

Anaesthetic Considerations in Management of Sino-Orbital Mucormycosis in Post Covid Diabetic Patients: A Case Series

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ABSTRACT

Introduction: The ongoing pandemic of COVID 19 has been a challenge to our health care system. It is an infectious disease caused by SARS-CoV-2 virus. It has shown a widespread multisystem involvement starting with severe acute respiratory infection (SARI) to multiple opportunistic infections specially in immunocompromised individuals with co-morbidities. One such case that we have come across is sino-orbital mucormycosis in post COVID diabetic patients.

Case series: Here we have discussed about 4 such cases where we have successfully managed sino-orbital mucormycosis in post covid diabetic patients. The diagnosis was made by thorough clinical history and examination and confirmed by histopathology and CECT PNS. All our cases were taken for surgical debridement by FESS under General anesthesia and were also put on systemic antifungal therapy as per recommended guidelines. We have anticipated difficult airway in few of our cases which was well handled due to prior prompt preparation.

Conclusion: Sino-orbital Mucormycosis are often associated with high morbidity and mortality. Comorbidities and rapid progression of infection after surgery can be overcome by pre ICU treatment with specific antifungals. Early debridement before intracranial extension leads to better prognosis and less mortality.

Keywords: Sino-orbital, COVID 19, Diabetes Mellitus, Mucormycosis, General Anesthesia, Difficult Airway

INTRODUCTION

While India has fallen prey to this devastating pandemic of COVID 19, a yet new threat has emerged specially in post Covid Diabetic patients, reason being low immunity in such individuals. Mucormycosis, a fungi, is clinically manifested by a variety of syndromes, especially in immunocompromised patients like those with diabetes mellitus. The most common clinical presentation being rhino- orbital-cerebral infection, which is presumed to begin due to inhalation of spores into the paranasal sinuses of a susceptible host. The spectrum of presenting symptoms in rhino-orbital-cerebral mucormycosis is vast. It may be localized to paranasal sinus or may extent upto orbit or even involve the cranium with associated neurological deficit. Better prognosis is seen if the disease has not penetrated beyond the sinus prior to surgical debridement.^{1,2}

Here we have discussed about 4 such cases where we have successfully managed sino-orbital mucormycosis in post covid diabetic patients.

Case 1

A 40 years female, referred to PAC(pre anesthesia checkup) clinic, gives history of nasal stuffiness since 10 days and swelling around eyes with blurring vision since 4 days. On further enquiry, she reveals, she suffered from high grade fever 25 days back and was diagnosed and treated as a patient of mild COVID 19 then. She is a known case of diabetes mellitus on OHA(oral hypoglycemic agents) since past 2 years, presently started on subcutaneous regular Insulin because of persistent poor glycemic control despite being on oral hypoglycemic agents. Investigations revealed, high leucocyte count with neutrophil predominance, raised ESR, urine ketones positive with sugar 3+, HbA1c 12% while electrolytes, renal function and LFT was within normal limits. CECT PNS revealed bilateral blocked osteomeatal complexes with lytic lesions and cortical erosions in maxillary sinus. Histopathology revealed erotic tissue

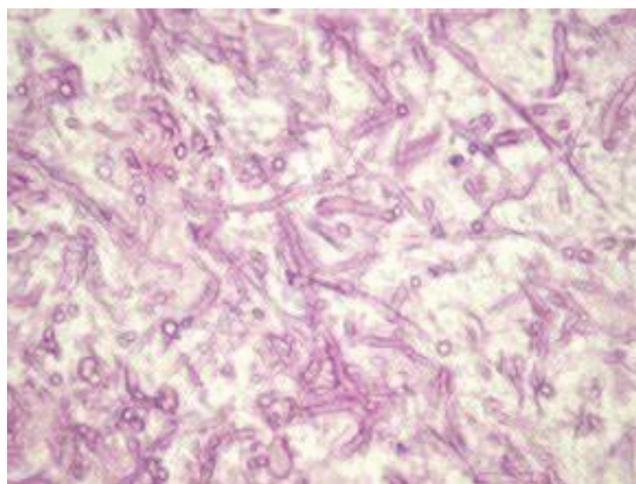


Figure-1: Histopathology of mucormycosis (specimen from nasal cavity)

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How to cite this article: Parhi D, Khalik M, Gupta A, Agrawal M. Anaesthetic considerations in management of sino-orbital mucormycosis in post covid diabetic patients: a case series. International Journal of Contemporary Medical Research 2021;8(8):H1-H5.

