

Research Article

A comparative study of intubating condition and hemodynamic changes during blind nasal intubation versus fibre optic intubation in cases of temporo-mandibular joint ankylosis

Manas Mishra, **Mrugank Bhavsar***, Chinar Patel, Hetal Parikh, Rama Upadhyaya and M.H. Parmar

Department of Anesthesiology, SBKS MI & RC, Sumandeep Vidyapeeth, Piparia, Vadodara, Gujrat, India

*** Correspondence Info:**

Dr. Mrugank Bhavsar,
Department of Anesthesiology,
SBKS MI & RC, Sumandeep Vidyapeeth, Piparia, Vadodara, Gujrat, India
E-mail: mmb9587@gmail.com

Abstract

Background: Preservation of patient's spontaneous respiration and consciousness are most important recommendations in any one of difficult airway. Under adequate upper airway block, awake intubation could be performed through oral or nasal routes using fibre optic visualization or blind nasal techniques. This work was designed to compare the applicability of awake blind nasal intubation and that of fibre optic naso-tracheal intubation.

Materials and Methods: Sixty patients were distributed randomly into two groups of thirty patients each, Group A (fibre optic intubation) and Group B (Blind nasal intubation) After pre-operative evaluation, patients in both the groups were given lidocaine nebulisation 4% (5ml) and bilateral SLN and RLN blocks. Patients were intubated with fibre optic and blind nasal intubation techniques according to their groups. Tube placement in trachea was confirmed by ET_{CO}2. In both the groups, comparison regarding time taken for intubation, no of attempts of intubation, hemodynamic changes and side effects / complications were done.

Results: Intubation time in group A was significantly less than that of group B. (P<0.05). Intubation under first attempt was significantly higher in group A than group B. Haemo-dynamic parameters were also comparable. No major side effects/complications were observed.

Conclusion: We concluded that, both blind nasal and fibre optic tracheal intubation are of gold standard in patients with no or reduced mouth opening. However fibre optic nasal intubation requires less time and less number of attempts for intubation with minimal haemodynamic changes and have low incidences of complications.

Keywords: Temporomandibular Joint Ankylosis, Blind Nasal Intubation, Fibre Optic Intubation.

1. Introduction

Ankylosis of temporo mandibular joint is a clinical condition in which there is bony and/or fibrous fusion of mandibular condyle with glenoid fossa of temporal bone. Factors for this include trauma, local and systemic infections as well as systemic disease like rheumatoid arthritis, psoriasis and ankylosing spondylitis^{1,2,3}.

In these patients there is no mouth opening or mouth opening is grossly restricted which challenge anaesthetist for difficult airway management. Nasotracheal intubation is necessary in patients suffering from temporo-mandibular joint ankylosis. Various techniques are used for nasotracheal intubation.

Magill and Rowbothom pioneered blind nasal intubation in 1920 as an alternative to oral intubation at Queens hospital, Sidcup to facilitate surgical access for head and neck surgery performed by Gilles⁴. Immediate risk include nasal trauma, haemorrhage and submucosal passage of the tube in the nasopharynx, the latter sometimes leading to pharyngitis. The cuff may be damaged in blind nasal intubation.

Awake intubation with bonfils fibre scope is well tolerated and highly successful even if performed by operators in training and strengthens that it is one of the most promising devices to assist intubation in patients with difficult airway with minimal haemodynamic changes⁵. All these complications can be reduced by passage through the nasal cavity under vision such as awake fibre-optic intubation.

In this study we decided to compare the efficacy and safety of fibreoptic intubation over blind nasal intubation regarding cardiovascular changes, nasal trauma and intra operative complications at the time of induction.

2. Material & Methods

After approval of institutional ethical committee and written informed consent this prospective, randomized controlled, interventional clinical study was carried out. 60 patients were allocated randomly into two equal groups. Group A (n=30) fibre optic intubation and Group B (n=30) blind nasal intubation. Patients in the age range 20-60 years of ASA I or II were included. Patients with severe pulmonary, cardiac, renal or endocrine disease, with poor myocardial contractility or on potent antiplatelet, Patients with coagulopathy or on anticoagulants were excluded.

In pre-anesthetic work-up history of tobacco chewing and smoking, history of trauma, head injury and any other genetic malformations was taken into consideration. Local examination of nasal cavity was done to know the patency of both the nostrils and to exclude any sign of sepsis, previous injury or previous deformity, Mouth opening of the patients were assessed and neck movements for extension and flexion were assessed.

All the patients were prepared with nebulisation with lignocaine (4%, 5ml), nasal packing which included xylometazoline drops as

nasal decongestants. Only those patients, in which mouth opening allowed the use of gargles, were given 2% lignocaine viscous 15 to 20 minutes before the procedure.

Multipara monitor were applied to the patient and all the following parameters were monitored (HR, BP, SpO₂, EtCO₂). Premedication - Inj. Glycopyrrolate 0.2 mg along with inj ondansetron 4mg iv. No sedative drug was given to the patient. All Patients were given sniffing of “morning air” position. Under all aseptic and antiseptic precautions, bilateral superior laryngeal nerve block using 2 ml lidocaine 2% was given, and 3 ml of lidocaine 2% was injected through the cricothyroid membrane to block recurrent laryngeal nerve. Patients were pre-oxygenated with 100% oxygen for 3 minutes.

