

Original Article

The effect of different Sellick's maneuver on laryngoscopic view and intubation time

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ABSTRACT

Background: Sellick's maneuver (cricoid pressure) may make laryngoscopic view and tracheal intubation more difficult. This study compared the different techniques of cricoid pressure (CP) regarding to the laryngoscopic view and time to intubation.

Methods: In 142 anesthetized patients, 4 types of CP was randomly applied; A) one-handed CP using thumb, index and middle fingers, B) one-handed CP using index and middle fingers, and the heel on the sternum, C) technique A with another hand below the neck, D) technique C with a pillow below the neck.

Results: There was significant difference in the laryngoscopic view changes. The view was better in group A, C, D and B, respectively. Mean intubation time did not show significant difference.

Conclusion: One-handed CP using thumb, index and middle fingers can provide the best views at laryngoscopy without significant effect on time to intubation.

Key Words: Sellick's maneuver, Laryngoscopic view, Intubation time, Tracheal

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Sellick at 1961 demonstrated that the compression of cricoid is effective to contribute the safety of rapid sequence induction, to minimize regurgitation of gastric material, and for reaching pharynx and upper airway.

This maneuver consists of temporary occlusion of upper esophagus by firm backward pressure on the cricoid ring against the bodies of cervical vertebrae ¹. It has been suggested that the use of cricoid pressure may make tracheal intubation more difficult ^{2, 3}. In addition, incorrect application of sellick's maneuver may delay tracheal intubation, through distorting anatomy or flexing patient's neck far from the ideal sniffing position ^{4, 5}.

This maneuver has different methods ⁶, with different benefits and difficulties ^{7, 8, 9}. There were no studies on comparison of four

cricoid pressure techniques, regarding to laryngoscopic view and time to intubation.

The aim of this study was to compare the different methods of cricoid pressure with respect to the view at laryngoscopy, time to intubation, and to examine whether the best method might be selected pre-operatively based on physical characteristics of patients.

Subjects and Methods

After agreement of ethics committee approval and informed consent, 142 patients aged 18 - 65 years, of ASA physical status I, II(I: no systemic disturbance, II: mild to moderate systemic disturbance), presenting for routine surgery requiring tracheal intubation were studied.

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They did not have gross anatomic maxillo-facial abnormality or cardio respiratory disease or symptoms of esophageal reflux. Age, weight, Mallampatti score ¹⁰, thyromrecorde teeth condition and upper lip bite test (ULBT) ¹² were recorded.

In all patients, anesthesia was induced with sodium thiopental 5mg/kg, fentanyl 2µg/kg and succinylcholine 1.5mg/kg, in all patients, then 40N force was applied on cricoid cartilage ¹³, using 4kg on weighting scale which is easily found in the operating room. Another investigator graded laryngoscopic view after laryngoscopy.

The patients were randomly allocated to the four groups. In all cases, cricoid pressure was performed by the first investigator who was blinded to the technique by a drape over the neck. All laryngoscopies were performed by second investigator.

The views of larynx at direct laryngoscopy with a Macintosh laryngoscope were compared between four different conditions:

A) Single- handed cricoid pressure: downward pressure with index finger over the cricoid cartilage, thumb and middle finger each side.

B) Single - handed cricoid pressure: downward pressure with index and middle finger over cricoid cartilage, the heel of hand over sternum.

C) Bimanual cricoid pressure: technique A with another hand behind the neck, preventing flexion during laryngoscopy.

D) Bimanual cricoid pressure (contra-cricoid cuboid): technique C with a pillow (size 27×10×5 cm) behind the hand.

Following tracheal intubation, the cricoid pressure was released and anesthesia continued. The duration between entering the tip of tracheal tube from anterior upper teeth and removal of laryngoscopy from teeth was considered as intubation time. If obtained view had grade 1, the changes of laryngoscopic view were graded as: better, worse, or no difference.

Statistical analysis was performed with SPSS software. A value of P<0.05 was considered statistically significant.

Results

The age, weight, sex, teeth condition (with or without teeth), Mallampatti score, TMD, and ULBT did not differ between four groups. No patients were failed intubation during Sellick's maneuver.

This maneuver produced better laryngoscopic view (34.5%). The change of laryngoscopic view were significantly different between four groups (p<0.05, Kruskal-Wallis test). The view was better in group A, C, D and B, respectively (Table 1).

Table 1. Frequency distribution of changes in laryngoscopic view

	A N(%)	B N(%)	C N(%)	D N(%)	Total N(%)
1 grade worse	1(3)	1(3.2)	0	2(4.2)	4(2.8)
No change	15(45.5)	24(77.4)	18(60)	32(66.7)	89(62.7)
1 grade improvement	15(45.5)	6(19.4)	11(36.7)	14(29.2)	46(32.4)
2 grade improvement	2(6.1)	0	1(3.3)	0	3(2.1)
Total	33	31	30	48	142
	P<0.05 between groups, kruskal-wallis test				

The times for intubation had not significant difference between groups (ANOVA). Mean intubation time was 5.40±3.25 second.

In all groups, the grading of changes in views had direct significant correlation with Mallampatti score (P= 0.001, r=0.272), age (P= 0.015, r=0.182) and weight (P= 0.003, r=0.233) (Spearman correlation).

The time to intubation in patients who had teeth, showed direct significant correlation with Mallampatti score (P= 0.001, r=0.421), view grading before CP (P= 0.001, r=0.579) and ULBT class (p=0.009, r=0.221). There was no significant correlation between ULBT grading and laryngoscopic view.

Discussion

Laryngoscopic view with cricoid pressure was better than without cricoid pressure which supports previous studies ^{7, 8}.

Technique A achieved the best views in a considerable proportion of cases (51.6%), and

can be recommended to improve laryngoscopic view. The preference of A over B technique may be due to using three fingers during sellick's maneuver and preventing larynx displacement.

The use of pillow and neck extension in C and D techniques resulted in greater difficulty during laryngoscopy. These results agree with those of Cook, who found that bimanual technique results in poorer view at laryngoscopy more than single handed technique ⁹.

In the present study, sellick's maneuver produced poorer laryngoscopic views in 2.8% which might be caused by specific laryngeal anatomy in these patients.

Mallampatti score demonstrate direct significant correlation with view grading and time to intubation. This score can pre-operatively and independently determine appropriate the best cricoid pressure techniques

in particular patients ⁸. Thyromental distance did not show significant difference with laryngoscopic view and intubation time, and is not a good determinant alone to predict view grading and safe intubation, pre-operatively.

We found that ULBT -in patients who had teeth reveal- has a direct significant correlation with intubation time. So, teeth conditions -in the cases with higher grading of ULBT- prolong intubation time without effect on view grading. Laryngoscopic view showed a significant correlation with Mallampatti score, age and weight that is similar to previous studies ⁸.

In conclusion, cricoid pressure improves laryngoscopic view, and single-handed cricoid pressure, (downward pressure with index finger over cricoid cartilage, thumb and middle finger each side) can result in the best views at laryngoscopy.

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