Original Research

Evaluation Of The Association Between Dental Malocclusion Classification And Laryngoscopic Grade During Airway Intubation In Patients Undergoing Surgery

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Abstract:

Background:

Airway management is one of the most important responsibilities of anesthesiologists, predict difficult tracheal intubation can reduce the possible complications of intubation. The aim of this study was to investigate the malocclusion classification and degree of laryngoscopy to predict the difficult intubation.

Methods:

A retrospective observational study was performed in Shahid Mohammadi and Shariati hospitals affiliated to Bandarabbas University of medical sciences in Iran. Over a 4-yr period from 2014 to 2018, 1080 attempts at for treatment of malocclusion were recorded.

Results:

According to the findings of this study, the highest percentage 49.3% (572 n), were malocclusion Class 1, and 42.1%(488n) were malocclusion Class 2 and 1.7% (20 n) were malocclusion Class 3. Findings showed that the relationship between the two variables of malocclusion and the degree of laryngoscopy in terms of age, sex, thyromental distance, malamapathy and BMI showed that between the two variables of malocclusion and the degree of laryngoscopy in ages less than 10 years, there is a significant relationship and inverse correlation(r= -0.594).

Conclusion:

The results of this study showed that is no significant relationship between dental malocclusion and degree of laryngoscopy, malamapathy, gender and BMI. Malocclusion only at less than 10 years of age is effective to predict difficult laryngoscopy.

Keywords: Airway, Difficult Intubation, Malocclusion, Laryngoscopic Grade

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Introduction

Airway management is one of the most important tasks of anesthesiologists, which in most cases is done through a tracheal tube and under direct laryngoscopy. Difficult intubation can cause a variety of complications from sore throat to serious injury in patients (1-2). 2018 guidelines for difficult airway management from American Society of anesthesiologists recommend airway risk assessment before any anesthesia procedure (3). In order to predict difficult tracheal intubation, airway examination is performed, before induction of anesthesia. Most tests used for airway examination based on anatomical signs and non-invasive clinical procedures. Clinical criteria have been presented with regard to patient airway evaluation prior to induction of anesthesia, including malamapathy classification, mouth opening size, thyromental distance, mandibular length, neck extension, sternomental distance and other examination methods such as dento-facial abnormalities(4). The Cormack-Lehane Classification (CL) is a grading system commonly used to describe laryngeal vision during direct laryngoscopy(5). Laryngoscopy was classified as easy (grade 1 and 2) or difficult (grade 3 and 4)(6). In this study, dento-facial abnormalities as one of the challenges of laryngoscopic pathway have been investigated. Dento-facial abnormalities are defined in a system called malocclusion, that causes aesthetic concerns and functional impairment that can have a long-term impact on mental health (7) Malocclusion, defined by the World Health Organization as a dento-facial abnormality, refers to abnormal obstruction and / or impaired craniofacial relationships, which may affect aesthetic appearance, function, facial harmony, and psychosocial well-being. (8,9). Early in the 8th century, Edward Engel categorized occlusion using the relationship between the teeth of the first large mill of two arches. Accordingly, the occlusion is divided into three general categories (10). One of the major challenges associated with Malocclusion is difficult intubation. Predicting difficult intubation can be effective in reducing anesthesia complications. Therefore, the purpose of this study was to evaluate the relationship between dental malocclusion classification and degree of laryngoscopy to predict the difficult intubation.

Method

After the approval of the Ethics Committee and obtaining informed consent, a retrospective observational study was performed in Shahid Mohammadi and Shariati hospitals affiliated to Bandarabbas University of medical sciences in Iran. Over a 4-yr period from 2014 to 2018, 1080 attempts at for treatment of malocclusion were recorded. Inclusion criteria were having a non-traumatic dental malocclusion that may be problematic in airway intubation, and being elective surgery. Airway evaluation and grading of laryngoscope, modified mallampati, thyromental distance, neck movements recorded in the patient's file, together with demographic information, age, patient weight were collected through a predetermined form. Data were analyzed by SPSS software and descriptive statistics (mean, standard deviation, percentage, etc.) and paired t-test and Wilcoxon test.

