

Is Stylet Use During Intubation Associated with Post Intubation Complications

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Abstract

Objective: The basic objective is to evaluate the impacts of placing stylet during tracheal intubation on the post-operative pharyngeal pain in anesthetized patients. **Methodology:** This randomized control trial was conducted in the department of Anesthesia and ICU, Ch. Pervaiz Ellahi Institute of Cardiology and Nishtar Hospital Multan from May 2017 to December 2018. All these patients were divided into two groups group S (stylet group) and group C (control group) by lottery method. All the data was entered and analyzed by the computer software SPSS version 23.2. **Results:** A total number of 100% (n=386) patients were included in this study, both genders. Gender distribution showed that there were more males than females i.e. 56.2% (n=217) and 43.8% (n=169) respectively. The main outcome variables of this study were pharyngeal pain, airway maintenance and sore throat. It was also noted that group (S) showed easy airway maintenance in 95.9% (n=185) patients. It was observed that, in group (S), 63.2% (n=122) patients were complained from sore throat and 67.4% (n=130) were complained about pharyngeal pain. While on the other hand, in group (C), only 8.3% (n=16) patients were complained about sore throat and 11.4% (n=22) were complained about pharyngeal pain **Conclusion:** Use of stylet during endotracheal intubation decreases the incidences multiple attempts and make the airway maintenance easy for the anesthetist but on the other side it have complications like sore throat and post intubation pharyngeal pain than those patients in which stylet was not used.

Keywords: Pharyngeal pain, Tracheal Intubation, Stylet, Post-operative.

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Introduction

Tracheal intubation is very well known and useful procedure in the general anesthesia(1). It is usually simply referred as to place the flexible plastic tube into the trachea (windpipe) to maintain the open air passage(2, 3). In 1979 Ketz and Berci(4) used a term optical stylet for a straight and rigid device which is helpful in Endotracheal intubation. This is very helpful in early airway maintenance. Size of stylet always constant and it should be equal to size of minimum endotracheal tube(5).

Stylets are designed to allow oxygen passage, route for drug administration and suction facility because as diameter of stylet increases size of tracheal tube shortens(6). In difficult airways it is very helpful to reduce number of attempts for intubation and easy airway management(7). Efficacy of styles and anesthetist satisfaction about has been reported in many studies, but at the same time it was reported that light obstruction with secretion increase the number attempts. Patients should be asked for coughing and huffing properly in pre intubation time to avoid hurdles due to secretions.

Contrary to this, pharyngeal pain and sore throat are very common and usual complaints of post-intubation. One of the major contributing factors is the tracheal intubation that could cause the pathological changes, trauma and nerve damage of trachea and air passage as well(8). It has following important uses: it guides the tracheal tube directly to the larynx, allows the tracheal tube to pass easily, can be stiffened to help tracheal tube to pass through trachea. Shape of stylet can be modified to facilitate the tracheal intubation(9).

In a study Nobuyasu et al (10) suggested that the stylet use in the tracheal intubation is very contributing in the post-operative pharyngeal pain. According to this, there was significantly. Raised post-operative pharyngeal pain in the stylet group (10/20 patients) than in the control group (2/20 patients) (P = 0.013). Similarly most of the previous studies are not in favor of stylet use during the endotracheal intubation but many previous studies also suggest the use of stylet.

Few studies have been conducted on this topic before and almost all were on a small sample size. Another gap in previous studies is that they were conducted on single aspect of device benefits or or complication. But in our study we evaluate both aspect and our study was on a large sample size.

Methodology

This randomized control (RCT) was conducted in the the department of Anesthesia and ICU, Ch. Pervaiz Ellahi Institute of Cardiology and Nishtar Hospital Multan from May 2017 to December 2018.. After taking the

ethical approval from the institutional ethical committee of hospital study was started. Informed consent from the particular subjects was also taken. After this we enrolled total number of 386 (100%) patients. Sample size was calculated from WHO's website sample calculation for two proportions with following figures CI 95%, Power, 80%, P1 50% and P2 6.66 (10). Patients need endotracheal intubation with help of stylet, from age group 15-45 years of both genders were included in the study, while patients with congenital abnormalities, ENT, oral surgery, facial injury, and above, and those in which endotracheal not placed for general anesthesia were excluded from study.

Patient meeting the endotracheal criteria were Intubating with endotracheal tube of standard size calculated 7 ID for females and 7.5 ID for males by anesthesiologist having an experience of at least 5 years. After placement of endotracheal tube to the patient, cuff was inflated with air by auscultating trachea with minimal audible air leak. Standard conducts of anesthesia with monitoring as suggested were observed. After extubation patients were interviewed about their pharyngeal pain and sore throat when gain the orientation and consciousness. Pharyngeal pain was graded as Grade 0 – No pain, Grade 1 – Mild Pain, Grade 2 – Moderate pain, Grade 3 – severe pain as described by the patients.

