

Anaesthetic considerations for post-COVID-19 mucormycosis surgery- A case report and review of literature

INTRODUCTION

While every anaesthesiologist is battling with the coronavirus disease (COVID)-19 as a frontline warrior,^[1,2] the issue of post-COVID-19 sepsis has opened a new battlefield and emerged as a significant problem. Recently, mucormycosis has emerged as a serious but rare opportunistic fungal infection that spreads very rapidly causing tissue infarction and necrosis in post-COVID patients.^[3] With more patients presenting with post-COVID mucormycosis, all anaesthesiologists must prepare themselves to manage this poorly understood patient population for elective or emergency surgery. Multiple factors including post-COVID systemic effects like residual pulmonary dysfunction, adrenal suppression, myocardial dysfunction, difficult airway due to mucormycosis and adverse effects of amphotericin B (AmB), can alter the anaesthetic outcome in these patients. Here, we are reporting a case of successful anaesthetic management in a patient with post-COVID mucormycosis posted for endoscopic surgical debridement. We aim to highlight the various factors in this post-COVID illness which need to be considered to deliver safe and quality anaesthesia services in this population.

CASE REPORT

A 73-year-old female presented with left nasal obstruction, left side facial pain and headache for the last 20 days. She had a history of COVID-19 infection a month back for which she underwent home isolation treatment without any steroid use. On examination, black mucopurulent secretion was present in the nose along with an oroantral ulcer perforating through the left side of the palate [Figure 1]. Histopathological examination of the biopsy specimen revealed fungal hyphae suggestive of mucormycosis. Magnetic resonance imaging (MRI) showed features suggestive of maxillary sinusitis with erosive lesions leading to a left oroantral fistula [Figure 2]. Hence, the patient was planned for endoscopic surgical debridement along with inj. AmB 5 mg/kg/day as per protocol to control fungal sepsis.

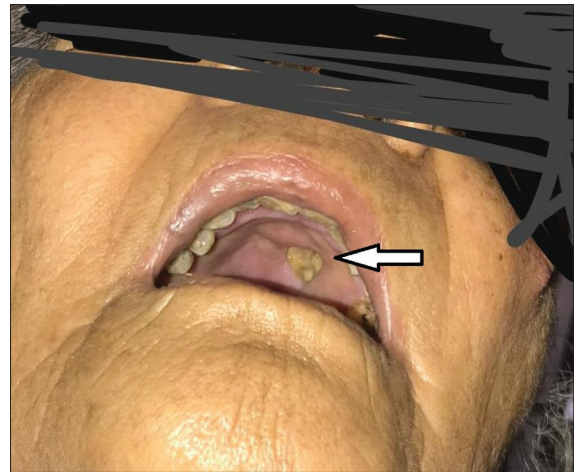


Figure 1: Oral ulcer perforating through the left side of the palate

On pre-anaesthetic check-up, she was found to be a case of bronchial asthma, hypertension and uncontrolled diabetes mellitus but on regular treatment and with normal airway examination. All routine blood investigations were within normal limits except a total leucocyte count of 14,000/ μ L, fasting blood sugar of 246 mg/dL, HbA1c of 10.9%. Her electrocardiography (ECG), chest roentgenogram (CXR), echocardiography and pulmonary function test (PFT) through spirometry were within normal limits according to age. For preoperative optimisation, the patient was put on regular insulin for sugar control, nebulisation with budesonide and salbutamol for asthma, and antifungal (AmB) along with antibiotics to control sepsis. After control of blood sugar and COVID-19 negative result from reverse transcription-polymerase chain reaction (RT-PCR) test, the patient was taken for surgery with written informed appropriate risk consent because of the reported post-COVID systemic complications. In the operation room, intravenous fluid was attached to the right subclavian central line (already *in situ*) and standard monitoring including ECG, non-invasive blood pressure, and pulse oximetry were applied. Inj. glycopyrrolate 0.2 mg and inj. fentanyl 100 μ g intravenously were given as premedication and the patient was induced with intravenous propofol and vecuronium. After securing the airway with an endotracheal tube, anaesthesia was maintained with oxygen, nitrous oxide and isoflurane with controlled ventilation. Intraoperatively, the patient was monitored with capnography, neuromuscular monitoring and urine output. She remained stable intraoperatively. After completion of the surgery, the patient was reversed and extubated on return of

