Evaluation of Inter Incisal Mouth Opening for Airway Maintenance in Oral Submucous Fibrosis

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Abstract

Purpose Determination of difficult airway maintenance preoperatively holds a great significance in different intubation techniques and also surgical exploration of airway. No data is available for relation of airway maintenance and preoperative interincisal mouth opening in oral submucous fibrosis patients.

Methods 20 oral submucous fibrosis patients were evaluated pre operatively for general anaesthesia. Direct nasotracheal intubation, fiberoptic laryngoscopy guided intubation or awake blind nasal intubation technique, or combination of above techniques were used.

Results Mean pre operative inter incisal mouth opening for direct nasotracheal intubation (nine patients) is 15.44 mm, fiberoptic guided laryngoscopy (six patients) is 9.0 mm and blind nasal intubation (five patients) is 5.2 mm.

Conclusion Benefits of avoiding a surgical exploration of airway was significant.

Keywords Pre operative inter incisal mouth opening · Direct nasotracheal intubation · Fiberoptic guided laryngoscopy · Awake blind nasal intubation · Oral submucous fibrosis

Introduction

Expertise in airway management is essential in every medical speciality. The three main causes of respiratory

related injuries are (1) inadequate ventilation, (2) oesophageal intubation, (3) difficult tracheal intubation. Difficult tracheal intubation accounts for 17% of the respiratory related injuries and results in significant morbidity and mortality [1]. Maintaining a patent airway is essential for adequate oxygenation and ventilation. Failure to do so, even for a brief period of time, can be life threatening.

In fact up to 28% of all anaesthesia related deaths are secondary to the inability to mask ventilate or intubate [1].

American Society of Anesthesiologists (ASA) defines a difficult intubation as a case in which “tracheal intubation requires multiple attempts, in the presence or absence of tracheal pathology. A “difficult laryngoscopy” is said to occur when” it is not possible to visualize any portion of the vocal cords after multiple attempts.

For various oral and maxillofacial surgical procedures, maintenance of airway during general anaesthesia can be achieved by (i) conventional direct laryngoscopy nasal/oral intubation, (ii) fiberoptic laryngoscopic guided intubation, (iii) blind nasal intubation, (iv) submental intubation, (v) tracheostomy.

Patients with restricted mouth opening pose challenges for conventional, nasal or oral intubation [2]. Submental intubation and tracheostomy demands a surgical exploration with morbidities associated with them which may not be acceptable to the patient [2]. For establishment of airway with incompatible inter incisal mouth opening in patients with oral sub mucous fibrosis, blind nasal intubation or fiberoptic laryngoscopic guided intubation offers an alternative to submental intubation or tracheostomy.

No literature data is available for maintenance of airway in submucous fibrosis patients during surgery in regards to minimum inter incisal mouth opening required and avoidance of tracheostomy for airway maintainance.

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This study of 20 cases of oral submucous fibrosis patients was carried out to evaluate methods of intubation with respect to pre operative inter incisal mouth opening and to assess the need for tracheostomy for airway maintenance.

Materials and Methods

Approval from the ethics committee of sumandeep vidya-peeth has been obtained. Preoperative assessment of 20 patients with moderate to severe submucous fibrosis was carried out by the team of expert anaesthetist for evaluation of difficult airway. They have evaluated patency of nares, interincisal mouth opening, angulation and stability of teeth, palate. They have assessed prognathism and temporo-mandibular joint movement also.

In patients with adequate mouth opening of 15 mm or more, airway could be maintained by direct nasotracheal intubation and throat packing was possible before commencement of surgery. A cuffed portex nasotracheal tube was introduced to maintain the airway and to prevent seepage of fluid secretions, blood into the tracheo bronchial tree.

In patients with inadequate mouth opening, throat packing was not possible before beginning of the surgery. In the cases with 4–12 mm pre operative mouth opening, awake fiberoptic guided laryngoscopy was carried out.

While in cases with almost no mouth opening, awake blind nasal intubation was carried out. In these cases throat packing was done once the considerable mouth opening was surgically achieved after excision of fibrous bands. Co relation with the technique to intubate the patient, time duration taken for intubating the patient, type of intubation and mean pre operative mouth opening has been done.

