthy population. About 70% rhinocerebral cases are found in diabetes mellitus with ketoacidosis.[2] The classical presentation of rhinocerebral mucormycosis is involvement of nasal mucosa with invasion of paranasal sinuses and orbit.[3] Imaging technique may be suggestive of mucormycosis but are rarely diagnostic. Most common finding of CT brain and paranasal sinuses is sinus mucosal thickening or thickening of extraocular muscles.[4] Although MRI is more sensitive than CT scan, patient with rhinocerebral mucormycosis may have normal MRI and surgical exploration with biopsy of areas of suspicion should always be preferred in high risk patients.[5] As there are no reliable serologic tests. PCR based test or skin test for mucormycosis, the diagnosis should be made by the biopsy of infected tissue. It is important to initiate empirical treatment with polyene antifungal drugs even in suspected cases, while the diagnosis is being confirmed.[6] Prognosis is related to the length of time before diagnosis and treatment.[7] These cases are usually referred at the late stage to the otorhinolaryngologist.

METHODS

The present prospective study was analyzed in the Nephrology unit and Department of Otorhino-laryngology, Al Ameen Medical College and Hospital

Vijayapur (Karnataka, India), from January 2014 to July 2016. The study protocol was approved by Institutional Ethical Committee and consent was obtained from all the subjects before the study being started.

Patient evaluations

Ten patients of diabetes mellitus with invasive fungal diseases who had renal failure were studied. All the patients were evaluated with detailed history, otorhino-laryngological, ophthalmic and neurological examination, renal failure status, nasal endoscopy with biopsy. Diagnosis was confirmed by histopathological examination. CT scan of brain and paranasal sinuses was done in all cases to assess the extent of involvement. Medical treatment with Amphotericin or liposomal amphotericin was initiated as soon as diagnosis was suspected. Diagnosis was confirmed and surgical debridement was done in all cases.

Inclusion criteria

Diabetic patients with a microbiology report of mucormycosis from a biopsy specimen and with renal failure were included in the study.

Exclusion criteria

Diabetic patients with underlying malignancy were excluded from the study.

Statistical analysis

The data was compiled in a MS excel worksheet and analyzed using Epi Info version 6. Percentages and mean ±standard deviation were the statistical tests used to study the distribution among patients.

RESULTS

Ten patients with diabetes mellitus who were suffering from renal failure with biopsy proven mucormycosis were studied. All the patients had uncontrolled diabetes mellitus. All were farmers by profession. Patients were in between 35-70 years (mean age 51.80±11.38 years) with male to female ratio 5:1. A total of 10 mucormycosis patients, 8 males and 2 females were evaluated. The patients were aged from 35 to 66; the majority of the cases were aged between 41 and 60 (Table 1). Figure 1 showed details of organs involvement in mucormycosis. All mucormycosis patients presented nasal discharge and nasal stuffiness. Out of the 10 patients of mucormycosis, 8 had paranasal sinuses involvement (Figure 2), 7 had orbital involvement (Figure 3), 5 had cerebrum involvement, 2 had tongue infection (Figure 4) and 2 had hard palate involvement. Examination of oral cavity revealed perforation of hard palate with black eschar formation in one patient. Biopsy was taken in all cases which was positive for mucormycosis. All patients also underwent ophthalmologic examination, in view of diminished or loss of vision. The distant visual acuity ranged from 6/36 to complete loss of vision in affected eye. Seven patients were on long term dialysis except one who was on dialysis for the first time for acute renal failure. CT scan of paranasal sinuses was done in all cases to determine the extent of infection as depicted in Figure 2. Apart of routine complete blood counts serum creatinine test was performed. All patients had neutropenia, grossly deranged glycemic control, and deranged serum urea and creatinine values suggestive of chronic kidney disease. All patients with rhinocerebral mucormycosis were started on injectable amphotericin immediately and they responded well to amphotericin with surgical debridement. In 7 patients mean prognosis (survival rate) was 70% for 30.71±17.18 days. Three rhinocerebral mucormycosis patients were showed complete survival after treatment with amphotericin drug treatment.

Table 1: Distribution of age and sex in mucormycosis patients.

Age group (years)	Male (%)	Female (%)	Total
30-40	1 (12.5)	0	1
41-50	3 (37.5)	1 (50)	4
51-60	2 (25)	1 (50)	3
61-70	2 (25)	0	2
	8 (80)	2 (20)	10

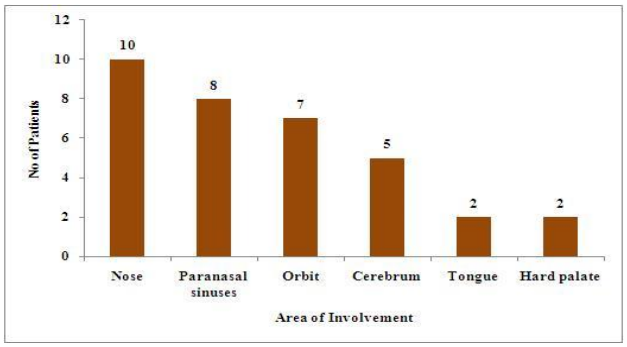

Figure 1: Distribution of involvement of nose, paranasal sinuses, orbit, cerebrum, tongue and hard palate in mucormycosis patients.

