

Comparison between blind nasal and fiber optic intubation in maxillofacial trauma posted for elective surgery

S. Jyotsna¹, R. Rajeshwar Reddy², Prattipati Swathi^{3*}

¹Postgraduate, Department of Anaesthesiology, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, West Godavari District, Andhra Pradesh, India

²Assistant Professor, Department of Anaesthesiology, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, West Godavari District, Andhra Pradesh, India

³Assistant Professor, Department of Anaesthesiology, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, West Godavari District, Andhra Pradesh, India

Received: 30-11-2021 / Revised: 27-12-2021 / Accepted: 01-01-2022

Abstract

Background: Airway management of patients with maxillofacial trauma is complex and crucial because it can dictate a patient's survival. Securing the airway of patients with maxillofacial trauma is often extremely difficult because the trauma involves the patient's airway and their breathing is compromised. In these patients, mask ventilation and endotracheal intubation are anticipated to be difficult. **Aim:** To compare the safety and complications of blind nasal and fiber optic intubation in maxillofacial trauma. **Materials and methods:** This is an observational study, approved by the institutional ethical committee. An individual informed consent was taken from all the patients selected for the study. All the patients belonging to ASA grade 1 and 2, between the age group of 18 to 50 years of either sex. Posted for maxillofacial surgery under general anesthesia patients with comorbidities like copd, cardiovascular problems, patient refusal are excluded from the study. Total 40 patients with different types of facial fractures are included in the study they were divided into blind nasal group (20 patients) and fiberoptic group (20 patients). **Discussion:** The patient with maxillofacial trauma presents serious challenges for the physician because airway management in these patients can be complicated by their injury. The first challenge is to secure the airway for sufficient and effective breathing and/or ventilation. Fiberoptic bronchoscopic intubation is best option for elective patients but has been considered difficult in maxillofacial trauma, patients with intraoral bleed. In both group of patients, securing the airway before induction of general anesthesia adds to the safety of anesthesia and helps minimize possibility of major complications. **Conclusion:** Awake fiberoptic intubation, is the best method for securing airway in patients with facial trauma when compared with blind nasal intubation.

Key words: Maxillofacial injuries, Blind awake nasal intubation, Fiberopticbronchoscopic intubation.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Multiple facial fractures are not uncommon in road traffic accidents and pose a great difficulty for an anesthetist to maintain the airway. Anesthesiologist must be conversant with the alternative techniques and appliances.

Preservation of patients' spontaneous respiration and consciousness are the most important recommendations in any case of difficult airway. It allows the patients to maintain the tonicity of airway muscles providing a degree of safety that may be lost in the anesthetized patients. Awake blind nasal endotracheal intubation is a modification of Sir Ivan Magill's technique of blind nasal intubation under ether anesthesia. Nasotracheal intubation is commonly used in patients undergoing maxillofacial surgery. If a difficult airway is not anticipated, the tracheal tube is passed through the nose after induction of anesthesia and neuromuscular blockade.

Nasal intubation which improves surgical exposure and increases tube stability during intra oral manipulation of facial structures is requested often by oral and maxillofacial surgeons. Also for postoperative airway maintenance and/or mechanical ventilation, a

nasal endotracheal tube is preferred as it is well tolerated and potentially less hazardous to the surgical repair.

Presence of maxillary or mandibular fractures, restricted mouth opening, bleeding in the naso – oropharynx, facial edema, associated cervical spine injury are anticipated factors of difficult intubation. Airway management in patients with lefort 2 with symphysis fracture of mandible is an ever challenging situation. So using fiberoptic bronchoscope helps in securing the airway.

We report 40 patients with facial trauma posted for maxillofacial surgery.

This study aimed to compare the safety and associated complications of awake endotracheal intubation in maxillofacial surgery patients using either blind nasal or fiber optic techniques.

Materials and methods

The present clinical observational, analytical study entitled —Comparison between blind nasal and fiber optic intubation in maxillofacial trauma posted for elective surgery was conducted on 40 patients posted for elective surgeries selected randomly. General anaesthesia was provided after intubation for all the patients.

