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A study on the presentation of symptoms in mucormycosis patients post COVID 19 infection – A retrospective study

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Abstract – Introduction: Mucormycosis is an opportunistic fulminant fungal infection caused by zygomycetes. This fungus is more common, particularly in the uncontrolled diabetes mellitus and immunocompromised state. There has been a recent surge of mucormycosis cases during the wave of COVID 19 because of patients having a weak immune system due to the COVID 19 infection which is also being treated with steroids which puts the body in a immunocompromised state. This also causes uncontrolled diabetes which is a predisposing factor for mucormycosis, also is the reason for delayed recovery. Zygomycetes impinge into the vascular network, resulting in thrombosis and necrosis of the surrounding hard and soft tissues. The infection begins in the nose and paranasal sinuses due to inhalation of fungal spores and spread to orbital and intracranial structures either by direct invasion or through the blood vessels. Aim and Method: In this study we have retrospectively studied 30 cases of mucormycosis admitted in saveetha medical college and hospital between April 2021 to September 2021. All the cases included in this study had a recent history of COVID 19 infection in the past 2 weeks for which they were treated with steroids. Results: 30 patients were included in the study, all of them had a recent history of COVID 19 in the past 2 weeks for which they received steroids as a part of their treatment for COVID19. This study involved 19(63.3%) males and 11(36.6%) females. The first symptoms is hemifacial pain in 12(40%) patients, toothache in 4(13.3%) patients, peri orbital pain in 6(20%) patients, nasal discharge in 8(26.6%) patients. Conclusion: Murcormycosis is a life-threatening disease which requires immediate management and extensive care. Knowing the presenting symptoms and clinical features of the disease helps in early diagnosis which helps in better and multidirectional approach for the management of mucormycosis

Key words: Mucormycosis, COVID 19.

INTRODUCTION

Mucormycosis is known for its high pathogenicity, characterised by rapid tissue and bone invasion and destruction. This is caused by a filamentous fungi[10], Rhizopus which is a mucorale fungi. Major risk factors for mucormycosis include uncontrolled diabetes, diabetes with ketoacidosis, haematological malignancies, haemodialysis, stem cell and organ transplantation, iron chelation therapy, and use of systemic corticosteroids[3]. Mucormycosis is seen in immunocompromised rather than in immunocompetent people. In a normally functioning immune system the spores and hyphae are readily taken up and destroyed by mononuclear and polymorphonuclear phagocytes. When patients have low phagocyte counts, impaired phagocytic function, or poorly controlled diabetes, they become increasingly susceptible to invasive mucormycosis[4]. In mucormycosis the hallmark of the disease is tissue necrosis due to vascular invasion and subsequent thrombosis. This manifests as the infamous black necrotic scab. The fungus enters the paranasal sinuses by inhalation and eventually spreads all the sinuses, orbits and brain by bony invasion and

necrosis[4,5]. Patients may complain of hemifacial pain, swelling and paresthesia, headache, periorbital pain and swelling, proptosis, blurring of vision, loss of vision, toothache, loosening of teeth, nasal discharge, nose block, erosion of hard palate.

Corona virus disease (COVID 19) is caused by novel severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). The first case was reported in Wuhan district, China in late December 2019 from where the disease spread worldwide. WHO had declared the COVID 19 disease as a pandemic by march 11 2020[6]. SARS-CoV-2 is a positive sense, single stranded RNA virus with a diameter of 60-140mm with an incubation period ranging from 1-14 days[8,9]. Symptoms of COVID 19 disease include cough, sore throat, headache, fever, myalgia, diarrhoea, loss of taste, loss of smell, nasal congestion, rhinorrhoea, dyspnoea[7,9]. It can be associated with a variety of clinical conditions which mainly effect the pulmonary system and can be associated with multiple bacterial and fungal coinfections[1]. Several treatment options have been evaluated and although the use of systemic glucocorticoids have significantly improved the survival rate from COVID 19 infection, unfortunately wide spread use of systemic glucocorticoids weakens the immune system and can lead to opportunistic secondary fungal infections like mucormycosis[2].

The invasive fungi is more prevalent in immunocompromised patients, seen during an ongoing COVID 19 infection in patients being treated with steroids, or with a recent COVID 19 infection of less than 2 weeks. This is rapidly progressive which need s a multidisciplinary approach for early diagnosis and adequate treatment of mucormycosis. The diagnosis of mucormycosis was done based on the complete detailed history and presentation of symptoms, clinical features, diagnostic nasal endoscopy, radiological investigations, and was confirmed by HPE reports. Then main stay of treatment for it includes extensive debridement and functional endoscopic sinus surgery, intravenous amphotericin B, retrobulbar amphotericin B for patients with orbital involvement, exenteration of eye, adequate and proper glycemic control.

