



A COMPARATIVE STUDY BETWEEN REGULAR PVC ENDOTRACHEAL TUBES AND THERMALLY SOFTENED ENDOTRACHEAL TUBES FOR THE TIME TAKEN FOR NASOTRACHEAL INTUBATION.

Anesthesiology

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ABSTRACT

AIM: to compare the time taken for nasotracheal intubation with a regular pvc endotracheal tube at room temperature and thermally softened endotracheal tube

TYPE OF STUDY: 60 patients were randomized into two groups. Group 1 regular pvc ET tube

Group 2 : Thermally softened ET tube

METHODS: Group 1 patients were intubated with regular ET tube whereas group 2 patients were intubated with thermally softened ET tube nasotracheally when all other parameters were kept identical.

RESULTS: Mean time for intubation in group 1 is 43.10 sec and the Mean time for intubation in group 2 is 42.7 sec which is statistically insignificant. The incidence of bleeding in group 1 is statistically significant.

CONCLUSION: Thermally softening an Endotracheal tube with hot water around 50 degrees will not increase the time taken for intubation but it significantly reduces the incidence of bleeding.

KEYWORDS

Nasotracheal , Endotracheal tube, Thermosoftening

INTRODUCTION:

Surgeries involving oral cavity, Dental, ENT and Oncosurgery require general anaesthesia with nasotracheal intubation. For nasotracheal intubation specially made tubes and preformed tubes like nasal RAE tubes are available. These tubes are soft and easy to introduce through nostril. But most of the time for nasotracheal intubation we use regular pvc endotracheal tube due to non availability of special tubes.

With the regular pvc tubes some use the tube as such in room temperature. Some anaesthesiologist soften the et tube by soaking the ET tube in hot water. This is done to reduce the injury to nasal mucosa and the incidence of bleeding. Those who use ET tubes at room temperature feel that softening the ET tube makes it difficult to manipulate the ET tube thereby increasing the time to intubate.

AIM OF THE STUDY:

To compare the time taken to intubate nasotracheally with a regular ET tube and a thermally softened ET tube. Also we compare the incidence of bleeding noticed during laryngoscopy.

MATERIALS AND METHODS:

This study was done in ENT operation theatre, Government Medical College, Omandurar Government Estate, Chennai after getting ethical committee approval and consent. 60 patients belonging to ASA I & II who were to undergo elective ENT surgeries were chosen. Among them 30 patients came for tonsillectomy and 30 patients came for mastoidectomy for CSOM. We selected mastoidectomy patients to avoid the bias caused by adenoids in tonsillectomy patients. In each group 15 tonsillectomy patients and 15 mastoidectomy patients were allotted.

STUDY DESIGN:

This study was done as prospective randomized trial. Patients were allotted to one of the two groups randomly.

Group 1 : Regular pvc Endotracheal tubes were used.

Group 2: Thermally softened Endotracheal tubes were used.

Inclusion criteria:

1. Patients of physical status ASA I and II
2. Normal biochemical and haematological parameters
3. Mallampatti class 1 and 2

Exclusion criteria:

1. Known bleeding diathesis

2. Known nasal septal deviation

3. Huge adenoids

4. Difficult airway including mallampatti 3 and 4

5. Turbinate hypertrophy.

MATERIALS AND METHODS

Endotracheal tubes

Magill forceps

Digital thermometer

Hot water

Suction apparatus

Emergency drugs.

Methods

Patients of both the groups were given general anaesthesia with standard drugs as per the body weight. After inducing the patients with propofol we use atracurium for muscle relaxation to enable nasotracheal intubation.

For group 1 patients we use regular ET tube in room temperature.

For group 2 patients we use regular ET tube softened by soaking in hot water which is kept at 50 degrees which is ensured by a digital thermometer. The Thermometer we use has a range of -50 to 300 degree Celsius.

The time taken for intubation is noted for each patient from the beginning of introducing the tube through the most patent nostril to placing the ET tube in the trachea.

In group 2 patients where we use thermally softened ET tubes we soak only 2/3 rd of the tube from the patient end to make it soft. The machine end of the tube is not soaked to keep it firm so that we can manipulate the tube when we introduce through nostril.

We also notice for the bleeding in the oropharynx when we do laryngoscopy for intubation. The bleeding was given 3 grades depending on the severity.

Grade 0 : No bleeding

Grade 1 : Mild trickling

Grade 2 : Significant bleeding which needs suctioning before proceeding with intubation.

Observation and Results:

The time for intubation for each patient in each group is noted.

The oropharyngeal bleeding noted during laryngoscopy is graded for each patient in both the groups.

Age distribution

In Tonsillectomy cases age distribution ranges from 7yrs to 64 years . The mean age for tonsillectomy patient is 16.83 years.

In mastoidectomy patients the age distribution ranges from 7 years to 62 years. The mean age of mastoidectomy patients is 32.8 years.

Age Distribution

Tonsillectomy - Table – I

Up to 10	7
11-20	15
Above 20	8

Mastoidectomy - Table – II

Upto 20 years	12
21-40	8
Above 40	10

In tonsillectomy 8 patients were male and 22 patients were female. In mastoidectomy 11 patients were male and 19 patients were female.

TEST STATISTICS

For intubation timing we use two sample independent t test.

Table – III

Two-Sample Independent t Test

Input Data				
Two-sided confidence interval	95%			
	Sample size	Mean	Std. Dev.	Std. Error
Regular ET	29	43.1	5.53	
Soft ET	29	42.7	3.86	

Result	t statistics	df	p-value ¹	Mean Difference	Lower Limit	Upper Limit
Equal variance	0.328608	62	0.7436	0.4	-2.03325	2.83325

For incidence of bleeding we use chi square test.

Table – IV

Single Table Analysis

Var 2			
RegularSoft			
No bleeding	6	18	
Var 1 Mild	16	11	
sig bleeding	7	0	
	29	29	

Table – V

Chi Square for R by C Table	
Chi Square=	13.93
Degrees of Freedom=	2
p-value=	0.0009463

DISCUSSION:

Nasotracheal intubation is done for tonsillectomy, dental surgery and in oncosurgery involving oral cavity. In most of the cases we use regular pvc tubes for it. But using the ET tube as such causes trauma to the nasal mucosa and bleeding mostly. In some patients it causes significant bleeding that we have clear the blood before proceeding with intubation. If the ET tube is softened with hot water, intubation becomes less traumatic and reduces the incidence of bleeding.

But some anaesthesiologist don't prefer to soften the tube saying that the tube becomes very soft so that it becomes difficult to manipulate the tube to place it in trachea. In our study we softened the ET tube with hot water kept at 50 degree temperature. In our pilot study we found that this temperature is good to soften the endotracheal tube when it is soaked for about 30 seconds.

Figure -I



Here we placed only 2/3rd of the tube in hot water making only the patient end soft. It is not mandatory that water should be kept at 50 degrees only. Individual can use hot water at a temperature which is comfortable for them.

As believed by some softening the ET tube does not increase the time for intubation. If routinely practised it will reduce the incidence of bleeding and its complication.

In our study in the regular ET tube group, in one case we had a rare complication of mucosal dissection and the ET tube goes submucosally. So we need to remove the tube and put the tube through the other nostril resulting in significant increase in intubation time. So we excluded that patient from study.

CONCLUSION:

Time taken for intubation is almost comparable in both the groups. Softening the et tube does not increase the intubating time.

At the same time softening reduces the incidence of bleeding significantly. Incidence of significant bleeding is nil for soft ET tube in our study.

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