Research Report

NEUROPSYCHIATRIC MANIFESTATIONS IN COVID-19 PATIENTS WITH MUCORMYCOSIS PRESENTING TO TERTIARY CARE CENTER- CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Corona Virus Disease 2019 (COVID-19) pandemic has caused disruption of mental health along with physical illness, and it is associated with social and occupational impairment. Co-morbid mucormycosis in COVID-19 has added to the severity of psychiatric symptoms. **Objectives:** Primary objective was to assess neuropsychiatric manifestations in COVID-19 patients with mucormycosis. The secondary objective was to assess concerns for psychiatric symptoms. **Materials and Methods:** A cross-sectional study was done on COVID-19 patients with mucormycosis. A consecutive sampling method was adopted, and 70 COVID-19 patients with mucormycosis were recruited to the present study. Mini International Neuropsychiatry Interview Plus (M.I.N.I. Plus) was used to screen psychiatric symptoms, and the diagnosis was made as per the International Classification of Diseases tenth revision (ICD-10). Beck depression inventory (B.D.I.), Hamilton scale for assessment of anxiety (HAM-A) and Beck suicide inventory (B.S.I.) were used to assess the severity of symptoms. **Results:** Prevalence of neuropsychiatric manifestations in the present study was 64.28%, among which 28.8% had Major depressive episodes, 40% had anxiety, 11% had substance use disorder, and 20% had delirium. The Major concern for symptoms was found to be the uncertainty of outcome, which was present in 29% of patients, followed by fear of death (25%), postoperative complications (19%), lack of knowledge (3%) and 22% of patients had multiple concerns. **Conclusion:** Prevalence of neuropsychiatric disorders is higher in COVID-19 patients with Mucormycosis. Psychiatric screening should be considered in these patients to decrease morbidity and improve outcome and quality of life.

Keywords: COVID-19, MINI-Plus, Major depressive episode, Anxiety, Mucormycosis.

INTRODUCTION

COVID-19 was declared a concern of public health by World Health Organization (WHO) on 30th January 2020, and it is caused by the new Coronavirus (SARS-CoV-2).[1] It originated during later parts of 2019 and has led to economic and social disruption.[2] This pandemic has led to the onset of new anxiety and depressive symptoms in people who did not have a history of any psychiatric illness. A meta-analysis found that the overall pooled prevalence of depression, anxiety, and distress was 31.4%, 31.9%, and 41.1%, respectively.[3] These mental health problems may be due to fear of contracting infection, work pressure, fear of job loss,

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fear of losing loved ones, and worsening living conditions.[4]

Some studies have demonstrated a bi-directional correlation between COVID-19 and psychiatric manifestations, i.e., COVI-19 will increase the chances of patients to suffer from mental illness and vice-versa, which might be due to lack of awareness about the disease, poor COVID appropriate behaviour, poor personal care, cognitive deficits, and poor financial support. A retrospective study in the U.S.A. found an increased risk of psychiatric sequelae in survivors of COVID-19.[5] Presence of psychiatry disorders is associated with poor outcomes in COVID-19 patients.[6] Studies have also found that the presence of medical co-morbidities increases the risk of psychiatric manifestations and mortality. Recently, there have been several cases of mucormycosis in COVID-19 patients worldwide. Risk factors include an environment of low oxygen, high glucose levels due to inadvertent use of steroids, acidic medium due to diabetic ketoacidosis, high iron levels and immune suppression.[7] Mucormycosis acts as a significant stressor for the development and worsening of psychiatric symptoms in COVID-19 patients. These patients also have to undergo surgical intervention like enucleation and debridement of para-nasal sinuses based on the site involved, adding burden on the mental health of these patients. Poor knowledge regarding the treatment (both surgical and medical) adds to the severity of symptoms. Patients undergoing major surgery involving any body part can develop anxiety over the uncertainty of outcome, postoperative complications and fear of disfigurement. A study conducted in Bangladesh, including 422 participants, revealed that fear of complications due to black fungus led to various psychiatric manifestations.[8] So, this study was conducted to assess the neuropsychiatric manifestations in these patients.