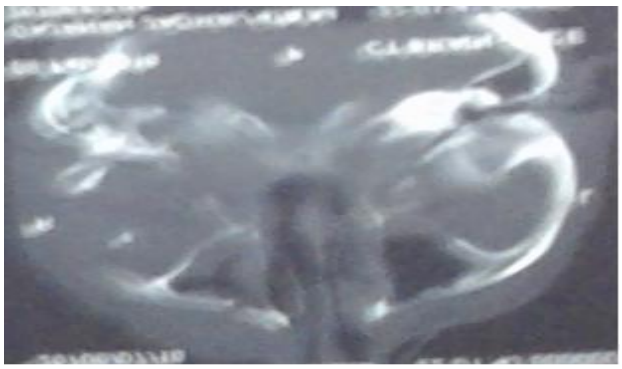

Figure 2: CT scan showing mucosal thickening of maxillary sinus.

Figure 3: A clinical photograph showing orbital involvement.

Figure 4: A clinical photograph showing tongue involvement.

DISCUSSION

Mucormycosis is opportunistic fungal infection caused by mucorales. It occurs mainly in those patients with diabetes mellitus and ketoacidosis, haematological malignancies, solid organ transplant recipients and in those who are on high dose steroids.[8-13] The commonest risk factor for the development of mucormycosis was diabetes. In a metaanalysis, 36% of the patients had diabetes as the risk factor for mucor. Another Indian study has reported diabetes as the main risk factor in 70% of the patients.[14] Most common sites for mucormycosis are sinus (39%), lungs (24%), skin (19%), brain (9%), GIT (7%), disseminated disease (6%) and other sites (6%).[15] Rhinocerebral mucormycosis also called as rhinosinus mucormycosis accounts for 33-50% of all cases of mucormycosis. Clinically it may manifest with necrosis of paranasal sinus or palate and tongue which may progress towards orbit before reaching intracranial structure.[16] Unresolved rhinosinus mucormycosis leads to thrombosis of cavernous sinus and cranial invasion. The rate of mortality of rhinoorbitalcerebral mucormycosis ranges from 30-69%.[17] Poor prognostic indicators are delay in treatment of more than 6 days, evidence of intracranial invasion, bilateral involvement, palate invasion and associated haematological malignancies.[18] In our study sites of mucormycosis in 10 patients were nose (10/10, 100%), sinus (8/10, 80%), orbit (7/10, 70%), cerebrum (05/10, 50%), tongue (02/10, 20%) and hard palate (02/10, 20%) as shown in Figure 1.

Early detection of mucormycosis is essential and incorporates clinical suspicion with culture and microscopic examination of the specimens.[19] A presumptive diagnosis of mucormycosis can be made histologically based on the broad ribbon-like hyphae, 10 to 20 µ across, haphazardly branched, and the absence or paucity of hyphal septations.[20] CT scan is initial investigation of choice. Fine-cut (2 mm) slices in the axial and coronal planes should be obtained in high-risk patients. Severe unilateral thickening of the nasal cavity mucosa has been shown to be the most consistent finding on CT, suggestive of underlying invasive fungal sinusitis. It has also been suggested that infiltration of the periantral fat planes may represent the earliest imaging evidence of mucormycosis. CT scans are helpful in defining individual variations in sinus architecture and possible periorbital and intracranial spread.[21] It is evident that prompt diagnosis and early initiation of management in form of surgical debridement with systemic antifungal therapy and correction of underlying predisposing risk factors, if possible; gives most promising results leading to decrease in morbidity and mortality.[22] According to few recent studies if treatment with polyene antifungal is initiated within 5 days of diagnosis of mucormycosis, survival was markedly improved compared to late initiation of treatment. (83% vs. 49% survival).[23] Medical antifungal therapy for most patients who have mucormycosis consists of systemic amphotericin B at intravenous doses of 0.25 to 1.0 mg/kg/d to a total dose of 2 to 4 g over six to eight weeks. The use of amphotericin B is limited in some patients secondary to renal toxicity, and they may be candidates for liposomal amphotericin B at a concentration of 3 to 5 mg/kg/d.[20] Moreover, there is evidence available that treatment of mucormycosis with liposomal amphotericin B was associated with a 67% survival rate, compared to 39% survival when patients were treated with amphotericin B.[23] In our study we also observed satisfactory results after treatment with amphotericin. Seven out of 10 pateints showed survival rate 70% for mean 30 days and 3 patients out of 10 showed good response (i.e. 30%) from rhinocerebral mucormycosis disease after treatment with amphotericin.

