



Delayed Elective Extubation To Preserve Surgical Outcome: A Case Report

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Abstract

Elective endotracheal extubation is essential for smooth and uneventful recovery of the patient. Delaying extubation in order to optimise and stabilise the patient, considering the patient's surgical outcome is essential as it prevents complications like hemodynamic and respiratory responses like hypertension, tachycardia, dysrhythmia, coughing, laryngospasm, myocardial ischemia and raised intracranial and intraocular pressure. We present here a case report of delayed elective extubation in a case of a 45 year old c/o left eye orbital cellulitis with post covid pneumonitis with diabetes mellitus, posted for left medial maxillectomy with sinus debridement and orbital enucleation.

Keywords: Extubation, Intubation, Exenteration, Accidental extubation, Mucormycosis, Maxillectomy

Introduction

Elective endotracheal extubation, as crucial as endotracheal intubation, is essential for smooth and uneventful recovery of the patient. In ophthalmic, vascular, intracranial or thoracic surgeries, associated with an increase of about 10-30% increase in blood pressure and heart rate as a pressor response during tracheal extubation, require suppression of respiratory and cardiovascular reflex responses. Delaying extubation in order to optimise and stabilise the patient, considering the patient's surgical outcome is essential as it prevents complications like hemodynamic and respiratory responses like hypertension, tachycardia, dysrhythmia, coughing, laryngospasm, myocardial ischemia and raised intracranial and intraocular pressure.

Case Report:

A 45 year old symptomatic male came to the MGM Hospital Kamothe fever OPD with past history of being tested COVID positive 3 weeks ago, with recent admission history at the local COVID treatment centre for the past 2 weeks. At the fever

OPD, the patient had complaints of blurring of vision in the left eye. With positive COVID antibody titres of 13.46, the patient was admitted under the ICU Care setup in the green zone. The patient had vitals, of Blood Pressure 126/80mmHg, Pulse 74/min, spO₂- 95% on O₂ support at 6L/min by Hudson mask and conscious and well oriented to time, place and person.

The patient had past surgical history of retinal detachment repair of the right eye 6 years ago, with no vision at present. Known case of diabetes mellitus since 10 years, the patient was maintaining blood sugar levels within normal limits, currently on HAI.

With a joint management under the department of medicine, surgical department of Ear Nose Throat (ENT) and Ophthalmology, the patient was diagnosed as a known case of Mucormycosis with Left Maxillectomy in a post COVID patient with left eye orbital cellulitis, with DM, to be posted for left medial maxillectomy with sinus debridement and orbital enucleation. MRI Of brain, orbit and paranasal

sinuses was suggestive of invasive fungal sinusitis with orbital cellulitis.

During the preoperative assessment of the patient, the patient had stable vitals with Blood pressure of 126/80mmHg and SpO₂ of 95% on oxygen support. As per the Mallampatti classification (MPC), with a score of 3, the patient had anticipated difficult intubation. On auscultation, air entry was found to be reduced in both lower zones. All routine investigations were done, Hemoglobin 9.4 and Platelet count 1.3 lacs. HbA_{1c} levels were 11.8. Correction for low Potassium levels of 2.8 was given.

A biopsy of left middle turbinate showed aseptate fungal hyphae on KOH mount. Chest X-ray was suggestive of right midline pneumonitis, suggestive of COVID 19 state. ECG showed T-wave inversion in all leads. 2D-Echocardiography was suggestive of normal Left ventricular systolic function of 60%, with cardiac chambers appearing to be normal. Cardiology opinion gave fitness for the surgery with mild risk of intraoperative cardiac events.

A day prior to the surgery, the patient was reassessed, packed red blood cell units and post surgical icu care was reserved for the patient. A well informed written consent from the patient and first degree relative was taken, meanwhile explaining the patient the high risks of the surgery.

On the day of surgery, with all due precautions, Air Blood Gas Analysis (ABG) was done s/o pH-7.48, PO₂-97, pCO₂-37, Lactates 0.4 and HCO₃ 27.6 under preoperative assessment. The anaesthetic set up was prepped well for difficult intubation with functioning laryngoscopes with Blades of sizes MAC 3 and 4, airway aids like Guedel's airway, Gum elastic Bougie, Magill forceps, working suction apparatus, essential drugs for rapid sequence intubation (RSI), Video laryngoscopy and Functional fiberoptic bronchoscope.

The patient was wheeled into the Operating Room (OR), all monitors attached and vital parameters recorded. The patient was premedicated and induced with propofol 120mg i/v (2mg/kg) under RSI with Inj. Scoline 100mg i/v (1.5mg/kg) intubated using a functioning video laryngoscope, with Endotracheal tube (ETT) no.8 fixed at 21 lip mark. Following confirmation of bilateral breath sounds, sustained end tidal CO₂ (ETCO₂) and adequate chest rise, the tube

was fixed and patient was mechanically ventilated. The patient was paralysed with Inj. Vecuronium 5 mg i/v (0.1mg/kg). Further, the patient was maintained on Inj. Vecuronium, with Oxygen, Nitrous oxide and Isoflurane.

