A case report on anesthetic challenges in the post-Covid complication of active mucormycosis: Patient preparedness for family physicians

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Abstract

Mucormycosis is a well-known yet complicated illness that seems benign but behaves malignantly. This article discusses the anesthetic challenges in providing care for a 49-year-old male who presented with post-Covid pneumonia and uncontrolled diabetes along with active mucormycosis and scheduled for functional endoscope sinus surgery (FESS) and debridement of necrotic tissue. We want to illustrate the importance of anticipated difficult airway, while highlighting the toxicity of intravenous amphotericin-B and its combination against anesthetic drugs.

Keywords: Anticipated difficult airway, drug interactions, general anesthesia, intravenous amphotericin B (AmB), mucormycosis, post-Covid pneumonia, video laryngoscope

Introduction

Post-Covid mucormycosis is a virulent, fungal infection prevalent in diabetic and immunocompromised patients,[1] with an elevated prevalence in post-Covid patients.[2] It is exceptionally lethal and highly invasive on a territorial level with proclivity for involving several structures. Despite adequate therapy, mortality can occur from days to weeks. Mucormycosis surgery requires early diagnosis; therefore, reversal of risk factors, surgical debridement of infected tissue, and brief systemic antifungal therapy are recommended. There are no proven treatment protocols for post-Covid mucormycosis.[3]

One of the potential long-term risks of Covid-19 pneumonia is progressive fibrotic lung disease. Pulmonary fibrosis is linked to nonreversible lung dysfunction. Previous Covid-19 contamination had effects on the lungs that were just now beginning to be fully understood.[4] The article’s objective is to discuss the challenges of anesthesia for a case of active mucormycosis in a post-Covid pneumonia patient who underwent functional endoscope sinus surgery (FESS) and tissue debridement procedures.[5]

Case Report

A 49-year-old male was hospitalized at our tertiary care hospital with a 4-day fever history on April 10, 2021. He experienced pyrexia, cough, and shortness of breath. In this case, the nasopharyngeal swab tested positive for Covid-19 by real-time polymerase chain reaction. The patient had diabetes for almost 10 years and was on a sliding-scale insulin. Abnormalities discovered on admission included the following: HbA1c 12.3%, fasting blood sugar (FBS) 250 mg/dL, postprandial blood sugar (PPBS) 350 mg/dL, interleukin (IL)
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He spent 10 days in the intensive care unit, receiving injection Remdesivir IV, 200 mg as a loading dose and 100 mg once a day for 4 days. As part of the Covid treatment regimen, methylprednisolone was administered intravenously (IV) at 10 ml per hour in 240 ml of saline for 10 days. FBS was 250 mg/dL after surgery, PPBS was 380 mg/dL, and HbA1c was 14%. Although the patient had recovered from Covid, he suffered from bilateral pneumonia.

In addition, the patient emerged with a new symptom of swelling and discomfort in the left eye, as shown in Figure 1. He was assigned for further examination to the Departments of ENT and Ophthalmology. Malaise, proptosis, chemosis, and periorbital cellulitis were all present clinically. For partial ophthalmoplegia, visual acuity was 6/6. The results of the magnetic resonance imaging (MRI) are shown in Figure 2. The MRI scans show the left nasal cavity, left maxillary sinus, ethmoidal sinus, sphenoid sinus, and left orbit with involvement of intraconal and extraconal spaces, left orbital apex with involvement of masticator space, pterygopalatine fossa, and a cerebral expansion to the left temporal lobe. In addition, there is left-sided proptosis bone degradation in the left maxillary sinus, orbit, and pterygoid process. Mucormycosis of the rhino-orbital-cerebral extension and bone erosion were identified in the reports.

Discussion

The most frequent side effects of amphotericin B (AmB) are hypokalemia, hypomagnesemia, fever, chills, dyspnea, and hypotension. Allergic responses, epilepsy, anemia, and thrombocytopenia are rare but well-documented side effects. Renal function is affected in about 80% of treated individuals, with 15% requiring hemodialysis, followed by an effective drop-in glomerular filter rate. The anesthesiologists should treat acute tubular necrosis leading to renal failure. Only lifesaving surgery can be done on individuals with acute renal illness due to significant mortality and morbidity. Anesthesiologists must maintain adequate mean arterial pressure and cardiac output while avoiding further renal complications.

AmB creates transmembrane channels by attaching to the sterol component of fungi’s cell membrane, ergosterol; it triggers cell death by leaking monovalent ions (Na, K+, K+, H+, and Cl). Binding to cholesterol in mammalian cells induces cytotoxicity. The metabolic processes of AmB after administration are unknown.

