International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Retrospective Comparison of Two Different Techniques of Airway Management in Temporomandibular Joint Ankylosis Patients within Paediatric Age Group

Vaishali Gautam[1], Pushkar Desai[2], Kinjal Shah[3]

[1]M.D. Anaesthesiology, Assistant Professor of Department of Anaesthesiology, Civil Hospital, BJ Medical college, Ahmedabad, India

[2]Resident Doctor, Department of Anaesthesiology, Civil Hospital, BJ Medical college, Ahmedabad, India

3rd Year Resident Doctor, Department of Anaesthesiology, Civil Hospital, BJ Medical college, Ahmedabad, India

Abstract: ***Fibreoptic Intubation is a better alternative to Blind Nasal intubation in patients with TMJ Ankylosis within paediatric age group and it reduces demand for elective tracheostomy in planned surgery. Awake Fibreoptic intubation is less time consuming more safe more successful and is associated with reduced morbidity and mortality. While blind intubation technique is associated with more complication and chances of success are almost 50% as compared to fibreoptic intubation***.

Keywords: Fibreoptic intubation, temporomandibular joint ankylosis, anaesthesia, difficult airway

1. Aim

The aim was to compare the morbidity or mortality associated with two different airway management techniques in temporomandibular ankylosis patients of age within 3 years to 12 years

2. Introduction

Securing the airway is fundamental to the practice of general anesthesia. Intubation by direct laryngoscopy is usually the norm.\ Surgery of temporomandibular joint (TMJ) ankylosis falls in the category of difficult intubation as direct vocal cord visualization is difficult due to an inability to open the mouth. The difficult intubation in TMJ ankylosis patient results from severe trismus, mandibular hypoplasia with unequal growth of two halves of mandible, reduced mandibular space with pseudomacroglossia in a confined space all of which narrow the pharyngeal passage. Many patients frequently suffer from obstructive sleep apnea. All of these factors make intubation much more difficult.

Hence, the intubating options in these patients are few and difficult: A blind nasal intubation, fiberoptic bronchoscope-assisted intubation,, retrograde endotracheal intubation using a pharyngeal loop, semi-blind technique of nasal intubation, and tracheostomy. [(1,2,3,4)] Though difficulty in intubating ankylosis patients is well accepted, there is no standardized protocol for the anesthetic management

3. Materials and Methods

A total of 40 cases with radiographically and clinically confirmed cases of temporomandibular joint (TMJ) ankylosis were included in the study for evaluation of anesthetic management and its complications.

A retrospective study of airway management was conducted on patients who have undergone surgery for TMJ ankylosis at our institute during the year 2012 to march 2017 nearly 5 years. Patients included in the evaluation were unilateral or bilateral TMJ ankylosis cases observed by orthopantomography or coronal computed tomography with American Society of Anesthesiologist I classification.

In this group of treatment, we evaluated the anesthetic plan, time to intubation, patient cooperativeness, and complications encountered during intubation and postoperative airway complications.

All TMJ ankylosis patients were evaluated for the airway assessment with a standard proforma which included previous anesthetic problem, general appearance of face, neck, maxilla and mandible, jaw movement, head extension and movement, teeth and oropharynx, nasal obstruction or deviated nasal septum, soft tissues of the neck, thyroid enlargement, recent chest and cervical spine radiographs, and for any gross anatomical distortion. Patients were assessed for spontaneous ventilatory exchange and an intact cough reflex. The difficulty of intubation was evaluated based on LEMON assessment and recorded. Patient's ability to follow simple verbal commands such as “open your mouth” and “take a deep breath” were confirmed. Possibility of elective tracheostomy, and requirement of postoperative ventilatory support were explained to the patient and guardian. Informed consent was taken from the patient and patient's guardian. Airway management was done according to availability of airway equipments available at our institute following difficult airway algorithm pathway

Monitors such as electrocardiogram, pulse oximetry, EtCO2 and Noninvasive blood pressure monitor were attached.
For local preparation:
Two drops of 2 % xylometazoline nasal drops were put into the nares after checking patency of nares.