Objectives

The primary objective was to assess the prevalence of neuropsychiatric manifestations in COVID patients with Mucormycosis. The secondary objective was to assess concerns for psychiatric symptoms

MATERIALS AND METHODS

This cross-sectional study was conducted on COVID-19 patients with mucormycosis from inpatient wards of the tertiary care centre in Karnataka, India. The study was conducted for a duration of five months, from March 2021 to July 2021. Data collection was started after obtaining approval from the Institutional Ethical Committee. Informed written consent was obtained from each patient and their relatives.

Inclusion criteria:

All gender patients aged less than 65 years

COVID-19 patients with mucormycosis.

Exclusion criteria:

COVID-19 patients with mucormycosis having a past history of psychiatric illness.

Procedure:

COVID-19 patients with mucormycosis diagnosed based on M.R.I. with gadolinium contrast and K.O.H. mount of tissue biopsy from inpatient setting were included in the present study. A consecutive sampling method was adopted, and 73 patients were recruited, out of which three patients were excluded as they had a past history of psychiatric illness. A semi-structured proforma was used to collect sociodemographic and clinical variables. Screening for psychiatry manifestations was done by M.I.N.I-Plus[9] before patients underwent surgical intervention. Diagnosis of psychiatric disorders was made as per ICD-10. BDI[10]was administered to assess the severity of depressive symptoms in patients diagnosed with depressive episodes, and the BSI[11] scale was administered to assess the suicidal intent in these patients. In patients with anxiety symptoms, HAM-A[12]was used to measure the severity of symptoms. Underlying concerns for these psychiatric symptoms were assessed.

Statistical analysis was done by frequency and percentage using WHO Epi-Info. 7

RESULTS

This study included 70 COVID-19 patients with mucormycosis, among which 72.9% were males and 27.1% were females. 82.8% of patients belonged to the age group of more than 35 years, and 41% were illiterate. 90% of subjects were married, and 10% were single. Most of the participants (57%) were unskilled labourers. The study comprised 50% of subjects from a rural background and 43% from urban areas. (Table1).

Table 1- Sociodemographic profile

	Frequency (%)
Sex	
Male	51(72.86)
Female	19(27.14)
Age in yrs.	
<25	1(1.43)
26 -35	11(17.14)
36 -45	27(38.57)
46 - 65	31(44.29)
Education	
Illiterate	29(41.43)
Primary	19(27.14)
Middle	9(12.86)
High school	1(1.43)
PUC	7(10)
Degree	4(5.71)
Post-graduate	1(1.43)
Religion	
Hindu	54(77.14)
Muslim	16(22.86)
Marital status	
Single	7(10)
Married	54(90)
Location	
Urban	30(42.86)
Rural	35(50)
Semi-urban	5(7.14)

Among the study subjects, 17(24.29%) were fully vaccinated and 6 (8.57%) were partially vaccinated. 90% of subjects were married, and 10% were single. Most of the participants (57%) were unskilled labourers. The study comprised 50% of subjects from a rural background and 43% from urban areas. (Table 1).

The prevalence of neuropsychiatric manifestations in the present study was 64.28%, among which 28.9% had the present study was 64.28%, among which 28.9% had a major depressive episode, 40% patients suffered from anxiety symptoms, 11.1% patients had Substance use and 20% patients were in delirium. 30% of Depressive episode patients had moderate suicidal intent, and 70% had mild suicidal intent on B.S.I. HAM-A was administered on 18 patients diagnosed with anxiety symptoms, among which 55.5% had mild, 27.7% had moderate, and 16.6% had severe anxiety scores, respectively. (Table 2)

Table 2. Data regarding frequency and type of psychiatry manifestations

Neuropsychiatric manifestations	Number of patients	Total (%)
Depression (B.D.I. score)		
Mild Depression	6	13(28.9)
Moderate Depression	3	
Severe Depression	4	
Anxiety (HAM-A)		
Mild	10	18(40)
Moderate	5	
Severe	3	
Substance use disorder		5(11.1)
Delirium		9(20)

Table 3. Data regarding COVID-19 concern for symptoms

Concern for symptoms	Number of patients (%)
Fear of death	8(25.81)
Uncertainty of outcome	9(29.03)
Post-operative complications	6(19.35)
Lack of knowledge	1(3.23)
Multiple concern	7(22.58)

Major concern for psychiatric symptoms was found to be the uncertainty of outcome, which was present in 29% of patients, followed by fear of death (25%), postoperative complications (19%), lack of knowledge (3%) and 22% of patients had multiple concerns. (Table. 3)

Among the 42 patients, who had medical co-morbidities, 88% had diabetes mellitus, and the remaining had hypertension and multiple co-morbidities. However, there was no significant association between medical co-morbidities and neuropsychiatric manifestations (x^2- 10.95, df-10, p-value- 0.36). Family history of psychiatric illness and medical illness were found in 17% and 31% of patients, respectively. It was found that a history of psychiatric illness in the family acted as a risk factor for the development of neuropsychiatric manifestations in these patients (x^2- 2.52, df-3, p-value-0.005, OR=3.6).

