Anaesthesia, Pain & Intensive Care
2002; 6/1:17-20

A REVIEW OF ANAESTHETIC TECHNIQUE IN PAEDIATRIC PATIENTS WITH TEMPOROMANDIBULAR JOINT ANKYLOSIS

LT COL MUHAMMAD BOOTA
MBBS, FCPS
AFID RAWALPINDI

ABSTRACT

A technique for securing the airway through blind nasal intubation by combination of inhalational general anesthesia and increments of intravenous propofol with lignocaine 2% plain was used due to non availability of flexible fibroptic bronchoscope at our institution. For general anesthesia a combination of halothane, oxygen and nitrous oxide by spontaneous ventilation through face mask, nasopharyngeal airway or nasotracheal tube was administrated. Increments of propofol mixed with lignocaine plain 2% were used to obtain adequate depth of anesthesia. Nasotracheal tube connected with Magil circuit was then advanced during inspiration, the movements of reservoir bag were observed continuously. By applying gentleness and patience during manipulation, airway was secured in 1-3 attempts. Tube position was confirmed by chest auscultation and capnography. Anaesthesia technique in 50 such cases of severe trismus, managed successfully between 1999-2000 has been reviewed.

Key words: Tempormandibular joint, ankylosis, difficult intubation blind nasal intubation.

INTRODUCTION

Temporomandibular joints are highly specialized bilateral joints comprising an articulation between the cranium and mandible. The articulating complexes of bone carry the teeth whose morphology and position exert considerable influence upon the movements of the joint The articular surfaces are covered with a vascular fibrous tissue rather than hyaline cartilage. Its ankylosis is an unusual problem. A Medline search from 1980 to 1998 revealed only three articles[2-4] about the anaesthetic implication, airway problems [4-6] and their management in this condition in children. It starts insidiously after some trauma. In an overpopulated country with large families, the child with trismus gets noticed only when he/she cannot bite off and masticate solid food. The management of the airway prior to intubation of the trachea is a difficult challenge in a child who is not likely to allow the airway to be secured while awake . We use blind nasal intubation technique under inhalational general anesthesia with propofol increments mixed with lignocain plain 2% to secure airway before proceeding for surgery. With this technique, we successfully avoided the need of elective or emergency tracheostomy even in patients with severe trismus.

METHODS

There were 50 patients with temporomandibular joint ankylosis (TMJA) anaesthetized between 1999 and 2000 in our hospital. None of them could be intubated in a routine manner with formal larnygoscopy.

This review includes patients whose trismus was too severe to allow laryngoscopy They were seen two to three times preoperatively to establish a good rapport and explain the anaesthetic procedure to them. The general conditions, associated problems such as malnutrition , upper respiratory tract infection, additional problems of the air way such as sleep apnea, snoring and preference for sleeping on any particular side were noted The interincisor distance and the ability of the tip of the Magill.s blade as well as nasal forceps to pass through was assessed. Mobility of the head and neck and intensity of breath sounds through each nostril was noted. The airway was assessed with anteroposterior and lateral radiographs of the head and neck.

Since the anaesthetic management was similar in all cases, with only few slight differences, case number 50 is described as an index case followed by a brief summary of the others.

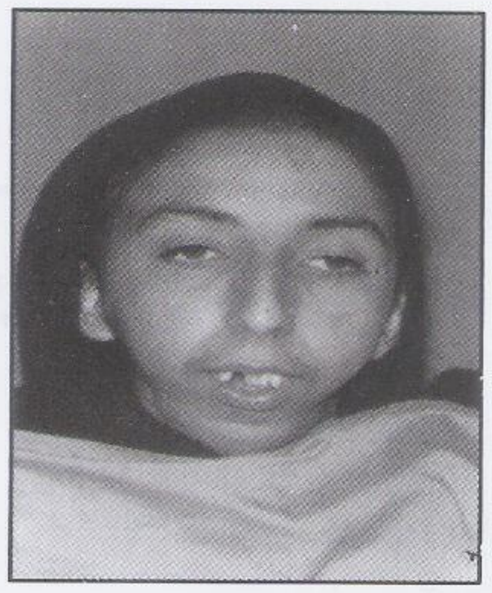
RESULTS

ANESTHESIA MANAGEMENT IN CASE NUMBER 50.