2.1 Fibre optic intubation technique (Group A)

In group A, the tip of the fiberoptic bronchoscope was fogged and introduced through the lumen of ETT, advanced until the glottic aperture seen and then through the vocal cords till carina was visualized. The fibroscope was fixed and the endotracheal tube was advanced after successful intubation, The fibro-scope was withdrawn.

2.2 Blind nasal intubation technique (Group B)

A proper size polyvinylchloride, cuffed, well lubricated endotracheal tube (ETT) was advanced into the oropharynx through the wider and more patent nostril. The distance from the nostril to the oropharynx (ear lobule) was estimated by aligning the tracheal tube against the side of the patient's face before tracheal intubation.

The ETT then advanced gently until slight resistance was felt. At that time, because the breath sounds could still be heard, the tip made contact with the vocal cords. While asking the patient to take deep breath, the ETT was advanced gently into the trachea. If breath sounds disappeared, the ETT was then withdrawn until breath sounds could be heard, and a second or further attempts were made till successful intubation was achieved.

In both the groups endotracheal tube placement was confirmed with capnography. Numbers of intubation attempts were recorded in both groups. Time taken to intubate the trachea was measured in seconds from the moment the tube was placed in the nostril until correct placement was confirmed by end-tidal carbon dioxide (ETCO₂).

HR, NIBP, SPO₂, ECG were recorded at baseline, after airway block, when ETT/FOB in nostril, after successful intubation and three minutes after intubation. If at any time during intubation the arterial oxygen saturation decreased below 90% or if cardiovascular variables deviated more than 25% from the base line values the patient was excluded from the study and procedure abandoned.

All patients were monitored for complications and side effects like nasal bleed, laryngospasm, bronchospasm, desaturation and severe patient discomfort and were treated accordingly.

Patients were induced with suitable induction agents according to the condition of the patient and were maintained on oxygen, nitrous oxide, isoflurane, non depolarizing muscle relaxants. Intraoperative vitals were monitored at 15 minute interval. At the end of surgery thorough oropharyngeal suction on patients were done and the patient were reversed and extubated Patients were shifted to recovery room with head-up position. Supplementary analgesia was given.

2.3 Statistical analysis

Data was collected, tabulated. Numerical variables were presented as mean & standard deviation (SD). Categorical variables were presented as frequency and percent. The Statistical software named SPSS11.0 was used for the analysis of the data and Microsoft Word and Microsoft Excel have been used to generate graphs, tables etc. As regard numerical variables; unpaired student – t test or was used whenever appropriate, for between-groups comparisons, while for categorical variables; chi – square test was used. A difference with significant level (P <0.05) was considered statistically significant.

3. Observation and Results

60 patients recruited for the study. The demographic data were comparable in both the groups which is statistically insignificant (p>0.05).

Table 1: Demographic Data

	Group A	Group B	P value
Mean Age	36 ± 8.241	37 ± 9.524	0.909
Sex ratio	M/F= 3.28	M/F= 6.5	-
Mean weight	59.0 ± 11.566	60.83 ±14.140	0.669
ASA grading I/II	19/11	11/18	-

Table 2: Comparison of time required in both the groups

Time required for successful intubation	Group	N	Mean	P-value
	Group A	30	125.53± 27.261	0.001
	Group B	30	177.50± 71.090	

Time for successful intubation was less in group A (125. 53 ± 27.261) as compared to group B (177.50 ± 71.090) which was statistically significant (P<0.05).

Table 3: Comparison of number of attempts in both the groups

Groups	Intubation	Number of attempts				Total
		1	2	3	4	
Group A	Count	25	4	1	0	30
	% within Group	83.3%	13.3%	3.3%	0%	100.0%
Group B	Count	18	8	3	1	30
	% within Group	60.0%	26.7%	10.0%	3.3%	100.0%
Total	Count	43	12	4	1	60
	% within Group	71.7%	20.0%	6.7%	1.7%	100.0%

Majority of patients were intubated in first attempt in both the groups. However Group B required two or more attempts in 40% of the patients

Table 4: Comparison of Complications in both the groups

Complications	Group A	Group B
Traumatic Nasal bleed	2 (6.67%)	7 (23.3%)
Bronchospasm	Nil	2 (6.67%)
Laryngospasm	Nil	Nil
Painful nose	Nil	Nil
Post-operative Sore throat	Nil	Nil
De-saturation during procedure	Nil	Nil

There was nasal bleed in two patients of group A (6.67%) and in seven patients in group B (23.3%). Two patients developed bronchospasm and coughing during procedure in group B. No other complications were encountered.

