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EVALUATION OF PATIENT WITH SINONASAL MUCORMYCOSIS REFERED TO THE EAR, NOSE, AND THROAT (ENT) DEPARTMENT OF EMAM KHOMEINI HOSPITAL OF AHVAZ FROM 2001 UNTIL 2016

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ABSTRACT

Mucormycosis is an acute opportunistic infection which is caused by the most prevalent subgroup of mucoracae family, namely Rhizus oryazae. Mucormycosis infection could engage nose, paranasal sinuses, orbit and palate, as well as central nervous system. The fungi, when detected in the sinuses, could cause a wide range of diseases. The statistical population targeted in the present study includes the patients hospitalized during 2001 to 2016 in the ENT Department of Imam Khomeini Hospital (Ahvaz, Iran) who was diagnosed with mucormycosis of nose and sinus. This study is a review of hospital records containing patients' information such as age, sex, underlying disease, engaged sinuses, and extent to the neighbor structures. In this study, 48 patients were examined. The highest prevalence of the disease is associated with palate which was found in 22 patients (45.83 percent). The second highest extent of prevalence was associated with orbit as it was found in 16 patients (31.25 percent). The lowest level of involvement was associated with central nervous system as it was solely diagnosed in 10 patients (20.83 percent). The highest numbers of patients were within the age range 51-70 years were male patiants. Diabetes was found to be the most prevalent underlying disease.

KEYWORDS: ***Otorhinolaryngology, sinonasal, mucormycosis, fungal, infections***

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INTRODUCTION

Mucormycosis is an acute opportunistic infection which is caused by the most prevalent subgroup of mucoracae family, namely Rhizus oryazae.[1] Saprophytic aerobic fungi of the class Phycomycetes (order Mucorales) cause rhinocerebral mucormycosis, also known as phycomycosis [2] The fungi, when detected in the sinuses, could cause a wide range of diseases. Based on clinical symptoms, fungi-originated sinusitis could be categorized into five groups of aggressive, aggressive chronic, fungal pellets, saprophyticus and allergic fungal.[3] The first case of survival mucormycosis was reported in 2016.[4] The main risk factors for developing mucormycosis are neutropenia due to cancer treatment, hematopoietic and solid organ transplantation, diabetes mellitus, in particular when presenting with ketoacidosis (DKA), and other forms of acidosis. However, immunocompetent subjects can be affected when afflicted with trauma (e.g., soldiers in combat operations and patients with injuries due to natural disasters)[5-6] Mucormycosis infection could engage nose, paranasal sinuses, orbit and palate, as well as central nervous system.[7] The first symptoms in the nose are swelling and inflammation which are usually non-specific and they include turbinate congestion and nasal obstruction.[8] Progress of the disease causes ischemia and tissue necrosis while turbinates turn black. In the final aggressive stage, certain symptoms such as ptosis, orbital cellulitis, ophthalmoplasty, cavernous sinus thrombosis and engagement of cranial nerves may manifest themselves.[9] The infection can spread to adjacent structures and cause more widespread and devastating disease. Imaging with a computed tomography (CT) or the use of magnetic resonance imaging is quite helpful in the diagnosis of such disease. Infections carry a high mortality rate and prognosis depends on the underlying condition. Mortality rates quoted in literature range from 20% to 70% [10], Managing this infection is primarily surgical but requires close medical management and often a collaboration of multiple specialties [11] The diagnosis of mucormycosis is challenging and treatment should start as early as possible in order to decrease mortality [12] No circulating antigen detection test (similar to galactomannan detection for invasive aspergillosis) is available for the diagnosis of mucormycosis, and although no sufficiently powered trials testing 1,3 beta-D-glucan in different types of mucormycosis have been performed, it is generally observed that 1,3 beta-Dglucan detection test is negative in Mucorales infections[13]. Definitive treatment for invasive fungal disease is surgical debridement because systemic medications cannot reach the infected tissue due to vaso-occlusion. Surgical management includes aggressive debridement of all necrotic tissue, sometimes requiring multiple debridement to reduce the microbial load[14]. Late diagnosis of the disease may lead to death. Diagnosis is done based on clinical symptoms and underlying disease. A definitive diagnosis is done by biopsy and culturing is not diagnostically valuable and its result is often negative.[15] Considering the high prevalence of the disease in Iran, especially in Ahvaz, the present study aims to study the prevalence of mucormycosis among patients visiting ENT Treatment Center of Imam Khomeini Hospital during 2001-2016. The hospital is administered by Jundishapur University of Medical Sciences.