DOI: <http://dx.doi.org/10.21276/ijcmr.2021.8.8.13>



with numerous broad aseptate ribbon like hyphae (figure 1). On examination, she thin built, weight 42kgs; was conscious, oriented, alert, afebrile, with sinus tachycardia and normotensive. Her chest was clear. Nasal cavity revealed brownish blackish discharge. Eye examination revealed complete loss of vision in left eye, while in right eye power was 6/36. On airway assessment, she had 3 fingers mouth opening with mallampatti II grading, METS >4 and neck movement was adequate. DKA and HSS was ruled out and patient was given fitness for anesthesia under moderate risk. Patient was posted for FESS guided local debridement under General anaesthesia.

Case 2

A 68 years male, referred to PAC (pre anesthesia checkup) clinic, gives history of severe headache, nasal discharge since 4 days and loss of appetite since 20-25 days. He suffered from COVID 19 1 month back and was under home quarantine for the same. He is a known case of diabetes mellitus on subcutaneous Regular Insulin thrice daily along subcutaneous Lantus once after dinner since past 16 years. He is also known hypertensive on oral Amlodipine once daily since last 4 years. Apart from diabetes and hypertension, he suffers from benign hypertrophy of prostate for which he underwent TURP 1 year back under

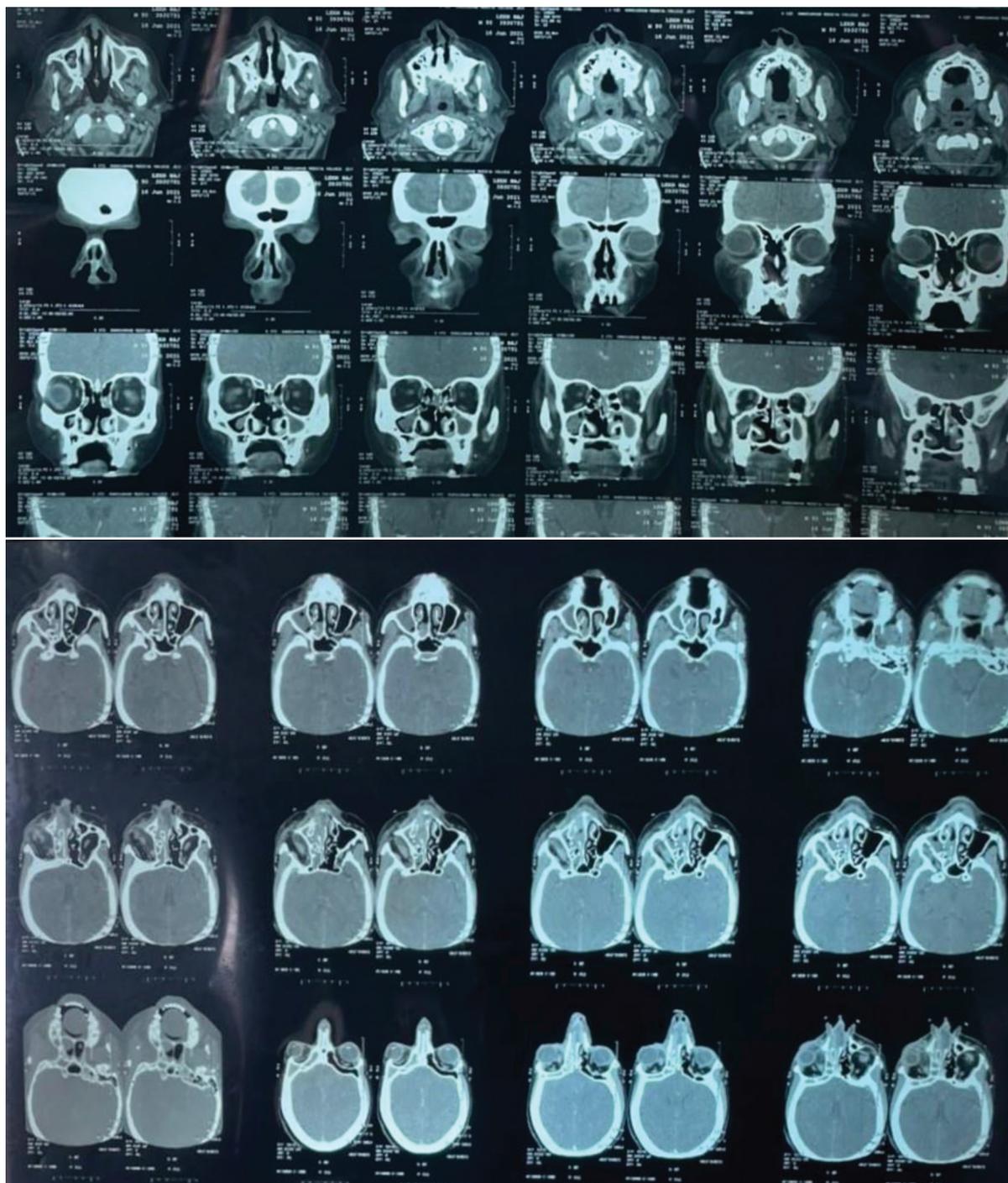


Figure-2: CECT PNS of a patient with mucormycosis

spinal anesthesia, no complications observed then. Patient is a habitual smoker and occasional alcoholic. Investigations revealed, low leucocyte count with neutrophil predominance, raised ESR, urine ketones were negative, HbA1c 8.4% and creatinine was 2.3mg/dl, while urea was 68 mg/dl. Electrolytes and LFT was within normal