METHODOLOGY

This is an observational retrospective study conducted in saveetha medical college on 30 mucormycosis patients with a history of COVID 19 infection and were treated with steroids. This study was conducted between April 2021 and September 2021. The study group included patients diagnosed with mucormycosis and also had a history of COVID 19 infection and were also treated with steroids.

The study group included all the patients who were diagnosed with mucormycosis based on the history of presentation of symptoms, diagnostic nasal endoscopy, radiological imaging like CT- PNS, MRI brain with orbit and also the histopathological examination reports after functional endoscopic sinus surgery. All the patients included in the study also had a recent history of COVID 19 infection and were admitted in a tertiary care centre. These patients also had a history of being treated with steroids for the COVID 19 infection. All the data collected was entered and analysed in a spread sheet.

Inclusion criteria;

- Patients with HPE positive for mucormycosis.
- Patients with a recent history of COVID 19 infection (RTPCR proven) and who received treatment for the same with steroids.
- Male and female between 20-70 years
- Patients with T_2DM.
- Patients who presented with any of the following symptoms – hemi facial pain and paresthesia, headache, peri orbital pain and swelling, blurring of vision, loss of vision, diplopia, nasal discharge, tooth ache and loosening of teeth.

Exclusion criteria;

- Patients with HPE negative for mucormycosis
- Patients without a history of COVID 19 infection
- Patients with a history COVID 19 infection but did not receive steroids.
- Patients not willing for the study

RESULTS

30 patients from saveetha medical college were included in the study with HPE proven mucormycosis, with a previous history of COVID 19 infection which was treated with steroids. The study included 19(63.3%) males and 11(36.6%) females between the age group of 20-70 years with a mean age of 45.8. Hemifacial pain was the first symptom noted in 12(40%) patients, of which were 8(66.6%) males and 4(33.3%) females. Toothache was the first symptom in 4(13.3) patients of which were 3(75%) males and 1(25%) female. Periorbital pain was the first symptom in 6(20%) patients of which 4(66.6%) male and 2(33.3%) females. Nasal discharge was the first symptom in 8(26.6%) patients, of which 4(50%) male and 4(50%) females.

Out of the 30 patients included in our study 26(86.6%) patients had hemifacial pain and swelling, 11(36.6%) had hemifacial paresthesia. 4(13.3%) patients had toothache, 22(73.3%) patients had periorbital pain and swelling, 17(56.6%) patients had blurring of vision, 8(26.6%) patients had loss of vision, 28(93.3%) patients had nasal discharge, all 30(100%) patients had complaints of headache.

