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Case Report

Newer Airway Gadgets: Rescuers in Difficult Airway Scenarios

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ABSTRACT

As anaesthetists, we may constantly be in the learning curve of the management of difficult airway scenario. It can have a disastrous outcome if one is not adequately prepared with the right equipment. Over time there has been multiple ways to tackle difficult airway scenarios. Needless to say, appropriate airway gadgets are carefully chosen according to the surgery and patient characteristics. But what if these certain techniques fail? Then, what next? The inability to efficiently manage a difficult airway is the major cause of morbidity and mortality in anaesthetic practice. Here, we discuss 4 different case scenarios of difficult airway management.

Case reports: Case 1 was a pediatric patient with TMJ ankylosis, with mouth opening 4mm, in whom we used the fibreoptic technique. Case 2- A failed fibreoptic attempt in a case of recurrent Ca oral cavity where we secured the airway using Airtraq video laryngoscope. Case 3- A patient with post burn contracture over front of neck and anterior shoulder where we decided to use intubating laryngeal mask airway (LMA) for securing airway and Case 4- An obese female patient posted for hysterolaparoscopy where we used the laryngeal mask airway supreme.

Conclusion: Effective usage of newer drugs, equipment and airway gadgets by technically skilled personnel, with sound clinical judgement are essential factors in reducing airway related adverse scenario and it is of utmost importance to keep these alternate gadgets handy and to be proficient with its usage.

Anticipated difficult airway is a major challenge to the both the expert and even more to the novice, particularly if associated with limited mouth opening. Desaturation during attempted ventilation and intubation can certainly be deleterious. Difficult case scenarios require clinical judgement along with the application of expert skills for the utilisation of alternate airway gadgets. Various patient factors like age and comorbidities, the availability of gadgets and adequate training in the usage of these will certainly decrease preoperative morbidity and mortality. Awake fibreoptic intubation is the gold standard for an anticipated difficult airway [1-2] and elective fibreoptic intubation is almost always successful [3], but there are a few patients in whom this technique may fail or may not be possible because of certain pathologies or abnormalities [4-5]. Videolaryngoscopy and supraglottic airway devices can prove to be an alternative rescue option in cases of failed intubation attempts or as a conduit to intubation in anticipated airway.

We report 4 different cases of successful management of difficult airway that stand apart from the conventional methods in the handling of difficult airway.

Case Report

Case 1: Fibreoptic intubation (FOI)

10yr old male child, weighing 27kgs, with reduced mouth opening since 6yrs following a trauma 7yrs ago, o/c/o right mandible parasymphysis fracture. On examination, patient had a retrognathic mandible with no mouth opening (Figure 1: A). He was posted for B/L gap arthroplasty under GA. The plan of anaesthesia was fibreoptic intubation. Preoperative nebulization given with 2% lignocaine. Patient was given B/L SLN block

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and transtracheal block and during fibreoptic bronchoscopy (FOB), lignocaine was sprayed using the 'spray-as-you-go' technique. Continuous oxygenation was ensured through the other nostril where we connected a nasal airway to Bain's circuit. With adequate sedation using inj dexmedetomidine, the child was cooperative throughout the procedure. Nasal fibreoptic intubation (Figure 2: A) was then done with cuffed ETT no 5.0 and the tube secured. He was induced and maintained with intermittent positive pressure on closed circuit.

Case 2: Failed Fibreoptic intubation

68yr old male patient with recurrence of Ca oral cavity. Posted for right hemimandibulectomy +MRND + free forearm flap. His tongue was adherent to the recurrent mass on the right side. Mouth opening 2 fingers and MPC IV (Figure 1: B). Patient was premedicated in the OT and sedated prior to the procedure with inj dexmedetomidine 30 mcg IV following which bilateral superior laryngeal nerve block was given with inj lignocaine 2% 2cc and transtracheal block with 2% lignocaine 2cc. After checking patency of both nostrils, the fibreoptic scope was inserted through the right nostril by an expert anaesthetist. We ensured continuous O2 from the other nostril. However, due to distorted anatomy of the oral cavity, excessive secretions and poor patient compliance to the procedure, the vocal cords could not be visualized despite multiple attempts. Hence a decision was made to secure airway nasally with the help of Airtraq A-390 video laryngoscope. Hence, patient was induced with inj. propofol 80mg IV. After check ventilation, inj. scoline 75mg IV was also given. Following this, Airtraq was inserted into the oral cavity and after external manipulation, the posterior commissure of the vocal cords was visible, then a gum elastic bougie through the right nostril was inserted since Cormack-Lehane grade was 3. Position was confirmed through the vocal cords as seen through Airtraq. and then an ETT of size 7.0 was railroaded over the bougie through the nostril into the trachea. Air entry was bilateral and equal, confirmed with EtCO2, cuff inflated and tube fixed in place. Muscle relaxant given and maintained with intermittent positive pressure on closed circuit. Intraoperative hemodynamics were stable.