Under all aseptic precautions, following draping and painting, surgical incision was taken, starting with medial maxillectomy and sinus debridement. The patient maintained a stable blood pressure throughout this procedure of over 110/70mmHg. Considering the longer duration of surgery, and for the analgesic requirement of the patient, an intravenous infusion was started comprising of Inj. Fentanyl, Inj. Midazolam and Inj. Vecuronium.

Further, during the enucleation procedure of the eye, just prior to evacuating the orbital cavity, the patient had a spike of high blood pressure of about 180/100mmHg, leading to a massive bleed from the cavity. Managed further, the patient was maintained intraoperatively on fluids (normal saline and hydroxyl-ethyl-starch) and blood was called for.

Following the completion of surgical procedure, the patient was given an extubation trial. However, the stimulus led to raised blood pressure leading to bleeding from the orbital cavity. The anaesthetist team made the required decision of keeping the patient sedated and paralysed in view of salvaging the surgical outcome. Under intravenous sedation – paralysis infusion, the patient was shifted safely to the surgical ICU care set up, for further monitoring and observation, intubated and mechanically ventilating on Continuous Mandatory Ventilatory (CMV) mode, with blood pressure of 136/84mmHg. Post operatively, the patient was transfused with one unit of PCV.

The ABG was suggestive of pH-7.49, PO₂-359, pCO₂-31, Lactates 1.3 and HCO₃ 25.3. Further, the patient's oxygen support was reduced.

Day 2 the patient's vitals were stable with BP of 112/62mmHg and ABG was suggestive of. pH-7.33, PO₂-189, pCO₂-58, Lactates 0.6 and HCO₃-24.3, sedated and paralysed. After the patient was completely awake, T-piece trial was given. Furthermore, following ABG and spontaneous motor activity and eye opening, the patient was extubated. The patient maintained saturation of 100% on oxygen support of 6Litres/min via Hudson mask.

Fig1 : Preoperative Chest X-ray and ECG of the patient

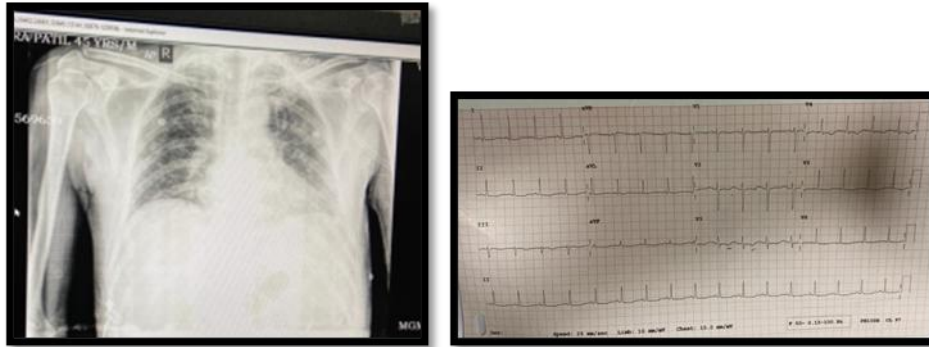


Fig3: Intraoperative Enucleation

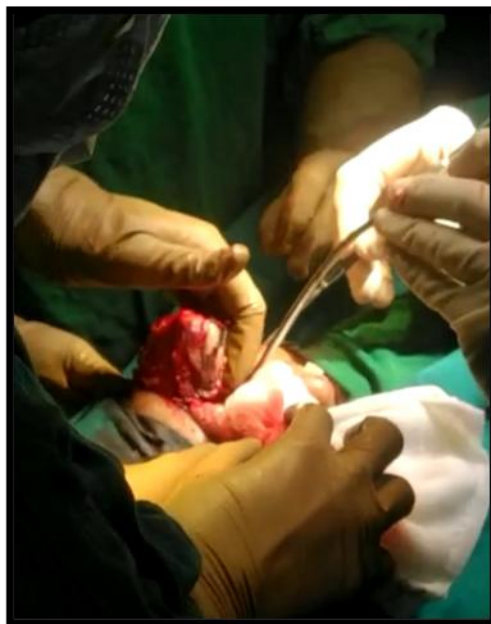


Fig 2: Anaesthesia Workstation



Fig4: Enuceated eye



Discussion:

Endotracheal extubation, an essential event in the course of general anaesthesia, is usually performed under a lighter plane of anaesthesia (1,2). Irritation to the airways during this process leads to cough or strain, further known to increase systolic, diastolic and arterial pulse pressure. Coughing can lead to increases in intra-thoracic pressure interfering with venous return to the heart. Reflex sympathetic discharge caused by epipharyngeal and

laryngopharyngeal stimulation produces significant increase in heart rate and arterial pressure that may persist into recovery period (3,4). If specific measures are not taken to prevent hemodynamic response, the heart rate can increase from 26% to 66% and systolic blood pressure from 36% to 45% in susceptible patients (3,4). Dyson and colleagues demonstrated increases in arterial pressure and heart rate lasting 5–15 min in 70% of the patients (2,3,5,6).

