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A Study of surgical management of rhino-orbital mucormycosis:

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Abstract:

Background:

Only about 0.1% (over 250 fungal species) are recognized as human pathogens. Their incidence and diversity has increased dramatically in recent years. Mucormycosis, a rare, potentially deadly infection , is caused by the fungus of the order Mucorales. But when it does occur, it is well remembered by those who have cared for the afflicted patient because of the speed with which it can progress. It has certainly earned the designation of the most acutely fatal fungal infection known to man. This study is undertaken to assess the surgical management, and outcome of rhino-orbital mucormycosis

Aims and Objectives:

To study the surgical treatment management and their outcomes.

Materials and Methods:

This study was done in the Department of Otorhinolaryngology, Gadag Institute Of Medical Sciences, Gadag, Karnataka, India.

The study was done from June 2020 to September 2021.

Thirty people were included in the study.

Results:

Without the surgery it was fatal in 100 percent. With multiple surgeries depending upon the extensions the result was found to be very good without taking the co-morbidities, initial signs and symptom into consideration.

Conclusion:

Its very deadly so prompt surgical management is a necessity.

Keywords: Fungal, mucormycosis, surgical, outcome, management.

Introduction:

Fungi are a major part of the ecosystem. With over 50,000 fungal species identified in the world, they are integrated critically into the lifecycle from birth to death(1) . Only about 0.1% (over 250 fungal species) are recognized as human pathogens. (2) Their incidence and diversity has increased dramatically in recent years.(3) Mucormycosis, a rare, potentially deadly infection , is caused by the fungus of the order Mucorales. But when it does occur, it is well remembered by those who have cared for the afflicted patient because of the speed with which it can progress. It has certainly earned the designation of the most acutely fatal fungal infection known to man. Mucormycosis is best known

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for its rhino-cerebral presentation even though it can infect the lungs, central nervous system, gastrointestinal tract, skin etc. Progressing through the stages of rhinomaxillary, rhino-orbital and rhino-orbito-cerebral mucormycosis(4), it is rapidly fatal in 50 to 80%. It primarily affects immunocompromised patients, more commonly diabetics but seldom infects a healthy host. (5) The clinical hallmark of invasive mucormycosis is tissue necrosis resulting from angioinvasion and subsequent thrombosis. In most cases, the infection is rapidly progressive and results in death unless underlying risk factors (i.e., metabolic acidosis) are corrected and 2 aggressive treatment with antifungal agents and surgical excision is instituted.(2) This study is undertaken to assess the surgical management, and outcome of rhino-orbital mucormycosis

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Materials and Methods:

This study was done in the Department of Otorhinolaryngology, Gadag Institute Of Medical Sciences, Gadag, Karnataka, India.

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Thirty people were included in the study.

Surgical procedures included endoscopic debridement, maxillectomy, orbital decompression with or without optic nerve decompression, sequestrectomy etc. Patients were also taken up for multiple procedures as and when required. The surgical procedures were done in either general anaesthesia or local anaesthesia. Since there is very little bleeding and decreased pain sensation, local anaesthesia was the preferred modality. Transnasal endoscopic debridement of all the necrotic material and unhealthy mucosa up to the point of presence of active bleeding or pain sensation was the main surgical modality. Maxillectomy was performed with an endoscope or sublabial approach or open approach using Weber Ferguson incision. It was either partial (medial maxillectomy, inferior maxillectomy or subtotal maxillectomy) or total maxillectomy. The defect created either by maxillectomy or a pre-existing oroantral fistula was covered by obturator of the appropriate size. They were immediate (up to 2 weeks), intermediate (2 weeks to 3 months) and permanent (after 3 months). Orbital decompression was most commonly done endoscopically, by removing the lamina papyraceae, incising the orbital periosteum and draining the pus if present. Other surgeries were done as and when required. Since mucormycosis is a very fatal disease, the outcome is determined as death or survival. But, comparison of other factors like complaints and diagnostic nasal endoscopy with the initial presentation are also used to evaluate the patient post-treatment. All the patients were followed up to 6 months with reviews at 1 month, 3 months and 6 months during which diagnostic nasal endoscopy was done. If needed, a Computer Tomography of the Paranasal Sinus was also taken.

