

AIRWAY MANAGEMENT IN SUBMANDIBULAR ABSCESS PATIENT WITH AWAKE FIBROPTIC INTUBATION

- A Case Report -

CHETAN B. RAVAL* AND MOHD. SULEIMAN KHAN**

Abstract

Securing the airway is a core skill in anaesthesia, the gold standard of which is tracheal intubation. Normally this is achieved after induction of anaesthesia. However, some circumstances demand an awake approach. Skilful airway management is critical in deep neck space infections. There is currently no universal agreement on the ideal method of airway control for these patients because this depends on various factors including available local expertise and equipment. Compromised airway is still a challenge to the anesthesiologist in spite of all modalities available. Any flaw in airway management may lead to grave morbidity and mortality.

We present a morbidly obese case of submandibular abscess with difficult intubation underwent incision and drainage. Large facial [jaw] swelling, TRISMUS-limited mouth opening, edema, protruding teeth and altered airway anatomy makes airway management more difficult. The case was further complicated by morbid obesity. Chances of rupture of abscess intraorally and aspiration under GA is a major threat. During GA, there is no change in mouth opening and loss of airway under muscle relaxation, “difficult to ventilate, difficult to intubate” makes these cases most challenging. On the basis of our experience case was successfully intubated by awake fiberoptic intubation.

Key words: Difficult Airway, submandibular abscess, Trismus, Awake fiberoptic intubation

Introduction

Airway management is a critical part of anesthesia practice, especially in patients with deep neck infections. A cause of death in these patients with difficult intubation is the acute loss of the airway during interventions to control it¹. Deep neck infections are formed from the untreated dental caries. Infection spreads in the bone and submandibular, sub mental, retropharyngeal or lateral pharyngeal spaces. Advance cases of abscess formations lead to restricted temporomandibular joint mobility with Trismus and pharyngeal, laryngeal edema causes narrowing and eventually to the loss of airway².

* Specialist, Department of Anesthesia, Al-Nahdha Hospital, P.O. Box: 937, PC: 112, Ruwi, Muscat, Oman.

** Junior Specialist, Department of Anesthesia, Al-Nahdha Hospital, P. O. Box: 937, PC: 112, Ruwi, Muscat, Oman.

Corresponding author: Dr. Chetan B. Raval, Department of Anesthesia, SICU, TICU, Hamad Medical Corporation, P.O. BOX: 3050, DOHA, QATAR.

The American Association of Anesthesiologists (ASA) developed guidelines for the management of the difficult airway focus on strategies for intubation as well as alternative airway techniques that can be used when a patient with a difficult airway is encountered^{4,5}, but careful planning and preparation, can reduce the potential for complications.

We present a case of Ludwig's angina with trismus, limited mouth opening, marked neck swelling and how the airway was secured for surgery.

Case Report

A 40 year old female patient was referred to Al-Nahdha hospital which is a tertiary referral hospital for maxillofacial surgeries, with complaints of fever, progressive facial swelling with TRISMUS-restricted mouth opening, redness, severe pain and dysphagia since 1 week. Patient was scheduled for emergency incision and drainage. Patient's weight was 112.5 kg and height 150 cms with BMI 49.9. On medical history, she was known case of hypertension on regular treatment since 2 years. No other significant cardiac, surgical or allergic history was noted. On general examination, fever and high blood pressure once on admission was noted. Other readings after admission were under control. Airway examination revealed mouth opening (inter-incisor Gap-Fig. 1) was less than one cm with protruding teeth and short neck with huge breast (Fig. 2). Mento-thyroid distance was less than six cm. Neck movements were adequate. Nasal patency was checked and found adequate. Systemic examination, blood investigations, ECG and Chest X-ray were within normal limits.

Fig. 1
Front view



Fig. 2
Lateral view



Looking at clinical airway examination and morbid obesity, we planned awake fiberoptic intubation with sedation with possibility of emergency tracheostomy and consent was taken. Detailed information about awake fiberoptic techniques with methods of local anaesthesia were explained. ENT surgeon was asked to remain standby in the theatre for possible need of emergency tracheostomy. Patient was pre-medicated with IM pethidine 100 mg and glycopyrrolate 0.2 mg half an hour before surgery. Topical anesthesia was achieved by nasal packing with Lignocaine 4% and xylometazoline 0.1%. Pharynx was sprayed with 4-6 puffs of lidocaine 10% aerosol. Routine monitoring was used. Difficult intubation cart was kept ready.

Tracheal mucosa was anaesthetized through crico-thyroid injection of 2 ml 2% lignocaine after aspiration of air. Sedation was supplemented with remifentanil i.v infusion (titrated dose) in a dose of 0.03 mcg/kg/min. Topical anesthesia of the larynx and trachea was supplemented via "Spray as-you-go" technique through the suction channel of the bronchoscope using injections of 2 ml of lignocaine 4%. Advancement of the fiberscope was withheld for 1 minute to allow for the drug's anaesthetic effect. Portex endotracheal tube was railroded on to the well-lubricated Karl Storz Fiberscope (Karl Storz, Germany) (Fig. 3, 4, 5). When the scope passed through the larynx, the endotracheal tube was advanced into the larynx till the carina was seen. The bronchoscope was removed with confirmation of ET tube in the trachea by visualization of the chest movement, auscultation of breath sounds and ETCO₂ monitoring.