Intubation grading scale

CL classification: Grade 1: Visualization of the entire laryngeal aperture. Grade 2: Visualize portions of the larynx or arytenoids. Grade 3: Visualization of only the epiglottis. Grade 4: Visualization of soft palate only(11).

Malocclusion classification

Class I (Neutrocclusion), Class II (Distocclusion), Class III (Mesiocclusion) (12).

Results:

In this study, 1080 patients were studied. And their information including age, gender,

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degree of laryngoscopy, dental malocclusion [table1] also it was observed that 536 patients (49.6%) had CL Grade 1, 349 patients had CL Grade 2(32.3%), 184 patients had CL Grade 3 (17%), 9 patients had CL Grade 4 (1.00%), therefore, that incidence of easy intubation (grade1and grade2) was 81.9 % and difficult intubation (grade3 and grade4) 18 % (figure1).

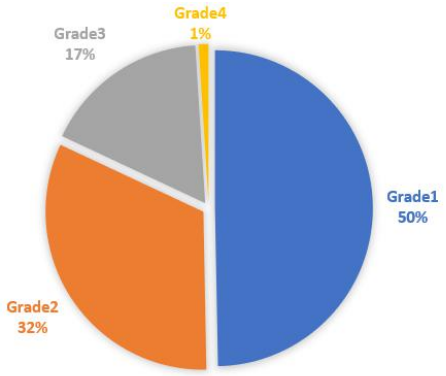


Figure1: Comack -Lehane Grade

According to research data and statistical tests (Chi-square, ANOVA, Fishers exact test), there was no significant difference between laryngoscopic grading and age, gender and BMI.

Also, according to the findings this study, the highest percentage 49.3% (572 n) were malocclusion Class 1, and 42.1%(488n) were malocclusion Class 2 and 1.7% (20 n) were malocclusion Class 3(figure 2).

Based on the results of this study, the statistical test showed no significant relationship between malocclusion variables and laryngoscopic grading (P=0.776). Using Pearson correlation test showed that between the two variables of malocclusion and the degree of laryngoscopy in ages less than 10 years, there is a significant relationship and inverse correlation (r= -0.594).