- The study was conducted between December 2020 – October 2021 at Alluri Sitarama Raju Academy of Medical Sciences, Eluru, after getting approved by the institutional ethical committee. An individual informed consent was taken from all the patients selected for the study from ENT and DENTAL Surgery departments posted for elective surgeries.

Inclusion criteria

- Patients aged 18 – 50 years of either sex

*Correspondence

Dr. Prattipati Swathi

Assistant Professor, Department of Anaesthesiology, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, West Godavari District, Andhra Pradesh, India

- ASA grade I and II
- Patients posted for maxillofacial surgery under general anesthesia.

Exclusion criteria

- Patients with comorbidities like copd, cardiovascular problems
- Unwilling patients

Total 40 patients with different types of facial fractures are included in the study. All patients were preoperatively assessed for airway, systemic examination, and detailed history was taken.

In preanesthetic assessment, patients were evaluated for type and mechanism of injury. Airway assessment by Mallampatti classification, Thyromental distance and atlanto-axial mobility. Based on type of injury and procedure, intubation technique was decided. Nasal patency was checked for all patients. Fiberoptic intubation technique was selected for patients with restricted mouth opening of one finger or less.

In all 40 patients' nasal preparation done with xylometazoline drops, a pack soaked with 4% lignocaine, nebulization with 4% lignocaine in the pre-operative room.

40 patients of both genders were randomly allocated into two equal groups of 20 each.

Group A - Blind nasal intubation group. In this group, blind nasal intubation was done before induction of anesthesia.

Group B - Fiberoptic intubation group. In this group, fiberoptic intubation was done after giving bilateral superior laryngeal nerve & transtracheal blocks.

Procedure

All the Patients were examined the day before surgery, and preanaesthetic counselling was done. All patients received Alprazolam 0.5mg orally on the night before surgery. Inj. Ondansetron 0.1mg/kg i.v. and Inj.Ranitidine 1mg/kg i.v. given on day of surgery.

In the operation theatre patients secured with 18 gauge bore cannula and preloaded with ringer lactate, all the monitors like ECG, NIBP, pulse oximetry, capnography were connected.

After nasal preparation, all patients are premedicated with inj.Midazolam 1mg, inj.Glycolpyrolate 0.2 mg and inj.Fentanyl 100 mcg. A proper size nasopharyngeal airway coated with 2% lidocaine jelly was inserted smoothly being act as nasal passagedilator just before intubation.Pre-oxygenate patient with 100% O₂ for 3-5min.

In group A proper sized 6.5 or 7mm ET tube was lubricated & inserted gently into nostril. ET tube then advanced gently until slight resistance was felt.

Resistance encountered when ETT approaches posterior pharyngeal wall, then retract ETT, extend the patient's neck if possible and gradually advance ET tube into trachea by asking patient to take deep breaths & keep on hearing breath sounds. The position of endotracheal tube was confirmed by auscultation and capnography.

In group B fiberoptic intubation is done after bilateral superior laryngeal nerve block given by injecting 2.5 cc of Lignocaine 2% on either side of greater cornu of hyoid bone. Transtracheal block given with 3 ml of 4% lignocaine after identifying cricothyroid notch. Intraoral spraying done with lox 10% to prevent cough reflex and gag reflex.

A 6.5 or 7mm reinforced nasotracheal tube was advanced into the nasopharynx. A fiberoptic scope was advanced through the nasotracheal tube and then scope was advanced towards the glottis. The fiberoptic scope was then passed behind the epiglottis to visualize the vocal cords and then advanced through the glottis opening into trachea during spontaneous breathing, the tip of the scope was positioned immediately proximal to carina. Then endotracheal tube was advanced smoothly into its final position and tube was secured. The endotracheal position of the tube was confirmed by capnography and bilateral chest auscultation.

Propofol and vecuronium were administered to induce general anesthesia. Intraoperative analgesia achieved with inj.Fentanyl and inj.Diclofenac. Anesthesia maintained with oxygen (33%), N₂O (67%) and isoflurane (1%). Intraoral pack was placed to prevent aspiration by using direct laryngoscope. Vital parameters were monitored throughout procedure and found to be stable.

