



COMPARISON OF SENSITIVITY OF KOH MOUNT AND CULTURE METHODS FOR THE DIAGNOSIS OF MUCORMYCOSIS IN A TERTIARY CARE HOSPITAL IN SOUTH INDIA.

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ABSTRACT

Introduction: Rhino-orbital mucormycosis is an invasive fungal infection that occurs primarily in the paranasal sinuses and progresses to involve orbit and the brain. The aim of the study was to compare the sensitivity of potassium hydroxide mount and fungal culture in the detection of mucormycosis and to determine the common fungi that are isolated in cases of rhino-orbital mucormycosis. **Materials & Methods:** The present study was conducted at the department of ENT, ASRAM Medical College, Eluru, A.P. 25 patients clinically diagnosed with rhino-orbital mucormycosis were included in the present study between June 2021 to July 2021. **Results:** Out of 25 patients diagnosed and managed as rhino-orbital mucormycosis, 17(68%) were male, and 8 (22%) were female. 50 – 59 years was the most commonly affected age group - 15(60%) followed by 40 – 49 years – 4(16%); among 25 patients in our study, 21 Were KOH positive, and four were negative. Out of 21 who were KOH positive in 14(66.7%) isolated were species of Mucor, in 6 patients(28.6%) rhizopus spp. Was isolated, and in one individual candida. spp was isolated. 4 patients who were initially KOH negative were found to be culture-positive, and in 3 individuals, Rhizopus spp were isolated, and in 1 individual Mucor was isolated. **Conclusion:** Early detection of the disease and prompt treatment are the vital steps in managing rhino-orbital mucormycosis. KOH mount gives us a prompt idea about the diagnosis and helps us plan surgery. Microbiological diagnosis is vital to patient recovery and management. Treatment with surgical debridement plays a vital role along with Inj. Amphotericin B and Tab. Posaconazole for complete clearance of the disease and to prevent further spread.

KEYWORDS :

INTRODUCTION

Fungal infections caused by members of the Mucorales order are rapidly progressing and fatal. The importance of mucormycosis has grown in recent years as the number of patients with predisposing factors has increased dramatically. Clinical symptoms are elusive and conventional techniques are often insensitive and unspecific; in particular, cultures are often negative even though direct microscopy is positive. For early diagnosis of the causative agent of disease and subsequently guiding therapy to improving patients' outcome, This article provides an overview on current laboratory methods for diagnosing mucormycosis and study the various fungi causing mucormycosis. We aim to highlight the pros and cons of various techniques at hand. Given the increase in number and the severity of these infections, especially in the present COVID -19 pandemic, this study on rhino-orbital mucormycosis in our district is highly warranted.

AIMS & OBJECTIVES

- To study the prevalence of various fungal causes of Rhino-orbital mucormycosis at our institution.
- Comparison of sensitivity of potassium hydroxide KOH mount and culture methods for microbiological diagnosis of rhino-orbital mucormycosis.

MATERIALS AND METHODS

The present study titled " Comparison of the sensitivity of Koh mount and culture methods for the diagnosis of mucormycosis" was conducted in the Department of ENT, and Dept of Microbiology In ASRAM Medical College, Eluru, A.P., in 1 month, i.e. 1st June 2021 to 1st July 2021.

Study design: Retrospective case series

Sample size: 25 patients

Statistical analysis:

Data was collected and tabulated in an excel sheet. Results are presented as percentages.

Inclusion criteria:

patients with nasal, orbital and maxillary and palate involvement, Patients with intracranial extensions.

Exclusion criteria: revision cases and those who were treated medically.

METHODOLOGY

25 patients clinically diagnosed with rhino-orbital, rhino-maxillo-orbital, rhino-maxillary mucormycosis were included in the present study. Detailed history regarding onset and progression of symptoms, clinical examination and diagnostic endoscopy was performed in all patients. The eschar within the nose and paranasal sinuses were detected for fungal elements using KOH mount. This was followed by C.T. of the nose and paranasal sinuses, and MRI brain and orbit with contrast was done when the intracranial and intraorbital extension was suspected.

Patients were taken for surgical debridement of necrotic material within the nose and paranasal sinuses. Patients who had orbital involvement, orbitotomy was done to prevent spread intracranially. And the debris collected in O.T. were further sent for fungal culture to confirm the diagnosis.

Testing samples in the Department of Microbiology included direct KOH mount examination And fungal culture on Sabourauds dextrose agar with antibiotics. The direct demonstration of fungal elements in the clinical sample is essential in establishing the diagnosis within a short period. The microscopic examinations of specimen in KOH (10% potassium hydroxide) wet mount were done to detect characteristic broad, sparsely septate, ribbon-like hyphae with wide-angle or right-angle branching at irregular intervals.

The tissue sample was cut into small pieces and inoculated without crushing in two tubes containing Sabouraud Dextrose Agar (SDA) with antibiotics (with chloramphenicol and gentamicin, without cycloheximide) and on two tubes without antibiotics, with one tube from each set incubated at 37°C and 22°C. The sample was also inoculated in brain heart infusion broth (BHIB) and blood agar and incubated at 37°C. Cultures were examined for growth daily for the first week and twice a week for the subsequent period. The fungal isolates were finally identified by conventional techniques like lactophenol cotton blue (LCB) mount.

