



THE USE OF A LARYNGEAL MASK FOR ANESTHESIA IN A PATIENT WITH SEVERE CERVICAL-THORACIC-CICATRICIAL CONTRACTURE

Sadikova Minura Adkhamovna.

Andijan State Medical Institute, Candidate of Medical Sciences Associate Professor of the Department of Anesthesiology and Resuscitation.

| Article history: | Abstract: |
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| <p>Received: December 11th 2021 Accepted: January 11th 2022 Published: February 25th 2022</p> | <p>According to the results of our research, we came to the conclusion that the indication for the use of LM involves to conduct the planned surgical interventions in prepared patients. A successful anesthetic procedure, in an inaccessible airway of respiratory tracts and in distortion by post-burn cirrhosis and fibrosis, requires a planned approach to the safety of respiratory tracts. This approach includes a successful use of the laryngeal mask (LM) in conditions of total myoplegia while providing anesthesia in the neck. Timely and effective airway management of the respiratory tracts is a priority for these patients. Our main task is to restore the form and function of this area in a safe way.</p> |

Keywords: Airway assessment, airway management, laryngeal mask, intubation technique.

TOPICALITY

According to the fact by the European League of Anesthesiologists, between 1988 and 2004, about 250 million anesthesia were performed worldwide using the classical laryngeal mask (LM) and its modifications [1,3]. The use of an airway laryngeal mask or LM which maintains free airway patency during anesthesia by creating a tight contact with the soft tissues of the hypo-pharynx above the entrance to the patient's larynx was proposed in 1981 by the British anesthesiologist A. Brain [5,7,8]. Unlike endotracheal tubes, the use of an airway laryngeal mask is less traumatic, because it is inserted not into the trachea, but into the lower part of the pharynx. Another advantage of using LM is the absence of the need for direct laryngoscopy and additional assistance from nursing staff [2,5,9]. The indication for the use of LM is the conduct of planned surgical interventions in prepared patients. However, the use of an airway laryngeal mask cannot be considered as an absolute alternative item to an endotracheal tube (ETT), since the LM does not prevent the risk of aspiration of gastric contents and cannot be used in emergency operations on patients with severe stomach contents. When the airways are inaccessible and distorted by post-burn cirrhosis and fibrosis, a successful anesthetic procedure requires a planned approach to ensuring the safety of the respiratory tract, including the successful use of a laryngeal mask (LM) in conditions of total myoplegia while providing anesthesia in the neck. Timely and effective airway management of respiratory tracts is a priority for these patients. The challenge is to restore the form and

function of this area safely. Traction force caused by burn cicatricial contracture can pull and cause insufficient extension of neck, incomplete oral occlusion, cicatricial ectropion, and changes in tracheal anatomy that affect breathing. This leads to difficult intubation and can lead to many serious complications and severe consequences [4,6,10]. However, the opinions of researchers about the safety and feasibility of this technique still differ.

AIM OF THE RESEARCH.

Our research is devoted to the question of the feasibility and effectiveness of setting up the ALM in anesthetic management during artificial ventilation of the lungs of a patient with severe cervical-thoracic cicatricial contracture in reconstructive plastic surgery.

MATERIALS AND METHODS.

52 patients aged 16-55 years were observed. The following reconstructive plastic surgeries were performed with those patients: post-burn and traumatic defects, deformities of the soft tissues of the neck. They were treated in the department of reconstructive surgery of the Multidisciplinary Medical Center of Andijan region from 2011 to 2021.

From all these patients, 25 anesthesia were performed with the help of laryngeal mask - these patients constituted the main group. The remaining 27 patients underwent surgical intervention with the usage of an endotracheal tube - these patients constituted the control group.

In all patients, cicatricial deformities of the neck were not accompanied by functional



disorders. The majority of patients - 90% of patients who underwent reconstructive plastic surgery were assigned to I - II risk groups according to the "Classification of the objective status of the patient of the American Society of Anesthesiologists" (ASA).

The main group of patients, (52 people) with thermal, post-traumatic cicatricial deformities, soft tissue defects of the neck, were operated with the usage of modern methods of reconstructive plastic surgery. They included skin plastic surgery, combined grafting, grafting with opposing flaps, local tissue grafting, relocated flap grafting, and intraoperatively stretched tissue grafting.

The duration of the operation ranged from 40 minutes to 150 minutes, with an average of 120 + 5.0 minutes.

The preparation of patients for anesthesia began before surgery and included: examining the patient, taking an anamnesis of life and illness. The preoperative examination plan involved electrocardiographic and radiographic observations. In addition, familiarization with general blood tests, hemoglobin, hematocrit was carried out and their age and body weight were recorded.