2% saline viscous gargles were done
Nebulization with 4% lignocaine was given
Transtracheal block were given by injecting 1 cc of 2% plain xylocaine intratracheally.
10% lignocaine solution was sprayed in the patients who had 10-12 mm mouth opening

Premedication comprised glycopyrrolate 0.004 mg/kg body wt, ondansetron 0.15 mg/kg body and fentanyl 1-2mcg/kg body wt which were given intravenous prior to surgery.

Before attempting intubation, Bag and mask ventilation was checked.

During first 25 patients when fibreoptic bronchoscope was not available, for induction purpose, inj ketamine 1 mg/kg body wt was given which was supplemented by inj propofol 2.5-3.5 mg/kg body wt if required. Suxamethonium or other Non-Depolarizing Neuromuscular blockers were not used as patients were kept on spontaneous respiration. Blind nasal intubation attempts were done. In cases where blind intubation failed, Elective tracheostomy was done to proceed with surgery.

During next 15 patients when fibreoptic bronchoscope became available, following local preparation, intubation attempts with fibreoptic bronchoscope were. In 2 cases where first attempt of fibreoptic intubation was failed, we attempted intubation after giving inj Ketamine 1 mg/kg body wt. Following which one patient got intubated successfully. In the case when fibreoptic intubation was failed after 2 attempts, Elective tracheostomy was done to proceed with surgery.

4. Result

Blind nasal intubation attempts were done in 25 no of cases during year 2012 to 2014 when fibreoptic bronchoscope wasn't available, out of which 48% of patients were successfully intubated with maximum no of 2 attempts and other 52% patient required elective surgical airway. Fiberoptic intubation attempts were done in 15 patients during year 2015 to march 2017, out of which 93.33% of patients were successfully intubated with maximum no of 2 attempts. and 6.67% patient required elective surgical airway.

5. Discussion

Endotracheal intubation in patients with altered airway anatomy always remains a challenge for the anesthesiologist. In developing countries, patients often present late for treatment. Due to the late presentation in patients having TMJ ankylosis, airway anatomy becomes so much altered that it becomes quite difficult or sometimes impossible to intubate with conventional methods. Airway obstruction due to the tongue falling back on the posterior pharyngeal wall may occur with deeper plane of anesthesia. Upward jaw thrust to perform a triple airway maneuver is near to impossible in children with bilateral TMJ ankylosis.Hence awake intubation methods are always preferred in TMJ ankylosis patients. (5)

Fiberoptic intubation is the gold standard for intubation in case of TMJ ankylosis but is quite expensive, and a variety of sizes are needed in pediatrics. Fiberoptic scopes from 2.2 mm outer diameter onward would be necessary for passing through the 3 ± 6 mm inner diameter tubes. With financial constraints, procuring scopes of various sizes (1.8–4.5 mm) is difficult

Nonavailability of suitable size of flexible fiberoptic scopes should not hamper the airway management. Although the use of the fiberoptic bronchoscope is simple conceptually, there is a significant learning curve that must be overcome before becoming proficient.

Methods such as retrograde intubation are more invasive and also retrieval of the catheter from oral cavity may not possible due to the limited mouth opening in the cases of TMJ ankylosis

Endotracheal intubation frequently induces intense autonomic responses such as tachycardia, hypertension, dysrhythmias, bronchospasm, and bronchorrhea. Occasionally, it may also produce hypotension and bradycardia. These reactions are exaggerated during awake intubation, and the patient may also become uncooperative. It can be minimized by anesthetizing the upper and lower airway by anesthetic nebulizer, topical local anesthetic application with cotton pledgets or by various nerve block techniques. In our study, we have administered transtracheal local anesthesia prior to intubation, which had reduced the incidence of vocal cord spasm and reflex cardiac arrhythmia. Reflex bradycardia resulting from intubation may be prevented by the IV administration of atropine or glycopyrrolate before intubation.