limits. CECT PNS revealed cortical erosions in maxillary sinussinus (figure 2). Histopathology revealed erotic tissue with numerous broad aseptate ribbon like hyphae. On examination, he was moderately built, weight 56 kgs; conscious, oriented, alert, afebrile, with sinus tachycardia and raised systolic blood pressure. Few rhonchi was audible during auscultation which disappeared post bronchodilator therapy. Nasal cavity revealed yellowish brown discharge. On airway assessment, he had 3 fingers mouth opening with mallampatti II grading, METS>4 and neck movement was adequate. Patient was given fitness for anesthesia under moderate risk and was posted for FESS guided local debridement under general anaesthesia.

Case 3

This is a 28 years female, who was apparently alright 2 months back, when she started with high grade fever with cold, cough and throat pain. She ignored her symptoms for few days but, later on worsening of symptoms, she self medicated herself through a local pharmacy. Later she developed severe tooth ache radiating over face, around eyes and headache since 15 days. She also complaints of loss of vision since last 3 days. On further evaluation, she turned out to be COVID 19 positive, with raised leucocyte counts, raised CRP, HbA1c 9%, FBS 286mg/dl, PPBS 344mg/dl with urine sugar 2+. Although her electrolytes, renal function and LFT were within normal limits. Chest was clear. Biopsy from nasal cavity revealed necrotic tissue with marked inflammation along with numerous septate hyphae showing branching at acute angles. On examination, she was thin built, weight 44 kgs, conscious, oriented to time place person, normotensive with sinus tachycardia. Her mouth opening was 3 fingers with a mallampatti grade 1 airway and