A 12 years old girl weighing 35 kg presented with bilateral TMJA . The thyromental distance was 3 cm and the interincisor distance was 8mm. She received

no premedication except reassurance.

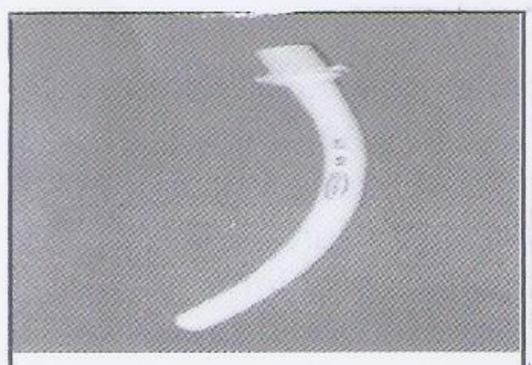
(Fig: 1)



(Fig2)

Monitoring of ECG, pulse oximeter and capnograph was achieved and venous access secured. Anesthesia was induced with oxygen and halothane by mask in sitting position as per the patients preference. On lowering the patient

(Fig 3)



(Fig 4)

to the spine position, there was total respiratory obstruction which was relieved and good P_EC0_2 curve returned with immediate passage of Portex polar preformed tracheal tube(North nasal 6.0mm ID) initially used as nasopharyngeal airway

(Fig 3 & 4).

Injection propofol, 25 mg increments mixed with lignocaine plain 2% was given i/v alongwith above inhalations. Gentle blind intubation with the head in sniffing position was attempted when adequate depth of anesthesia was achieved. First attempt was unsuccessful necessitating more attempts. Next attempts were made while observing reservoir bag movements, listening to the breath sounds, rotating the tube and advancing during inspiration with cephalad traction. The SpO_2 and P_EC0_2 curve through the nasal tube remained normal during several attempts at intubation. After 15 minutes, the trachea was intubated. Position of the tube was confirmed by bilateral chest auscultation and end tidal $C0_2$ tracing.

In view of the extremely difficult intubation, spontaneous ventilation was retained with nitrous oxide, oxygen and halothane I.5-2%. Surgery was started with bupivacaine 0.25% infiltration at operative site. Once we are able to open the mouth, inj. Atracurium 0.5mg/kg, inj. midazolam 0.05mg/kg, inj. nalbuphin 0.05mg/kg were given and the ventilation controlled. At the end of surgery which resulted in excellent mouth opening, the patient was extubated when fully awake. All other patients were intubated with same technique with little variation. No patient required preoperative/postoperative tracheostomy and post-operative ventilatory support.

DISCUSSION

The causes of TMJA [1] may be congenital (forceps delivery 2.6%) trauma, infection and unknown causes. Unusual causes include rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis(I), fibrodysplasia ossificans progressiva [7], infectious diseases such as measles pseudoankylosis after supratentorial craniotomy[8]. Younger patients have greater tendency towards recurrent ankylosis.

The difficult intubation in TMJA in children results from severe trismus, associated mandibular hypoplasia with unequal growth of two halves of mandible, reduced mandibular space with overcrowding of soft tissues, a maxillary overbite and / or hypoplasia. The ankylosis may be within or external to the joint. The fusion at the articular level may be fibrous or bony in nature. When the fusion occurs during the growth of the mandible, varying degrees of facial deformity result. As the child grows with the facial asymmetry, the position of the larynx may be altered.

In TMJA the limitation of movements[15] is such that even the hinge movement is affected, so direct larygoscopy is impossible. Since the attachment of the lateral pterygoid muscle to the condyle and meniscus may also be altered the patient presents with limited protrusion and diminished excursion, as well as trismus.