Fig. 3
Procedure



Fig. 4
Procedure



Fig. 5
Intubated patient



After securing airway, general anesthesia was achieved with propofol 2.5 mg/kg and atracurium 0.5 mg/kg. Anesthesia was maintained with sevoflurane, N₂O in O₂. Analgesia was supplemented with remifentanyl titrated infusion. Anesthesia was reversed at the end of surgery with Neostigmine 50 mcg/kg and glycopyrrolate 0.4mg administered intravenously. Extubation was carried out with smooth emergence and patients in fully awake state, breathing spontaneously, obeying commands and satisfactory muscle power. Post operative analgesia provided with Diclofenac 1mg/kg IM 20 min. before extubation. Post-operative care was given in the high dependency unit.

Discussion

Ludwig's angina originates from an infected or recently extracted tooth, most commonly the lower second and third molars. It is rapidly progressive, potentially fulminant cellulitis involving the sublingual, sub-mental, and sub-mandibular spaces^{1,2}. It begins as a mild infection and can rapidly progress to brawny bilateral induration of the upper neck with pain, trismus, and tongue elevation. Fever and dysphagia are common. The most serious complication of Ludwig's angina is asphyxia caused by expanding edema of soft tissues of the neck³. Medical management with antibiotics, improved dental care and dexamethasone in the early stages of the disease has minimized the need for surgical intervention to control the airway¹⁻³. But if swelling is too big and spreading fast then surgical intervention is needed as early as possible.

Airway management of patients with Ludwig's angina presenting for surgical drainage is a challenging task for the anaesthesiologist. There is no consensus regarding the airway management in the available literature. The recommendations are based on the anaesthesiologist's personal experience and available resources. The suggested methods include tracheostomy, conventional laryngoscopy and intubation (after administration of muscle relaxant), awake blind nasal intubation and awake fiberoptic intubation.

Difficult airway management is a dilemma for any anaesthesiologist. Although practice guidelines and algorithms may help in such situations, the anaesthesiologist's judgment and vigilance remain the primary means to save lives^{4,5}. Common cause of death is the acute loss of airway during interventions to control the condition. Limited access to mouth, edema, distorted anatomy, tissue immobility makes oro-tracheal intubation with rigid laryngoscopy very difficult^{2,6}. In the early stages of the disease, general anesthesia may overcome trismus and allow the mouth to be opened for rigid laryngoscopy; it is like the tip of the iceberg². Under anesthesia, a potentially life-threatening condition as rupture of abscess can result in pulmonary aspiration and in inability to secure the airway due to blood, pus and secretions. In advanced cases, induction of general anesthesia is dangerous because this may precipitate complete airway closure

and make mask ventilation and intubation impossible⁷. Securing of the airway in the awake state is therefore the safest option. The surgical airway should always be kept ready which can be lifesaving in such circumstances.

Blind Nasal intubation is a simple technique with two major drawbacks: infrequent success on the first pass and increased trauma with repeated attempts, precipitating complete airway obstruction that necessitates emergent cricothyrotomy^{1,2,8}. Classically, tracheostomy was considered as the standard of care for establishment of a definitive airway. Elective awake tracheostomy has been suggested for all patients with deep neck infections in order to avoid the dangers of emergency tracheostomy in a severely compromised airway⁹.

Gruen *et al*¹⁰, found that failure to intubate, secure or protect the airway was the most common factor related to patient mortality especially in cases of difficult airway. Single universal technique of intubation may not be favorable in all circumstances so timely, decisive and skillful management of the airway can often make the difference between life and death or between ability and disability in such situations.

Keeping all above points in mind and as per our experience, we selected awake fiberoptic intubation as a method for airway management in our morbidly obese patient. Although distorted anatomy, edema, and secretions may contribute to difficulty with fiberoptic intubation, in skilled and experienced hands. The success is attributed to a well-organized approach and expertise in flexible fiberoptic. Flexible fiberoptic nasal intubation is the preferred method of airway management^{11,12} and has a high rate of success¹⁻⁴. Peiris K *et al*¹³, compared awake intubation with attempts at difficult direct laryngoscopy, awake fiberoptic intubation provides excellent cardiovascular stability when performed under good topical anaesthesia and conscious sedation. Understanding the equipment used as well as preparing the patient and being aware of potential pitfalls are important elements to performing a successful awake intubation. Avoiding airway irritation and laryngeal spasm by using topical anesthesia increases the success rate¹⁴. F.S. Xue *et al* suggested that 2% topical lignocaine provide acceptable condition, smaller doses and lesser plasma

concentration for awake fiberoptic intubation¹⁵. In our case we used 2% lignocaine for topical “spray-as-you-go”. Maximum allowable dose of Lignocaine is 4.5 mg/kg¹⁶. Recently Awake fibrecapnic intubation (AFcI) is a technique wherein a suction catheter is advanced through the working channel of the bronchoscope and via this catheter repeated CO₂ measurements are possible when visibility of pharyngeal and laryngeal structures is limited, when anatomy is unrecognisable or in the case of severe airway obstruction¹⁷. Opioids and benzodiazepines increase the risk of respiratory depression. Therefore, these drugs must be titrated carefully. Decompression of Ludwig’s angina under cervical block has also been reported¹⁸.