All variables like, Age, Gender, BMI, easiness in airway maintenance, Pharyngeal pain and sore throat were noted in the Pre- designed Performa and analyzed by using SPSS 23.2 V. Mean + SD calculated for quantitative variables and frequency percentages for qualitative variables. P value 0.05 was considered as significant.

Results

A total number of 100% (n=386) patients were included in this study, both genders. Gender distribution showed that there were more males than females i.e. 56.2% (n=217) and 43.8% (n=169) respectively. The mean age and BMI of the patients was 35.03±9.82 years and 28.45±4.60 BMI respectively. The distribution of Mallum Patti grades (1-4) showed that 33.4% (n=129) patients had grade 1, 17.1% (n=66) had grade 2, 38.1% (n=147) had grade 3 and only 11.4% (n=44) patients had grade 4.

When patients were categorized into different age and BMI categories, it was noted that majority of patients i.e. 52.3% (n=202) were aged from 15 to 35 years and 47.7% (n=184) were aged from 36 to 63 years. 56% (n=216) patients were BMI from 22 to 28 and 44% (n=170) patients were BMI from 29 to 36 respectively.

These 100% (n=386) patients were divided into 2 groups, 193 in each, i.e. control (C) and stylet (S). The mean age and BMI of the patients of control group was 35.16±9.98 and 32.46±2.76 respectively, while the mean age and BMI of the patients of stylet group 34.91±9.69 and 24.44±1.58 respectively.

The main outcome variables of this study were pharyngeal pain, airway maintenance and sore throat. It was observed that, in group (S), 63.2% (n=122) patients suffered from sore throat and 67.4% (n=130) suffered from pharyngeal pain. It was also noted that group (S) showed easy airway maintenance in 95.9% (n=185) patients and difficult airway maintenance in 4.1% (n=8). While on the other hand, in group (C), only 8.3% (n=16) patients suffered from sore throat and 11.4% (n=22) suffered from pharyngeal pain. It was also observed that group (C) showed easy airway maintenance in 78.2% (n=151) patients and difficult airway maintenance in 21.8% (n=42) patients.

When Chi-Square was applied to check the association, it was noted that sore throat was significantly associated with stratified age, BMI, Mallum Patti grades and groups with p-values 0.000, 0.000, 0.000 and 0.000 respectively. But it was not associated with gender with p-value 0.344.

Similarly, when Chi-Square was applied to check the association, it was noted that pharyngeal pain was significantly associated with stratified age, BMI, Mallum Patti grades and groups with p-values 0.000, 0.000, 0.000 and 0.000 respectively. But it was not associated with gender with p-value 0.073.

Similarly, when Chi-Square was applied to check the association, it was noted that airway maintenance was significantly associated with stratified age, BMI, Mallum Patti grades and groups with p-values 0.000, 0.000, 0.000 and 0.000 respectively. But it was not associated with gender with p-value 0.735.

Table- 1 Demographic Variables:(n=386)

Characteristics	Frequency	Percentage (%)
Gender		
Male	217	56.2
Female	169	43.8
Total	386	100.0
Stratified Age		
15-35years	202	52.3
36-63 years	184	47.7
Total	386	100.0
Stratified BMI		
22-28	216	56
29-36	170	44
Total	386	100.0
Mallum Patti Grades		
Grade 1	129	33.4
Grade 2	66	17.1
Grade 3	147	38.1
Grade 4	44	11.4
Total	386	100.0
Descriptive Statistics		
	Mean	S.D
Age in years	35.03	9.82
BMI	28.45	4.60

Table 2: Mean±S.D in Groups

Groups	variables	Mean±S.D
Group (S)	Age in years	34.91±9.69
	BMI	24.44±1.58
Group (C)	Age in years	35.16±9.98
	BMI	32.46±2.76

Table 3:

Pharyngeal Pain			
Groups	Presence	Frequency	Percent
Group (S)	Yes	130	67.4
	No	63	32.6
	Total	193	100.0
Group (C)	Yes	22	11.4
	No	171	88.6
	Total	193	100.0
Sore throat			
Group (S)	Yes	122	63.2
	No	71	36.8
	Total	193	100.
Group (C)	Yes	16	8.3
	No	177	91.7
	Total	193	100.0
Airway Maintenance			
Group (S)	Easy	185	95.9
	Difficult	8	4.1
	Total	193	100.0
Group (C)	Easy	151	78.2
	Difficult	42	21.8
	Total	193	100.0

Table No. 4
Association of Pharyngeal Pain with Effect Modifiers
(n = 386)

Effect Modifiers		Pharyngeal Pain		Total	P-value
		Yes	No		
Stratified Age	15-35 years	127	75	202	0.000
	36-63 years	25	159	184	
Total		152	234	386	
Stratified BMI	22-28 BMI	140	76	216	0.000
	29-36 BMI	12	158	170	
Total		152	234	386	
Gender	Male	94	123	217	0.073
	Female	58	111	169	
Total		152	234	386	
Mallum Patti grades	1	8	121	129	0.000
	2	14	52	66	
	3	25	122	147	
	4	32	12	44	
Total		152	234	386	
Groups	Group (S)	130	63	193	0.000
	Group (C)	22	171	193	
Total		152	234	386	