Results

Fourty patients of maxillofacial injuries reported to tertiary care hospital over a period of one year. Majority of patients were in the age group of 21 - 40 years. Fracture mandible was found to be most common injury, followed by fracture maxilla and zygoma and panfacial trauma.

In group A Patients airway was secured by blind awake nasal intubation, it was successful in 13 (60%) patients. This group constituted multiple fractures of unilateral zygomatic, maxilla and mandible, limited TMJ movement c-spine injuries. 7 patients (40%) needed assistance with fibreoptic bronchoscope subsequent to failed blind nasal intubation attempt.

Failed blind nasal intubation seen in patients of restricted mouth opening, restricted TMJ movement, mallampatti unable to assess and along with leaforte 1 & 2.

In group B most of patients for maxillofacial surgery with difficult airway were intubated successfully and one was unsuccessful with fiberoptic intubation.

Table 1: Comparison of success rate in blind nasal group & fiberoptic group

S.No	Type Of Intubation	Successfull	Unsuccessfull	P Value
1.	Blind nasal intubation	13 cases	7 cases	< 0.05
2.	Fiberoptic intubation	9 cases	1 case	

*P is calculated by Chi-square test using SPSS software trail version 26.

*The p- value is 0.0177, significant at < 0.05.

Table 2: Complications associated with blind nasal and fiberoptic intubation

S.No	Complications	Blind Nasal Intubation	Fiberoptic Intubation
1.	Bleeding	4	2
2.	Gag reflex	8	8
3.	Laryngospasm	2	0

While HR and MABP were slightly increased immediately after successful intubation in both groups with insignificant differences between each group.

Discussion

Management of the airway is a major concern in patients with maxillofacial trauma because of a compromised airway can lead to death.

Various airway management strategies have been suggested like blind nasotracheal intubation, fiberoptic endoscope guided intubation and preliminary tracheostomy

When planning to secure the airway, the physician has to consider several aspects:

- the nature of the trauma and its effect on the airways,
- potential difficulties in mask ventilation or endotracheal intubation,
- possible trauma of the cervical spine,
- the risk of regurgitation and aspiration of gastric contents,

- (e) significant bleeding that precludes view of airway anatomy and may cause circulatory deterioration, and
- (f) the type of maxillofacial operation that is to be done and whether the oral cavity needs to be empty for performing the procedure, In this review the complexity and difficulties of securing airway in maxillofacial trauma.

Fiberoptic bronchoscopic intubation is best option for elective patients but has been considered difficult in maxillofacial trauma, patients with intraoral bleed.

In both group of patients, securing the airway before induction of general anesthesia adds to the safety of anesthesia and helps minimize possibility of major complications.

Awake intubation should also be considered in patients with history of difficult intubation, patients with questionable airway who are at high risk of aspiration, patients who have an unstable cervical spine, upper body morbid obesity and ventilatory failure.

Conclusion

Nasotracheal intubation is an effective and safe technique that is underused in the current practice. The skill of fiber-optic intubation has become essential for a practicing anesthetist today to safely manage patients in whom orotracheal intubation is anatomically difficult. From the present study it can be concluded that awake fiberoptic intubation, is the best method for securing airway when compared to awake blind nasal intubation in patients with facial trauma.

