CASE REPORT

Head and neck cancer recurrence with limited mouth opening, radiation fibrosis and confirmed COVID-19 infection: Approach to airway management

Faisal Shamim[1], Muhammad Sohaib[2], Kashaf Shahid[3], Syed Akbar Abbas[4]

Abstract

We present a case that describes the airway management of a patient with recurrent head and neck cancer and confirmed COVID-19 infection. Securing airway of these patients with anticipated difficulty and at the same time limiting virus exposure to providers can be challenging. The risk of aerosolization during awake tracheal intubation is extreme as it carries a high risk of transmitting respiratory infections. A multidisciplinary team discussion before the procedure highlighted aspects of both airway management and the urgency of surgical procedure where particular care and modifications are required. Successful flexible bronchoscopy and intubation was done under inhalational anaesthetics with spontaneous breathing. Although fiberoptic intubation during sleep,in anticipated difficult airways, have led to enhanced intubation time, this technique was opted to minimize the risk of aerosol generation associated with topicalisation, coughing and hence reduced incidence of cross infection to health care workers.

Keywords: COVID-19, Head and neck cancer, Difficult airway, fiberoptic intubation, Aerosol generating procedure.

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Introduction

The speed and scale of the global COVID-19 pandemic has resulted in exceptional pressures on health services worldwide, requiring new techniques of healthcare service provision during current crisis.[1] The constraints developed during this period are preventing timely delivery of comprehensive care because of the fear of viral transmission. Patients with head and neck cancer are facing challenges in seeking their treatment during the pandemic because it has greatly impacted surgical practice and decision making in cancer setting. The Head and Neck Cancer International Group (HNCIG) proposed consensus practice recommendations for head and neck surgical oncology during COVID-19 pandemic and among top five factors for prioritization of surgery in these patients, it should not be delayed when there are chances of tumour progression.[2]

Our case highlights the complexities, decision making for surgery and new challenges of difficult airway management in a patient with confirmed COVID-19 infection suffering from cancer recurrence.

Case Report

A 58-year-old man (weight 64 kg, height 167 cm) presented to ENT clinic at Aga Khan University Hospital, Karachi on 17th November 2020 with left submandibular swelling. He was a known case of right buccal squamous cell carcinoma and had been operated previously for composite resection of floor of mouth and mandible, radical neck dissection and free flap surgery in December 2019. Following surgery, the patient had 5 cycles of chemotherapy and 33 cycles of radiotherapy.

On routine workup, the submandibular swelling was diagnosed as metastatic submandibular lymph nodes. Computed Tomography (CT) scan of head and neck showed enhancing right buccal lesion (52x19 mm) extending up to the retromolar trigone and enlarged right submandibular lymph nodes. There were no other known co-morbids, but he had been using tobacco (betel leaf) for more than 15 years. On admission, on 1st December, 2020, the other necessary laboratory data were within normal limits, but, the Qualitative PCR result for 2019 novel Coronavirus (SARS-CoV-2) was positive. He had no signs and symptoms of COVID infection. This was discussed amongst the surgical team, anaesthesiologist, and family about the urgency of surgery in view of cancer recurrence, presence of COVID infection and decided to proceed.

The case was scheduled on 02nd December 2020, in negative pressure operating room (OR) according to institutional policy for COVID positive or suspected patients. The patients' airway was assessed by consultant anaesthesiologist in isolation room adjacent to OR with level III personal protective equipment (PPE), maintaining six feet distance. We found a very limited mouth opening, hardly less than a finger, radiation changes on skin and soft

[1-3]Department of Anaesthesiology, Aga Khan University Hospital, Karachi, Pakistan; [4]Department of Surgery, Aga Khan University Hospital, Karachi, Pakistan.

Correspondence: Muhammad Zain Mushtaq. e-mail: zain.mushtaq@aku.edu
ORCID ID. 0000-0001-5504-8341

Figure-1: Predicted difficult airway due to radiation changes on skin, limited mouth opening and class IV Mallampati.

Figure-1: Using a pre-procedure COVID airway management huddle to improve patient safety.

tissues of the neck resulting in fibrosis, Mallampati class IV and upper lip bite test grade III (Figure 1). The anaesthesiologist also obtained a verbal consent from the patient for pictures and scientific paper publication due to unique combination of confirmed COVID-19 infection and difficult airway.

First, we did a comprehensive huddle involving two anaesthetic consultants, a trainee and anaesthesia technician (Figure 2). We discussed different options of airway management and their consequences, availability necessary equipment, key personnel, and human factors if any situation of failed airway happened. Ultimately, we agreed that topical anaesthesia, awake intubation, and tracheostomy under local anaesthesia should be avoided due to risk of aerosolization. We kept fiberoptic bronchoscope, front of neck airway set and difficult airway cart. We also asked ENT team to scrub and don fully for emergency tracheostomy. All the personnel protective measures were taken by the team. The patient was received in operative room in a vitally stable condition. The primary airway manager performing flexible bronchoscopy took powered air purifying respirator (PAPR) and rest of the team had level II PPE with N95/reusable respirator and all other essential components including full sleeved gown, face shield, double gloving and shoe covers.

