

Cryoprobe as a novel tool in difficult Airway management for Trans-oral Robotic Surgery

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A difficult airway scenario is every anaesthesiologist's nightmare. We present a unique case of difficult airway where a cryoprobe was used to clear the path for securing the airway in a cancer patient, where established difficult airway tools like fiberoptic bronchoscope and videolaryngoscope failed. We could pull the giant slippery polyp downwards and laterally with the help of cryoprobe, to facilitate tracheal intubation.

Trans-oral robotic surgery, done for removing cancerous growths from difficult to reach areas of the oral cavity, has revolutionised the field of head and neck cancer surgery. With advances in surgical technology, anaesthesiologists must also be prepared to handle the challenges posed, especially when it comes to managing difficult airways.

Keywords: Difficult airway; cryoprobe; trans-oral robotic surgery; head and neck cancer

Introduction

Despite the multitude of airway management tools available for difficult airway, we can still face problems in securing the airway. One must keep the options open for newer innovations for successful endotracheal intubation. We hereby present a unique case of laryngeal growth hindering the passage of both the tracheal tube as well as the fiberoptic bronchoscope. In this situation, cryoprobe was helpful in pulling away the polyp, allowing the passage of the endotracheal tube.

Case Report

A 60yr old, ASA grade 2, chronic tobacco smoker and chewer, post- radiotherapy to the neck, was posted for trans-oral robotic surgery (TORS). A nasal flexometallic tube was planned in order to access the tumour through robotic arms. After adequate nasal preparation, and preoxygenation, intravenous induction was done with fentanyl 60µg and propofol 60mg. Flexible fiberoptic bronchoscope (FOB) was inserted through nasal tube, but was unsuccessful in securing the airway. Oxygen was given continuously through the other nostril through a nasal airway connected to the anaesthesia circuit. Intermittent face mask ventilation was also utilized to maintain oxygenation during intubation attempts. On insertion of the C-MACTM D-blade videolaryngoscope, a giant

(30x25x22mm) pedunculated polyp originating from the right ary-epiglottic fold obstructing the laryngeal inlet was seen (Figure 1). The nasal flexometallic tube (ETT) could not negotiate the polyp. The jaws of the Magill forceps were unsuccessful in grasping the large slippery polyp. All efforts only pushed the polyp towards the glottic opening with the danger of stalk rupturing and complete airway obstruction thereafter. A readily available cryoprobe was then applied to the polyp, which could be pulled downwards and laterally and kept out of the axis of intubation, long enough to facilitate endotracheal intubation. The ETT could now be successfully inserted into the trachea. The position of the tube was confirmed clinically and capnographically. Muscle relaxant was then given. The rest of the trans-oral robotic surgery proceeded uneventfully. The polyp was robotically excised and the patient was shifted to an onco-surgical intensive care unit for overnight retention of ETT (as per institutional protocol for TORS), after adequate reversal. The patient was later successfully extubated over a tube exchanger device. All the vital parameters were maintained within normal limits and the entire perioperative course was uneventful.

Discussion

Laryngeal polyps are benign lesions but may sometimes obstruct the laryngeal inlet by virtue



of their sheer size.^{1,2,3} A closed system nitrous oxide cryoprobe has been used previously to treat oral soft tissue lesions, retinoblastomas, skin lesions, liver metastases, cervical intra epithelial neoplasia etc. According to the principles of Joule-Thompson expansion, when nitrous oxide is released from the high pressure inside the cryoprobe to the lower pressure cryo tip, the drop in temperature causes a ball of ice crystals to form around the probe tip due to freezing of the tissues⁴. As per current protocols, for most benign mucosal lesions a 1–2 minute freeze/thaw cycle and three 2-minute freeze/thaw cycles for malignant lesions are recommended⁴. Our experience has extended the use of the cryoprobe (which was readily available and we had routinely observed the surgeons using it) to a new dimension, namely difficult airway management. The large pedunculated laryngeal polyp was repeatedly slipping out of the Magill forceps grip. On application of the cryoprobe, freezing of the portion of tumor tissue in contact with the tip occurred and the cryoprobe tip was stuck to the tumour tissue for one whole minute before thawing occurred, giving us ample time to manipulate the papilloma away from the laryngeal inlet to facilitate tracheal intubation. As application of the cryoprobe is a relatively painless procedure, it can be used even in difficult airway patients undergoing awake fibreoptic intubation. A cryoprobe does not result in any bleeding which is an added advantage. Not only the surgeon, but also the

anaesthesiologist must be familiar with the working of a cryoprobe.

Conclusion

Difficult airway is a challenge with countless presentations. Even though the superiority of the fiberoptic bronchoscope and video-laryngoscopes cannot be questioned in difficult airway management⁵, we need to develop newer tools for managing such rare and challenging difficult airways.

References

1. Moorthy SS, Gupta S, Laurent B, Weisberger EC. Management of airway in patients with laryngeal tumors. *Journal of Clinical Anesthesia* 2006; **17**(8):604-9. <http://dx.doi.org/10.1016/j.jclinane.2004.12.019> PMID:16427530
2. Borges A, Bikhazi H, Wensel JP. Giant Fibrovascular Polyp of the Oropharynx. *Am J Neuroradiol* 1999; **20**:1979–82. PMID:10588130
3. Xue FS, Liao X, Liu JH et al. Severe airway obstruction caused by tonsillar polyp in anesthetized patient. *Chin Med J* 2014; **127** (5)
4. Farah CS, Savage NW. Cryotherapy for treatment of oral lesions. *Australian Dental Journal* 2006; **51**(1):2-5. <http://dx.doi.org/10.1111/j.1834-7819.2006.tb00392.x>
5. Xue FS, Liao X, Yuan YJ et al. A modified difficult airway management algorithm incorporating video devices in routine anesthesia practice. *Anesthesiology* 2011; **115**: 442-444. <http://dx.doi.org/10.1097/ALN.0b013e3182255112> PMID:21792002

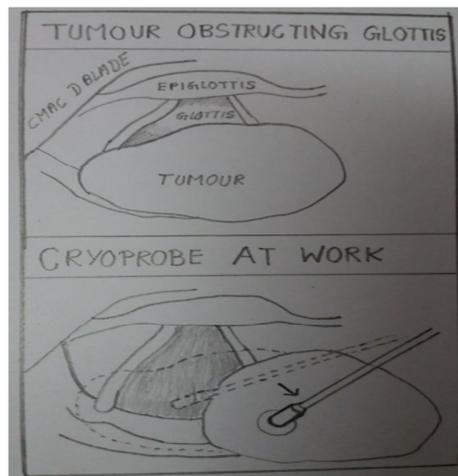
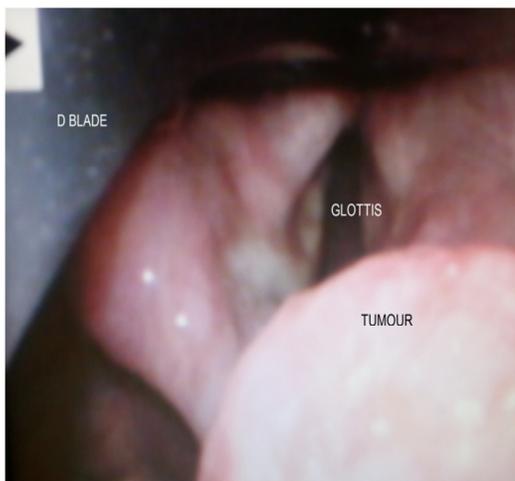


Figure 1