

Use of McGrath® MAC Video Laryngoscope for Nasotracheal Intubation in Patients for Whom Intubation Was Expected to Be Difficult Due to the Limited Mouth Opening

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How to cite this paper: Sato, A., Tachi, N., Okumura, Y., Hashimoto, M., Yamada, M. and Yamada, T. (2018) Use of McGrath® MAC Video Laryngoscope for Nasotracheal Intubation in Patients for Whom Intubation Was Expected to Be Difficult Due to the Limited Mouth Opening. *Open Journal of Anesthesiology*, 8, 223-227.

<https://doi.org/10.4236/ojanes.2018.87023>

Received: May 10, 2018

Accepted: July 22, 2018

Published: July 25, 2018

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Abstract

McGrath® MAC video laryngoscope (McG) has been used for orotracheal intubation in both normal patients and patients for whom intubation was expected to be difficult, and has been reported to provide improved visibility of the glottis during tracheal intubation. There are some reports that normal nasotracheal intubation is easier with McG than with macintosh laryngoscope (ML). The usefulness of McG for nasotracheal intubation is beginning to be recognised. We experienced three cases using McG in patients for whom intubation was expected to be difficult due to the limited mouth opening and using McG for those patients enabled smooth nasotracheal intubation. McG provides good visual field during nasotracheal intubation, and is less invasive to the patient.

Keywords

McGrath® MAC Video Laryngoscope, Limited Mouth Opening, Difficult Intubation Nasotracheal Intubation

1. Introduction

Recently, various types of video laryngoscopes have been introduced for securing the airway during general anesthesia. McGrath® MAC video laryngoscope (hereafter referred to as “McG,” Covidien, Tokyo) was released in 2012. McG has been used for orotracheal intubation in both normal patients and patients for whom intubation was expected to be difficult, and has been reported to pro-

vide improved visibility of the glottis during tracheal intubation as well as an increased tracheal intubation success rate [1] [2]. On the other hand, normal nasotracheal intubation is reportedly easier with McG than with macintosh laryngoscope (hereafter referred to as “ML”) [3] [4].

In this report, we describe three success cases in which nasotracheal intubation was smoothly performed using McG in patients for whom intubation was expected to be difficult due to the highly limited mouth opening. “Written consent” for this publication has been obtained from the patients. We obtained all the patient’s consent for the case report to be published.

2. Case Report

2.1. Case 1

The patient was a 50-year-old man with height of 165 cm and weight of 65 kg. He underwent cortical osteotomy for radiation osteomyelitis. The patient had a history of carcinoma of the tongue, and underwent chemotherapy, right radical neck dissection, right hemiglossectomy, and pectoralis major myocutaneous flap reconstruction between 1991 and 2009. Preoperative examination findings were as follows: 2 fingers’ width maximum mouth opening (hereafter referred to as “MMO”), Class III in Mallampati classification, and difficulty in tilting the head backwards. Prior to anesthesia, the patient was sufficiently oxygenated at 6 L/min for 3 min, and given rapid induction with propofol 100 mg, fentanyl 100 µg, and remifentanyl 0.2 µg/kg/min. After confirming sufficient mask ventilation, rocuronium 40 mg was administered. The visual field of the larynx spread with the ML was a Cormack-Lehane [5] (hereafter referred to as “C-L”) Grade III, and the visual field with the McG was a C-L Grade I. Use of the McG allowed insertion of the tube in one attempt.

2.2. Case 2

The patient was a 47-year-old man with height of 174 cm and weight of 63.5 kg. Removal of the articular tubercle was performed for left recurrent temporomandibular joint dislocation. The patient had a history of depression, but was not under medical treatment.

Preoperative examination findings were as follows: 1.5 fingers’ width MMO, Class IV in Mallampati classification, and no limits in tilting the head backwards. Prior to anesthesia, the patient was sufficiently oxygenated at 6 L/min for 3 min, followed by rapid induction with propofol 120 mg, fentanyl 100 µg, and remifentanyl 0.25 µg/kg/min. After confirming sufficient mask ventilation, rocuronium 50 mg was administered. The ML could not be inserted. The visual field of the larynx spread with the McG was a C-L Grade II, and intubation was possible in one attempt.

2.3. Case 3

The patient was a 77-year-old man with height of 157 cm and weight of 58 kg. A plastic surgery for cicatricial contracture of the oral cavity following surgery for

carcinoma of left buccal mucosa was performed. The patient had history of hypertension, diabetes mellitus, glaucoma, and carcinoma of left buccal mucosa, which was treated with a tumorectomy in 2016.

