ORIGINAL ARTICLE

Association of Airway Difficulties and Complications of Endotracheal Intubation in Maxillofacial Surgery

MAQSOOD AHMAD KHAN[1], MUNIR AKHTAR KHAN[2], MIRZA ABDUL RAUF[3], *USMAN ALI KHAN[4]*

ABSTRACT

Aim: To determine the safe and secure mode of endotracheal intubation along with surgeon satisfaction to have adequate room and easy access for Oral & Maxillofacial Surgery.
Study Design: Descriptive study
Place and Duration of Study: A total of Sixty one patients requiring Oral & Maxillofacial Surgery under general anaesthesia from June 2016 to April 2018 were analysed retrospectively. Study was carried out at Islam Medical & Dental College Sialkot.
Methodology: All patients of both gender in all age groups who underwent maxillofacial procedure with nasal intubation were picked for descriptive study, considering difficulty faced by anesthesiologist[2] Preoperative data and airway assessment of all patients were taken for evaluation. Cormack and Lahane' scrore were recorded at laryngoscopy for analysis[1,2,18]. Registered Percentage of Glottis Opening (POGO) was also evaluated along with the Intubation Difficulty Score (IDS) from 0 to 10.
Results: Mallampati classification[(1,17)] class, i, ii, iii, and iv, was applied to all patients, the percentage found in maxillofacial surgery patients was 0,10,60,30 percent in respective class .After general anesthesia and muscle relaxation with suxamethonium, laryngoscopy done, Cormack and lahane grade[1,9,18] i, ii, iii, iv was 5,20,50,25 percent respectively. Percentage of glottis opening (POGO) was 40 percent 30 percent 20 percent and 10 percent in corresponding Mallampati class. Intubation difficulty score (IDS) from 0 to 10 scale was recorded. The mean was found to be 7.5.
Conclusion: There is high degree of airway difficulties[3] and complications of endotracheal intubation associated with maxillofacial surgery which require high level of competence, skills and experience of anesthesiologist to deal with. Nasal intubation is most secured and stabilized mode of airway and has higher level of satisfaction for surgical hand.
Key words: Endotracheal intubation, submucous dissection, glottis view, laryngoscopy

INTRODUCTION

Maxillofacial trauma is increasing component of road traffic accident (RTA) with population explosion, urbanization and changing hurried life style. Its association with increased use of mechanical transport with fewer adherences to traffic rules and safety measures is well established. A difficult situation is faced by anesthesiologist when prolonged, deep and safe anesthesia is requirement of such clinical entities[10]. Limited jaw opening due to ankylosis[11,12] of temporomandibular joint (TMJ) is a common presentation in a maxillofacial surgery department of dental college. Sometime glottis visualization on direct laryngoscopy become difficult for endotracheal intubation (ETT) due to mutilation of face, multiple fractures, growth, big cystic lesions of maxilla and mandible[13,14]. Competition between anesthesiologist and maxillofacial surgeon in the field of operation continue throughout long surgical procedures which require persistent vigilance to mitigate displacement, kinking of endotracheal tube or accidental loss of airway.

[1]Associate Professor Anaesthesiology, Islam Medical & Dental College.
[2]Department of Surgery King Khalid Hospital Najran KSA.
[3]Associate Professor & HOD Department of Oral & Maxillofacial Surgery Islam Dental College Sialkot.
[4]Department of Maxillofacial surgery Armed Forces Institute of Dentistry(AFID).
Correspondence to Dr. Maqsood Ahmad Khan,
E-mail: colmaxdr@gmail.com

METHODOLOGY

The study was carried out at Islam Teaching Hospital which is associated with Islam Medical and Dental College Sialkot from June 2016 to April 2018 after approval from hospital committee on research. All patients requiring maxillofacial surgery were admitted in hospital, investigated and evaluated at pre-anesthesia clinic. All possible scenarios of difficulties at intubation were discussed with surgeon. Operative plan of surgeon and immediate postoperative follow up was discussed in detail. All risks and possible surgical intervention including emergency cricothyroidotomy[6,11] was discussed with surgeon and well explained to the patients. Written informed consent was taken. Exclusion criteria was cervical spine injuries, gastro-esophageal reflux history and allergic reaction to any anesthetic drug history. Preoperative fasting period was 4 – 6 hours.