Results

(See Tables 1,2,3,4 and Figs 1,2,3,4,5)

Discussion

‘Difficult airway’ is one in which there is a problem in establishing or maintaining gas exchange via a mask, an artificial airway or both. Recognizing before anaesthesia, the potential for a difficult airway in designated ‘difficult airway clinics’ allows time for optimal preparation, proper selection of equipment and technique and participation of personnel experienced in difficult airway management. One of the major challenges in the practice of general anesthesia is to predict how difficult the intubation of

Table 1 Airway maintainance by conventional nasotracheal intubation

Haider's clinical stage	Interincisal mouth opening (mm)(pre op)	Time duration (min)
1	16	15
2	14	27
1	15	24
1	15	24
2	14	18
1	18	20
2	14	27
1	18	22
2	15	25

$n = 9$ patients

Mean pre op mouth opening 15.44 mm

Clinical stage I = 5 patients

Clinical stage II = 4 patients

Mean time duration 22.44 min

Table 2 Airway maintainance by fiberoptic guided layrngoscopy

Haider's clinical stage	Interincisal mouth opening (mm)	Time duration (min)
2	12	30
2	11	18
2	12	28
2	08	35
3	04	28
2	07	27

$n = 6$ patients

Mean pre op mouth opening 9.0 mm

Clinical stage 2 = 5 patients

Cinical stage 3 = 1 patients

Mean time duration 27.66 min

Table 3 Airway maintainance by Awake Blind Nasal Intubation

Haider's clinical stage	Interincisal mouth opening (mm)	Time duration (min)
2	09	35
3	02	40
3	05	40
3	06	30
3	04	28

$n = 5$ patients

Mean pre op mouth opening 5.2 mm

Clinical stage 2 = 1 patient

Clinical stage 3 = 4 patients

Mean time duration 34.6 min

Table 4 Haider's clinical stage and type of intubation

Haider's classification	Total no. of patients	No. of patients with nasotracheal intubation	No. of patients with fiberoptic guided laryngoscope	No. of patients with blind intubation
Stage I	05	05	—	—
Stage II	10	04	05	01
Stage III	05	—	01	04

Fig. 1 Airway maintenance by conventional nasotracheal intubation **Fig. 2** Airway maintenance by fiberoptic guided laryngoscopy **Fig. 3** Airway maintenance by Awake blind nasal intubation **Fig. 4** Photograph of fiber optic guided laryngoscopy **Fig. 5** Photograph of awake blind nasal intubation

patients will be in the preoperative period. Unanticipated intubation difficulties are major source of morbidity and mortality in anaesthetic practice. It is well-documented that more than 600 patients die annually as a result of failed intubation [3].

Graham Cobb et al. [4] had considered mandible fracture, Mallampati score, and interincisal opening in the preoperative evaluation, all patients in this population would traditionally have been predicted to be difficult to intubate.

Fiberoptic-assisted nasoendotracheal intubation has been well documented in oral and maxillofacial surgery specifically it is useful when there is limited ability to open,

and/or protrude the mandible, derangement of upper airway anatomy, restriction in movement and/or injury to the cervical spine, and severe midface fractures.

Tracheal intubation with direct laryngoscopy is currently the most commonly used method for securing the airway in maxillofacial surgery patients. Management of difficult airway cases represents the majority of complexities in anaesthesia practice. The relationship between a problematic airway and difficult laryngoscopy and difficult intubation has not been documented properly in the literature. There are some preoperative predictive tests and measurements which are utilized in practice.

In our study 20 patients of oral submucous fibrosis has been operated under general anaesthesia. Among them nine patients (five patients of clinical stage I and four patients of clinical stage II) with mean interincisal mouth opening of 15.44 mm (range: 14–18 mm) were successfully operated under nasotracheal intubation, even though the interincisal mouth opening less than 35 mm (three finger breadth) which is predicted to be the difficult airway. Average duration of time taken to intubate with conventional nasotracheal intubation is 22.25 min.

Fiberoptic guided laryngoscopy was required for maintenance of airway in six patients (five patients of clinical stage II and one patient of clinical stage III) with mean preoperative mouth opening of 9.0 mm. Five patients (one patient clinical stage II and four patients of clinical stage III) with mean pre operative mouth opening of 5.2 mm required blind awake nasal intubation.

Though all the cases fall under either moderately difficult or difficult intubation category, no patients required

surgical exploration for airway maintenance. No significant post anaesthetic morbidities were observed in any of the technique of airway maintenance. Cases where anatomic restrictions limited fiberoptic guided laryngoscopy, awake blind nasal intubation was successfully attempted.

Conclusion

Oral submucous fibrosis has got its own specific limiting factor for intubation which demands careful pre operative evaluation to avoid failure to intubate and also to avoid anaesthesia related mortality and morbidity.

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