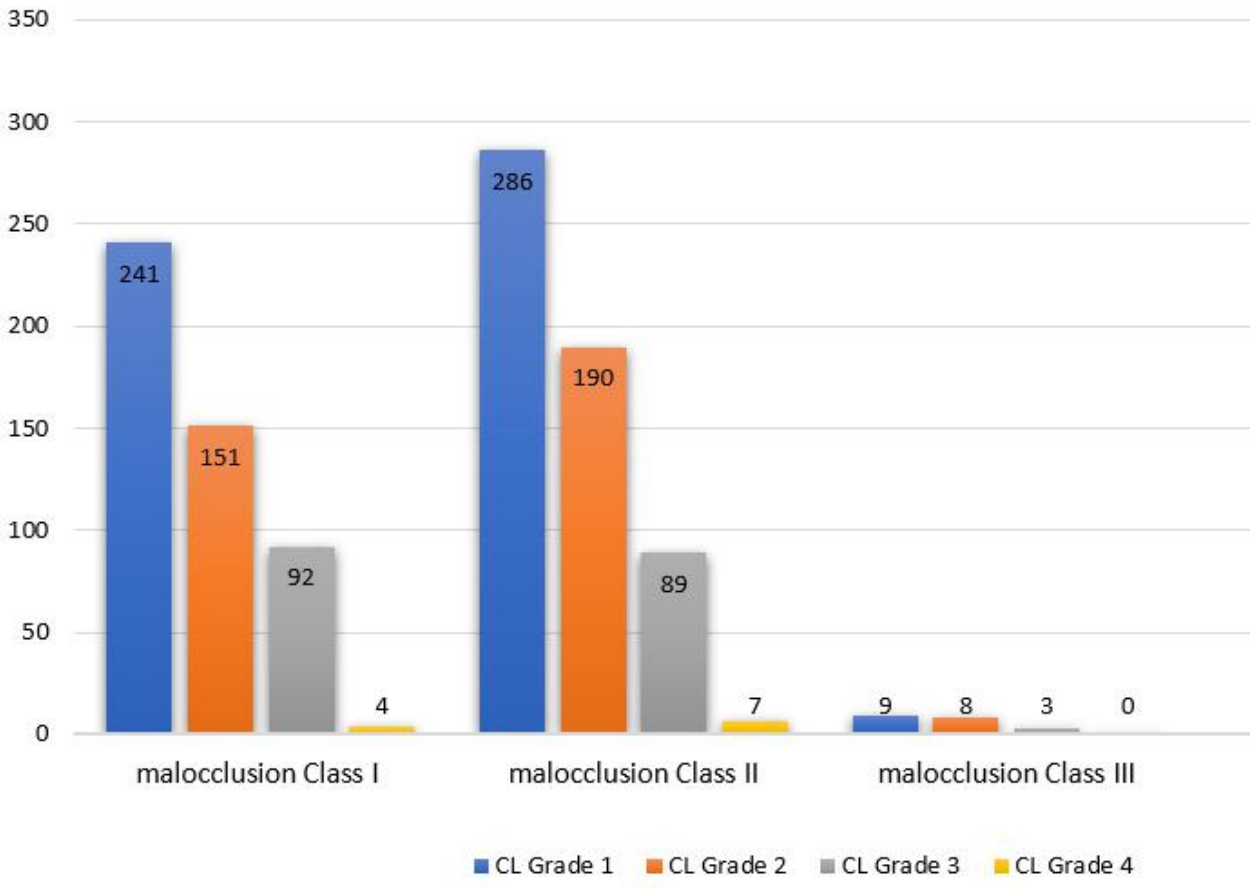


Figure 2: Comparison of Frequency of Malocclusion and Laryngoscopic Grading

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Table1: relationship between CL grading with age, gender and BMI

Variable		CL	grading		P
	Grade 1	Grade 2	Grade 3	Grade 4	
Age(years)*	40.76±20.11	41±18.62	44.23±19.4	39.18±14.51	0.076
Gender(n) Male/female	367/169	240/109	11569	5/6	0.17
BMI(kg/m^2)	24.18±4.13	23.97±3.7	23.87±3.53	26.875±2.01	0.655

*mean ±SD. BMI: Body mass index CL: Comack –Lehane

Discussion

Airway safety is one of the most important tasks of the anesthesiologist. Prior airway assessment helps plan for difficult intubation. There are many bedside experiments to evaluate airway. One of the usual tests is Cormack-Lehane Classification. The purpose of this study was to evaluate the relationship between laryngoscopic grade and dental malocclusion for predicting difficult intubation.

In this study the mean age of the patients was 41±19.49 yrs. Fisher's exact test showed no significant relationship between age and degree of laryngoscopy, This was similar to studies by Rampati et al. (13) and Significant correlation was also shown by tiffany et al (14).

Also the mean BMI of the patients were 24.08±3.88 kg/m2. The statistical tests did not show a significant difference between the BMI and the degree of laryngoscopy. Similar results were shown by Mohammadi et al (8) and Significant correlation was also shown by Soyuncu et al (15) and Saasouh et al (16).

As for gender, our study also showed that the 21.24 percentage of women and the 16.50 percentage of men were difficult intubation. Statistical tests did not show a significant difference. The results of our study were consistent with the study Bin wang et al and Abhishek et al (17-18).

About dental malocclusion which was evaluated in this study, showed that the highest percentage of patients were in malocclusion Class 1 and the lowest in malocclusion Class 2. Also, statistical tests showed significant relationship at the age of less than 10 years between dental malocclusion and degree of laryngoscopy(P=0.042), significant correlation was shown by Uma Hariharanet al (19) and prerana (20).

Conclusion

The results of this study showed that there is no significant relationship between dental malocclusion and degree of laryngoscopy. Therefore, other criteria for evaluation before induction of anesthesia should be used to predict difficult intubation.

Competing interests

The authors declare that they have no competing interests.

Acknowledgement

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