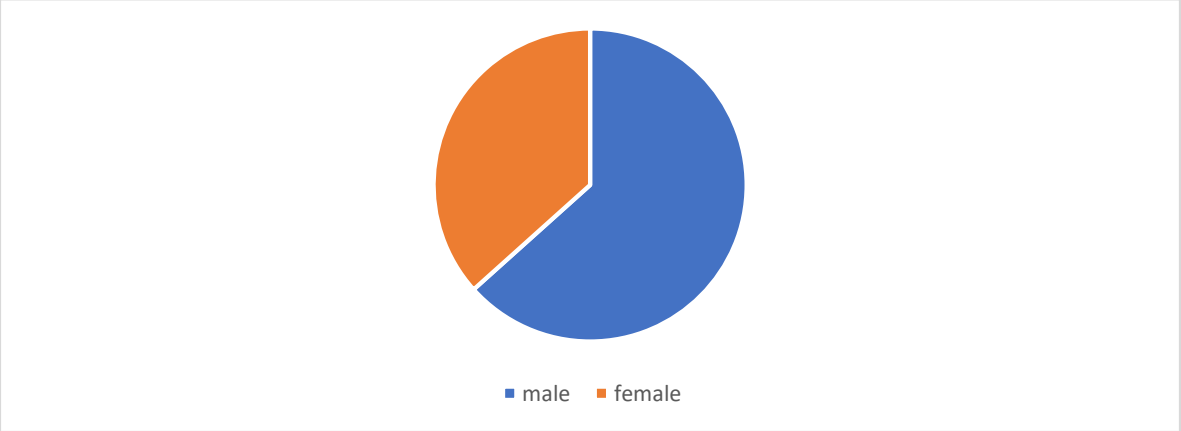

Fig.1. Gender distribution of mucormycosis

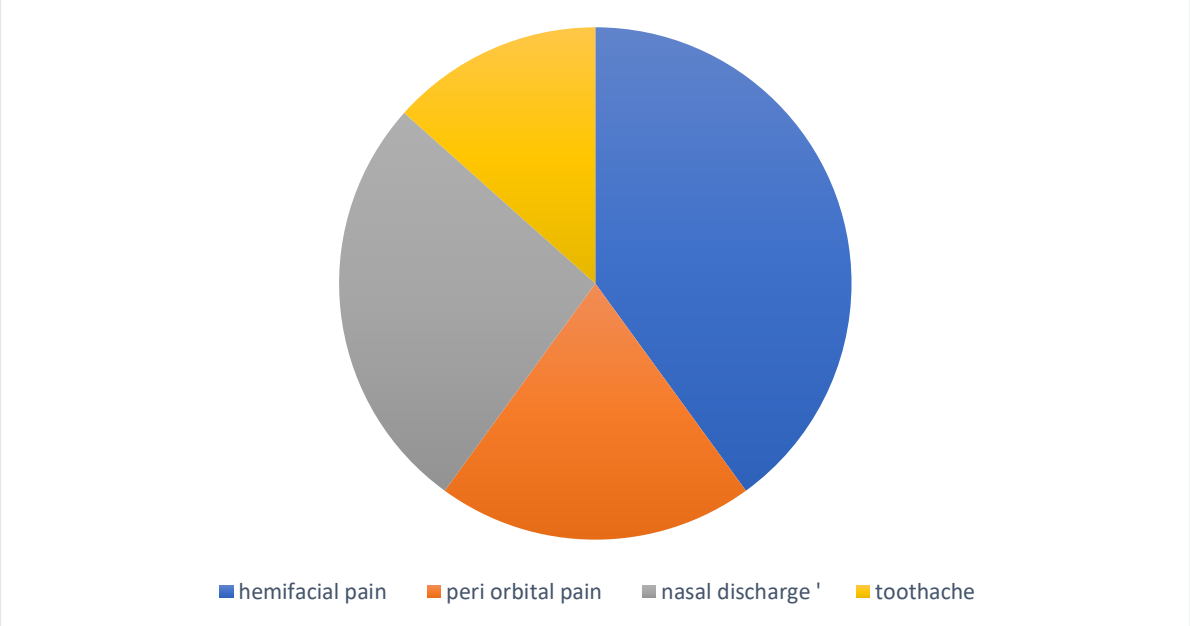

Fig.2. Initial presenting symptom in HPE proven mucormycosis patients

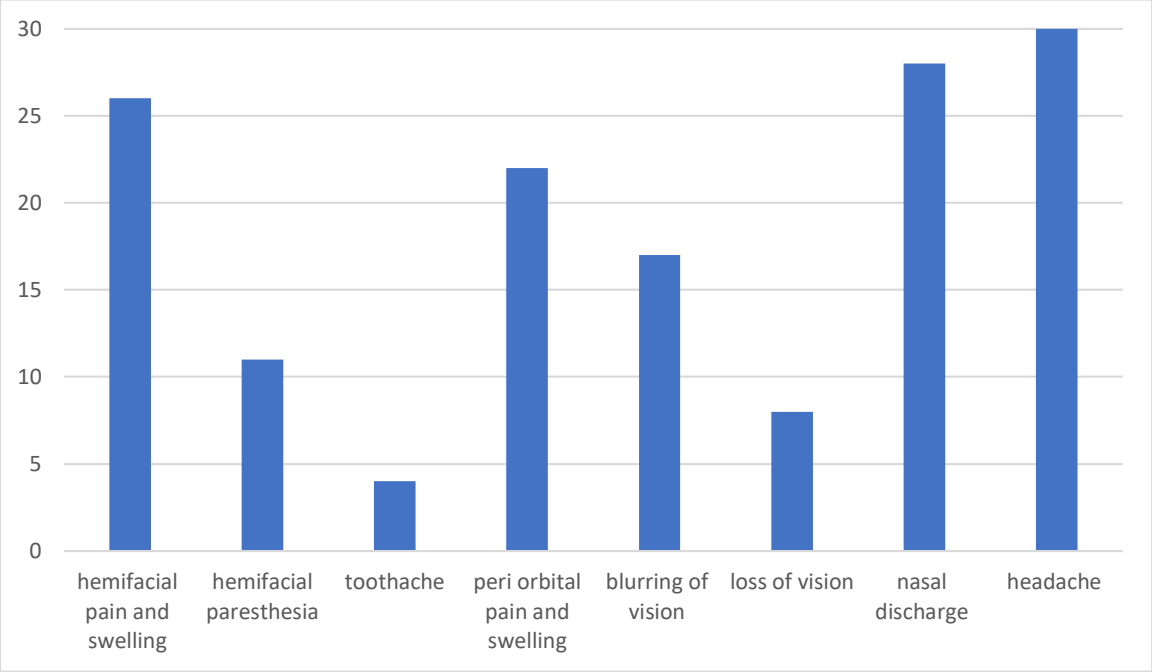

Fig.3. symptoms of mucormycosis patients

Fig.4. peri orbital swelling, nasal discharge – symptoms of mucormycosis

DISCUSSION

Mucormycosis is caused by members of the Mucorales family by Rhizopus[12]. This is most commonly seen in immunocompromised patients with an underlying illness most commonly uncontrolled diabetes mellitus, haematological malignancies, stem cell transplantation, use of systemic steroids all of which compromises the immune system of the patient[13]. The disease starts by the sporangiospores being deposited in the nasal cavity, turbinates and para nasal sinuses[13]. Rhino orbital and rhino cerebral symptoms are the most common presentation sof the disease.it spreads by direct invasive and through the blood stream causing necrotizing vasculitis and thrombosis causing extensive tissue infarcts and necrosis[16.]

The recent emergence of corona virus disease (COVID 19) caused by novel severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) has been associated with reports of fungal infections like mucormycosis, especially in critically ill patients treated with steroids. The surge of COVID 19 cases during the second wave of the pandemic

has been linked to an increase in reports of post COVID 19 mucormycosis[14]. The triad of COVID 19 disease, corticosteroids use and uncontrolled diabetes has been shown to lead to a significant increase in the incidence of mucormycosis.

In a recent retrospective study analysing the presentation of symptoms in rhino-orbito-cerebral mucormycosis in 35 patients with diabetes, included 23 men and 12 women with a mean age of 47.3, compared to in our study which included 30 patients with a recent history of COVID 19 infection with treatment history of steroids and also have uncontrolled diabetes, of which 19 males and 11 females with a mean age of 45.8. ophthalmic symptoms like peri orbital swelling and pain presented in 89% of patients compared to 73.3% of patients in our study. Nasal discharge was present in 74% of patients compared to 93.3% of patients in our study[11].