There are no predictors of difficult intubation such as Mallampatti sign[9], Patils's sign[10] Wilson's criteria [11], etc., applicable in pediatrics. We had no established standards at different ages for comparison and sensible interpretation of thyro- mental distance. Mallampatti sign was obviously difficult to elicit in young children. Our main guide was the air shadow of the airway on radiograms. The problems related to TMJA are superimposed on the usual difficulties of pediatric airway[12,13].

Blind nasal intubation [14], intubation over a wire passed retrograde from trachea[15,16] fibroptic laryngoscopy or tracheostomy [4-6] have been described as alternatives

for securing the air-way.

Fibroptic laryngoscopy and intubation , the most ideal alternative, is not without difficulties, as the equipment is quite expensive and a variety of sizes are needed in pediatrics [17-20]. Fibroptic scopes from 2.2mm outer diameter onwards would be necessary for passing through the 3-6 mm inner diameter tubes ,used in children. Larger sizes with a suction channel would be preferred wherever possible. With our financial restraints, procuring scopes of various sizes is virtually impossible.

This leaves us only with blind nasal intubation which, even in expert hands , has a high rate of failure , trauma and bleeding from the upper airway because of the distorted soft tissue anatomy. The tube can be obstructed by any of the nine points around the larynx, such as the two halves of vallecula between the epiglottis and cords or between the true and false cords in the vestibule, two para laryngeal and pharyngeal spaces or pass into the esophagus. The tip of the tube was in the vallecula on several occasions. To enter the larynx, the tube has to traverse an initial anterior and then an inferoanterior angle[16] . To guide the tube through these changing angles by remotely controlling the other end of the tube is difficult. Blind nasal intubation is not an art. It is every time a new experience, needs patience, gentleness during handling and manipulation of airways. Use of inhalational anesthetic with propofol along with lignocaine 2% in incremental doses up to 50 mg help to suppress the stress response and reflex laryngospasm and to achieve adequate depth of anesthesia. Arrangements for securing surgical airway must be at hand to meet the 'failure to intubate, failure to ventilate' situation.

The semi blind techniques have been described in literature. It is a modification of blind nasal intubation. At no time is any attempt made to see the larynx. A tongue depressor and fibroptic light source, which are easily available in all operating theatres allow some vision to determine the correct direction for the tube. This reduces the time taken, chances of trauma and failure. Nasal forceps can be used to correct the wrong angle of the tube by placing its tip away from obstructions, and as near to the glottis opening as possible. The fibroptic light source is bright enough to illuminate the back of the throat. Use of topical anesthesia and superior laryngeal nerve block allow the invasive manipulations for blind intubation and the later semi blind attempts at lighter planes of anesthesia, as the physiological reflex responses to airway instrumentation are obtunded. Nasopharyngeal insufflation of an oxygen rich mixture of inhalational anesthetics improves safety even in patients with extreme difficult airway.

Sevoflurane is an attractive choice for deep inhalational induction while halothane remains a cheap alternative where sevoflurane is not available. Isoflurane is likely to induce coughing, and bucking due to its slight irritating effects, and its sleep induction is comparatively more transient with the risk of the patient waking up. The local infiltration of bupivacaine for surgery ensures a very light plane of anaesthesia and postoperative comfort without recourse to sedative analgesics. This, together with spontaneous ventilation gives us theoretical safety in case of any accidental extubation intraoperatively. These small details assume importance in situations where small problems can lead to a catastrophe in difficult patients.

In conclusion, patients with TMJA pose a difficult airway problem that requires careful planning. The use of combined general, local and topical anaesthesia offers considerable advantage in these children with severe trismus. Surgical airway expert team should be stand by alert.

REFERENCES

1. Block C, Brecner, VL, Unusual problems in airway management 11. The influence of temporomandibular joint, the mandible and associated structures on endotracheal intubation. Anesth Analg 1971; 50:1.

2. Roelofse JA, Morkel JA. Anaesthesia for temporomandibular arthroplasty in quadriplegic patients: a case report. Anaesth Pain control Dent 1992:1:153-156.