Case 3: Intubating LMA (ILMA)

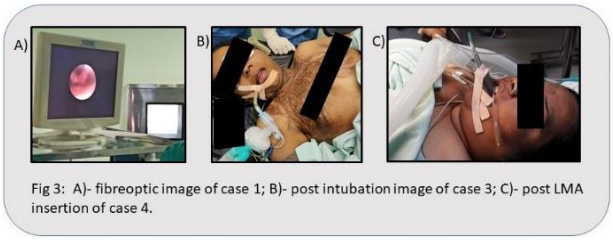
A 32yr old female patient, weighing 45kgs with h/o burn to the front of neck and chest and right shoulder, due to gas explosion at the age of 10yrs now posted for post burn contracture release and skin grafting (Figure 1: C). Patient was nebulized preoperatively with 4% lignocaine and taken to the OT. She was pre-oxygenated with 100% O2 for 3mins and then induced with inj. propofol 3mg/kg. The ILMA was inserted according to Chandy's maneuver and check ventilation was done. After confirming seal of the LMA over the hypopharynx, a flexometallic tube of No 6 was inserted and cuff inflated (Figure 2: B). Position of the ETT was confirmed with EtCO2 and auscultation and the tube was then fixed. Throat pack was also inserted. inj. vecuronium 0.08mg/kg was given thereafter and a train of four monitor was attached for neuromuscular monitoring. Prior to extubation inj. dexmedetomidine 0.5mcg/kg was given and this lead to smooth extubation.

Case 4: LMA Supreme

39yr old P3L3 tubectomised patient, k/c/o HTN and DM since 8yrs, on treatment. The patient was obese (BMI-33) with short stature, short neck, mouth opening-2 fingers, MPC 3 (Figure 1: D) and hence we anticipated difficult airway. Other systemic examination was normal. Posted for diagnostic hysterolaparoscopy. Premedication was given. Patient was induced and LMA supreme was introduced, air entry was bilaterally equal, cuff inflated and LMA fixed in place (Figure 2: C). Ryle's tube was also inserted. The surgery lasted for 40minutes.

Figure 1- Images of the different difficult airways

Figure 2- A)- Fibreoptic image of case1; B) Post intubation image of case 3; C) Post LMA insertion of case 4



Discussion

Difficult airway due to limited head and neck mobility, previous surgeries or post burn contractures or

obesity certainly increases the risk of anaesthesia. An anaesthetist must have alternatives to prevent any critical incidents during difficult airway management.

A difficult airway resulting in inadequate ventilation has been reported to be a major cause of morbidity in children more than in adults [6]. Mallampatti classification has been proven to be less useful in cases like these.

In all cases, alternate airway gadgets (Figure 3) were kept ready in the event of a failed attempt along with difficult intubation trolley with cricothyrotomy and tracheostomy sets were kept ready.

Figure 3- difficult airway cart

Intubating a pediatric patient with limited mouth opening due to conditions like temporomandibular joint ankylosis or retrognathia is a daunting task. Securing airway in these cases definitely needs expertise in difficult airway management. Vigilance while attempting fibreoptic bronchoscopy in the pediatric population is of utmost importance due to the smaller space of airways. The presence of TMJ ankylosis with poor mouth opening increases chances of airway obstruction [7]. The use of dexmedetomidine as an anxiolytic, an adjuvant for the prevention of pressor response and emergence agitation before intubation and after extubation respectively, for postoperative analgesia and shivering has been cited in literature [8]. This facilitates smooth emergence.

We decided to go ahead with fibreoptic intubation after comparing the pros and cons of other difficult intubation techniques, while also keeping in mind the age, patient cooperation, clinical status, equipment availability and expertise. The dose of lignocaine used was calculated according to the patient's weight. The other options that we could have used were semi-blind nasal intubation, but this could have been traumatic causing further airway complication, retrograde intubation also had the disadvantage of being a blind procedure, fluoroscopy assisted intubation being associated with radiation exposure and tracheostomy being an invasive emergency procedure was reserved as the ultimate rescue option.

