

Estudo Comparativo entre o Uso de Laringoscópio e Estilete Luminoso para Intubação Traqueal *

A Comparative Study Between the Laryngoscope and Lighted Stylet in Tracheal Intubation

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RESUMO:

Salvalaggio MFO, Rehme R, Fernandez R, Vieira S, Nakashima P – Estudo Comparativo entre o Uso de Laringoscópio e Estilete Luminoso para Intubação Traqueal.

JUSTIFICATIVA E OBJETIVOS: A abordagem das vias aéreas com o uso do laringoscópio pode causar diversos tipos de traumatismos. Este estudo teve como objetivo tentar esclarecer se o método de intubação que utiliza o estilete luminoso pode ser uma alternativa menos traumática para o paciente em comparação ao método por laringoscopia direta.

MÉTODO: O presente estudo envolveu 98 pacientes de 16 a 88 anos, estado físico ASA I e II. Os pacientes foram divididos em dois grupos: Grupo L, submetido à intubação com laringoscópio, com 54 pacientes, e Grupo E, intubado com estilete luminoso, com 44 pacientes. Foram avaliados o número de tentativas para intubação, tempo de intubação, variação de pressão arterial e frequência cardíaca, dor de garganta (odinofagia), disfagia e rouquidão pós-operatória.

RESULTADOS: Os dados demográficos e os parâmetros hemodinâmicos foram semelhantes entre os grupos. Não houve diferença estatística significativa na pesquisa de dor de garganta e disfagia entre os dois grupos. A rouquidão foi o único dado estudado em que se observou diferença estatística significativa, mais predominante no grupo E ($p = 0,05$).

CONCLUSÕES: Ambas as técnicas de intubação são semelhantes em relação ao comportamento hemodinâmico dos dois grupos. No entanto, o grupo com estilete luminoso apresentou maior frequência do sintoma rouquidão.

Unitermos: INTUBAÇÃO TRAQUEAL; EQUIPAMENTOS: laringoscópio; estilete luminoso

SUMMARY

Salvalaggio MFO, Rehme R, Fernandez R, Vieira S, Nakashima P – A Comparative Study Between the Laryngoscope and Lighted Stylet in Tracheal Intubation.

BACKGROUND AND OBJECTIVES: Approaching the airways with a laryngoscope can cause different types of injuries. The objective of the present study was to determine whether lighted stylet tracheal intubation can be a less traumatic alternative for patients when compared to direct laryngoscopy.

METHODS: Ninety-eight patients between 16 and 88 years and physical status ASA I and II participated in the present study. Patients were separated into two groups: Group L, 54 patients who were intubated with a laryngoscope, and Group E, 44 patients who were intubated with a lighted stylet. The number of attempts, time until intubation, variation in blood pressure and heart rate, and postoperative sore throat (odynophagia), dysphagia, and hoarseness were evaluated.

RESULTS: Demographic data and hemodynamic parameters were similar in both groups. Statistically significant differences in the incidence of sore throat and dysphagia were not observed. Hoarseness was the only data that showed statistically significant differences, being more predominant in Group E ($p = 0.05$).

CONCLUSIONS: The intubation techniques are similar regarding the hemodynamic behavior in both groups. However, hoarseness was more common in group with lighted stylet.

Keywords: TRACHEAL INTUBATION; EQUIPMENT: laryngoscope; lighted stylet.

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The possibility of complications secondary to tracheal intubation is a concern for all professionals involved. Those complications include sore throat, dysphagia, hoarseness, and trauma of the teeth, lips, gingiva, and oropharynx, among others; they can be seen both in tracheal intubation with direct laryngoscopy and with lighted stylet. Sore throat is a common symptom and it can be attributed to ischemia-reperfusion injury, local inflammatory reaction, or abrasion². Vocal cord paralysis can also be associated with tracheal intubation. It is related with different factors, such as age, length of intubation, and other diseases (hypertension and diabetes). Besides, this complication is also associated with technical difficulty³.

However, some of the studies on this matter have observed a difference in morbidity between both techniques, suggesting a lower incidence of complications associated with the lighted stylet. Moreover, hemodynamic changes represent an important factor observed during intubation. Tracheal stimulation by the ET tube probably causes an additional increase in hemodynamic parameters, without statistical difference between both groups⁴⁻⁶.

The objective of this study was to evaluate postoperative morbidity by comparing the consequences of direct laryngoscopy and lighted stylet in tracheal intubation regarding hemodynamic repercussions and trauma of the oropharynx and hypopharynx (dysphagia, hoarseness, and sore throat).

METHODS

After approval by the Ethics on Research Committee of the Hospital das Clínicas of UFPR and signing of the informed consent, 98 patients, ASA I and II, undergoing surgical procedures requiring tracheal intubation were included in the present study. Patients undergoing bariatric and cardiac surgeries, surgeries with selective intubation or involving the head and neck, patients assigned to rapid sequence induction, foreign body in the airways, polyps, tumors, retropharyngeal abscess, laryngeal trauma, hoarseness, history of difficult intubation, and psychiatric disorders hindering proper evaluation were excluded.