RESULTS

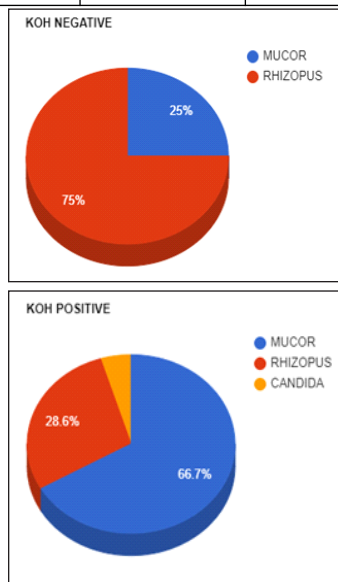
Out of 25 patients diagnosed and managed as rhino-orbital mucormycosis, 17(68%) were male and 8 (22%) were female. 50 – 59 years was the most commonly affected age group - 15(60%) followed by 40 – 49 years – 4(16%).

TABLE 1.
Showing type of species isolated in culture after KOH mount is positive.

KOH MOUNT +VE	SPECIES IF +VE	CULTURE	SPECIES IF +VE
6	ZYGOMYCOSIS	6	RHIZOPUS
1	CANDIDA	1	CANDIDA
14	ZYGOMYCOSIS	14	MUCOR

TABLE 2
Showing type of species isolated in culture after KOH mount is negative.

KOH MOUNT -VE	CULTURE +VE	SPECIES ISOLATED
3	3	RHIZOPUS
1	1	MUCOR



Among 25 patients in our study 21 Were KOH positive and 4 were negative.out of 21 who were positive in 14(66.7%) isolated species in culture were Mucor spp.in 6 patients(28.6%) rhizopus spp was isolated.and in one individual candida spp was isolated.

In 4 patients who were initially KOH negative were found to be culture positive and in 3 individuals Rhizopus was isolated and in 1 individual mucor was isolated.

DISCUSSION

Mucormycosis was first reported as a cause of human disease in 1885 [2]. During the last two decades, there has been a dramatic increase in the occurrence of invasive fungal infections observed worldwide, largely due to the increase in the size of the population at risk. During this period of increased incidence of fungal infections, mucormycosis is not the exception. It is usually an acute necrotizing fungal infection with a fulminant course due to angioinvasion. The rise in the number of patients with mucormycosis in developed countries has been particularly evident in hematopoietic stem cell transplant recipients and patients with haematological malignancies [3]. The rise in the number of patients with invasive mucormycosis may be correlated with an increase in the population of diabetics in developing and tropical countries. Countries like India, China, the United States, and Indonesia have the highest number of diabetic patients; for example, India probably has more than 30 million diabetic individuals. Therefore, mucormycosis can establish themselves on such patients with uncontrolled diabetes mellitus.[11]

Various risk factors are associated with the development of mucormycosis. In uncontrolled diabetes, ketoacidosis is considered the critical factor for predisposition to mucormycetes infection, as low serum pH diminishes the phagocytic effect of macrophages, chemotactic and oxidative burst of neutrophils. Macrophages and neutrophils are the primary host defences against the invasion of mucormycetes. Moreover, other serum components like the transferrin system are less active at acidic pH, allowing unbound iron to circulate in the blood. The free iron is then utilized by mucormycetes. In a study conducted by Roden et al. [1], .of 929 patients diagnosed with

mucormycosis, the mean age was 38.8 years, and disease was more common in males (65%) as compared to females (35%). In the present study, the most common is in males (60%) compared to females (40%).

Among mucormycetes, members of the genera Rhizopus Mucor, Lichtheimia, Rhizomucor, and Apophysomyces are commonly implicated in causing human infection, and overall Rhizopus species are the most commonly isolated agent from patients with mucormycosis [1].in the present study Among 25 patients in our study 21 Was KOH positive, and four were negative. Out of 21 who were positive in 14(66.7%), isolated species in culture was mucor. In 6 patients(28.6%), isolated species was rhizopus. And in one individual isolated species was candida.

Four patients who were initially KOH negative were found to be culture-positive, and in 3 individuals, Rhizopus was isolated, and in 1 individual, mucor was isolated.

Appropriate surgical management and treatment for the elimination of infection could be initiated because of timely microbiological diagnosis.

CONCLUSION

Rhino-orbito-cerebral mucormycosis is a rapidly progressive disease with a fulminant course and fatal outcome unless diagnosed early and treated appropriately. Fast diagnosis plays a vital role in treatment so that initial KOH mount can be an important test for diagnosis of mucormycosis, .and tissue can be quickly taken in OPD. Later fungal culture can confirm the diagnosis and be used for maintenance therapy post surgically. And also to use appropriate antifungals to prevent a recurrence. Treatment with surgical debridement plays a vital role along with Inj. Amphotericin B and Tab. Posaconazole for complete clearance of the disease and to prevent further spread. The present study, therefore, emphasizes the need for further awareness of the disease and aggressive measures for early diagnosis and management.

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