3. Gallagher DM RL, Epker BN . Hemifacial microsomia: an anaesthetic airway problem. Oral Surg Oral Med Oral Pathol, 1980;49;2-4.

4. Lauritzen C, Lilija J. Airway obstruction and sleep apnoea in children with craniofacial anomalies. Plast Reconstr Surg 1986;77:1 -6.

5. Pensler JM, Christoher RD, Bewyer DC, Correction of micrognathia with ankylosis of temporomandibular joint in childhood . Plast Reconstr Surg 1993;91: 799-805.

6. El Sheikh MM, Medra AM, Warda MH.; Bird face deformity secondary to bilateral temporomandibular joint ankylosis. J craniomaxillofac Surg 1996; 24; 96-103.

7. Luchetti W, Cohen RB , Hahn GV et al; Severe restriction in jaw movement after routine injection of local anaesthetic in patients who have fibrodysplasia ossificans progressiva. Oral Surg, Oral Medicine, Oral Radiol Endo 1996; 81:21-25.

8. Kawaguchi M, Sakamoto T, Furuya H et al. Pseudo ankylosis of the mandible after supratentorial craniotomy. Anesth Analgl996;83;731-734.

9. Mallampatti SR, Gatt SP, Gugino LD et al. A clinical sign to predict difficult intubation. Can Anaesth Soc J 1985; 32: 429-434.

10. Patil VU, Stehling LC, Zaunder HL et al. Fiberoptic Endoscopy in Anesthesi. Chicago, IL: Year book Medical Publishers Inc., 1983.

11. Wilson ME, Spiegelhalter D, Robertson JA et al. Predicting difficult intubation. Br J Anaesth 1988; 61 ;211-216.

12. Berry FA. Difficult intubation. In: Berry FA, ed. Anaesthetic Management of difficult and Routine Pediatric Patients, 2nd Edn. New York: Churchill Livingstone, 1990:373-382.

13. Brown TCK, Fisk GC. Anaesthesia for Children, 2nd edn. Melbourne: Blackwell Science, 1992.

14. Divekar VM, Samtani RJ Anaesthesia for children, 2nd edn. Melbourne: Blackwell Science, 1992.

15. Dasgupta D. Endotracheal intubation in bilateral temporomandibular joint ankylosis. Indian J Anaesth 1987;35:367-373.

16. Sanchez AF, Retrograde intubation . Difficult intubation. Anesthesiology Clinics of North America 1995;13:439-473.

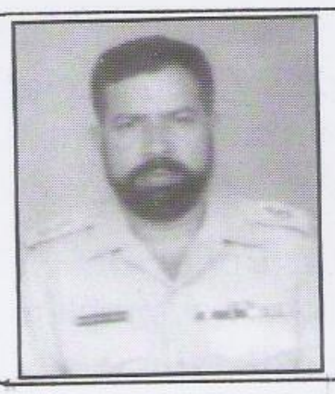
17. Sidhu VS, Wrigley SR, Black AE. Ultra thin fibreoptic laryngoscope. Can J Anaesth 1995;42:747.

18. Katznelson T, Frost EAM, Farcon E et al. When the endotracheal tube will not pass over the flexible fiberoptic bronchoscope. Anesthesiology 1992;76:151.

19. Heard CMB, Caddicott LD, Fletcher JE. Fiberoptic-guided endotracheal intubation via the laryngeal mask airway in pediatric patients. A report of a series of cases. Anesth Analog 1996;82:1287.

20. Schwartz D, Singh J. Retrograde wire guided direct laryngoscopy in a 1-month old infant. Anesthesiology 1992;77:607-608.

21. Vas L. Nasal packing forceps as a part of anaesthesia armamentarium. Anaesthesia 1996;51:514.



Lt Col Boota *is a graduate of KEMC, Lahore. After serving as a GDMO in field units, he did his grading in anaesthesia in 1988 from AFPGMI. He qualified FCPS in 2001, and is now serving as Head of the Department of Anaesthesiology, AFID.*

LIST OF ADVERTISEMENTS