Patients were randomly allocated into two groups according to the admission registration number, in which even numbers were included in the L group and odd numbers in the E group. The L group was composed of 54 patients who were intubated with the laryngoscope, and group E consisted of 44 patients intubated with a lighted stylet.

After peripheral venous puncture with an 18G catheter and monitoring with pulse oximeter, non-invasive blood pressure, cardioscope, capnometry, and bispectral index, patients received oxygen with a face mask and infusion of remifentanyl, 0.25-0.35 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$, and propofol, 75-100 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$, with additional slow and progressive bolus of propofol until achieving BIS lower than 65 during anesthetic induction. At this moment, rocuronium, 0.6 $\text{mg}\cdot\text{kg}^{-1}$, was administered and, after 2-3 minutes, the patient was intubated. The time in seconds from the moment the laryngoscope or lighted stylet was picked up by the anesthesiologist until insufflation of the balloon was recorded; intubation was confirmed by observing the capnography curve on the monitor af-

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INTRODUCTION

The lighted stylet consists of a malleable intubation guide-wire with a small light bulb in the distal extremity, which allows visualization of the tip of the ET tube at the entrance of the larynx in the anterior cervical region by transluminescence.

This technique is used in patients with limited mouth opening, restricted movements of the cervical spine, orofacial distortions, and prior failure in laryngoscopy-assisted tracheal intubation, but it can also be the first choice¹.

Table I – Graduation of the Clinical Parameters Investigated in the Postoperative Period.

	0	1	2	3
Sore throat	Absent	Less severe than a cold	Similar to a cold	Stronger than a cold
Dysphagia	Absent	Difficulty with some foods	Difficulty with all foods and drinks	Unable to swallow saliva
Hoarseness	Absent	Perceived only by the patient	Perceived by the observer	Aphony

Table II – Demographic Data.

	Group L	Group E	<i>p</i>
Gender			
Male	17	11	
Female	37	33	
Age (years)*	36 ± 15	39 ± 15	0.31
Weight (kg)*	70 ± 16	67 ± 13	0.32
Height (cm)*	167 ± 8	166 ± 10	0.68

*Data expressed as mean ± SD.

Table III – Behavior of the Hemodynamic Data.

	Group L	Group E	<i>p</i>
Moment 1			
SBP	130 ± 19	120 ± 18	0.65
DBP	76 ± 12	73 ± 14	0.40
HR	79 ± 13	78 ± 15	0.81
Moment 2			
SBP	110 ± 17	100 ± 14	0.24
DBP	59 ± 10	56 ± 10	0.27
HR	72 ± 12	68 ± 11	0.07
Moment 3			
SBP	100 ± 20	96 ± 23	0.17
DBP	61 ± 13	56 ± 15	0.13
HR	75 ± 13	72 ± 13	0.10

Data expressed as mean ± SD.

Table IV – Postoperative Symptoms.

Symptoms	Group L		Group E		<i>p</i>
Pain	0	41 75.93%	29	65.91%	0.55
	1	9 16.67%	10	22.73%	
	2	2 3.70%	4	9.09%	
	3	2 3.70%	1	2.27%	
Dysphagia	0	50 92.59%	34	77.27%	0.076
	1	2 3.70%	7	15.91%	
	2	1 1.85%	3	6.82%	
	3	1 1.85%	0	0%	
Hoarseness	0	31 57.41%	16	36.36%	0.05 *
	1	17 31.48%	16	36.36%	
	2	6 11.11%	12	27.27%	
	3	0 0%	0	0%	

ter the onset of controlled mechanical ventilation. Postoperative analgesia included ketorolac, 30 mg every 8 hours, associated with dypirone, 1 g every 6 hours, and the first dose of each drug

was administered immediately after intubation. This scheduled was maintained for at least 12 hours after the patient regained consciousness.

Data were collected in two steps. The first step was carried on in the operating room, where the anesthesiologist recorded the age, gender, and height of the patient, time until intubation, number of attempts required, blood pressure and heart rate before anesthetic induction (moment 1 – M1), immediately after induction (moment 2 – M2), and immediately after intubation (moment 3 – M3). Anesthesiologists responsible for the intubations had an experience of at least 40 intubations with the lighted stylet.

The second step was carried between 6 and 12 hours after intubation. At this occasion, patients were questioned in their rooms, by properly trained technicians, on the presence of dysphagia, hoarseness, or sore throat, and they were asked to classify their symptoms according to Table I.

The Chi-square test was used for the analysis of qualitative parameters, while the Student *t* test for independent samples was used for quantitative parameters. A confidence interval of 95% was used.

RESULTS

Table II shows the demographic data. Groups L and E were homogenous regarding age, gender, weight, and height.

The mean time of intubation was 22 ± 16 seconds in, Group L, and 18 ± 7 seconds, in Group E (*p* = 0.11), which was not statistically significant.

Table III shows SBP, DBP, and HR at the different evaluation moments.

Table IV shows the results of the postoperative symptoms reported by patients in each group.

