A case of post-COVID-19 mucormycosis with permanent pacemaker posted for functional endoscopic sinus surgery: Anaesthetic challenges

Sir,

The important perioperative challenges during surgical debridement for post-coronavirus disease (COVID)-19 rhino-orbital-cerebral mucormycosis include difficult airway, uncontrolled diabetes mellitus (DM), side effects of amphotericin B (AmB), presence of other comorbidities and post-COVID-19 systemic abnormalities including a decline in respiratory function.[1] We report the successful management of a patient with post-COVID-19 mucormycosis with a permanent pacemaker *in situ* posted for functional endoscopic sinus surgery (FESS) under general anaesthesia.

A 70-year-old male with post-COVID-19 mucormycosis came with complaints of right-sided facial swelling and pain with nasal blockage. The patient when admitted for COVID-19 was given tablets favipiravir and prednisolone and discharged after 15 days. He had a history of syncopal attacks and was diagnosed as having a heart block 8 years back for which a permanent pacemaker had been inserted [Figure 1]. He was a known case of DM and hypertension, with a blood sugar of 490 mg/dL and urine ketones positive on admission, and was started on insulin to control the blood sugar. The airway examination showed Mallampati classification (MPC) grade 3 with a thyromental distance of 6.5 cm. Oedema and pain present on the maxillary and orbital regions limited the mouth opening. A preoperative arterial blood gas (ABG) analysis showed PaO_2 60 mmHg, $PaCO_2$ 34 mmHg, and pH 7.4 and six-zone involvement on chest radiograph. The baseline oxygen saturation (SpO_2) was 91% (room air) and the baseline heart rate was 70/min and regular. The electrocardiogram (ECG) showed ventricular pacing with wide QRS complexes [Figure 2]. The echocardiography showed degenerative changes with fair left ventricular systolic function (ejection fraction of 60%). The pacemaker was identified as VITATRON A20A1SR (mode VVIR) which was reprogrammed to asynchronous V000 mode prior to surgery. The defibrillator, transcutaneous pacing and crash cart trolley were kept ready. After pre-oxygenation, the patient was induced with intravenous fentanyl 50 µg, thiopentone 250 mg and rocuronium and tracheal intubation were facilitated with a C-MAC video laryngoscope. The patient was maintained on oxygen, nitrous oxide, isoflurane and vecuronium. He was extubated at the end of the procedure and shifted to the post-anaesthesia care unit. The pacemaker was programmed to its initial mode after surgery. The COVID-19 mucormycosis patients with a pacemaker *in situ* pose several challenges for an anaesthesiologist. Diabetic nephropathy, renal toxicity and electrolyte imbalance associated with inj. AmB are major concerns besides preoperative hypokalaemia, fever and hypotension.[2] Perioperative blood pressure, urine output, renal function and serum electrolyte monitoring is mandatory.

Figure 1: Chest radiograph showing six zone involvement and a ventricular pacing system

Figure 2: Pacemaker spike precedes each QRS complex with LBBB, discordant ST segment and T waves- consistent with right ventricular pacing

Supraglottic oedema, fungal debris in the oropharyngeal region and palatal perforation can lead to difficult mask ventilation and endotracheal intubation.[3] In our patient, the thyromental distance was less, the MPC was grade 3 and the mouth opening was restricted leading to an anticipated difficult airway. Hence, a C-MAC videolaryngoscope was used.

Post-COVID-19 pulmonary fibrosis leads to breathlessness, dyspnoea, cough, fatigue, limited exercise tolerance and an abnormal ABG picture (low PaO_2, high $PaCO_2$, low SpO_2).[4] The patient on preoperative oxygen therapy can desaturate during the laryngoscopy for which adequate pre-oxygenation and minimum time for laryngoscopy and intubation is the key. Hypoxaemia and hypercapnia can increase the pacing threshold, and thus, lead to the failure of the pacemaker to capture. Mucormycosis may exist with diabetic ketoacidosis and further treatment with AmB can lead to renal toxicity, acid-base and electrolyte disturbances (hypokalaemia, hyperkalaemia, hypomagnesemia) and hypovolaemia, which may precipitate arrhythmias. These conditions can cause perioperative interference with the pacemaker function leading to failure to capture and pacemaker dysfunction.[5] In addition, FESS is in proximity to the pacemaker and requires the use of cautery leading to electromagnetic interference.[6] Similarly, the microdebrider can lead to artefacts in the ECG mimicking ventricular tachycardia and even asystole. Hence, we converted the pacemaker to an asynchronous mode; nonetheless, pacemaker failure in the synchronous and asynchronous modes has been noted leading to hypotension, arrhythmias or cardiac arrest. Thus, a post-COVID-19 case of mucormycosis with suboptimal lung function, compromised airway, uncontrolled diabetes and an artificial cardiac pacemaker, posted for FESS was managed successfully with vigilant perioperative monitoring under general anaesthesia.

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Declaration of patient consent

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

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Conflicts of interest

There are no conflicts of interest.

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