Glycopyrrolate was given in our study since it produces less stimulatory effects on the central nervous system and heart rate than does atropine.

During blind awake intubation, the tube may theoretically pass through any one of the following routes such as submucosal dissection into the mucous membrane of the nose, epiglottic vallecula, esophagus, right or left pyriform fossa or anterior wall of larynx and may complicate endotracheal intubation.Hence, anesthesiologist should have a thorough knowledge of the upper airway, be cautious and suspicious about wrong passage of endotracheal tube whenever resistance is felt or if there is any absence of breath sound through the endotracheal tube. In such cases, successful endotracheal intubation can be achieved by using any of the maneuvers such as passing the tube through other nostril, slight withdrawal and then advancement and mild rotation, altering neck extension, and external manipulation of vocal cord depending on the obstruction encountered.

Maximal abduction of the vocal cords occurs during the latter phase of inspiration, and at this phase of the respiratory cycle, the tube is quickly passed through the glottis into the trachea, thereby minimizing vocal cord trauma. The technique of passing the tube at the moment of an explosive cough is also helpful because the laryngeal aperture is again at its greatest diameter during this time. Successful intubation may be verified by one or more of the following:

Continued passage of air through the endotracheal tube as evidenced by excursions of the anesthesia bag; equal bilateral breath sounds, symmetric bilateral chest movement, observation of tube condensation, and pulse oximetry. However, the confirmatory test for successful intubation is fiberoptic bronchoscopy or capnography.

There is a close relationship between difficult intubation and traumatic intubation. A difficult intubation may thus become a traumatic intubation. Complications vary widely in severity. whereas some are dramatic and immediately life-threatening (unrecognized esophageal intubation), others can be severe and long-lasting (nerve injuries) or mild and short-lived (sore throat). Advancement of the nasotracheal tube can traumatize nasal passages causing bleeding, bacteremia, avulsion of a turbinate or even retropharyngeal dissection. Lubrication, use of vasoconstrictor, and prewarming of endotracheal tubes for softening have been recommended to reduce trauma during nasotracheal intubation.

6. Conclusion

Awake Fibreoptic intubation is less time consuming more safe more successful and is associated with reduced morbidity and mortality. While blind intubation technique is associated with more complication and chances of success are almost 50% as compared to fibreoptic intubation

7. Future Scope

Various other techniques may be compared.
Various sedation techniques may be tried.

References

[1] Morgan JP, 3rd, Haug RH, Holmgreen WC. Awake blind nasoendotracheal intubation: A comprehensive review. J Oral Maxillofac Surg. 1994;52:1303–11.
[2] Xue FS, Yang QY, Liao X, He N, Liu HP. Lightwand guided intubation in paediatric patients with a known difficult airway: A report of four cases. Anaesthesia. 2008;63:520–5.
[3] Vas L, Sawant P. A review of anaesthetic technique in 15 paediatric patients with temporomandibular joint ankylosis. Paediatr Anaesth. 2001;11:237–44.
[4] Kopman AF, Wollman SB, Ross K, Surks SN. Awake endotracheal intubation: A review of 267 cases. Anesth Analg. 1975;54:323–7.
[5] Apfelbaum JL, Hagberg CA, Caplan RA, Blitt CD, Connis RT, Nickinovich DG. American Society of Anesthesiologists Task Force on Management of the Difficult Airway. Anesthesiology. 2013;118:251–70.

Author Profile

Vaishali Gautam (M.D. Anaesthesiology) Assistant Professor of Department of Anaesthesiology, Civil Hospital, BJ Medical college, Ahmedabad

Pushkar Desai (Resident doctor) Department of Anaesthesiology, Civil Hospital, BJ Medical college, Ahmedabad

Kinjal Shah (3rd year resident doctor) Department of Anaesthesiology, Civil Hospital, BJ Medical college, Ahmedabad