

Clinical experience with the C-Mac videolaryngoscope in morbidly obese patients

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Abstract

Background: The use of videolaryngoscopes is recommended as a part of routine practice in anaesthesia for morbidly obese patients. The aim of this study was to evaluate C-Mac in a group of morbidly obese patients to see if it improves intubation conditions.

Methods: 86 morbidly obese (BMI > 40 kg m⁻²) patients scheduled for bariatric surgery were included in the study. In every studied case, C-Mac was used with a Mackintosh shaped blade. For the first attempt, the anaesthetists performing the intubation were asked to use a videolaryngoscope as a standard laryngoscope (they were blinded to the monitor display) and evaluate the glottic view in direct laryngoscopy. Then they were asked to look at the monitor of the videolaryngoscope and intubate the patient. The laryngoscopy conditions were evaluated using the Cormack-Lahane (CL) scale. The time from picking up the laryngoscope to inserting the endotracheal tube was recorded.

Results: The evaluation of CL grade in direct laryngoscopy was: 44 patients — grade 1; 23 patients — grade 2; 13 patients — grade 3; six patients — grade 4. In all cases of CL grade > 1 in direct laryngoscopy, the use of C-Mac improved CL grade to 1. Mean time of intubation was 17.2 ± 2.5 sec.

Conclusion: The C-Mac improves laryngeal view in morbidly obese patients, and allows for fast endotracheal intubation.

Key words: tracheal intubation, videolaryngoscope, laryngoscope, C-Mac; obese patient

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The use of videolaryngoscopes should improve the laryngeal view in morbidly obese patients [1]. Although obesity alone is not a risk factor for difficult intubation [2], it is recommended to use videolaryngoscopes as a part of routine practice in anaesthesia for morbidly obese patients [3].

The C-Mac videolaryngoscope (Karl Storz, Germany) is a modern portable device for airway management (Fig. 1). So far there have been only a limited number of scientific papers describing clinical experience with this device in morbidly obese patients. To the best of our knowledge, this is the first report of the use of the C-Mac MC (Mackintosh) blade videolaryngoscope in morbidly obese patients. We

decided to evaluate C-Mac in a group of morbidly obese patients in a prospective observational study.

METHODS

This protocol study was approved by the Medical University of Lodz Ethics Committee (Protocol Number: RNN/752/10/KB). 86 morbidly obese (BMI > 40 kg m⁻²) patients scheduled for bariatric surgery were included in the study after giving written consent. Patients with a predicted difficult intubation were excluded from the study, i.e.: limited mouth opening, Mallampati grade > 3, or neck circumflex > 50 cm [4]. For intubation, patients were posi-

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Figure 1. Videolaryngoscope C-Mac Storz, Germany (source: manufacturer's marketing materials)

tioned with a head-elevated position [5]. All patients were anaesthetised following the protocol adopted in our institution: induction of anaesthesia with propofol 2.0 mg kg⁻¹ of corrected body weight; for muscle relaxation rocuronium 0.6 mg kg⁻¹ of ideal body weight (IBW); fentanyl 0.005 mg kg⁻¹ of IBW. After achieving the full neuromuscular suppression confirmed by TOF-Watch monitoring, laryngoscopy was performed by different anaesthetists working in our hospital. They had differing, but for the most part little, experience of using videolaryngoscopes. In every studied case, C-Mac was used with a Mackintosh shaped blade. For the first attempt, the anaesthetists performing the intubation were asked to use a videolaryngoscope as a standard laryngoscope (they were blinded to the monitor display) and evaluate the glottic view in direct laryngoscopy. Then they were asked to look at the monitor of the videolaryngoscope and intubate the patient. The laryngoscopy conditions were evaluated using the Cormack-Lahane (CL) scale. The time from picking up the laryngoscope to inserting the endotracheal tube was recorded.

Statistical analysis included a simple summary test. The Microsoft Excel 2003 v.11.5612.5606 (Microsoft, Warsaw) software package was used. Sample size was not calculated, but based on literature we assumed that a group comprising more than 50 pts was sufficient to detect differences in intubation conditions [1].

RESULTS

Demographic data and results of observation are presented in Table 1. In all cases, intubation was successful at the first attempt. Although 75% of the patients had Mallampati grade 1, 50% of the patients had CL grade 1. In all cases of CL grade >1 in direct laryngoscopy, the use of C-Mac improved CL grade to 1. 50% of patients with Mallampati > 1 had CL grade > 1. The remaining patients who had

Table 1. Demographic data and results of the study. Means \pm SD or numbers

Male/female (n)	23/63
Age (yrs)	36.7 \pm 11.4
Weight (kg)	126.4 \pm 18.6
Height (cm)	168.2 \pm 2.5
BMI (kg m ⁻²)	44.8 \pm 11.1
Mallampati grade (n)	
I/II/III/IV	63/20/3/0
Intubation time (sec.)	17.2 \pm 2.5
Cormack/Lehane grade (n)	
As classic laryngoscope	
1/2/3/4	44/23/13/6

BMI — body mass index

CL > 1 had Mallampati grade 1. Although we turned on the C-Mac at least 30 sec. before use (as recommended by the manufacturer), in five cases fogging of blade tip lens decreased the laryngeal view on the monitor. No complications of intubation were observed.

DISCUSSION

The use of videolaryngoscopes in morbidly obese patients not only improves the glottic view but also makes intubation efforts easier and less traumatic [6]. Therefore, although obesity is not necessarily associated with a higher probability of difficult intubation, endotracheal intubation in morbidly obese patients requires skill and usually more strength. In our study, we confirmed previous results demonstrating that standard Mallampati evaluation cannot predict increased Cormack-Lehane score in the morbidly obese [7], and in this group of patients it is justified to use videolaryngoscopes as a standard practice. The C-Mac videolaryngoscope proved to be very effective and easy to use even for anaesthetists with limited experience of using videolaryngoscopes. In a study describing the use of the V-Mac videolaryngoscope (an earlier version of the C-Mac) in the morbidly obese, Massen et al. [8] presented similar results to ours: intubation time of 17 sec but more intubation attempts (average 1.4). In our study, in all cases intubation was successful within the recommended time of intubation attempts, which is especially important in morbidly obese patients, in whom desaturation is faster than in non-obese patients [9]. The use of videolaryngoscopes is justified in patients in whom the probability of difficult intubation is increased because of coexisting diabetes mellitus, which is common in morbidly obese patients [10].

The C-Mac videolaryngoscope proved to be very effective for the intubation of morbidly obese patients, and we suggest

that videolaryngoscopes should be recommended for routine practice in anaesthesia for morbidly obese patients.

CONCLUSION

The C-Mac improves laryngeal view in morbidly obese patients, and allows for fast endotracheal intubation.

CONFLICT OF INTEREST

The author has received an honorarium from the firm of Medim (the representative of Storz in Poland) for lectures on airway management.

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