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CONVENTIONAL NASOTRACHEAL INTUBATION VERSUS RED RUBBER CATHETER-GUIDED NASOTRACHEAL INTUBATION- RANDOMIZED STUDY

Anaesthesiology

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ABSTRACT

Introduction: Various techniques have been formulated and suggested to reduce the trauma of nasotracheal intubation. Hence the evaluation is done between Conventional Nasotracheal intubation versus red rubber catheter-guided nasotracheal intubation.

Methods: Paediatric age group presenting for elective surgery were randomized to undergo red rubber catheter-guided nasotracheal intubation or to have the nasotracheal tube alone inserted after administering of general anaesthesia and paralysis of patient with vecuronium. The nares were prepared with topical vasoconstrictor. The nasotracheal tube was softened with lubricant jelly. In the catheter guided group, the nasotracheal tube tip was fitted to the trailing end of the red rubber catheter, and the two were advanced together. The red-rubber catheter and the two were advanced together. The red rubber catheter was retrieved from the nasopharynx, disconnected, and removed. In the other group, the nasotracheal tube was advanced blindly into the nasopharynx. In both the groups, intubation was successfully completed during direct laryngoscopy using Magill forceps. A observer who is blinded will swab the pharynx and rated the severity of bleeding.

Results: Age, weight, difficulty of intubation, and snoring history, are same in two groups. Anticipated bleeding was lower using the red rubber catheter technique (10vs.29%,P=0.013), which took longer time interval to perform(74vs.56 s,P=0.02)

Conclusions: Although the incidence of bleeding in both groups was similar, severity of bleeding was reduced in the catheter guided group during nasotracheal intubation. Use of a red rubber catheter may reduce the trauma associated with nasotracheal intubation.

KEYWORDS

Conventional Nasotracheal Intubation(CNTI); Advancement of nasotracheal tube(ANETT)

INTRODUCTION:

The oral cavity surgical procedures often require nasotracheal intubation (CNTI) to facilitate surgical access. The chances for trauma are relatively greater with CNTI than with orotracheal intubation, because the endo tracheal tube passes through the narrow nasal passages.

Forceful advancement of the nasotracheal tube (ANETT) can traumatize nasal passages, causing bleeding, avulsion of a turbinate, bacteremia, or even recto pharyngeal rupture and dissection. In prospective series, the incidence of bleeding is very high, ranging from 18 to 77% even in the senior experienced hands.(1,6)

The intermediate CNTI, usually performed blindly as the ANETT is passed from the naris to the nasopharynx, is particularly traumatizing. Many suggestions have been made to reduce the potential for trauma at this juncture. The only prospective trials have been to document the efficacy of applying lubricant jelly and thermal softening of tube before insertion of the endotracheal tube(5,6) and the use of vasoconstrictor oxymetazoline drops(7).

A randomized, controlled, blinded study was performed to determine the incidence of bleeding with controls versus a technique that uses a red-rubber catheter passed in advance of the endotracheal tube (8).

METHODS:

After SVIMS institutional approval and informed parental consent, we enrolled paediatric age group from 4 to 10 years of age presenting for oral surgeries during general anaesthesia for which CNTI was planned.

Exclusion criteria – Children with a history of latex allergy, recurrent epistaxis, nasal polyposis, risk of gastroesophageal reflux, or any contraindication to CNTI, such as previous chronic sinusitis, palatoplasty, abnormal coagulation status, cyanotic heart disease, use of anti-inflammatory medications, or children with difficult or potentially difficult airway.

Demographics recorded were age, sex, and weight. Paediatric age group patients received a standardized anesthetic agents, including midazolam premedication (0.5mg/kg), topical vasoconstrictor 4-5drops of oxymetazoline in each naris, preoxygenation, and maintenance was done with isoflurane. A nasal RAE uncuffed tube with a Murphy's eye was selected for the patient according to the formula (age/4)+3.5 (5)

The patients who were randomized by a computer-generated random table out of two groups, using sealed envelopes that were opened before the induction of anaesthesia. In the catheter guided group, the red rubber catheter was advanced into the nasopharynx. The trailing end of this catheter was fitted around the tracheal tip of the ANETT, and the two were advanced together through the nasopharynx. The red rubber catheter was withdrawn from the oropharynx using Magill forceps, disconnected from the ANETT, and removed. The intubation was then completed during direct laryngoscopy using Magill forceps. In the control group (ANETT group), the ANETT was advanced into nasopharynx, and intubation was completed during direct laryngoscopy with the Magill forceps. The number of attempts through each naris was recorded, as was the level of training of the anesthesiologist performing the intubation, and the assessment of the difficulty of intubation versus other nasal intubation on a scale from 1 to 10.

The surgeon who will be performing surgery will remain outside operating room during intubation and acted as the blinded observer to assess bleeding, using the following method to grade bleeding in the pharynx immediately after intubation. Using Magill forceps and folded 4X4-in gauze, the posterior pharynx is swabbed to assess the blood loss.

