Anticipated difficult airway management in a resource-constrained environment: Two case reports

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ABSTRACT

In these reports we describe two cases of anticipated difficult airway. First one was secondary to a large thyroid gland in a resource-constrained environment without much-needed advance airway management equipment. In an improvised three-step approach to establish a definitive airway coupled with thyroidectomy, significant improvement in general outlook of the patient was observed. Second case was that of a large fungating squamous cell carcinomatous mass involving nasal and maxillary regions. Apart from clinical consequences, these cases provides an impetus to develop difficult airway algorithms for local populace and brings to fore one of myriads of difficult situations encountered in secondary and tertiary care hospitals of Pakistan.

Key words: Difficult airway; Huge thyroid; Laryngeal mask airway; Tracheostomy; Neck mass; Facial lesion; Goiter

INTRODUCTION

American Society of Anesthesiologists (ASA) and different anesthesiologists’ societies in the world have charted elaborate and clear algorithms for both unanticipated and anticipated difficult airways to prevent untoward incidents.1,2 Yet the challenge to ventilate and intubate the trachea in unfavorable circumstances continues to baffle the anesthesiologists particularly those who work in resource-constrained environs. Developed in the 1980s, Laryngeal mask airway (LMA) quickly gained popularity among the anesthesiologists and soon after its invention by British anesthesiologist Dr. Archie Brian, cases of difficult airways being managed by LMA started to get reported from across the globe. LMA and its various recent forms (e.g. i-gel™, ILMA™, ProSeal™ etc) have proven to be relatively complication-free, user-friendly second-line life-saving tools in difficult airway scenarios barring the intra-oral pathologies like abscess, acute laryngeal edema and massive intra-oral carcinomatous lesions. In addition to being easy for the operator to use, LMA has the benefit of easy availability and lesser burden on finances of any setup.

Following is the description of two cases of difficult airway managed using simple LMA in patients with entirely different pathologies to underscore the importance of the use of LMA in developing countries like ours.

CASE REPORT 1

A 12 year old female patient was brought to our hospital, by the attendants with complaint of loud snoring at night which was intolerable for the rest of the family members. On first look the reason was obvious: a huge neck-mass which was obscuring most of the features of head and neck (Figure 1). Upon laboratory and radiological workup, it was determined to be a huge thyroid mass. Upper airway and tracheal anatomy was moderately distorted, where major
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structures could be identified. Patient was primarily hypothyroid and lethargic with a sub-normal intelligence quotient. It was decided by the surgical team to perform thyroidectomy not only to alleviate symptoms but also to improve quality of life of the patient. Preoperative assessment was done. There was no facial deformity appreciable but thyromental and sternomental distances were not ascertainable. Limited head and neck movements and mouth opening up to two-finger breadths were recorded. Patient was labeled to have “anticipated difficult airway” and a team of 3 senior anesthesiologists would manage the airway. A plan was formulated in coordination with the surgical team to establish definitive airway i.e, tracheostomy and then proceed with thyroidectomy. Difficult airway and crash carts were kept ready. It was imperative to establish airway prior to tracheostomy since the depth at which trachea was lying due to massive vascular thyroid warranted use of ETT as tracheostomy conduit, and the anticipated time for tracheostomy alone was predictably much more than any other routine tracheostomy procedure.

Fiber-optic bronchoscope (FOB) was precluded due to lack of availability and technical constraints. Standard ASA monitoring was applied and intravenous access established. Patient was then anesthetized with sevoflurane and maintained on a mixture of oxygen and nitrous oxide in lateral position on spontaneous breathing. Anesthesia was gradually deepened. It was decided to attempt the intubation while the patient was breathing spontaneously, with 4% lidocaine spray, using a small 5.0 ID endotracheal tube. Two attempts were made by the anesthesiologist to intubate the patient with McIntosh and levering McCoy blades respectively. Unable to intubate, a size 2 LMA was then inserted, which was not only well tolerated by the patient but also ensured ventilation. Ventilation on Bain circuit was instituted and patient was then turned supine. After extensive dissection of soft tissues and gland, an ETT of 5.5 ID was used as temporary tracheostomy conduit for ventilation. Trachea was found at a depth of 15 cm from the skin and the ETT was fixed at 17 cm mark (Figure 2). Tracheal intubation was confirmed by end-tidal carbon dioxide. Muscle relaxation was then given and mechanical ventilation instituted.

The airway pressures did not peak to more than 25 cmH2O. With extensive vascularity and blood-rich gland removed after delicate and careful dissection which took approximately 3 h, tracheostomy tube was placed after removing the ETT. Intraoperative course remained uneventful as no untoward incident took place; patient remained vitally and clinically stable. To our luck the surgery was not followed...
by complications like hematoma, oozing from the wound or any overt arterial or venous bleed, recurrent laryngeal damage or systemic complications directly or indirectly related to extensive surgeries. She was later on shifted to Intensive Care Unit (ICU) for further management where she recovered from acute stress of surgery and over the course of seven days was shifted from ICU to surgical unit and discharged home with appropriate instructions for tracheostomy care and thyroid replacement therapy.