References

- Hutchison I, Lawlor M, Skinner D. ABC of major trauma. Major maxillofacial injuries. *British Medical Journal*. 1990;301(6752):595-599. doi: 10.1136/bmj.301.6752.595.
- Walls R. M. Management of the difficult airway in the trauma patient. *Emergency Medicine Clinics of North America*. 1998;16(1):45-61. doi: 10.1016/S0733-8627(05)70348-5.
- Dhasmana S, Singh V, Pal US. Awake Blind Nasotracheal Intubation in Temporomandibular Joint Ankylosis Patients under Conscious Sedation Using Fentanyl and Midazolam. *J Maxillofac Oral Surg*. 2010 Dec;9(4):377-81.
- Kramer A, Müller D, Pfortner R, Mohr C, Groeben H. Fiberoptic vs videolaryngoscopic (C-MAC (®) D-BLADE) nasal awake intubation under local anaesthesia. *Anaesthesia*. 2015 Apr;70(4):400-6.
- Rosenstock CV, Thøgersen B, Afshari A, Christensen AL, Eriksen C, Gätke MR. Awake fiberoptic or awake video laryngoscopic tracheal intubation in patients with anticipated difficult airway management: a randomized clinical trial. *The Journal of the American Society of Anesthesiologists*. 2012 Jun 1;116(6):1210-6.
- Chauhan V, Acharya G. Nasal intubation: a comprehensive review. *Indian journal of critical care medicine: peer-reviewed, official publication of Indian Society of Critical Care Medicine*. 2016 Nov;20(11):662.
- Calder I, Murphy P. A fibre-optic endoscope used for nasal intubation. *Anaesthesia* 1967; 22: 489-91.
- Hopkins HH, Kapany NS. A flexible fibrescope, using static scanning. *Nature*. 1954 Jan;173(4392):39-41.
- Benumof JL. Management of the difficult adult airway. *Anesthesiology* 1991;75:1087-110.
- Ovassapian A: The flexible bronchoscope. A tool for anaesthesiologists. *Clin Chest Med* 2001; 22: 281-299.
- Hastings RH, Marks JD: Airway management for trauma patients with potential cervical spine injuries. *Anesth Analg* 1991; 73:471-82.
- Lee JA, Atkinson RS: A Synopsis of Anaesthesia, 7th Edn. Bristol: John Wright and Sons Ltd, 1973.
- Stone DJ, Gal TJ: Airway management: Anaesthesia. New York, Churchill Livingstone, 1990; pp 1278-1281.
- Bell CNA, Macintyre DR, Ross JW, Pigott RW, Weller RM: Pharyngoplasty: A hazard for nasotracheal intubation. *Br J Oral Maxillofac Surg* 1986; 24:212-216.
- Ghassem LE, David C, Irwin G, Lynn M, Robert M, Mary A, Michael G E: The Efficacy and Safety of EMLA Cream for Awake Fiberoptic Endo-tracheal Intubation. *Anesth Analg* 2000; 91:1024-6.
- Lloyd EL: Fiberoptic laryngoscopy for difficult intubation. *Anaesthesia* 1980;35:719.
- Cobley M, Vayghan RS: Recognition and management of difficult airway problems. *BJA* 1992; 68:90-7.
- Grindlinger GA, Niehoff JO, Hughes SL, Humphrey MA, Simpson GE. Acute paranasal sinusitis related to nasotracheal intubation of head-injured patients. *Critical care medicine*. 1987 Mar 1;15(3):214-7.
- Magill IW. Technique in endotracheal anaesthesia. *British medical journal*. 1930 Nov 15;2(3645):817.
- Vaughan RS. EDITORIAL II: TRAINING IN FIBEROPTIC LARYNGOSCOPY. *BJA: British Journal of Anaesthesia*. 1991 May 1;66(5):538-40.
- Atchabadian A, Gupta R. *The anesthesia guide*. McGraw-Hill; 2013.
- Gerheuser F, Gürtler K. Awake fiberoptic intubation. *Der Anaesthesist*. 2011 Dec 1;60(12):1157-74.
- Jacomet A, Tasman AJ. Airway management in facial trauma patients. *Facial Plastic Surgery*. 2015 Aug;31(04):319-24.
- Barak M, Bahouth H, Leiser Y, Abu El-Naaj I. Airway management of the patient with maxillofacial trauma: review of the literature and suggested clinical approach. *BioMed research international*. 2015 Jun 16;2015.
- Wong J, Lee JS, Wong TG, Iqbal R, Wong P. Fiberoptic intubation in airway management: a review article. *Singapore medical journal*. 2019 Mar;60(3):110.

Conflict of Interest: Nil Source of support: Nil