Collection of Data and statistical analysis:

Estimation of Sample size was based on a previous report of a 33% incidence of bleeding(2). The current study results were assumed to be clinically significant if the rate of bleeding would have reduced by two thirds. Estimation of sample, based on α of 0.05 and a β of 0.2 to detect a reduction in bleeding from 33 to 10% was 49 patients per group. The data are presented as median (25^{th} percentile, 75^{th} percentile). Ordinal values and nonparametric continuous data were compared using Wilcoxon rank sum test, and proportions were compared using the Fisher exact test.

RESULTS:

Both the groups were similar with respect to age, weight, and history of previous tonsillectomy, recent cold, or snoring (Table 1). The table 1indicates, intubation with the red-rubber catheter method was associated with a significant reduction in obvious bleeding. The control intubations took shorter time when compared to red –rubber catheter technique, although there was no difference between groups in the self-rated difficulty of performing the intubations, although there was no difference between groups in the self-rated difficulty of performing the intubation. The intubation attempts were more in control group. Both the nares were alternatively attempted

significantly in the control group. The presence of particulate matter was noted in four patients, two in each group. Bleeding was severe enough to require suctioning in addition to throat swabbing in five patients. In one patient, the leak around the ANETT was large, necessitating a change of tube; study endpoints were collected before this tube was changed. Children who had undergone previous tonsillectomy or adenoidectomy(10 patients) had the same incidence of bleeding during intubation as those who had a history of recent upper respiratory infection (within the preceding 3 weeks) were not a greater risk of bleeding during CNTI (p=0.35)

Table 1: Comparison of intubation techniques

Comparison of	ANETT only	Red rubber catheter value	P
Intubation	N=51	N=52	
Female	23 (45%)	21 (40%)	0.69
Age (yr)	5.3(4.3,6.7)	5.3 (4.6,6.6)	0.81
Weight (kg)	20 (18,23)	20 (17,23)	0.81
Snoring history	23 (45%)	20 (38%)	0.55
Recent URTI	15 (29%)	15 (29%)	1.0
Intubation with assistance	24(47%)	29(56%)	0.43
Intubation attempts	1(1,2)	1 (1.1)	0.0018
Both nares entered	9 (18%)	1 (2%)	0.008
Difficulty rating	1 (1,3)	2 (0.3,3)	0.76
Time to intubate (s)	59 (42,88)	74 (56,87)	0.045
Obvious bleeding	15 (29.4%)	5 (9.6%)	0.013

Values are Median (25^{th} ,75^{th} percentile) or N (%) as appropriate ANETT only = blind nasal advancement of nasotracheal tube; red rubber catheter = nasal advancement of red rubber catheter, with nasotracheal tube attached to trailing end of catheter; recent URTI = Upper respiratory infection within preceding 3 weeks.

DISCUSSION:

Using a red rubber catheter to guide a softened ANETT, we found a decrease in severity of nasopharyngeal bleeding versus using the softened ANETT alone. There were few more attempts during intubation and it took longer time using a red-rubber catheter technique.

Trauma is inevitable when a larger tube is used. Several suggestions were made to facilitate passage of the tube smoothly; the suggestions were divided into three groups. (I) A tube passed through the lumen of the ANETT and beyond its tip prevents blockage of the ANETTT and beyond its tip prevents blockage of the ANETT lumen, helps to part the tissues for its passage, and if a suction catheter is used which can clear the secretions encountered (4). The resulting step in diameter from the inner catheter to the ANETT presents a rough edge at the advancing tip that could traumatize the nasal passage. (II) The nasal passage can be prepared by passing a series of nasal airways supposedly to dilate the passages(9), although this consumes time and resources which can increase chances of trauma. (III) The distal end of the endotracheal tube can be covered with a finger tip of a rubber glove to minimize trauma, but this may poses the risk of a misplaced foreign body(10). Of all various suggestions made the technique using a red-rubber catheter fitted over the end of the ANETT(8) proved to be a simple and atraumatic technique.

There were few suggestions made for reducing trauma during CNTI have been made. A prospective controlled study showed a significant reduction in bleeding when the tube was lubricated and softened thermally(5,6) Secondly, there was fluctuation in nasal diameters in cycles(11), it is helpful to select the most patent naris before intubation by comparing airflow or probing with a swab used to apply topical vasoconstrictor oxymetazoline(1,2).

The randomized study results may have been based to the Hawthrone effect, i.e. a change in behavior due to an awareness of being observed(14). The anesthesiologist who is performing intubation becomes more cautious than usual and this effect is probably the same for both groups and would thus influence the overall rate of bleeding. The study was chosen to this paediatric age group to signify the age range when adenoidal hypertrophy is likely to be common. Hence, we used muscle relaxation to cease the patient movements to prevent nasal trauma during intubation. When CNTI is used for difficult airways it is important maintain spontaneous ventilation, hence we specifically excluded difficult airways. Our method of assessing bleeding was simple and has its own drawbacks. It is difficult to ensure that the technique of swabbing the pharynx was consistent, and it would be difficult to assess bleeding during emergence from anesthesia in children. Blood in the airway can make easy intubation difficult, and which can increase in risk of aspiration of blood. If this technique can decrease bleeding, this may help to increase in patient safety. Minor drawbacks to this technique may include additional disposable items and exposure to latex.

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