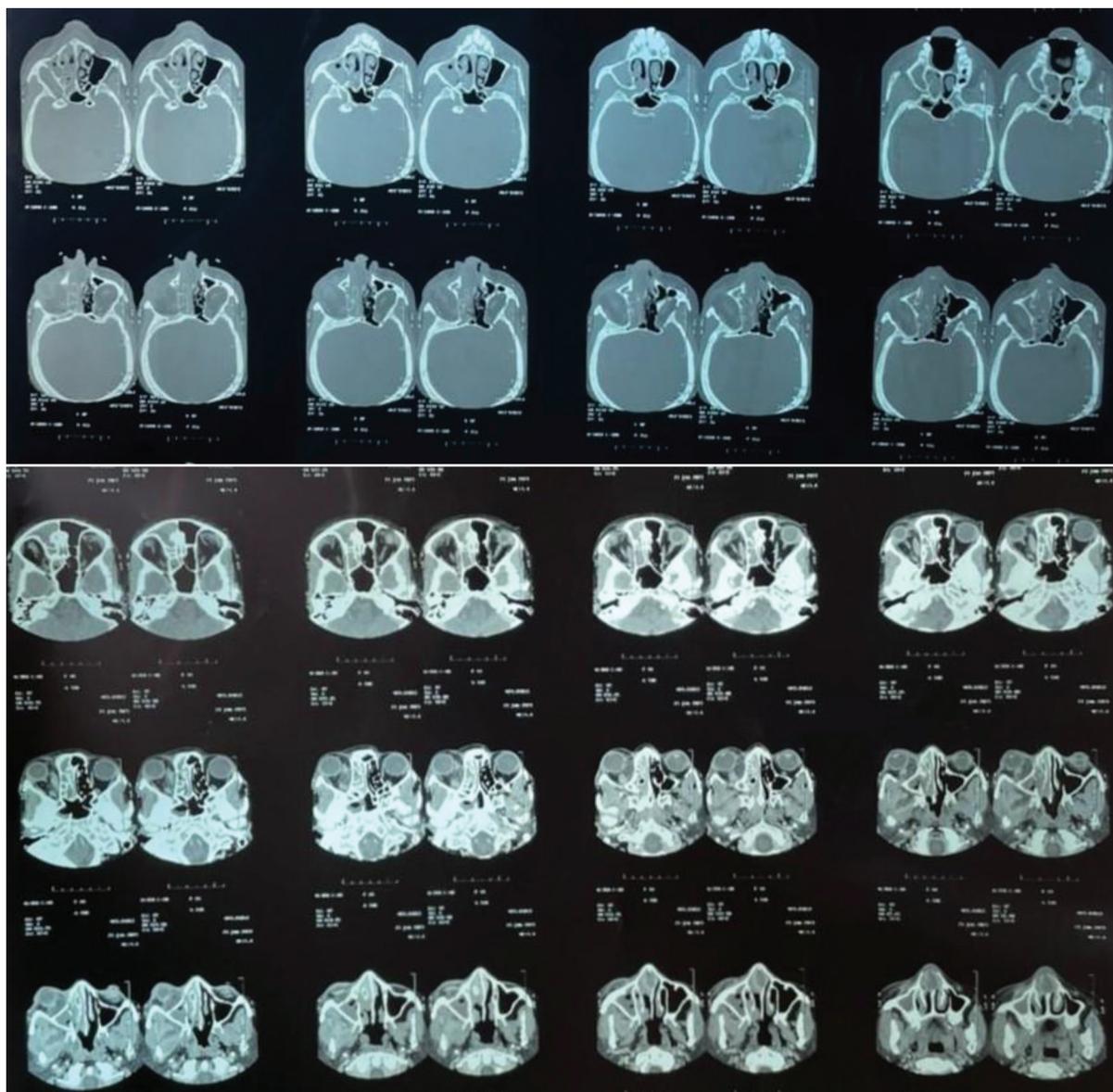


Figure-3: CECT PNS of post covid mucormycosis patient.

neck movement was adequate. Her eye examination revealed complete loss of vision in right eye, while in left eye power was 6/18. She was referred to a physician for optimisation of blood sugar and was started on subcutaneous insulin. She was treated for Covid 19 and came negative on 12th day of admission. Later after re-evaluation fitness was given for anesthesia and she was posted for orbital exenteration under general anaesthesia.

Case 4

Another 50 years old male patient referred to PAC clinic with history of lesion over hard palate since 15-20 days, headache since 15 days, pain over cheek and loss of vision since 10 days. There is also history of fever with cough and expectoration a month back which was diagnosed as COVID 19 and patient was hospitalised for 5 days and then home quarantined on recovery of symptoms. During his hospital stay he was diagnosed as Diabetic type 2 and CKD stage 1 for which is on medication. Clinical examination revealed ulcerative lesion over hard palate, crusting present in bilateral nasal cavity, tenderness over frontal and maxillary sinus and complete loss of vision in both eyes. Patient was thin built, weight 46 kgs, conscious but apprehensive, febrile with sinus tachycardia and hypotension. His laboratory reports revealed leucocytosis, high CRP, high Urea and creatinine, hypernatremia (hypovolemic hypernatremia), HbA1c 8% and FBS 214mg/dl. CECT PNS (figure 3) revealed bilateral blocked osteomeatal complexes with lytic lesions and cortical erosions in maxillary sinus. Biopsy from nasal cavity revealed tissue erosion, marked inflammation with eosinophils as well as neutrophils and numerous broad aseptate ribbon like hyphae. Chest was clear. Mouth opening was 3 fingers with Mallampatti grade 3 airway with adequate neck movement. Patient was initially referred to physician for symptomatic management and then posted for FESS guided debridement under general anesthesia under high risk.