DISCUSSION

To our knowledge, this is the first study, which highlights the prevalence of neuropsychiatric manifestations in COVID-19 patients with mucormycosis who underwent surgical or medical intervention. The prevalence of neuropsychiatric manifestations in the present study was 64.28%, among which 69% had either depressive or anxiety spectrum disorders, which is higher compared to the general population (13.7%) according to the National Mental Health Survey of India 2016.[13] Major depressive episode and panic attacks were more common psychiatric manifestations found in this study, which is similar to study done in Iran, in which depression and anxiety were more predominant in patients undergoing major surgery, which was found to be 45% and 11% respectively.[14]Almost all patients had suicidal intent, which might be due to the awareness of poor outcome associated with mucormycosis and its treatment and also due to uncertainty over the availability of timely treatment during the pandemic situation. Diagnosis of COVID-19 acts as a significant stressor and lead to the development of psychiatric symptoms like depression and anxiety.[15] Presence of mucormycosis in these patients adds to the severity of symptoms. Mucormycosis is the second most common invasive fungal infection, involving the Rhino-Orbital-Cerebral system,[16] requiring pan nasal sinus debridement and enucleation surgery.[17] These surgeries are associated with fear of facial disfigurement, postoperative complications and sometimes death. A study, including 95 postoperative chronic sinusitis patients, revealed that 31% of patients had somatization, 17% patients had anxiety, and 25% patients had depressive disorders.[18]

Another major finding of the study is, among the clinical variables, the presence of medical co-morbidities like diabetes mellitus and family history of psychiatric illness increased the risk of development of psychiatry symptoms. This finding is similar to a study in which 43% of patients with psychiatric symptoms and mucormycosis had co-morbid diabetes mellitus and other comobidities.[19]

The study also found that the major concern for psychiatric symptoms was the uncertainty of outcome followed by fear of death, postoperative complications and around 22% of patients had multiple concerns. The majority of the studies have found that, following oral-maxillary-facial surgeries, patients will develop post-traumatic stress disorder, body dysmorphic disorder and other anxiety disorders due to fear of facial disfigurement.[20, 21] However, these findings were not prominent in this study, which might be due to socio-cultural background, majority of study sample belonged to elderly age group, low socio-economic status of patients and lack of awareness regarding the postoperative outcomes.

Out of 45 patients with neuropsychiatric manifestations, 20% were diagnosed with delirium. The underlying risk factors involved in the pathophysiology of delirium include elderly age, prolonged hospital stay, co-morbid substance use, medical illness, electrolyte imbalance, sleep deprivation, and hypoxia. This finding is similar to a study, which reported a higher risk of developing delirium in elderly patients undergoing major surgery.[22] Even mucormycosis can involve the central nervous system in later stages of disease and lead to delirium and neurological deficits.[23] A prospective study reported delirium in patients having prolonged hospital stays.[24] A study reported that delirium could be better managed by early detection and intervention of underlying cause.[25]

Strengths and Limitations:

The major strength of the study is, it highlights on impact of COVID-19 with mucormycosis on mental health and recommends early screening for psychiatric manifestations in these patients to ensure better outcome and quality of life. The second strength is an adequate sample size. Limitations include heterogeneous sample and cross-sectional nature of the study.

Conclusion:

COVID-19 is associated with an increased risk of developing psychiatric symptoms like anxiety and depression. The presence of mucormycosis adds to the severity of these symptoms. The main concern for symptoms includes fear of death, postoperative complications, lack of awareness and uncertainty of outcome. There is a need to curb vaccination hesitancy and create awareness regarding the importance of vaccination. This study advocates psychiatry assessment for all COVID-19 patients with mucormycosis. When suspected, refer without undue delay and to psycho-educate regarding the nature and prognosis of illness so that neuropsychiatric co-morbidity and severity can be reduced.

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Conflict of interest:

None declared

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