Ethical issue

It was certified that all applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during this research. Informed written consent was obtained from all participants and the Ethical Committee of Jundishapur University of Medical Sciences. The study protocol conforms to the ethical guidelines of the 2008 Declaration of Helsinki. The study was approved by the University's Ethics Committee approved by medical ethic committee: IR.AJUMS.REC.1396.438

METHODOLOGY

The statistical population targeted in the present study includes the patients hospitalized during 2001 to 2016 in ENT department of Imam Khomeini Hispital (Ahvaz, Iran) which were diagnosed with mucormycosis of nose and sinus. During the study, review of hospital records contributed to extraction of patients' information such as age, sex, underlying disease, engaged sinuses, and extent of spread to adjacent buildings (and extent to the neighbor structures).

STATISTICAL ANALYSIS

To compare demographic and baseline characteristics of groups, independent samples t-test was used for continuous variables and Pearson chi-square tests were conducted for nominal variables. P-values less than 0.05 were considered

statistically significant. All tests were two-sided. The statistical software SPSS 18.0.0 (SPSS Inc. Chicago, IL, USA) was used for all data analyses.

RESULTS

In this study, 48 patients were examined. The population includes 30 male patients (62.5%) and 18 female patients (37.5%). The mean age of patients was 54.8 years and their ages ranged from 9 to 78 years. Most of the patients were within the age range of 51-70 years (56.25%). It should be noted that 39 patients had underlying diseases and the remaining 9 patients (18.75%) lacked such diseases. Diabetes was found to be the most prevalent disease. Diabetes, chronic renal failure, acute myeloid leukemia, and kidney transplant were found in 29, 4, 3 and 1 patient respectively. The most prevalent case of sinus engagement is ethmoidal sinus engagement which was found in all of the patients. Maxillary sinus involvement was found in 83.33 percent of patients while frontal sinus involvement was diagnosed in 29 cases (60.41 percent). Sphenoidal sinus involvement was found to be minimum (25 percent). The highest prevalence of the disease is associated with the palate which was found in 22 patients (45.83 percent). The second highest extent of prevalence was associated with orbit as it was found in 16 patients (31.25 percent). The lowest level of involvement was associated with central nervous system as it was solely diagnosed in 10 patients (20.83 percent). In the 35.42 percent of patients, spread to neighboring structures was not found. A summary of collected information is represented in the following Table 1.

Table 1
Collected information from patients

	Number	Percentage
Male	30	62.5
Female	18	37.5
10 Years>	1	2.08
11-30 Years	3	6.25
31-50 Years	10	20.83
51-70	27	56.25
70 Years <	7	14.59
DM	29	60/41
AML	3	6/25
CRF+DM	4	8/34
KTP	3	6/25
No Risk Factor	9	18/75
Ethmoid	48	100
Maxillary	40	83.33
Frontal	29	60.41
Sphenoid	12	25
Palate	12	25
Orbit	3	6/25
CNS	4	8/33
Palate+ Orbit	6	12/5
Orbit+ CNS	2	4/17
Orbit+ CNS+ Palate	4	8/33
No Spread to Adjacent Areas	17	35.42

DISCUSSION

Out of 48 patients diagnosed with mucormycosis, only 9 patients lacked immune system disorders and this suggests that in most of the cases mucormycosis contributes to the development of immune system disorders. Ekhvat et al (2009) suggested that most of the 22 patients with positive diagnostic results were male. In their study, 12 males and 10 females within respective minimum

and maximum ages of 16 and 73 years participated. The most prevalent underlying disease was found to be diabetes mellitus which was consistent with the findings of the present study. The prevalence levels of leukemia, lupus, and chronic kidney disease among the patients were 9.6, 4.8 and 4.3 percent respectively. In addition, 9.6 percent of the patients lacked any risk factors while a higher percentage (i.e. 18.75%) of patients in the present study were found to lack any risk factor.[2] In another study, Javadi et al [14], 21 patients were examined. In their study, 14 participants were male and 7 participants were female. Similar to present study, diabetes, renal failure, leukemia and lupus were found in 10, 4, 3 and 1 patient respectively. This suggests that the most prevalent disease was diabetes. Similar to the results of the present study, the findings of their study suggested that ethmoidal sinuses followed by maxillary and sphenoidal sinuses were the most frequently involved ones. The least level of involvement was related to frontal sinuses and this result is not supported by the present study as it suggests that sphenoidal sinus involvement is minimal.

CONCLUSION

The age range of 51-70 years was characterized by the highest number of patients and prevalence level for male patients was higher. Diabetes was found to be the most prevalent underlying disease. In addition, the findings suggested that ethmoidal and sphenoidal sinuses had highest and lowest involvement levels. The highest level of spread to adjacent tissues was related to palatal spread.

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AUTHORS CONTRIBUTION STATEMENT

Hassan Abshirini and Peyman Kaveh conceived of the presented idea. Hassan Abshirini developed the theory and performed the computations. Mohmmad Javad Namazi and Amir Mohammad Eghbalnejad Mofrad verified the analytical methods. Peyman Kaveh encouraged Hassan Abshirini to investigate and supervised the findings of this work. All authors discussed the results and contributed to the final manuscript.

CONFLICT OF INTEREST

Conflicts of interest declared none.

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