Table No. 5
Association of Sore Throat with Effect Modifiers
(n = 386)

Effect Modifiers		Sore Throat		Total	P-value
		Yes	No		
Stratified Age	15-35 years	121	81	202	0.000
	36-63 years	17	167	184	
Total		138	248	386	
Stratified BMI	22-28 BMI	132	84	216	0.000
	29-36 BMI	6	164	170	
Total		138	248	386	
Gender	Male	82	135	217	0.344
	Female	56	113	169	
Total		138	248	386	
Mallum Patti grades	1	27	105	129	0.000
	2	33	33	66	
	3	38	109	147	
	4	40	4	44	
Total		138	248	386	
Groups	Group (S)	121	71	193	0.000
	Group (C)	16	177	193	
Total		138	248	386	

Table No. 6
Association of Airway Maintenance with Effect Modifiers
(n = 386)

Effect Modifiers		Sore Throat		Total	P-value
		Easy	Difficult		
Stratified Age	15-35 years	197	5	202	0.000
	36-63 years	139	45	184	
Total		336	50	386	
Stratified BMI	22-28 BMI	208	8	216	0.000
	29-36 BMI	128	42	170	
Total		336	50	386	
Gender	Male	190	27	217	0.735
	Female	146	23	169	
Total		336	50	386	
Mallum Patti grades	1	122	7	129	0.000
	2	55	11	66	
	3	133	14	147	
	4	26	18	44	
Total		336	50	386	
Groups	Group (S)	185	8	193	0.000
	Group (C)	151	42	193	
Total		336	50	386	

Discussion

For last many years, instead of having many side effects on the air passage and tracheal passage but tracheal intubation procedure is still being used separately and with help of stylet as well. Because still the anesthesiologists think it as useful and very helpful but none of any other procedure has not replaced it properly till now(11, 12).

In our study it was noted that group (S) showed easy airway maintenance in 95.9% (n=185) patients and difficult airway maintenance in 4.1% (n=8). In two previous studies 35 patients were intubated, out of these 11 patients were with difficult airway due to anatomical curvature and lot of secretions but they were all intubated successfully, success rate was 100%(13). In another study a special type of stylet named as styletoscope was used and tried on difficult airways. It was reported that 94 % difficult airways were intubated successfully after one attempt and 100% after two attempts. In this study it was also reported that mallampati score have no effect on intubation time and number of attempts (14).

In our study we observed that, in group (S), 63.2% (n=122) patients were complained from sore throat and 67.4% (n=130) were complained about pharyngeal pain. While on the other hand, in group (C), only 8.3% (n=16) patients were complained about sore throat and 11.4% (n=22) were complained about pharyngeal pain. In another study conducted by John C et al (9) on effect of stylet use on successful intubation rate and reported that successful airway management and intubation rate was 82.9% with the use of stylet. But he also evaluated complications of stylet use as oxygen desaturation but he compared two types of stylets not stylet and control group. Results of these studies are comparable with our results.

But the previous study did by Nobuyasu Komasa et al (10) suggested that the incidence of post-operative pharyngeal pain was raised in the stylet group (10/20 patients) about 50% than in the control group (2/30 patients) about 6.6%. This study shows identical results to our clinical trial.

Similarly, the previous study by El-Boghdadly K et al (15) suggested that sore throat in 50% patients and the hoarseness in 55% patients were observed immediately after the surgery. Both the sore throat and the hoarseness were found even after the use of lidocaine spray. This is also mismatching of our study at all. In another study Salvalaggio et al(16) conducted a study and reported that intubation with the use of stylet have more complication like sore throat and hoarseness of voice (17). In another study Kitamura T et al(14) reported incidence of sore throat in 28% of patient with the use of stylet minor hoarseness in 25% patients. In some studies conducted by AM Christensen (18), Harding CJ (19), P Herlevsen (20) post intubation sore throat reported from 14.4 to 50% and after insertion of laryngeal mask airway it was 5.8 to 24%.

Some previous studies shows the results of application of lubricant on the endotracheal tube in (20/60) patients, the sore throat and pharyngeal pain were both significantly higher; but in our study we didn't use lubrication for endotracheal tube.

Conclusion

Use of stylet during endotracheal intubation decreases the incidences multiple attempts and make the airway maintenance easy for the anesthetist but on the other side it have complications like sore throat and post intubation pharyngeal pain than those patients in which stylet was not usede.

Recommendations

In the spectrum of our clinical trial we are going to suggest using the stylet during every endotracheal intubation procedure for every difficult airway. But it enhances the incidence of the sore throat and pharyngeal pain in post-operative anesthetized patients, so it should be use in limited cases.

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Nil

Conflict of interest:

Nil

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