Concurrent corticosteroids, adrenocorticotropic hormone (ACTH), and digitalis glycosides can worsen hypokalemia, putting the patient at risk for cardiac failure and digitalis toxicity. The role of skeletal muscle relaxants can be enhanced by AmB-induced hypokalemia. Serum potassium levels should be closely monitored. Arrhythmia, cardiac arrest, cardiomegaly, bradycardia, hemorrhage, postural hypotension, atrial fibrillation, and vasodilation are reported. The normal dosage is 1–1.5 mg/kg/day. The overall dosage is typically 2.5–3 g throughout treatment.

Our patient presented us with three issues:

1. Difficult airway due to restricted mouth opening, secondary due to pain and limited room for a laryngoscopy (facial nerve palsy).
2. Longstanding uncontrollable diabetes mellitus.
3. Post-Covid pneumonia and underlying sepsis.

After a comprehensive examination, the patient was placed under general anesthesia for FESS and surgical debridement using the American Society of Anesthesiology (ASA) risk classification—ASA III. An informed written high-risk consent was obtained from the patient and his family. A 16-gauge IV line with a wide bore was set up. Electrocardiography (ECG), pulse oximetry, and noninvasive blood pressure (NIBP) monitors were also set up. Video laryngoscope and bougies were on a cart that was ready to go. The patient was given an injection of glycopyrrolate 0.2 mg and fentanyl 150 mg intravenously to help with the pain. Three minutes of preoxygenation with 100% oxygen were done, and then propofol 100 mg was injected because it was expected...
that the airways would be hard to clear. We preferred rapid sequence induction (RSI) with scoline 2 mg/kg body weight. We intubated with an 8-mm cuffed portex endotracheal tube after confirming bilateral air entry, and the endotracheal tube was fixed appropriately. Injection xylocard 1.5 mg/kg was used to blunt the intubation response; a throat pack was done to prevent aspiration. Postintubation pulse oximetry, five-lead ECG, NIBP, end-tidal carbon dioxide (EtCO2), temperature, and urine output monitoring were done. The patient was kept on oxygen, nitrous (50-50), and sevoflurane 1% with regulated breathing. Vecuronium 0.1 mg/kg injections every 30 minutes were used to maintain muscle relaxation. The patient was electively ventilated due to the post-Covid pneumonia, uncontrolled diabetes, and underlying sepsis.[6,14]

The delta variant influenced the second wave of Covid-19 in India. Due to the severity of the infection and high mortality rate, heavy steroids were administered. Even though they were not hospitalized, the immunocompromised patients faced serious post-Covid complications in several ways. Precisely those patients with uncontrollable diabetes were more vulnerable to mucormycosis infection.[15] In our case, the patient presented signs of prolonged post-Covid pneumonia even after testing negative for Covid and was diagnosed further with active mucormycosis. As the patient was already admitted to the hospital undergoing treatment for post-Covid pneumonia, the ENT department conducted timely tests; hence, FESS and debridement of necrotic tissue surgery were executed. The significance of this article is that it presents the challenges faced during surgery and difficult airway complications. It urges family physicians to do a detailed background check on patients visiting them with any signs of post-Covid complications and modify treatment plans accordingly.

Conclusion

Early diagnosis of post-Covid mucormycosis, intravenous AmB, surgical debridement, and treatment of underlying illness improve the patient’s prognosis; nevertheless, attending anesthesiologists should be aware of the renal and cardiovascular system alterations caused by intravenous AmB and their interactions. The patients with high-range diabetes and post-Covid pneumonia present difficult airway, which are a major challenge for the anesthesiologist. Anesthesiologists must be alert and prepared with a sophisticated toolset during intubation. It is recommended that family physicians educate patients with post-Covid serious complications and decide on treatment plans accordingly as well as follow the Covid treatment regime based on the diabetic history of the patient. The first and second waves caused massive pulmonary complications in Covid and post-Covid patients leading to high mortality and morbidity, irrespective of patients’ age and gender. We propose that the future scope of the findings presented in this article involves and necessitates carrying out an extensive study and research on other post-Covid complications.

KEY POINTS

- Post-Covid pneumonia
- Uncontrolled diabetes
- Seriously compromised immunity
- Active mucormycosis
- Drug interaction complications of AmB with anesthesia drugs
- Difficult airway management.

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.

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Conflicts of interest

There are no conflicts of interest.

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