CASE REPORT 2

A 51 year old female patient presented to the ENT department with a large foul-smelling fungating growth on the face, involving nasal and maxillary areas. Upon diagnostic and radiological workup it was diagnosed as squamous cell carcinoma. Nose and adjoining maxillary areas were un-recognizable (Figure 3). Patient had no other co-morbidities. Surgical team decided to excise the lesion and the patient was posted for elective surgery. Based on history, presentation of the growth and radiology, which showed patent upper airway, plan was made to intubate the trachea with rapid sequence, with ENT surgeons standing by for tracheostomy as option B. As can be seen from Figures 3 and 4, face-mask ventilation was not feasible. In the operating room after following protocols for pre-operative checklist and verification and application of standard ASA monitoring, the patient was pre-oxygenated for almost 5 min with 100 % oxygen by using nasal prongs. Intravenous access established and pillow under the shoulder was used to maximize the viewing angle. Anesthesia was given with sevoflurane on spontaneous breathing and supplemented by low-dose incremental ketamine and propofol. When the intubation of the patient was attempted, the endotracheal tube of any size could not be passed in first attempt because the anesthesiologist was unable to locate the epiglottis and subsequently an LMA of size 2.5 was inserted and the patient was ventilated, meanwhile the surgeons prepared for tracheostomy. The anesthesiologists decided to make another attempt to intubate the trachea with a smaller ETT of size 6.0 before proceeding for the tracheostomy. With maximum lifting effort and using backwards, upwards and rightwards pressure (BURP maneuver) the intubation was successful and the patient was put on mechanical ventilation (Figure 4).

Muscle relaxation was given using rocuronium and surgery commenced. Excision of the lesion went uneventful and the patient was subsequently sent to the ICU for postoperative care.

DISCUSSION

FOB may not be available in majority
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of the operating rooms across a developing economy like ours and even though the frequency of “Cannot Intubate Cannot Ventilate” (CICV) was reported to be 0.003 % by Tachibana N3 in Japan, we do come across difficult airway cases of such grade and difficulty due partly to endemic goiter. Goiter in our part of the world has been generally associated with iodine deficiency and prevalent more in females than males4. Goiter may be obvious in the anterior neck or may have retrosternal extension. Our first patient had huge goiter weighing several kilograms with a retrosternal extension. The symptoms of obstruction led to extremely loud snoring which was the primary reason she was brought to the hospital, otherwise limited to a bed at her home. Large neck masses including but not limited to thyroid lesions, thyroglossal cysts, teratomas, cystic hygromas and meningeal outgrowths present similar challenges to not only anesthesiologists but also the treating surgeons and physicians. While patients with oral and maxillofacial surgeries, ENT, plastic and general surgeries do present us with challenging environment at times, but no patient had previously required a three-tier improvised approach for establishing airway. A similar case was reported by Anwarul Huda at the Aga Khan University Hospital, Karachi5 which they had managed using fiberoptic bronchoscope for intubation and mediastinal approach for tracheostomy. An incident in a 3-year old patient was reported by Jain G and Varshney R6 in which they intubated the patient without FOB resulting in successful airway management and completion of the surgical procedure. In a case reported by Lijen Yeh, Hung-Shu Chen and associates, FOB could not be used to intubate the patient because of the distorted anatomy due to a huge neck mass. Instead the levering McCoy laryngoscope was used with a titled tip to intubate the trachea of a 71 year-old male patient. FOB was essentially “defeated and giant neck masses narrowed the laryngeal aperture".7

The common factors in the above mentioned cases, critical to management were preservation of spontaneous ventilation and the use of LMA as a rescue device. Numerous reports from around the globe have led to the incorporation of LMA as a second line airway management tool in difficult airway algorithms, when the intubation has been attempted at least twice by experienced anesthesiologists.8 M. S. Ghaus reported in 2014 about an 80-year old male patient who developed respiratory distress and was found out to be a CICV case, was rescued by using LMA Supreme™ in the intensive care settings where the FOB was not immediately available.9 Similarly in patients with disabilities LMA proves to be a useful instrument to prevent unwanted complications like dental injuries.10 In such cases the importance and help of radiological imaging cannot be over-emphasized. The degree of confidence afforded by the definitive radiological report which precludes the extra and intra-thoracic obstructions and helps identify the patent tracheal and unhindered passage in the upper airway encouraged the anesthesiologists to undertake airway management in a certain way that they did. Kamalipour H, Bagheri M et al. demonstrated the usefulness of lateral x-rays in fifteen cases of difficult airway posted for elective surgeries.11 Availability of ultrasonography and computed tomography has been proven hugely beneficial for airway management and often helps take the airway specialists that leap of faith needed to save lives.

CONCLUSION

The fore-mentioned cases underscore the following critical points; a) There is a need to reassess, re-evaluate and re-ascertain difficult airway statistics in Pakistani populace. There may be a separate algorithm needed for managing anticipated and unanticipated difficult airway, tailored to our domestic needs and challenges across secondary and tertiary care hospitals in various cities of Pakistan where advanced airway equipment like fiber-optic bronchoscopes are not available. b) LMA is life-saver in some situations but particularly in resource constrained institutions. c) Adequate imaging and reporting have added some new dimensions to the airway management.

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REFERENCES