Preoperative examination findings were as follows: 2 fingers' width MMO, Class III in Mallampati classification, and no limits in tilting the head backwards. Prior to anesthesia, the patient was sufficiently oxygenated at 6 L/min for 3 min, followed by rapid induction with propofol 100 mg, fentanyl 100 µg, and remifentanyl 0.2 µg/kg/min. After confirming sufficient mask ventilation, rocuronium 50 mg was administered. The visual field of the larynx spread with the ML was a C-L Grade III and the visual field with McG was a C-L Grade I. Use of the McG allowed insertion of the tube in one attempt.

Those are summarized in **Table 1**.

3. Discussion

Since McG has become commercially available, its use has been reported for various purposes such as education [6], pediatric cases [7] and for cases with technical difficulties of intubation [8]. In particular, McG can be used on diverse types of cases with technical difficulties of intubation, such as unpredicted cases, obese patients, and cases with difficulty tilting the neck backward following cervical spine surgeries. We experienced nasotracheal intubation of three patients with high degrees of limited mouth opening and predicted intubation difficulty in whom McG enabled effective intubation, and report herein.

The most notable advantage of McG for effective nasotracheal intubation in patients with predicted difficulties of intubation due to limited mouth opening is believed to be the thin blade. While there is only a small difference from a ML at the thickest part, the portion that comes in contact with the teeth during laryngeal

Table 1. Patient's demographics.

Case No.	Age (yr)/Sex (M/F)	BMI (kg/m ²)	Previous head and neck surgery	Limitation for head extension	Maximum mouth opening	CL grade by ML	CL grade by McG
1	50/M	23.8	Neck dissection Right hemiglossectomy Pectoralis major myocutaneous flap reconstruction	Severe	2 fingers	III	I
2	47/M	21.0/M	None	Normal	1.5 fingers	IV	II
3	77/M	23.5/M	Tumorectomy for left buccal mucosa	Normal	2 fingers	III	I

ML = Macintosh laryngoscope, McG = McGrath* MAC video laryngoscope, CL grade = Cormack-Lehane grade, CL grade: I = Most of glottis is visible, II = Only the posterior extremity of the glottis is visible, III = No part of the glottis, but only the epiglottis is visible, IV = Not even the epiglottis can be seen [5].

spreading is extremely thin, at 11.9 mm [8]. Furthermore, the composition of the McG blade is polycarbonate, which has a lower likelihood of causing dental or oral mucosal trauma compared to the ML, which is metal. Despite the highly limited mouth opening, there were no cases with difficulty inserting the blade or trauma to the teeth or oral mucosa, and the McG provided a good view of the glottis for all cases. Especially in case 2, it was impossible to insert the Macintosh due to limited mouth opening (MMO 1.5 fingers), but the thinness of the McGrass was sufficiently effective.

The second advantage was its maneuverability. Unlike other video laryngoscopes, such as the Airwayscope® or Glidescope®, which require a certain level of training and experience to manipulate, the shape of the McG is similar to the ML with a similar blade angle, which enables use for beginners with relative ease [6]. A trial of 100 consecutive oral and nasotracheal intubations by new residents and anesthesiologists resulted in 90 Cormak classification grade I (90%), 9 grade II (9%) and 1 grade III (1%) views of the larynx under McG and on the monitor [9], demonstrating its high glottis visibility rate. The intubation of the three cases that we experienced were all performed using the McG by experienced users of the ML, and in each case, the glottis was highly visible.

There was a previous report of an oral intubation with McG of a patient with only 1-finger-width MMO whose limited mouth opening prevented free manipulation of the tube in the oral cavity and failure in guiding towards the glottis, and in which intubation was ultimately performed by combining Parker Flex-IT™ and McG [10]. This does not indicate that McG is effective for tracheal intubation in all patients with limited mouth opening. Indeed, the reason why intubation was feasible in our cases may be due to the fact that they were nasotracheal intubations, and because tube manipulation in the oral cavity was relatively free and easy.

4. Conclusion

Use of McGRATH MAC video laryngoscope in patients for whom intubation was expected to be difficult due to the limited mouth opening enabled smooth nasotracheal intubation. McGRATH® MAC provides good visual field during nasotracheal intubation, and is less invasive to the patient.

Conflict of Interest

The authors declare no conflicts of interest.

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