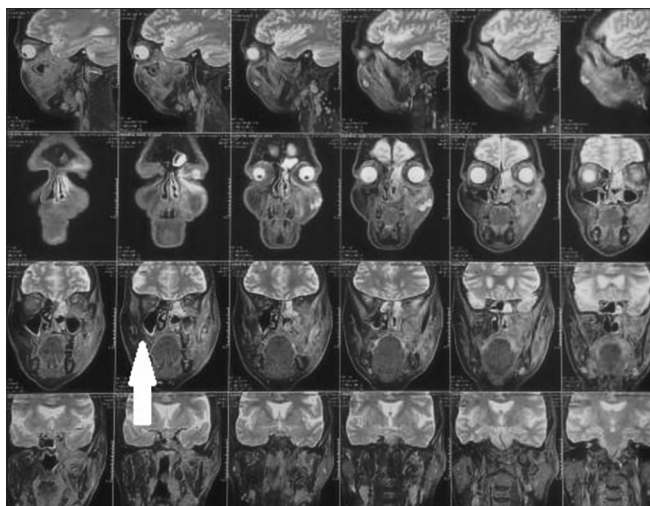


Figure 2: MRI image showing oroantral fistula on the left side

spontaneous respiratory efforts. Postoperatively, she was shifted to the intensive care unit (ICU) for further management including inj. AmB and monitoring of renal parameters and blood sugar.

DISCUSSION

Till now, innumerable complications have been reported and new ones are emerging with each passing day as we learn more about this COVID-19 pandemic. More than 150 million patients have recovered worldwide till today, but the dysregulated innate immune response, ciliary dysfunction, cytokine storm and microvascular coagulation caused by the coronavirus, have put these patients at risk of post-COVID sepsis and numerous complications. Mucormycosis has recently emerged as the most common post-COVID infection. It is a lethal fungal disease with the rhino-orbital-cerebral (ROC) presentation being the most common form. As the surgical debridement of the infected area has improved survival in these cases, we are going to encounter these surgical patients daily.^[4] So, we need to re-evaluate our anaesthetic approach towards these patients.

Recent studies on post-COVID-19 patients have documented residual shortness of breath and deranged PFTs suggestive of restrictive lung disease.^[5] So, a detailed respiratory assessment including PFTs and CXR is advisable. For emergency surgery, risk stratification along with postoperative ventilatory management should be planned. Preoperatively, complete cardiac assessment including echocardiography is advisable, because stress cardiomyopathy and myocardial injury with coronavirus have been observed.^[6] The risk of thromboembolic phenomena due to a hypercoagulable

state associated with the COVID infection should be kept in mind.^[7] A detailed history of prolonged or excessive use of corticosteroid must be obtained as it may cause adrenal suppression leading to perioperative hypotension. So, a stress dose of corticosteroids should be considered in these patients, if other, more common causes of persistent hypotension are ruled out.^[8] Use of succinylcholine should be avoided in patients recovering from prolonged critical COVID-19 illness to prevent myopathy-induced hyperkalaemia.^[9] Isoflurane can be the preferred inhalational anaesthetic agent as it has been found to halt fungal growth *in vitro*.^[10] Patients with ROC mucormycosis may present with difficult mask ventilation and endotracheal intubation as a result of epiglottitis and supraglottic oedema associated with fungal debris. So, a difficult airway cart with the backup of tracheostomy must be kept ready.^[11] Due to the extensive nature of mucormycosis surgery, blood and blood product transfusion and intraoperative inotropic support may be needed in some patients. So, perioperative central venous cannulation should be considered. Due to AmB-induced side effects like nephrotoxicity, hypotension, hypokalaemia, hypomagnesaemia, arrhythmias, and fever, continuous monitoring of invasive arterial pressure and arterial blood gases should be considered for extensive surgery. Arrangement of postoperative ICU care is important due to the associated comorbidities and delayed recovery.

CONCLUSION

We anaesthesiologists must prepare ourselves and reframe our anaesthetic approach for this new post-COVID mucormycosis disease. Large-scale prospective studies are needed to unfold the anaesthetic challenges in these patients.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Acknowledgements

We would like to thank Dr Rabia Monga and her team (from the Department of ENT) whose help and cooperation was invaluable in patient management.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Submitted: 29-May-2021

Revised: 04-Jun-2021

Accepted: 04-Jun-2021

Published: 23-Jul-2021

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Access this article online	
Quick response code	Website: www.ijaweb.org
	DOI: 10.4103/ija.ija_470_21

How to cite this article: Gupta KK, Singh A, Kalia A, Kandhola R. Anaesthetic considerations for post-COVID-19 mucormycosis surgery- A case report and review of literature. *Indian J Anaesth* 2021;65:545-7.