The pathognomonic feature of mucormycosis is the is the presence of fungal hyphae with invasion of vessel walls and necrotizing vasculitis. KOH mount shows the presence of broad aseptate hyphae with right angled branching[17]. CT scan and MRI show mucosal thickening and opacification of the paranasal sinuses with invasion of bones and tissues and spread to the brain and orbits[22].

The main key to management of mucormycosis patients is early diagnosis, timely antifungal therapy, proper glycemic control and comprehensive surgical debridement which help in successful eradication of the disease and patient survival[15]. The first line drug for management of mucormycosis is Amphotericin B unless contraindicated[18]. The dose of Amphotericin B is 1.0-1.5 mg/kg/day and can be given upto 3mg/kg/day in a 5% dextrose solution intravenously after a test dose. This is more effective and less toxic than the lyophilised form[19,20]. Antifungal therapy alone is inadequate because of extensive vascular thrombosis and necrosis which prevent the entry of adequate concentrations of antifungal drugs. Therefore, early radical debridement of infected, necrotic tissue and drainage of infected paranasal sinuses should be done. This also minimizes the fungal load in the tisssues[21].

CONCLUSION

Mucormycosis is an opportunistic infection prevalent in immunocompromised, patients with a recent history of COVID 19 infection, patients treated with steroids, uncontrolled diabetics. Mucormycosis is a fatal disease involving the nasal cavity, nasal sinuses, along with extension to the orbits and brain with erosion of bone. Knowing the presenting symptoms helps in early diagnosis, treatment with systemic antifungals, functional endoscopic sinus surgery, along with glycemic control. Screening of patients with a recent history of COVID 19 infection who present with any of the following symptoms is of the utmost importance. Patients also should be on regular follow up and strict glycemic control since mucormycosis can reoccur. People should also be educated about the signs and symptoms of mucormycosis.

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