Results:

Most of the patients were middle-aged. Meanage was53.14years±9.72years.In gender distribution, there is as light preponderance towards males with18/30male patients and the remaining were female patients

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Graph 1: Mean Age and Sex Distribution:

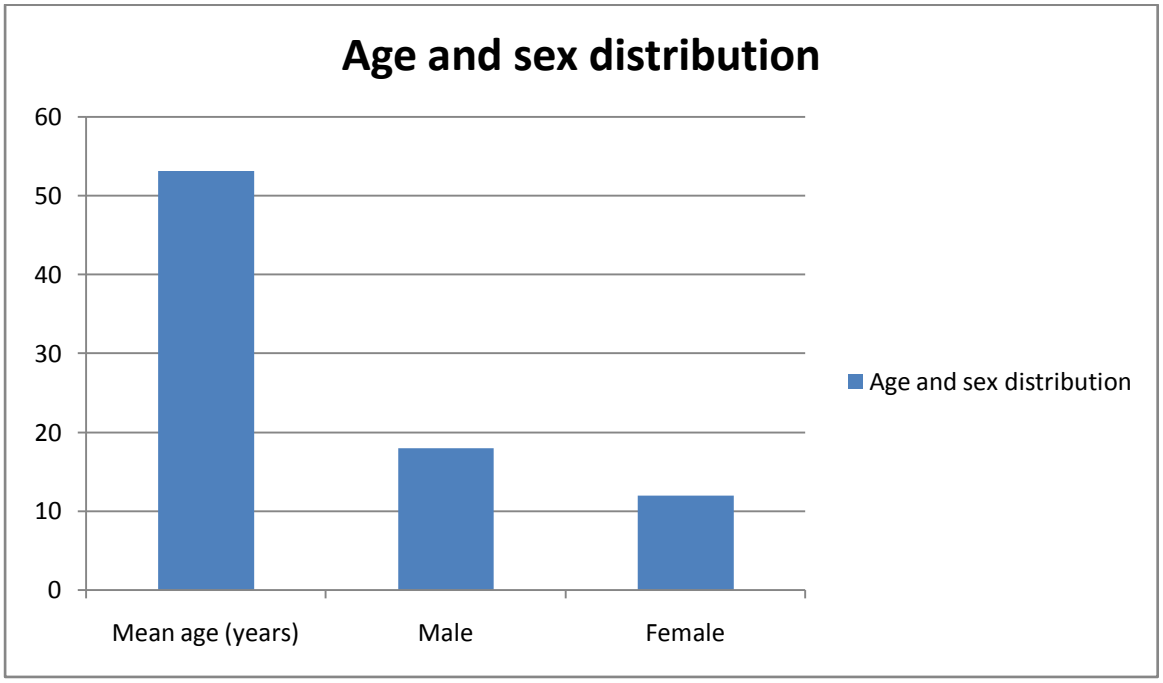

Table 2: Stage of Presentation

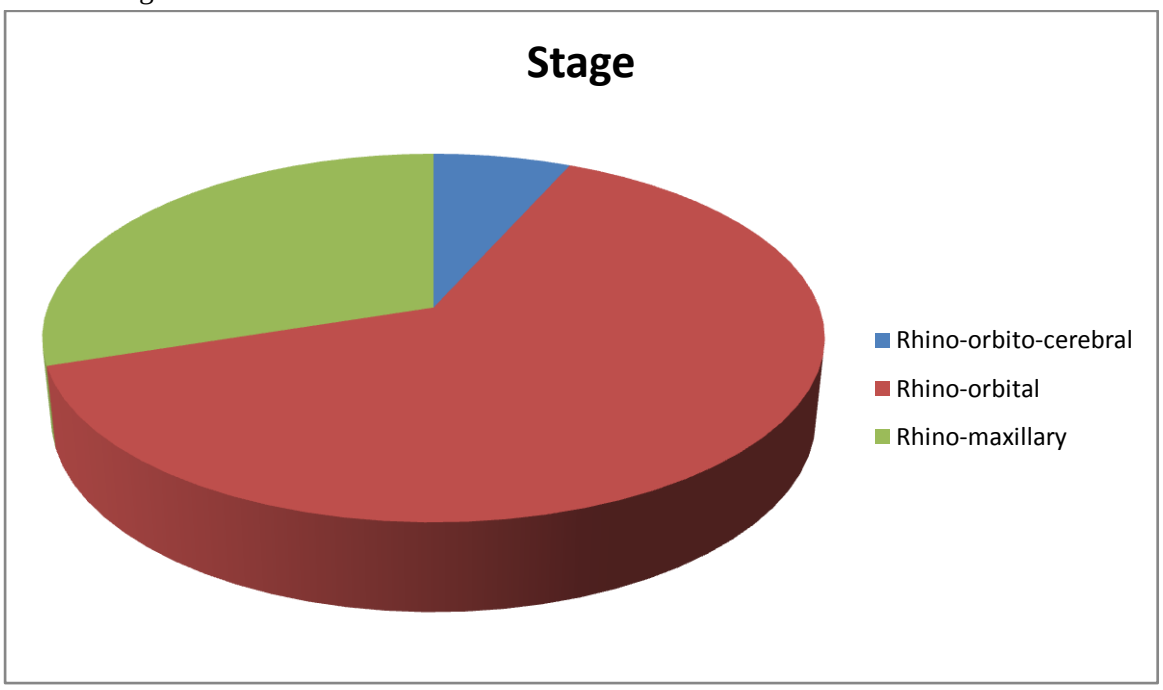

Table 3: Surgical Management

SurgicalManagement	NumberofPatients
EndoscopicDebridement	21