All patients were evaluated at pre anaesthesia clinic, Mallampatti classification applied to all patients and documented. Before induction patients were preoxygenated with 100% oxygen for three minutes. All monitors attached to the patients and vital parameters recorded before induction. Injection atropine 0.15 milligram per kilogram bodyweight was given. These patients were induced with injection Propofol 3milligram per kilogram bodyweight. Ability to ventilate lungs with positive pressure mask ventilation with the help of Bain circuit checked[(12,13)] After confirmation of ability to ventilate, injection Suxamethonium 1.5milligram per kilogram bodyweight given. After achieving full relaxation laryngoscopy was

done in those patients where jaw opening was possible but limited. Effort for glottis visualization was made possible and Percentage of Glottis Opening (POGO) was registered. Polyvinyl chloride endotracheal (ETT) was lubricated with water soluble xylocain gel and nasal endotracheal intubation[15] done with the help of Magill forceps guidance[11,12,13,17] .ETT cuff baloon inflated with air and bilateral ventilation confirmed. Throat packing was done to prevent soiling of trachea with blood and secretion. Patients were given injection Atracurium for relaxation. Patients were maintained with oxygen nitrous oxide gas mixture and isoflurane added as anaesthetic agent. Intermittent positive pressure ventilation continued with injection ketorolac 0.5 milligram per kilogram as analgesic. Intubation Difficulty Score (IDS) 0 -10 in each case was registered. After completion of surgery all patients were extubated at operation table and recovered well, and later discharged from the hospital.

Table 1: Maxillofacial surgeries under general anesthesia in main operation theatre of Islam Medical and Dental College Sialkot from June 2016 to April 2018.

Mandibular fractures of different types	17
Radiolucent pathologies excision	8
Nasomaxillary complex fractures including Lefort 1,2	10
Ankylosis of Temporomandibular joint (TMJ)	5
Odontogenic tumor	2
Carcinoma	5
Benign growth	4
Miscellaneous	10
Total	61

Table 2: Preoperative assessment and data of all patients.

Age (Years)	Maximum 30 Years Minimum 5 Years Mean 18 Years
Gender	Male- 35 Female- 26
Weight	Maximum 74 kilogram Minimum 20kilogram Mean 52 kilogram
Height	Maximum 172 Centimeter Minimum 38 Centimeter
BMI (Mean)	24
Mouth opening Mean	2 Centimeter
Thyromental distance Mean	4.2 Centimeter
Mallampatti class	0 Patients 4 Patients 27 Patients 30 Patients

Table 3: Data at Laryngoscopy of all 61 patients.

	1	2	3	4
Cormack and Lehane grade	5%	20%	45%	25%
POGO (%) (Percentage of glottis opening) at larogoscopy	40%	20%	30%	10%
	Mean 25%			
IDS (Intubation difficulties score) (0 - 10)	Mean 7.5			

RESULT

A total of sixty one patients were brought by maxillofacial surgeon for different procedures in main operation theatre of Islam Medical and Dental College Sialkot. In three Patient mobilization under anesthesia (MUA) of TMJ with gag done before nasal intubation to visualize guided procedure of EET to glottis by Magiall Forceps. One patients developed submucous dissection with nasal intubation which was switched over to oral EET for fracture fixation and plating. This patient was extubated at the end of procedure. The patient required Maxillomandibular fixation (MMF) at second sitting in dental chair of Dental department. In three cases, hemimandibulectomy done for carcinoma with extubation at the end of procedure on table. Post-operative vigilance for patency of airway and bleeding was required. Patients were nursed in lateral position to monitor airway. In twenty four cases passing oral EET was not possible due to disturbed anatomy caused by multiple fractures, large growth and big cysts switched to nasal intubation and guided by Magill forceps. Fifteen patients required maxillomandibular fixation (MMF). Two patients with severe bilateral ankylosis of temporomandibular joint having minimal jaw opening were anaesthetised with inhalational anesthesia on mask and intravenous adjuvant on spontaneous ventilation. Condyl resection were done and jaw opening were made possible for later nasal intubatrion to proceed further for definitive surgery under muscle relaxant.