Difficult airway management in pediatrics is very challenging, requiring expertise and planning with the readiness to tackle any complication arising due to the attempted intubation such as bleeding, trauma, laryngospasm, and hypoxemia. The situation can deteriorate and can convert into "cannot intubate and cannot ventilate" scenario. There has to be a closed-loop functioning between anaesthesia team members to have a favorable outcome in terms of morbidity.

An advantage if fibreoptic intubation fails is that we can always switch over to another technique.

Fibreoptic intubation in case 2 may have failed due to reasons such as distorted anatomy due to previous surgery and recurrent mass, excessive secretions and poor patient compliance. However, failure of FOI may have also been due to our inability to do so. But, considering the expertise in airway fibreoptic endoscopy of the senior attending faculty that were involved in this case, this possibility seems unlikely. We chose Airtraq video laryngoscopy because, it offers a better visual field, provides an option to exchange ET tubes during the procedure without losing visualization and the laryngoscopist can apply adequate tissue traction so as to increase the glottic aperture in cases of obscured view.

According to literature, Airtraq reduced the number of optimization maneuvers apart from having reduced the potential for dental trauma when compared to Macintosh, in both the normal and simulated difficult intubation scenarios. On the other hand, Truview increased the duration of intubation attempts, and required a greater number of optimization maneuvers. The Airtraq laryngoscope performed more favorably than the Macintosh and Truview devices when used [9].

Both ventilation and intubation are major challenges in patients with post contracture burns. Even though there was no absolute contraindication to the use of scoline, we decided to avoid the use of muscle relaxant before securing the tube. A higher than usual induction dose of inj. propofol ensured adequate depth of anaesthesia and jaw relaxation. ILMA gives an added advantage of intubation after ensuring ventilation. In the event of a failed intubation one has the advantage of continuation of ventilation and may abandon the procedure if needed. In this case as well, inj. dexmedetomidine was given prior to extubation to avoid displacement of graft and extubation was done in sniffing position.

Use of ILMA eliminates the need for head-neck manipulation and insertion of fingers in the mouth during placement. It has an anatomically curved, rigid airway tube with an integral guiding handle, an epiglottic elevating bar replacing the mask bars, a guiding ramp built into the floor of the mask aperture and a modified silicone tracheal tube developed for use with the device [10].

Langeron et al. compared ILMA with FOB in a hundred difficult airway patients and concluded that the success rate of tracheal intubation and procedure duration were comparable between both the devices but in an unanticipated difficult airway scenario, the ILMA provides rescue ventilation in 94% compared to 50% offered by the FOB [11]. ILMA could thus be considered as an interesting option in unanticipated difficult airway management, as is the LMA in difficult airway algorithm

As was our experience with the success in the usage of supraglottic airway devices, we decided to use the LMA supreme in this obese patient with anticipated difficult airway for a short procedure. However, P Gupta et al. in their study has also concluded that the use of proseal LMA was an effective alternative for securing airway and intubation in patients with fixed flexion deformity and limited mouth opening following a failed FOB [12]

Brooks P et al. in their research have stated the alternate options available in patients with limited mouth opening-nasal intubation either blind or fibreoptic assisted, retrograde intubation, and tracheostomy. The choice of technique depends on various patient factors, faculty expertise and availability of the equipment. Inhalational

induction of the patient before attempted intubation is preferred in majority of cases after confirming the adequacy of mask ventilation and maintaining the spontaneous ventilation [13]

Every technique to secure airway has its own failure rates, thus as an anaesthetist, one should always have an alternative plan for securing airway without causing hypoxia. In cases where supraglottic airway devices are of limited use, Mc Coy laryngoscope and video-laryngoscopes must be kept ready and one should be well versed with the technique to tackle a difficult airway scenario. Surgical techniques should be the last resort, after outweighing the risks and benefits and such a decision should be made at the right time [14].

Conclusion

Effective usage of newer drugs, equipment and airway gadgets by technically skilled personnel, with sound clinical judgement are essential factors in reducing airway related adverse events and it is of utmost importance to keep these alternate gadgets handy and to be proficient with its usage. As an anaesthetist, we may either have a plethora of options to choose from or limited rescue devices. Hence, expertise which comes with the usage of available equipment, clarity in thoughts and discernment are of supreme importance and certainly proves beneficial in saving lives.

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