Video Laryngoscopy or Macintosh Laryngoscopy: Which One Is More Successful in Patients With Bilateral Mandibular Fractures?

Reza Tabrizi, DMD, * *Mastaneh Dahi, MD,* † *Mohammad Reza Moshari, MD,* ‡ *Fereydoon Pourdanesh, DMD,* § *and Sahar Zolfigol* ‖

Purpose: Successful intubation is challenging in patients with bilateral mandibular fractures. The aim of this study was to compare the video laryngoscope (VL) with the Macintosh laryngoscope (ML) for intubation of patients with bilateral mandibular fractures.

Materials and Methods: In this randomized controlled trial study, patients who had bilateral mandibular fractures (angle or subcondylar) were studied. Patients were randomly assigned to 1 of 2 groups using computerized randomization. Laryngoscopy was performed by the ML in group 1 and the VL in group 2. Intubation device (ML or VL) was the predictive factor of the study and age, maximum mouth opening (MMO), incisor fracture, and gender were the variables. Intubation time and successful intubation at the first attempt were the study outcomes. Independent *t* test was applied to compare intubation time, MMO, and age between the 2 groups.

Results: Seventy-eight patients were studied (40 in group 1 and 38 in group 2). Mean intubation time was 33.02 ± 9.68 seconds in group 1 and 39.16 ± 7.40 seconds in group 2. Comparison of the data showed a significant difference between the 2 groups ($P = .002$). Twenty-four patients in group 1 and 31 in group 2 were successfully intubated at the first attempt. There was a significant difference in the number of successful or failed intubation attempts between the 2 groups ($P = .03$).

Conclusion: According to the present findings, use of the VL increased the first-attempt success rate of intubation in patients with bilateral mandibular fractures. Time of intubation could be longer when using the VL than when using the ML.

J Oral Maxillofac Surg ■*:1-5, 2018*

Direct laryngoscopy using a Macintosh or Miller blade laryngoscope is the main technique to aid endotracheal intubation.[1] In direct laryngoscopy, the laryngeal inlet is directly viewed by using the Macintosh laryngoscope (ML) after compression of the tongue base with the blade. However, placement of an endotracheal tracheal tube can be difficult in patients with mandibular fractures because of the restriction of mouth opening, difficult visualization of the opening of the glottis, and anatomic deformity

Received from the Shahid Beheshti University of Medical Sciences, Tehran, Iran.

*Associate Professor of Oral and Maxillofacial Surgery, Shahid Beheshti Dental School.

†Associate Professor of Anesthesiology, Faculty of Medicine.

‡Assistant Professor of Anesthesiology, Faculty of Medicine.

§Associate Professor of Oral and Maxillofacial Surgery, Shahid Beheshti Dental School.

‖Dental Student, Shahid Beheshti Dental School.

Conflict of Interest Disclosures: None of the authors have a relevant financial relationship(s) with a commercial interest.

Address correspondence and reprint requests to Dr Tabrizi: OMFS Department, Taleghani Hospital, Velenjak, Tehran, Iran; e-mail: tabmed@hotmail.com

Received December 21 2017

Accepted March 20 2018

0278-2391/18/30283-0

https://doi.org/10.1016/j.joms.2018.03.025

from trauma. Studies have shown that the prevalence of difficult intubation is approximately 6 to 10%.[2,3] Failed intubation is less frequent (1.8 to 5.8%).[4,5] Use of the gum elastic bougie has been suggested for cases in which visualization of the true vocal cords is difficult.[6]

The video laryngoscope (VL) enables indirect visualization of the glottis through a camera placed on the blade of a laryngoscope.[7] In contrast to the ML, the VL improves the visual field during intubation by magnification of the glottic area. Clinicians do not require alignment of the line of vision of the glottis with the laryngeal axis when using the VL.[8] Use of the VL has been reported in maxillofacial patients for routine elective procedures[9] and in emergency situations.[7] A search of the literature yielded no studies comparing the VL with the ML in patients with mandibular fractures.

The purpose of this study was to address the following question: does the VL have any superiority over the ML in patients with bilateral mandibular fractures undergoing open reduction and rigid fixation? The authors hypothesized that the VL would decrease the intubation time and increase the success rate of intubation at the first attempt.

Materials and Methods

This was a randomized controlled trial study. The study sample was derived from the population of patients who presented to the Department of Oral and Maxillofacial Surgery at Taleghani Hospital (Tehran, Iran) for treatment of mandibular fractures from September 1, 2015 to September 30, 2016. Patients eligible for study inclusion had bilateral mandibular fractures (angle and subcondylar) and had to undergo open reduction with rigid fixation. The research was approved by the committee of the medical ethics group of the Shahid Beheshti University of Medical Sciences (Tehran).

Patients were excluded from study enrollment if they had a cervical spine injury, severe Class II skeletal malocclusion, perioral lacerations, or tooth loss in the anterior maxilla or anterior mandible. Edentulous patients also were excluded. For determination of severe Class II skeletal malocclusion, the authors requested frontal and profile photographs of patients that had been taken before their trauma. Because all patients were operated on after admission to the oral and maxillofacial ward, none of the patients had an emergency intubation. Two anesthesiologists (second and third authors) visited all patients a day before the operation and determined the need for intubation by the ML or VL. Patients were excluded from the study if the anesthesiologists predicted needing a fiberoptic intubation.

Teeth fractures (incisor teeth) were documented in the 2 groups. Maximum mouth opening (MMO) was measured by a ruler as the distance between the incisal edges of the anterior maxillary and mandibular teeth in maximum opening in awake patients without any assistance.

Patients were randomly assigned at the time of intubation to 1 of the 2 groups by computerized randomization. Laryngoscopy was performed by the ML in group 1 and the VL in group 2.

All patients received premedication with fentanyl 2 μg/kg and midazolam 1 to 2 mg. For anesthesia induction, thiopental 5 mg/kg and atracurium 0.5 mg/kg were administered. All patients underwent 3 minutes of preoxygenation with 100% O_2 before induction of anesthesia to prevent desaturation during intubation.

Duration of laryngoscopy was measured from the beginning of laryngoscopy until placement of the intubation tube. Patients received nasotracheal intubation. Magill forceps were used in all intubations.

Correct and successful intubation was confirmed by auscultation of chest sounds and symmetrical movement of the chest. Capnography was performed for all patients.

The number of patients who had a successful intubation at the first attempt was documented in each study group.

Successful intubation at the first attempt was defined a successful intubation in 1 try. If a patient's desaturation decreased below 90%, the intubation was stopped and the patient was oxygenated with a mask; this was considered a failed intubation.

The intubation device (ML or VL) was the predictive factor in this study and age, MMO, incisor fractures, and gender were the variables. Intubation time and successful intubation at the first attempt were the study outcomes.

All intubations were performed by 2 anesthesiologists.

STATISTICAL ANALYSIS

Statistical analyses were performed using SPSS 21 (SPSS Inc, Chicago, IL). Independent *t* test was applied to compare the intubation time, MMO, and age between the 2 groups. *P* values less than .05 were considered statistically significant. The χ^2 test was used to compare the number of patients who had a successful intubation at the first attempt and gender between the 2 groups.

Results

Seventy-eight patients were studied (40 in group 1 and 38 in group 2). None of the patients in the 2 groups showed desaturation. The mean age of patients was