In one case minimal possible size endotracheal tube failed to advance in both nostrils due to obstruction and was switched to oral intubation. There was little difficulty faced by surgeon for the removal of growth in maxillary sinus during the procedure. In two cases endrotracheal tube air cuff was found punctured during the process of nasal intubation. Nasopharyngeal packing was done around the same tube to avoid further trauma of mucosa at another attempt with a new tube. There was no or minimal compensated peritubular leak on positive pressure ventilation. No spillage of blood or secretion in to the trachea was found. One diagnosed patient of carcinoma required facilitation of gum elastic bougie for intubation and hemimandibulactomy was also done in this case.

CONCLUSION

Endotracheal intubation for maxillofacial surgery is a challenging job. It has generally low POGO (Percentage of glottis opening) and high IDS (Intubation difficulty score). It requires confident and experienced pair of hands of anaesthesiologist who can keep alternate plan ready and do not hesitate to call for help. This should be practiced in well equipped hospital and pre-anaesthetic “Cockpit” drill is mandatory. Anaesthesiologist must have at least two experienced, dependable assistants on his both sides before start of induction of anaesthesia. Wire cutter must be kept along the patients bed side in the ward in cases of maxillomandibular fixation (MMF) to deal with emergency of airway if required.

REFERENCES

1. Morgan & Mikhails' Clinical Anaesthesiology. 5th ed Chapter Airway management. P313.
2. Mallampatti SR: Clinical signs to predict difficult tracheal intibation [hypothesis] Can Anaesth Soc J 1983:30:316.
3. Schumann M, Biesler, Borgers A, pfortner R, Mohr C, Groeben H. Tracheal intubation in patients with odentogenous abscesses and reduced mouth opening. Br J Anaesth 2014; 112:348-54.
4. Apfelbaum JL, Hagberg CA, Caplan RA. Practice guidelines for management of the difficult airway: an update report by the American Society of Anesthesiologists Task Force on management of the difficult airway. Anesthesiology 2013; 118:251-70.
5. Liang YX,Gu MN, wang SD. The application of fibreoptic intubation in difficult airway patient. J Clin Anesth 2010;22:300-1.
6. Byard RW, Gilbert JD. Potentially lethal complications of tracheostomy; autopsy considerations. Am J Forensic Med pathol 2011;32:352-4.
7. McCracken J, Leasa D. Trach tubes designed to maximize safety may increase risk to ventilated patients. Crit Care 2010;14:1008.
8. Cheney FW, posner KL, Lee LA, caplan RA, Domino KB: Trends in anesthesia-related death and brain damage. A closed claims analyasis.Anesthesiology 2006;105:1081.
9. Cook TM A new practical classification of laryngeal view. Anaesthesia 2000;55:274.
10. Langeron O, Masso E, Huraux C, et al: Prediction of difficult mask ventilation. Anesthesiology 2000;92:1217.
11. Stauffer JL: Complication of endotracheal intubation and tracheostomy.Respir care 1999;44:828.
12. Watson CB: prediction of a difficult intubation: methods for successful intubation. Respir Care 1999;44:777.
13. Apfelbaum JL, Hagberg CA, Caplan RA, Blitt CD, Connis RT, Nickinovich DG, et al. Practice guidelines for management of the difficult airway:an updated report by the American Soioety of Anaesthesiologists Task Force on Management of the Difficult Airways. Anesthesiology. 2013;118:251-270.
14. Kheterpal S, Healy D, Aziz MF, shanks AM, Freundlich RE, Linton F, et al. Incidence, predictor, and outcome of difficult mask ventilation combined with difficult laryngoscopy: a report from the multicenter perioperative outcomes group. Anesthesiology. 2013; 119: 1360-1369.
15. Zhang J, Lamb A, Hung O, Hung C, Hung D,. Blind nasal intubation: Teaching a dying art. Can J Anaesth.2014;61:1055-1056.
16. O'Connor RE, Megargel RF, Schnyder ME, Madden JF, Bitner M, Ross R. Paramedic success rate for blind nasotracheal intubation is improved with the use of an endotracheal tube with directional tip control. Ann Emerg Med.2000;36:328-332.
17. Hagberg CA, Artime CA. Airways management in the adult. In: Miller RD, editor. Miller's anesthesia. 8th ed. Philadelphia:Elservier/Saunders;2015.p.1670.
18. Benumof JL, Cooper SD. Quantitative improvement in laryngoscopic view by optimal external laryngeal manipulation. J Clin Anesth. 1996;8:136-140.
19. Gorback MS. Inflation of the endotracheal tube cuff as an aid to blind nasal endotracheal intubation.Aesth Analg. 1987;66:916-917.