DISCUSSION

The efficacy of lighted stylet tracheal intubation compared to laryngoscopy in patients scheduled for elective surgeries has been questioned, but the data in the literature is rare and controversial. A study with 40 patients that compared the morbidity of lighted stylet tracheal intubation to that of tracheal intubation with direct laryngoscopy observed a lower incidence of upper airways complications in patients undergoing lighted stylet intubation, and the cases of sore throat and hoarseness were less severe⁵. The results of the present study differed, since the incidence of postoperative hoarseness was higher in Group E, which was statistically significant (*p* = 0.05). Besides, hoarseness was milder (grade I) in most patients (57.41%) of Group L with this symptom, i.e., it was observed only by the patient. Those results go against

the hypothesis of the present study, which suggested that lighted stylet intubation was less traumatic, and against the data reported in the literature⁵. This difference in the results could possibly be explained by the wide difference in the ability of participating anesthesiologists with both techniques, since before this study, contrary to laryngoscopy, the lighted stylet had been used a little over than forty times by each professional, which is unexpressive when compared to intubation with direct laryngoscopy. As for sore throat, the data was not relevant ($p = 0.55$). However, some studies reported higher incidence of sore throat in the group of patients intubated with the lighted stylet⁶. Those clinical data contradict the results of the present study.

The incidence of dysphagia was higher in group E, although the difference was not statistically significant ($p = 0.076$).

In another review article, the causes of post-intubation hoarseness were investigated. The authors reported that injury of laryngeal structures was the main factor responsible for the symptom⁷.

Other important data observed during intubation included hemodynamic changes. Among them, changes in blood pressure and heart rate are more commonly associated with intubation, which have been attributed to the mechanical stimulation of tracheal receptors. Some studies whose results coincide with ours have not demonstrated differences in hemodynamic changes between lighted stylet intubation and with direct laryngoscopy^{5,6,8}. Another study showed that lighted stylet attenuates hemodynamic changes after intubation when compared with the laryngoscope⁵.

In the present study, the time of intubation was similar in both groups. However, the same was not observed by another author who compared the use of both techniques by teams without experience with the new method and, therefore, mean intubation time was lower in the laryngoscopy group than in the lighted stylet group⁹.

In a study comparing the hemodynamic changes between both intubation techniques in patients with coronary heart disease, blood pressure and heart rate were lower in patients undergoing lighted stylet intubation, but this difference was not significant¹⁰. The literature also demonstrates that lighted stylet intubation is associated with a smaller rate of hemodynamic changes in normotensive patients older than 60 years; however, changes were similar when hypertensive patients in the same age group were compared¹¹.

Summarizing, it can be concluded that the hemodynamic behavior is similar in both groups. However, group E had a higher incidence of postoperative complications (hoarseness). The lighted stylet consists of a malleable intubation guide wire with a small lamp on the distal end allowing the visualization of the tip of the ET tube on the entrance of the larynx in the anterior cervical region by transluminescence. The objective of the present study was to compare post-intubation morbidity between two techniques, lighted stylet and direct laryngoscopy, in 98 patients. Hoarseness was the only symptom, which showed a statistically significant difference ($p = 0.05$), with a higher incidence in the group of patients undergoing lighted stylet intubation. Therefore, it is possible to conclude that the technique with the lighted stylet had a slightly higher rate of postoperative complications, although hemodynamic parameters during intubation did not differ between both groups.

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RESUMEN:

Salvalaggio MFO, Rehme R, Fernandez R, Vieira S, Nakashima P – Estudio Comparativo entre el Uso de Laringoscopio y Estilete Lumínoso para la Intubación Traqueal.

JUSTIFICATIVA Y OBJETIVOS: *El abordaje de las vías aéreas con el uso del Laringoscopio puede causar diversos tipos de traumatismos. Este estudio tuvo el objetivo de intentar aclarar si el método de intubación que utiliza el estilete luminoso puede ser una alternativa menos traumática para el paciente en comparación con el método por laringoscopia directa.*

MÉTODO: *El presente estudio captó 98 pacientes de 16 a 88 años, estado físico ASA I y II. Los pacientes fueron divididos en dos grupos: Grupo L, sometido a la intubación con Laringoscopio, con 54 pacientes, y el Grupo E, intubado con estilete luminoso, que contó con 44 pacientes. Se evaluó el número de intentos para la intubación, el tiempo de intubación, la variación de la presión arterial y la frecuencia cardíaca, dolor de garganta (odinofagia), disfagia y ronquera postoperatoria.*

RESULTADOS: *Los datos demográficos y los parámetros hemodinámicos fueron similares entre los grupos. No hubo diferencia estadística significativa en la investigación del dolor de garganta y disfagia entre los dos grupos. La ronquera fue el único dato estudiado en que se observó diferencia estadística significativa, lo que predominó más en el grupo E ($p = 0,05$).*

CONCLUSIONES: *Se observó que las dos técnicas de intubación son similares con relación al comportamiento hemodinámico de los dos grupos. Sin embargo, el grupo E presentó una frecuencia más elevada del síntoma de la ronquera.*