Original Research Article

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Comparative Study of Conventional Versus Nasal-18 Method for Fiberoptic Nasal Intubation

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Abstract

Background: Fiberoptic nasal intubation (FONI) is an effective technique for establishing airway access in patients with both anticipated and unanticipated difficult airways. Utilization of fiberscope without the use of any facilitating techniques has proven to be a difficult task. In this study we compare conventional versus Nasal- 18 method for fiberoptic nasal intubation.

Aims and Objectives: To compare time for successful FONI in both the groups. To see procedure related adverse effects.

Method: A randomized controlled trial was carried out at our hospital. Fifty patients aged 20-60 years with American Society of Anesthesiologist (ASA) class I and II undergoing elective surgery under general anesthesia were allocated to two groups of fiber optic nasal intubation using either the Nasal -18 technique or the conventional method. In the Nasal-18 group, a nasal tube was gently inserted into the nasopharynx till mark 18, then a fiberscope was glided over it and advanced through the nasal cavity till the glottis could be visualized. Finally the nasal tube was rolled over the fiberscope. Time from the start of insertion of fiberscope into nares till visualization of vocal cord (T_1) and from visualization of vocal cord to complete intubation (T_2) was recorded. *Result:* T_1 values in nasal 18 and conventional group were 33.16±7.96 and 56.76±17.08 seconds respectively [$p < 0.05$]. T_2 duration were 35.16±9.83 and 31.20±6.89 seconds in nasal 18 and conventional group respectively [$p = 0.10$]. *Conclusion:* Nasasl- 18 method significantly reduces the time to visualize the glottis compare to conventional technique for FONI. This method should be added as a preferred technique to facilitate FONI.

Keywords: Fibre Optic Intubation; Fibre Optic Nasal Intubation; Conventional Method.

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Introduction

Fiberoptic nasal intubation (FONI) is an effective technique for establishing airway access in patients with both anticipated and unanticipated difficult airways. First described in the late 1960s, this approach can facilitate airway management in a variety of clinical scenarios given proper patient preparation and technique [1].

The conventional fiber-optic nasal intubation method could be divided into three steps which include the visualization of the glottis with fiberscope, passing the fiberscope through the glottis into trachea till carina and railroading the endotracheal tube over the fiberscope into the trachea. Few major problems are encountered with conventional method, i.e. visualization of the glottis, the entry point at the level of vocal cords, and insertion of the fiberscope into the trachea [2,3].

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To expedite the successful visualization of the glottis, different methods such as jaw thrust, lingual traction, fiber-optic assisting airway devices and laryngoscopy assisted fiber-optic intubation have been employed [4,5]. None of them has been found to be individually effective to improve the glottis visualization while the combination offers a better outcome on most occasions.

If choosing to pass the tube first, the anaesthetist is faced with the challenge of inserting the tube to an appropriate distance that allows for appropriate visualization of the laryngeal opening after the fibrescope is passed through the pre-placed tube. A reasonable approach is to insert the tube to approximately 18 cm. If breath sounds can be heard through the tube, it is likely placed above the laryngeal inlet, and ready for insertion of the bronchoscope.

The goal of the Nasal-18 or the tube-first approach is to achieve Greater speed of intubation with potentially more successful intubation Rates [6,7]. This study was designed to ascertain whether the Nasal-18 is superior to the Conventional fiber-optic nasal intubation, as judged by visualization of vocal cord (T_1) and from visualization of vocal cord to complete intubation (T_2).

Method

This randomised study was conducted in medical college and research institute after obtaining approval from the institutional research and ethics committee. Patients with age between 20 to 60 years belonging to the ASA grade I and II scheduled for an elective surgery under general anaesthesia were included in the study. Patients with anticipated difficult airway, pregnancy, contraindication for nasal intubation, maxillofacial trauma and known allergy to anaesthetic drugs were excluded from the study.

The patients were randomly allocated into two groups of fiber optic nasal intubation using either the Nasal-18 or the conventional method based on a table of randomization.

In the conventional group, the fiberscope was inserted into the nasal cavity via the nostril and advanced through it till the vocal cords were visualized. Then, the nasal tube, which had been mounted on the scope before hand, was glided over the scope and advanced through the vocal cords into the trachea. Whereas in the Nasal-18 group, the tube-first approach, the nasal tube was inserted into the nasal cavity and advanced through it till the mark 18 reached at the level of alae of the nose. Here the tube tip stands just above the larynx and breath sounds are audible through the Tracheal tube. With additional anesthesia directed at the larynx (topical Lignocaine), run the long scope through the tube, visualize the larynx, and pass between the cords towards the carina. The final depth of insertion of the nasal tube should be 26–28 cm at the nare, establishing its correct placement in the trachea as confirmed by bilateral audible breath sounds.

The routine pre-anaesthetic evaluation was performed on the day before surgery. After obtaining written and informed consent, all the patients were premedicated with aspiration prophylaxis and anxiolytics as per departmental protocol. In the pre-anaesthetic room, an intravenous infusion was initiated, and glycopyrolate (0.2 mg) was administered.