CONCLUSION

Mucormycosis in patients on dialysis is fatal. Improvement in renal function is a favourable prognostic factor for the successful treatment of mucormycosis. Our results show that early detection of sinonasal mucormycosis in immunocompromised patients enables prompt aggressive treatment. Powered endoscopic debridement is efficient and feasible, leading to excellent local control and which ultimately led to reduced morbidity and mortality. The aggressive control of immune compromise status along with surgery and 4

weeks of amphotericin drug can improve the mortality rates in such patients which happened in our cases.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Shekar V, Sikander J, Rangdhol V, Naidu M. Facial nerve paralysis: A case report of rare complication in uncontrolled diabetic patient with mucormycosis. J Nat Sci Biol Med. 2015;6:226-8.
2. Shinde RV, Karande GS, Mohite ST, Patil SR. Rhino-orbital mucormycosis in diabetes mellitus. J Clin Diagn Res. 2013;7:1145-7.
3. Singh I, Gupta V, Gupta SK, Goyal S, Kumar M, Singh A. Our experience in endoscopic management of mucormycosis: a case series and review of literature. Int J Otorhinolaryngol Head Neck Surg. 2017;3:465-71.
4. Fatterpekar GS, Arbealez MA, Maheashwari S, Castillo M. Fungal diseases of the paranasal sinuses. Semin Ultrasound CT MR. 1999;20:391-401.
5. Herrera DA, Dublin AB, Ormsby EL, Aminpour S, Howell LP. Imaging findings of rhinocerebral mucormycosis. Skull Base. 2009;19:117-25.
6. Arvanitis M, Anagnostou T, Fuchs BB, Caliendo AM, Mylonakis E. Molecular and nonmolecular diagnostic methods for invasive fungal infections. Clin Microbiol Rev. 2014;27:490-526.
7. Rougraff BT, Lawrence J, Davis K. Length of Symptoms Before Referral: Prognostic variable for high-grade soft tissue sarcoma? Clin Orthop Relat Res. 2012;470:706-11.
8. Ingram CW, Sennesh J, Cooper JN, Perfect JR. Disseminated zygomycosis :report of four cases and review. Rev Infect Dis. 1989;11:741-54.
9. Morrisson VA, Mcglave PB. Mucormycosis in the BMT population. Bone marrow Transplant. 1993;11:383-8.
10. Maertens J, Demuynck H, Verbeken EK, Zachée P, Verhoef GE, Vandenberghe P, et al. Mucormycosis in allogenic bone marrow transplant recipients :report of five cases and review of the role of iron overload in the pathogenesis. Bone marrow Transplant. 1999;24:307-12.
11. Kontoyiannis DP, Wessel VC, Bodey GP, Rolston KV. Zygomycosis in the 1990s in a tertiary-care cancer center. Clin Infect Dis. 2000;30:851-6.
12. Herbrecht R, Letscher-Bru V, Bowden RA, Kusne S, Anaissie EJ, Graybill JR, et al. Treatment of 21 cases of invasive mucormycosis with amphotericin B colloidal dispersion. Eur J Clin Micorbial Infect Dis. 2001;20;460-6.
13. Baddley JW, Stroud TP, Salzman D, Pappas PG. Invasive mold infections in allogenic bone marrow transplant recepients. Clin Infect Dis. 2001;32:1319-24.
14. Chakrabarti A, Das A, Mandal J, Shivaprakash MR, George VK, Tarai B, Rao P, et al. The rising trend of invasive zygomycosis in patients with uncontrolled diabetes mellitus. Med Mycol 2006;44:335-42.
15. Roden MM, Zaoutis Te, Buchanan WL, Knudsen TA, Sarkisova TA, Schaufele RL, et al. Epidemiology and outcome of zygomycosis:a review of 929 reported cases. Clin Infect Dis. 2005;41:634-53.
16. Effat KG, Karam M, EL-Kabani A. Potts puffy tumour caused by mucormycosis. J Laryngol Otol. 2005;119:643-5.
17. Gleissner B, Schilling A, Anagnostopolous I, Seihl I, Thiel E. Improved outcome of zygomycosis in patients with haematological diseases? Leuk Lymphoma. 2004;45:1351-60.
18. Parfery, NA. Improved diagonis and prognosis of mucormycosis. A clinicopathologic study of 33 cases. Medicine (Baltimore). 1986;65:113-23.
19. Schell WA. Histopathology of fungal rhinosinusitis. Otolaryngol Clin North Am. 2000;33:251-76.
20. Epstein VA, Kern RC. Invasive fungal sinusitis and complications of rhinosinusitis. Otolaryngol Clin North Am. 2008;41:497-524.
21. Gillespie MB, O'Malley BW. An algorithmic approach to the diagnosis and management of invasive fungal rhinosinusitis in the immunocompromised patient. Otolaryngol Clin North Am. 2000;33:323-34.
22. Parikh SL, Venkatraman G, DelGaudio JM. Invasive fungal sinusitis: a 15-year review from a single institution. Am J Rhinol. 2004;18:75-81.
23. Spellberg B, Ibrahim AS. Recent advances in the treatment of mucormycosis. Curr Infect Dis Rep. 2010;12:423-9.

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