Maxillectomy	13
OrbitalDecompression	09

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Sequestrectomy	02

Table 4: Number of surgical procedures:

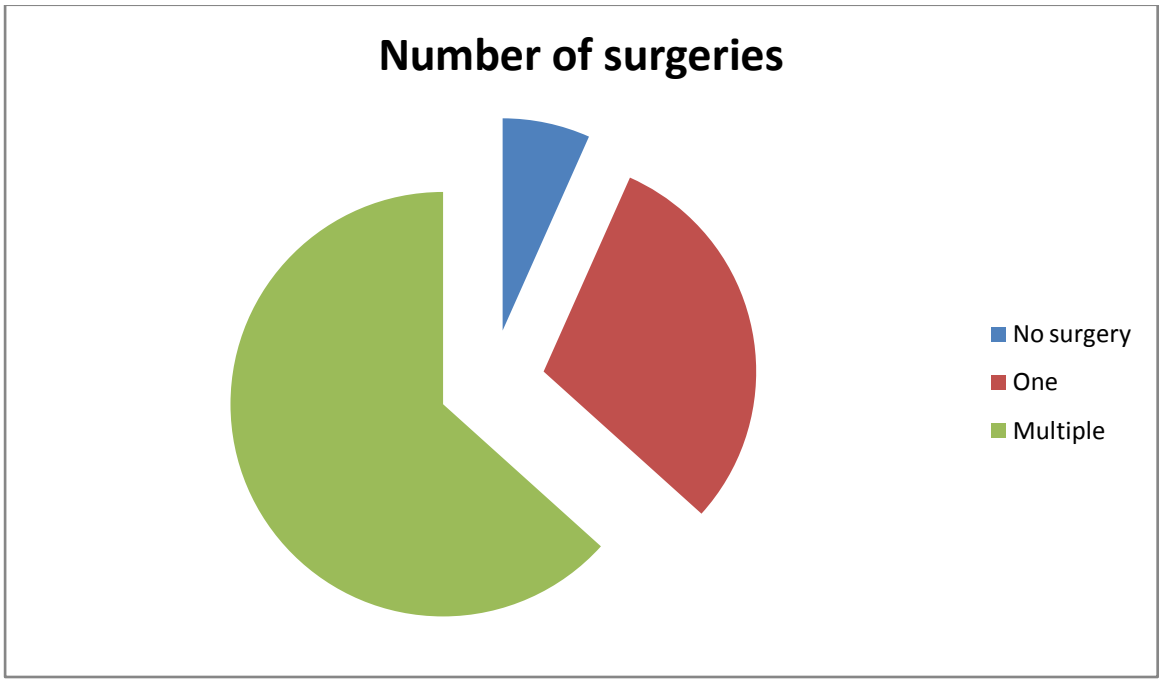

Table 5: outcome

	Alive	Death
No Surgery	Nil	2
Single surgery	9	Nil
Multiple Surgeries	17	2

- Since the mortality rate ofmucormycosis is very high (>50%), theoutcomewasmeasuredwithmortalityandsurvivalrates.Inthisstudy,therewasa86.66%survivalrateatthetimeofdischarge.Only13.33%mortalitywaspresent.