Standard monitors including pulse oximetry, capnography, electrocardiography, and non-invasive blood pressure measurement were performed prior to the administration of intravenous medications.

After instillation of phenylephrine drops (3 drops in each nostril), lidocaine spray (10%) and xylocaine 4% Nebulisation were used to anaesthetize airway passage. In addition to this like bilateral superior laryngeal nerve block and transtracheal block were perfomed. All the patients received Inj. fentanyl 2 μg/kg, Inj. Midazolam 0.02 mg/kg intravenously.

Nasal intubation with a flexometalic armoured tube no.7 or 7.5 were used. Two experienced anesthesiologists in fiber-optic nasal intubation were involved in fiberoptic intubation of patients, and each anesthesiologist performed both techniques. The karlz storze fibre optic scope was used during this procedure. After dipping the fiberscope into the lubricating jelly, we inserted it into the nasal cavity until it reached to the vocal cords.

During this period, patients were awake and co-operated well with the anesthesiologists. Time was recorded in seconds, from the start of insertion of fiber-optic laryngoscope in the nares till visualization of vocal cords (T_1) and from visualization of vocal cords to successful intubation (T_2). We did not use other facilitating techniques like head flexion and jaw thrust. A time period of more than 180 s for the procedure or inability to intubate was considered as failed intubation.

Statistical analysis was performed using the SPSS version 16.

Result

A total of 50 patients who were planned for elective surgery under general anaethesia were randomised in the study. There were not statistically significant difference between the groups regarding age, gender, BMI, mallampatti classifiction and ASA class [Table 1]. There was no exclusion of patients due to any procedural problem in either group.

We performed independent sample t–test [unpaired] between conventional and nasal 18 groups. The results show T_1 [33.16±7.96] is shorter in the nasal 18 group as compare to the conventional group [56.76±17.08] which is significant [p< 0.005]. T_2 duration was 35.16±9.83 and 31.20±6.9 in nasal 18 and conventional group respectively which is not significant [p< 0.106] [Table-2].

Discussion

Fibre optic intubation can be done orally or nasally. The nasal approach is preferred in patient with a large tongue, limited mouth opening, tracheal deviation or jaw abnormalities [6].

The major reason for difficulty in advancing an endotracheal tube over a fiberscope is considered to be deviation of the course of the tube from that of the fibrescope towards the epiglottis, arytenoids cartilage, pyriform fossa or esophagus [8,9,10].

Lee et al concluded that optimal length of pre-inserted tracheal tube for nasal fiberoptic intubation can be predicted using a newly developed formula with three patient parameters, namely, height, the NM distance, and weight. Application of this equation in the clinical setting should facilitate nasal fiberoptic intubation [11].

If we choose to pass the tube first, how much tube should be inseretd to visualized the laryngeal inlet is a challenge. A reasonable approach is to insert the tube to approximately 16-18 cm while directing the ETT toward the contralateral nipple [7].

Flexometalic armored tube and insertion of predetermined length of tube upto 18 mark at ala nasi significantly improved the success rate of fiber optic intubation in our study.

We choose 18 number because when 18 mark tube is reached at the nasal alae the endotracheal tube has sufficiently advanced to reach a point close to vocal cord [7,11].

Nasal bleeding and oral secretion may obscure vision in conventional method while in nasal 18 method, the tube act as a passage to guide the fiberscope to visualize the vocal cord which avoid this problem. Hence T_1 was shorter in nasal 18 method compare to conventional method.

Nasal- 18 method for fiber optic intubation is relatively simple, comfortable and easy technique for the learner. Early visualization of glottis and minimal twisting of fiberscope increase the confidence of anesthesiologist.

Mohammad et al concluded that the nasal 18 method reduces the time needed for successful fiber optic nasal intubation [7]. In this study we can say nasal 18 method allowed to perform fiberscopy with greater speed and comfort. Although we had limitation of number of patients. Hence the same

Table 1: Demographic parameters

Parameters	Both groups [n=50]
Age [years]	34.9 ± 11.8
Gender [n] male: female	21/29
BMI [kg/m^2]	22.6 ±1.9
ASA physical status [n]: I/II	34/16
Mallampatti classification [n]: I/II	18/32

Data are expreesed as mean ± SD. SD- standard deviation
BMI: Body mass index, ASA: American Society of Anaesthesiologist

Table 2: Time duration in conventional and nasal 18 techniques

Time both groups	Conventional	Nasal 18	P value
T_1 [sec.]	56.76±17.08	33.16±7.96	0.000
T_2 [sec.]	31.20±6.9	35.16±9.83	0.106

T_1= time from the start of insertion of the fibre scope into nares till visulisation of vocal cords.
T_2= time from visulisation of vocal cords to complete intubation

study should be done with large number of patients to confirm the result. This technique should be part of the fiberoptic nasal intubation.

Conclusion

We can state that Nasal -18 method is easy for learner with greater speed of intubation as compare to conventional method.

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