4. Discussion

Airway management is core for anesthesiologist. Deficiency in training or equipment as well as complications in this field are responsible for a significant proportions of anesthesia associated morbidity and mortality. Nevertheless the cannot ventilate cannot intubate scenario still occurs and regularly results in poor outcome such as permanent neurological deficit or even deaths. Therefore fibre optic intubation remains gold standard in patients with limited mouth opening and difficult airway because when applied correctly this technique never leads to point where patients' respiration is compromised⁶.

Haemodynamic responses, airway injuries, hypoxia, hypercarbia, bronchospasm and respiratory depression are well recognized hazards of patients during awake nasal intubation. Hemodynamic responses to tracheal intubation may cause adverse cardiovascular events in patients with or without cardiovascular disease⁷.

In our study, we have compared fibre optic and blind nasal intubation in cases of temporomandibular joint ankylosis in terms of time for intubation, number of attempts, hemodynamic changes and complication rate in both the groups. All patients of both the groups were pre-treated with lidocaine nebulisation and xylometazoline nasal packing 15 to 20 minutes before procedure. Bilateral superior laryngeal nerve and recurrent laryngeal nerve blocks were given inside the OT. Patients' compliance was good for tube tolerance in awake nasal intubations in both groups.

Kundra *et al*⁸ studied and evaluated the efficacy of upper airway anaesthesia produced by nebulised lidocaine against combined regional block (CRB) for awake fiberoptic nasotracheal intubation. In similarity to our study they concluded that both nebulisation and CRB produced satisfactory anaesthesia of the upper airway, but CRB provided better patient comfort and hemodynamic stability.

In our study, time required for intubation was higher in group B (177.50 ± 71.090 seconds) as compared to group A (125.53 ± 27.261 seconds) and was statistically significant (P<0.05) as shown in Table - 2. This can be attributed to more number of attempts taken for intubation in group B as compared to group A. In group A 83.3% patients were intubated in first attempt, 13.3% in second attempt and 3.3% in third attempt while only 60% patients in group B were intubated in first attempt. Hence, 40% of the patients in group B required two or more attempts as shown in Table-3.

Similar to our study, Blanco *et al*⁹ categorized 46 patients as difficult tracheal intubation, fibre optic laryngoscope was used successfully in 44 children, there were two failures. They intubated 37/40 (80.4%) of patients on I attempt and in 7 cases in II attempt. Their success rate was similar to our study. In contrast to our study Ashraf *et al*. (2005)¹⁹ studied 30 patients who were intubated by blind nasal and fibre optic techniques and concluded that mean time to intubate trachea using blind nasal was significantly less with fiberoptic techniques. They suggested that this was due to extra time taken for fiberoptic to be through the ETT lumen and to be adjusted to get better vision. They also studied that blind nasal intubation had 80% success rate as compared to fiberoptic intubation which had a success rate of 73.3% in first attempt. They concluded that both blind nasal and fibre optic tracheal intubation are valuable in awake sedated patients with no significant difference between the success rate of both techniques.

In our study, longer time taken for blind nasal intubation could be attributed to the fact that all blind nasal intubations were performed by different anesthesiologists', hence their skills were variable whereas fiberoptic intubations were done by single anesthesiologist who was trained for the procedure. This was again confirmed by Lee *et al*¹⁰ and Danzel *et al*¹¹ who suggested that blind nasal intubation is a technique learnt only by practice and easily mastered psycho motor skill.

The haemodynamic changes were comparable in both the groups (P>0.05) and were statistically insignificant. Andranik Ovassapian, *et al*¹² studied fibre optic nasotracheal intubation in patients posted for oral and maxillofacial surgery and concluded that flexible fibre optic endoscopy provides the opportunity for tracheal intubation in awake patients, producing minimal pressure and thus minimise stimulation of the oropharyngeal tissues, which thereby limits increases in MAP and HR. Smith *et al*.¹³ studied sixty patients who required fibre optic intubation. Almost one third of the patients suffered decrease in arterial oxygen saturation below 90% during the intubation and 17% patients had saturation below 80%. They concluded that episodes of desaturation were not related to the induction-intubation time or to the grade of laryngeal visibility at direct laryngoscopy.

Incidence of nasal bleed was more in group B (7 patients, 23.3%) than in group A (2 patients, 6.67%). Two patients in group B developed bronchospasm (6.67%) during procedure which was treated immediately with Inj. Deriphyline and Inj. Hydrocortisone 100mg and Inj

Dexamethaxone 8mg IV. No treatment was required for nasal bleed as shown in Table-4. Similar to our study, Gold *et al*¹⁴ performed blind nasal intubation in conscious patients and they have reported nasal bleed and sore throat as common complications.

Both awake fibre optic intubation and blind nasal intubation have been recommended for patients with difficult airway in whom anesthesia and/or relaxation could lead to cannot ventilate cannot intubate situation.¹⁵

5. Conclusion

We concluded that, both blind nasal and fibre optic tracheal intubation are of gold standard in patients with no or reduced mouth opening. However fibre optic nasal intubation requires less time and less number of attempts for intubation with minimal hemodynamic changes and have low incidences of side effects/complications.

However, blind nasal intubation can be a valuable alternative to awake fibre optic intubation in cases of difficult airway when expertise of fibre optic intubation is not available

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