Discussion:

W. Jeong et al in their study on The epidemiology and clinical manifestations of mucormycosis: a systematic review and metaanalysis of case reports (7), in 2018 analysed 851 patients from 2000 to 2017. 34% were from Europe, 31% from Asia and 28% from North/South America. Median age was 51 years. 63% were men. Median time to diagnosis was 10 days. Diabetes was the most common 5 underlying condition (40%) of which 20% had diabetic ketoacidosis. 42% had hematological malignancies and 14% received solid organ transplant. Corticosteroid use was present in 33%. 34% had rhinoorbital-cerebral mucormycosis, 22% cutaneous and 20% pulmonary mucormycosis. ROCM was more commonly identified in diabetics (51%) than non-diabetics (23%). 88% had proven mucormycosis and 12% probably. Histopathology was done in 83% and culture in 69 %(of which 79% grew). Rhizopus species was the most common (48%). Overall mortality was 46%, highest in disseminated (68%) and lowest with cutaneous (31%) Dora E. Corzo-Leo´n et al in their study

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Diabetes mellitus as the major risk factor for mucormycosis in Mexico: Epidemiology, diagnosis, and outcomes of reported cases(8) analysed the literature of 418 cases that occurred in Mexico between 1982 and 2016. A clinical algorithm for early diagnosis was devised in this study. Median age was 42 years with 54% males. 72% were diabetics, of which 42% had ketoacidosis. 18% had an underlying malignancy. 75% were sino-nasal mucormycosis. Histopathology was positive in 88%, cytology in 98% and culture in 71%. Rhizopus species were the most frequent isolates (59%) followed by Mucorspp (28%). Mortality rate was 51% (125/244). Combined treatment with surgery and antifungal agents was used in 77 % (162/209) of which 47% died. This strategy significantly improved mortality in ROCM. Antifungal therapy alone was used in 14% (29/209) 6 of which 76% died. 15 patients did not receive any treatment and there was 100% mortality. A Chakrabarti et al Invasive zygomycosis in India: experience in a tertiary care hospital(9), 75 cases were reported from July 2006 to December 2007 with antemortem diagnosis in 81%. Rhino-orbitocerebralmucormycosis was 48% - the most common variant. Uncontrolled diabetes mellitus (58%) with 38% having diabetic ketoacidosis were significant underlying condition in ROCM. Mean age was 33 years, male to female ratio 2.6:1. Orbital presentations were most common - ophthalmoplegia (75%), proptosis (72%), and loss of vision (61%). Fever was uncommon 44%. ROCM divided into three clinical stages based on the extent of involvement: stage I had signs and symptoms limited to the sino-nasal area, stage II had sino-orbital disease, and stage III had intracranial extension from sino-nasal disease. The overall mortality was 45%. The mortality rate was significantly high (85%), 11/13 in patients who were managed without surgical debridement. Patients in stage III had significantly higher (89%, p=0.018) mortality compared to stages I or II. JyotiShaileshKolekar published a study, Rhino-cerebral Mucormycosis: A Retrospective Study(10) in 2014. 20 diagnosed cases of rhino-cerebral mucormycosis, between February 2003 to January 2006, at two institutions, were included in the study. The study 7 evaluated the etiology, pathology, clinical features, diagnosis, the management, and complications. (10 men and 10 women). The median age was 60 years (range 24–80 years). 80 % had uncontrolled diabetes mellitus. Symptoms were fever (50 %), nasal discharge (60 %), black necrotic turbinates (50 %), palatal ulceration or perforation (10 %), septal perforation (10 %) ,periorbital or facial swelling (40 %), oedema of lids (40 %), chemosis (40 %),decreased vision (40 %), restricted movements of eyeball (40 %) ophthalmoplegia (30 %), headache (30 %), sinusitis (30 %), facial paralysis (10 %), and confusion (20 %). Systemic Antifungal Therapy- Amphotericin B was given depending upon extent and aggressiveness of disease in the dose of 5 mg/kg for a period of 6–12 weeks. Repeated surgical debridement of paranasal sinuses and orbital exenteration were done. Approaches used for debridement of paranasal sinuses were endoscopy (75 %), Caldwell Luc (20 %), lateral rhinotomy (10 %), and combined approach (20 %). Diagnostic nasal endoscopy was done twice a week to rule out recurrence. The overall survival rates were 55 %. Diagnostic nasal endoscopy was done during follow up. Recurrence rate was 20 %

Conclusion:

Bold investigations and frank treatment has to be initiated. Surgical management is the key which would decide the fate of the patient.

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