Preoperative therapeutic and preventive measures were taken together with the doctor in charge of that case – with therapist. In patients with a labile nervous system, drug preparation of the psycho-emotional sphere was started, 1-2 days before the operation with the use of hypnotics and sedatives. Premedication included: at night and two hours before the operation, sedatives (seduxen 5-10 mg or dormicum 5-10 mg) and antihistamines (diphenhydramine 0.05-0.1 g) in tablets. 30-40 minutes before the operation, diphenhydramine 1% - 1-2 ml (0.2-0.3 mg/kg), seduxen or dormicum 5-10 mg (0.1-0.2 mg/kg) were administered intramuscularly. As a rule, premedication had a pronounced sedative effect; patients were admitted to the operating room with stable hemodynamics and gas exchange.

The difficulty of the tracheal intubation was predicted with the assistance of the LEMON scale [10] and with the rule №3-3-2-1 [6,7]. in 52 patients. The absolute criterion of a difficult tracheal intubation (one parameter is enough) included: opening of the mouth (distance between the upper and lower teeth less than 3 cm), thyroid-chin distance <6 cm, class IV of Mallampati, neck stiffness up to complete immobility, inability to push the lower jaw forward (put the incisors of the lower jaw in front of the upper incisors, maxillary prognathism).

The criterion of the possible complex tracheal intubation (presence of several parameters) were: Mallampati class III, distance between upper and lower teeth 3-3.5 cm, thyroid-chin distance 6-6.5 cm, A. Brain's restriction of neck extension; modifiable maxillary prognathism; obesity [6,7,10].

Based on the results of the LEMON scale and based on the rule №3-3-2-1, the etiological factors of difficult tracheal intubation were established in reconstructive plastic surgery. While they were installing the laryngeal mask, the method of A. Brain was used: before installation, air was completely removed from the cuff of the laryngeal mask, then the cuff was lubricated with 1% hydrocortisone ointment. In the case of any failures occurred during the 1st attempt, the reinstallation of the laryngeal mask was also carried out according to the author's method.

In patients of both groups, combined intravenous anesthesia was used on the basis of bolus administration of ketamine (1.5–2 mg/kg), benzodiazepines (sibazon 0.14 mg/kg) and fentanyl (2.8 mg/kg). Maintenance of anesthesia: N2O:O2-2/1 (FiO2 = 0.3), fractional fentanyl (0.1-0.2), pancuronium (0.08 mg/kg).

Control of the adequacy of anesthesia was carried out by continuous monitoring of blood pressure, heart rate, pulse oximetry, using a monitor. The dynamics of CBS indicators (acid-base state) of capillary blood was studied by the method of Astrup, from samples of capillary blood. The above tests were carried out sequentially - at four stages of the intraoperative period:

Stage 1 - outcome;

Stage 2 - after induction;

Stage 3 - at the traumatic moment of the operation;

Stage 4- the end of the operation;

They determined the time of awakening of patients, the time of extubation, the presence of laryngeal-glottic reflexes at the stage of awakening.

RESULTS OF THE RESEARCHES:

A correct placement of the LM on the first attempt was achieved with 97.9%, despite the fact that there was a deliberate selection of patients with a perceived difficult intubation. The required time for the installation of the laryngeal mask was 9.3±1.9 sec., ETT - 8.9±1.89 sec. The research of hemodynamic parameters, the study of acid-base state and Et CO2 SpO2 at the stages of the research did not reveal glaring differences between the groups. That testified the adequacy of anesthesia, ventilation, gas exchange. Under the conditions of total myoplegia, in 100% of



cases, there were no any unwanted pharyngeal and laryngeal reflexes which cause airway obstruction of respiratory tracts or reflexes which provoke the occurrence of regurgitation; and they significantly affected the final results of the effectiveness of the installation of the laryngeal mask. While they were installing both the laryngeal mask and the endotracheal tube, any damage to the pharyngeal structures was not noted. Putting and placing the laryngeal mask in conditions of total myoplegia was not accompanied by an increase in airway resistance of the respiratory tracts. Pre-oxygenation of O₂ through the face mask of the respiratory apparatus provided a stable value of SpO₂ indicators (98-100%) during the installation of both the laryngeal mask and the endotracheal tube.

CONCLUSIONS:

- This method may be a viable alternative for the protection of respiratory tracts and intubation in patients with fixed flexion deformity, even with limited mouth opening;

- The use of total myoplegia makes it possible to install a laryngeal mask while using modern induction agents, without any hindrance. Because muscle relaxation creates "simplified" conditions in order to install a laryngeal mask: relaxation of the maxillo-facial muscles and the complete absence of negative pharyngeal-laryngeal reflexes.

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