After securing intravenous lines, ASA standard monitoring was attached, patient was preoxygenated with 100% oxygen using tight fitting size 3 facemask. Sevoflurane was used for inhalational induction with small boluses of propofol to keep patient on spontaneous breathing while under anaesthesia. A size 7 nasopharyngeal airway (NPA) was inserted in left nostril to maintain oxygenation and spontaneous breathing by anaesthetic circuit connected to it. Initially, fiberoptic bronchoscopy for nasotracheal approach was attempted, but limited space and distorted anatomy rendered it unsuccessful as the scope could not pass through the posterior nasal aperture. After two to three attempts, the oral route for fiberoptic intubation was adopted. Severe problems were faced in identifying the structures due to radiation effects, causing swelling, previous surgery and moving airway due to spontaneous breathing. Successful intubation was achieved after about 20 minutes when a jaw thrust maneuver was done from the front which slightly pulled out the NPA. The flexible bronchoscope navigated through the glottic opening and once carina was visualized, size 7.5 mm I.D reinforced ETT was passed over it. On two occasions, oxygen saturation level dropped below 90% with no other vital signs changes. After confirmation, tube was secured and fixed at 23 cm. Neck dissection and tracheostomy was done and 6mm fenestrated tube was inserted and confirmed by capnography. No staff had cross infection and they were asked specifically for any symptoms.

Discussion

This case illustrates new challenges in airway management of COVID-19 patients, with an anticipated difficult airway. Meticulous planning in head and neck cancer patients must consider safety of both patient and all health care professional involved.

According to Royal College of Anaesthetist's 4th national audit report (NAP4), high-risk patients should have their airway secured before induction of anaesthesia in anticipated difficult airway scenario.[3] This can avoid potential morbidity and mortality associated with difficult

airway. In anticipated difficult airway, successful airway management is achieved either by awake tracheal intubation (ATI) through fiberoptic bronchoscopy (FOB) or tracheostomy depending on the site and nature of lesion.[4] Current recommendations for intubating patients with COVID-19 infection includes deep sedation and full paralysis to minimize coughing and aerosol generation.[5]

The decision to use ATI is based on an evaluation that contemplate the risk of routine induction of anaesthesia against the likelihood of awake intubation success, the ability of patient to cooperate with the procedure, and consequences of this more prolonged intubation technique. In patients with COVID-19, the extended time needed to perform ATI may increase the risk of severe oxygen desaturation and cardiorespiratory arrest and prolong HCW exposure. Additionally, preparation of the patient for ATI, as well as inadequate topical anaesthesia of airway may be associated with coughing and gag, which likely results in increased airway secretions and virus aerosolisation. This has also been confirmed recently that both intubation and extubation sequences produce less aerosol than voluntary coughing.[6] In our case, we planned for asleep fiberoptic intubation under sevoflurane inhalational anaesthetic while maintaining spontaneous ventilation. Although our technique increased the intubating time and there were two episodes of hypoxia during the procedure but coughing was avoided.

The infection rate in health care providers after performing intubations in COVID-19–positive patients is unclear, studies suggest that HCWs may be at increased risk of COVID-19 infection after an airway management episode involving an infected patient.[7] Our selected technique did not result in significant aersol generation and there were no reports of cross infection in the theater personnel present at that time. The other reason is use of standard or greater level of personal protective equipment that should apply to all airway procedures in COVID-19 patients with a difficult airway. A powered air-purifying respirator (PAPR) is the preferred level of PPE especially during difficult airway management.[8] The airway manager in our case have taken PAPR and rest of the team members were with N95 mask along with face shield. Nebulization with local anaesthetic and other techniques of airway topicalisation cannot be employed in this patient due to high risk of aerosolisation leading us to one more challenge of maintaining optimal level of sedation during fiberoptic technique. High flow nasal cannula (HFNC) oxygen can be used during fiberoptic intubation, but it also increases the risk of aerosolisation and hazards to health care professional.[9] HFNC facility was not available in our operation theatres.

Conclusion

This report highlights about safe conduct of fiberoptic intubation during sleep, in a COVID-19 infected patient with predicted difficult airway. We have emphasized the importance of proper personnel protective measures taken that reduces the risk of aerosol generation.

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Disclaimer: This is to certify that the manuscript has been read and approved by all the authors, the requirements for authorship have been met, and each author believes that the manuscript represents honest work.

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References

1. Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the COVID-19 epidemic? Lancet 2020; 395: 931–4.
2. Mehanna H, Hardman JC, Shenson JA, Abou-Foul AK, Topf MC, AlFalasi M, et al. Recommendations for head and neck surgical oncology practice in a setting of acute severe resource constraint during the COVID-19 pandemic: an international consensus. Lancet Oncol 2020; 21: e350-9.
3. Cook TM, Woodall N, Harper J, Benger J; Fourth National Audit Project. Major complications of airway management in the UK: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 2: intensive care and emergency departments. Br J Anaesth 2011; 106: 632-42.
4. Cook TM, MacDougall-Davis SR. Complications and failure of airway management. Br J Anaesth 2012; 109(suppl_1): i68-85.
5. Tone KJ, Busato GC, Aflaki S, Ip T, Lyn S. Emergency awake fibreoptic intubation with confirmed COVID-19. Can J Anaesth 2021; 68: 1721-2.
6. Brown J, Gregson FKA, Shrimpton A, Cook TM, Bzdek BR, Reid JP, et al. A quantitative evaluation of aerosol generation during tracheal intubation and extubation. Anaesthesia 2021; 76: 174-81.
7. El-Boghdadly K, Wong DJN, Owen R, Neuman MD, Pocock S, Carlisle JB, et al. Risks to healthcare workers following tracheal intubation of patients with COVID-19: a prospective international multicentre cohort study. Anaesthesia 2020; 75: 1437-47.
8. Smith JD, Chen MM, Balakrishnan K, Sidell DR, di Stadio A, Schechtman SA, et al. The Difficult Airway and Aerosol-Generating Procedures in COVID-19: Timeless Principles for Uncertain Times. Otolaryngol Head Neck Surg 2020; 163: 934-7.
9. Lee S, Bradley WPL, Brewster DJ, Chahal R, Poon L, Segal R, et al. Airway management in the adult patient with COVID-19: High flow nasal oxygen or not? A summary of evidence and local expert opinion. Anaesth Intensive Care 2021; 49: 268-74.