

The Effects of Videolaryngoscope on Hemodynamic Response and Adverse Events Associated with Intubation: A Comparison of C-MAC versus McGrath Videolaryngoscope in Morbidly Obese Patients Undergoing Bariatric Surgery

***Sedat Akbas**, Asst. Prof. Department of Anesthesiology and Reanimation, Inonu University Medical Faculty, Malatya, Turkey

Ahmet Selim Ozkan, Asst. Prof. Department of Anesthesiology and Reanimation, Inonu University Medical Faculty, Malatya, Turkey

Erol Karaaslan, Asst. Prof. Department of Anesthesiology and Reanimation, Inonu University Medical Faculty, Malatya, Turkey

Address all correspondence to:

Sedat Akbas, Asst. Prof. Department of Anesthesiology and Reanimation, Inonu University Medical Faculty, Malatya, Turkey

Mail: drsedatakbas@gmail.com

Phone Number: +905058263912

Fax Number: +904223410728

A short title: **C-MAC versus McGrath Videolaryngoscope in Morbidly Obese Patients**

Conflict of Interest:

The authors declare that they have no conflict of interest.

Funding Information:

None

Study Protocol

This trial was approved by the Local Ethic Committee of Inonu University (Protocol no: 2018/96, Approval Date: 27.06.2018). We conducted a prospective, randomized controlled clinical trial with 80 adult morbidly obese patients underwent laparoscopic bariatric surgery from August 2018 to September 2018 at an university hospital.

Study Participants:

Morbidly obese patients with American Society of Anesthesiology (ASA) scores of III-IV, who were aged 18–65 years old, and had a BMI>40 were included in our study. Patients were interviewed before surgery to obtain informed consent. Patients with pregnant or uncontrolled diabetes mellitus, cardiovascular disease, pulmonary disease, cerebrovascular disease, or drug and alcohol addiction were excluded. Patients who refused informed consent were also excluded.

Preoperative Procedures:

All of the patients one day before surgery; hemoglobin, hematocrit, prothrombin time, active partial thromboplastin time, aspartate aminotransferase, alanine aminotransferase were evaluated. Electrocardiography, posterior-anterior chest X-ray and preoperative anesthetic evaluations were performed. Age, gender, height, weight, BMI, ideal body weight (IBW), ASA physical status and type of the surgery were recorded in preoperative evaluation. On the day of surgery, patients were taken to the operating room without premedication. Interlingival and thyromental distance were measured. Standard monitoring procedures were used, including heart rate (HR), noninvasive blood pressure (NIBP), electrocardiogram (ECG), peripheral oxygen saturation (SpO₂), and body temperature monitoring by esophageal probe.

General Anesthesia:

A standardized general anesthesia protocol was administered in all patients by an experienced anesthesiologist. After preoxygenation (100% 4 L/min O₂ for 3 min), propofol (1–2 mg/kg), rocuronium (0.8 mg/kg) and fentanyl (0.1 µg/kg) were administered during the induction of anesthesia via intravenous (IV) route at doses calculated according to ideal body weights. End-tidal carbon dioxide (EtCO₂) was continuously monitored after intubation. Tidal volume and ventilation rate were adjusted to maintain EtCO₂ partial pressure of arterial blood at 35–45 mmHg. Rocuronium was intermittently injected according to need based on Train of Four (TOF; Dräger AG, Lübeck, Germany) values. TOF responses were assessed by ulnar nerve stimulation and adductor muscle response. 0.1–0.2 µg/kg fentanyl was titrated for analgesia, as needed, if HR and/or mean arterial pressure (MAP) increased by 20% above baseline during surgery. Anesthesia was maintained in both groups at desflurane inhalation in a 0.5 O₂ oxygen-air mixture. Desflurane was discontinued with the beginning of the skin sutures and the fresh gas flow was changed to 4 L/min of oxygen for both groups. In patients who did not experience complications during the surgery, sugammadex (IV, 2–4 mg/kg, Bridion[®], MSD, Greenville, USA) was then administered to reverse residual muscle relaxation at the end of surgery.

Randomization:

Randomization was performed with the MedCalc for Windows (medcalc.com.tr.), version 16 statistical software. Eighty patients were randomly allocated to two study groups: C-MAC group (Group C, $n = 40$) and McGrath group (Group M, $n = 40$). Patients in both groups received a fresh gas flow of 4 L/min for the first 10 minutes and were then maintained with a fresh gas flow of 2 L/min. All patients were mechanically ventilated with a tidal volume of 8 mL/kg based on ideal body weight and a frequency of 12–14 breaths/min using a Dräger Primus ventilator (Dräger AG, Lübeck, Germany). Age-related minimum alveolar concentration values were determined and expressed as a percentage of volume. All patients received the standard

surgical procedures determined by the same team of surgeons with experience in gastroenterology surgery. Pneumoperitoneum pressure ranged between 10 – 12 mmHg. Also pneumoperitoneum level was 30 – 45 degrees. Surgical management of sleeve gastrectomy was not changed in any way.

Postoperative Management:

Patients were transferred to the post-anesthesia care unit (PACU) after surgery. Patients were transferred to the general surgery intensive care unit when they achieved a score of 9 or higher on the Modified Aldrete score (range 0 –12; scores of 9 and above indicate that the patient can be discharged from the PACU). In all patients, postoperative analgesia was achieved IV analgesic medication using appropriate doses of tramadol (0.5-1 mg/kg, IV) and paracetamol (1 gr, IV) at the time of beginning skin sutures.

Outcome Measures:

HR, MAP, SpO₂, EtCO₂, and respiratory rate were recorded before anesthesia (T₀), after intubation (after the drugs given) (T₁), 1 min after induction (T₂), 2 min after induction (T₃), 3 min after induction (T₄), 5 min after induction (T₅). In addition to anesthesia and surgery times, perioperative and postoperative complications were recorded. Bleeding and edema in the mouth, burst of intubation tube cuff, presence of external laryngeal press and head position change, bradycardia, laryngospasm, and hypoxia were recorded during the 5th min perioperatively. Also hoarseness and throatache were recorded within the first 24 hour postoperatively.

Statistical Analysis:

On the basis of Taylor's study and using the power calculation method (OpenEpi, Version 3), assuming an alpha of 0.05 and a beta of 0.90, we calculated that 30 patients per group should be included in this study. Data were analyzed using the Statistical Package for the Social

Sciences program (SPSS 22.0, IBM). As some pre and anesthetic characteristics of patients were distributed abnormally nonparametric statistics was used. Quantitative data are presented as mean or standard deviation and categorical data are shown as numbers or percentages. Continuous variables were compared between the groups using Mann-Whitney U-test. Categorical variables were summarized using frequencies and percentages (%) and compared between the groups using Chi-Squared Test. The results were evaluated at a 95% confidence interval at a significance level of $p < 0.05$.