DISCUSSION

Immunocompromised patients, specially patients with diabetes mellitus (DM) and ketoacidosis (which hampers various phagocytic functions) is one of the most commonly encountered predisposing conditions for Sino-orbital mucormycosis.^{3,4} Success rate and better recovery depends on early diagnosis, recognition of underlying predisposing factors and prompt management, surgical debridement of necrotic tissue as well as pre surgical appropriate anti fungal therapy.⁴ Mucormycosis in patients with diabetes with post covid status require surgical debridement before intracranial extension for better results. One must not ignore the importance of proper airway assessment as well as airway management in such patients; the reason being, the fungal debris in the oropharyngeal region and supraglottic edema results in difficult ventilation and endotracheal intubation.^{5,6} Literature reviews indicate that the use of aggressive medical and surgical treatment approaches in patients with rhinocerebral mucormycosis has recently decreased the mortality rate from 88% to 21%.^{7,8} In our case series, all surgical procedures were

performed under general anaesthesia by an experienced anaesthesiologist, after obtaining proper informed written consent from authorised patient attendants. Patient was premedicated with intravenous ranitidine (50 mg), intravenous metachlopramide (10 mg), intramuscular glycopyrrolate (0.2 mg) and intravenous midazolam (1mg). After 3-min preoxygenation with 100% Oxygen via Bain circuit with appropriate fitting anatomical mask, patient was induced with intravenous propofol (2 mg/kg), vecuronium (0.1 mg/kg) and fentanyl (1 mg/kg). Dose of the anesthetic drugs decided as per patients ideal body weight.⁹ Orotracheal intubation was done in each patient using a glidescope and patient was mechanically ventilated at a frequency of 12 breaths per min with a tidal volume of 6 mL/kg. During the case EtCO₂ value, heart rate, blood pressure, saturation was monitored continuously. Anesthesia was maintained with a mixture of 50%-50% oxygen and nitrous oxide and Isoflurane.¹⁰ A bolus injection of vecuronium (1mg) was administered as needed. At the end of the procedure, on achieving spontaneous respiration, patients were reversed from neuromuscular blockade with intravenous glycopyrrolate (0.01 mg/kg) and intravenous neostigmine (0.05 mg/kg).¹¹ All four patients were having an Aldrete score of more than 9, so were shifted to post-operative area where they were monitored for an hour and later shifted to general ward. Apart from postoperative pain and vomiting, no other complications were encountered. Post-operative pain was managed with intravenous paracetamol and intravenous tramadol. While vomiting was managed with intravenous ondansetron.¹² All our patients were treated with anti fungal therapy (Amphoterecin B) prior to surgical debridement.

A number of volatile anesthetic drugs have been reported to show antibacterial and antifungal activity in in-vitro studies¹³ However, there is little or no documentation on ideal intravenous and inhaled anesthetic agents in progressive active fungal infections such as mucormycosis. In a previous in-vitro study, Barodka et al. reported that isoflurane inhibited the growth of *Albicans*.¹⁴

CONCLUSION

Sino-orbital Mucormycosis are often associated with high morbidity and mortality due to delayed diagnosis as well intracranial extension. Often difficult intubation is anticipated in most of the cases due to fungal debris and supraglottic edema in the oropharynx of the patient. Comorbidities and rapid progression of infection after surgery can be overcome by pre ICU treatment with specific antifungals (Amphoterecin B was used in all of our cases). Early debridement before intracranial extension leads to better prognosis and less mortality.¹⁵

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 25-06-2021; **Accepted:** 24-07-2021; **Published:** 30-08-2021