The intra-operative factors affect the time to extubation (7). Prolonged exposure to general anaesthesia drugs is associated with longer time to recover from anaesthesia, further leading to delayed extubation. A study by Twohig EM *et al* suggested that staged extubation is always better in head and neck surgeries (8).

Extubation related complications vary from stridor, laryngospasm, residual neuro-muscular blockade, post obstructive pulmonary oedema (POPO), raised intracranial and intra-ocular pressures, coughing and bronchospasm (9).

Residual neuro muscular block commonly presents as airway obstruction. The upper airway and pharyngeal muscles are more sensitive, taking longer to recover. Inadequate ventilation and suppression of the hypoxia chemo reflex is common, further making the extubation period hazardous unless the reversal of neuromuscular block is complete (10). A Train of Four (TOF) ratio of more than or equal to 0.9 is recommended before extubation (11,12).

Laryngospasm is a common complication of GA, resulting from direct irritation of the vocal cords by blood, saliva or instrumentation of indirectly from surgical stimulation. Laryngeal muscle contraction causes adduction of the vocal cords and airway obstruction (7,13). In patients with normal IOP, Lamb *et al.* observed that the most marked increase in IOP occurred after extubation (14).

Conclusion:

Extubation is an elective procedure. The primary aim during extubation is to ensure adequate delivery of oxygen to the lungs. In severely compromised airways, it may be safer to delay the removal of tracheal tube and transfer the patient to the intensive care unit (ICU) to allow for a period of weaning. Practising delayed extubation for a good surgical outcome, to preserve the airway or to avoid other complications of extubation is beneficial for the patient. Furthermore, extubation strategy should be considered before anaesthesia, to assess the individual risk for each patient and allow sufficient time for planning and preparation.

Utmost vigilance by the anaesthetist as to decide when to plan the extubation is essential for the prevention of complications.

References:

1. R Vachhani R Gulati Comparative study to evaluate effects of nitroglycerine and esmolol on hemodynamic parameters in controlled hypertensive patients during emergence from anaesthesia and extubation *Int J Med Res Prof*2017;33903
2. M Hartley R S Vaughan Problems associated with tracheal extubation *Br J Anaesth*1993;71:456180007-0912Elsevier BV
3. N Tandon S Goyal Comparison of dexmedetomidine and magnesium sulphate in attenuation of airway and pressor responses during extubation in patients undergoing craniotomies *Int J Contemp Med Res*2017;4510337
4. K Nishina K Mikawa N Maekawa H Obara Attenuation of cardiovascular responses to tracheal extubation with diltiazem *Anesth Analg*1995;80:6121722
5. Andrew Dyson Philip A. Isaac John H. Pennant Adolph H. Giesecke James M. Lipton Esmolol Attenuates Cardiovascular Responses to Extubation *Anesth Analg*1990;71:667580003-2999Ovid Technologies (Wolters Kluwer Health)
6. Swati Karmarkar Seema Varshney Tracheal extubation *Contin Educ Anaesth Crit Care Pain*2008;8:6214201743-1816Elsevier BV
7. Patel SK, Kacheriwala SM, Duttaroy DD. Audit of postoperative surgical intensive care unit admissions. *Indian J Crit Care Med* 2018;22(1):10–15.
8. Twohig EM, Leader R, Shaw RJ, *et al.* Staged extubation to manage the airway after operations on the head and neck. *Br J Oral Maxillofac Surg* 2016;54(9):1030–1032.
9. Schürner AM, Manzini G, Bueter M, *et al.* Perioperative surgery- and anesthesia-related risks of laparoscopic Roux-en-Y gastric bypass: A single centre, retrospective data analysis. *BMC Anesthesiol* 2018;18(1):190.
10. Raju M, Pandit JJ. Re-awakening the carotid bodies after anaesthesia: managing hypnotic and

- neuromuscular blocking agents. *Anaesthesia* 2020; 75: 301e4. ***@[14]
11. Naguib M, Kopman AF, Ensor JE. Neuromuscular monitoring and postoperative residual curarisation: a meta-analysis. *Br J Anaesth* 2007; 98: 302e16
12. 15. Hunter JM. Reversal of residual neuromuscular block: complications associated with perioperative management of muscle relaxation. *Br J Anaesth* 2017; 119: i53e62
13. Misal US, Joshi SA, Shaikh MM. Delayed recovery from anesthesia: A postgraduate educational review. *Anesth Essays Res* 2016;10(2):164–72.
14. Popat M, Mitchell V, Dravid R, Patel A, Swampillai C, Higgs A. Difficult Airway Society Guidelines for the management of tracheal extubation. *Anaesthesia* 2012; 67: 318e40.