Conclusion

Single universal technique of intubation may not be favorable in all circumstances so timely, decisive and skillful management of the airway can often make the difference between life and death or between ability and disability in such situations. Sound clinical judgment is critical for timing and for selecting the method for airway intervention. The data suggest that practicing fiberoptic intubation is safe and effective in patients with difficult airway, but it requires additional skills and practice. On the basis of our experience, patient was successfully intubated with visual-guided fiberoptic intubation and managed without any complication.

Competing Interests

The authors declare that they have no competing interests.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying Figures.

Acknowledgements

We thank the patient for giving us consent for the publication of the case report. We also thank the Nurses and surgical team for their help.

References

1. OVASSAPIAN, MELTEM TUNCBILEK, ET AL: Airway management in adult patients with deep Neck infections: a case series and review of the literature. *Anesth Analg*; 2005, 100:585-9.
2. CHETAN RAVAL, MOHD RASHIDUDDIN: Nasal Endotracheal Intubation under Fiberoptic endoscopic control in Difficult Oral Intubation, two Pediatric Cases of Submandibular abscess. *Oman Med J*; 2009 January; 24(1):51-53.
3. ANAND H KULKARNI, SWARUPA D PAI, BASANT BHATTARAI, ET AL: Ludwig's angina and airway considerations: a case report. *Cases Journal*; 2008 June; 1:19doi:10.1186/1757-1626-1-19.
4. BERKOW LC: Strategies for airway management. *Best Pract Res Clin Anaesthesiol*; 2004 Dec; 18(4):531-48.
5. American society of Anesthesiologists Task Force on Management of the Difficult Airway: Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. *Anesthesiology*; 2003; 98:1269-1277.
6. NEFF SP, MERRY AF, ANDERSON B: Airway management in Ludwig's angina. *Anaesth Intensive Care*; 1999, 27:659-661.
7. PARHISCAR A, HAR-EL E: Deep neck abscess. A retrospective review of 210 cases. *Ann Otol Rhinol Laryngol*; 2001, 110:1051-54.
8. SAINI S, KSHETRAPAL KK, AHLAWAT G, ET AL: Anaesthetic challenges in a patient with Ludwig angina: A case report. *SAJAA*; 2008, 14(5):10-11.
9. BARAKATE MS, JENSEN MJ, HEMLI JM, GRAHAM AR: Ludwig's angina: report of a case and review of management issues. *Ann Otol Rhinol Laryngol*; 2001, 110:453-456.
10. GRUEN RL, JURKOVICH GJ, MCINTYRE LK, FOY HM, MAIER RV: Patterns of errors contributing to trauma mortality: lessons learned from 2,594 deaths. *Ann Surg*; 2006; 244:371-380.
11. SAIFELDEEN K, EVANS R: Ludwig's angina. *Emerg Med J*; 2004; 21:242-243.
12. PETER J AQUILINA AND ANTHONY LYNHAM: Serious sequelae of maxillofacial infection. *Medical J Australia*; 2003, 179(10):551-552.
13. PEIRIS K, FRERK C: Awake intubation. *J Perioper Pract*; 2008 Mar; 18(3):96-104.
14. ME WALSH, GD SHORTEN: Preparing to perform an awake fiberoptic intubation. *Yale J Biol Med*; 1998 Nov-Dec; 71(6):537-549.
15. FS XUE, HP LIU, N HE, YC XU, QY YANG, X LIAO, XZ XU, XL GUO AND YM Zhang: Spray-As-You-Go Airway Topical Anesthesia in Patients with a Difficult Airway: A Randomized, Double-Blind Comparison of 2% and 4% Lidocaine. *Anesth. Analg*; February 2009, 108(2):536-543.
16. NIBEDITA P, SHO VAN R: Regional and topical anaesthesia of upper airways. *Indian J Anaesth*; 2009, 53(60):641-648.
17. HUITINK JM, BALM AJM, KEIZER C, BUITELAAR DR: Awake fibrecapneic intubation in head and neck cancer patient with difficult airway: new finding and refinement of technique. *Anaesthesia*; 2007, 62:214-219.
18. MAHROTRA M, MAHROTRA S: Decompression of Ludwig's Angina under cervical block. *The Journal of American society of Anaesthesiologist*; 2002, 97(6):1625-6.

