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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

**COMPARATIVE EVALUATION OF CRITERIA FOR
ADEQUACY OF GENERAL ANESTHESIA
DURING THYROIDECTOMY**

Speciality: 3231.01 – Anesthesiology and reanimatology

Field of science: Medicine

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The work was performed at the department of endocrine surgery, anesthesiology, reanimatology and intensive care of the Scientific Center of Surgery named after acad. M.A. Topchubashov PLE.

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THE ACTUALITY OF THE SUBJECT

It is known from the literary sources that, the nodules of the thyroid gland (TG) are determined at the 7 % of population, but the thyroid nodules are determined at 50 % cases at the cadavers of other diseases¹. Increase of TG diseases has been concluded to increase numbers of the applied surgical operation on its treatment, thus surgical treatments are in the main part of treatment of TG diseases². Surgical operations are applied more than 40 thousand people in Russia Federation, up to 3 thousand people in Azerbaijan for the different disease of TG each year³. Increasing the quality on treatment of surgical pathologies of the thyroid gland does not mean only improvement of surgical techniques; this should also include the prevention of possible perioperational complications as part of the optimization of anesthesia support⁴. Applied anesthesia should provide effective antinociceptive blockade in segmental and peripheral innervation of the central nervous system to prevent the development of surgical stress⁵.

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The main duty of the anesthesiologist is to protect the patient from surgical trauma, making adequate anesthesia, to ensure the safety of the patient during and after the operation in the immediate postoperative period⁶. Therefore the anesthesiologist should provide with enough drugs for ensuring compliance of adequate anesthesia, should be applied by the means and algorithm of anesthesia methods⁷. Single-component of anesthesia on operation of traumatic and vital organs of the organism did not earn all demands of anesthesiologist for this the demand of using different drugs and combination of means⁸. Applying operations for thyroid glands diseases are realized where blood and nerve supply are high, performed directly on the upper respiratory tract and on the area of rich in reflexogenic points. Therefore, such operations are leaded by using combined endotracheal anesthesia mostly⁹. In this case intubation of trachea provides as adequate way of artificial ventilation of the lungs (AVL) by providing the permeability of the respiratory tract confidently¹⁰.

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At the same time using of endotracheal tube (ETT) requires creating deep sedation, using myorelaxants on the patient¹¹. On the other hands endotracheal tube can appear a number of dangerous occurrence of complications both operation period and after the operation¹². The followings are the best example of complication as hyperdynamic response of the cardiovascular system to intubation, in some cases unilateral ventilation of the lungs, violation integrity of the ciliated epithelium in the respiratory tract and difficulty in secretion of sputum, laryngitis, pharyngitis, tracheitis¹³. After the intubation anesthesia of above mentioned patients, several postoperational signs happen which are connected with intubation of trachea – some of these signs are nausea and vomiting, the density of such symptoms varies from 18 to 80%, depending on the nature of the surgery and the individual characteristics of the patient¹⁴. The act of vomiting concluded in addition from the risk of respiratory aspiration also intensification of ache, intracranial and thoracic internal hypertension¹⁵.

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Regularly vomiting affects to the regulation of water and salt balance (dehydration, hypokalemia, metabolic, alkalosis). On the other hand, the act of vomiting should be observed with hyperdynamic syndrome, which has a negative impact on the close postoperative period. The appearance of nausea and vomiting reduces the effectiveness of anesthesia support¹⁶. Therefore nowadays in some clinics have positive feedback on solving several problems by entering laryngeal mask airway (LMA) to the anesthesiology practice¹⁷. Appliance of laryngeal mask airway on regulation of airway permeability is new direction and alternative to the LMA both air transmission and endotracheal tube¹⁸. LMA is recommended for use in minimally invasive and non-void areas with spontaneous respiration in the literature¹⁹. The main problem on applying LMA saves patient from the aspiration of gastric contents and regurgitation by providing adequate anesthesia. Ensuring adequate anesthesia through LMA in thyroid surgery and prevention of possible complications is one of the current problems of modern anesthesiology and applied research is aimed at solving same problems.

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The purpose of research: The aim of study learning by the comparative way standard containing and combined general anesthetics according to the various adequateness criteria operated with appliance of endotracheal tube and laryngeal mask airway for the diagnosis of non- toxic nodules at the time of surgical operation of thyroid gland.

Issues of Research

1. To evaluate various methods by the comparative way with each other that appear the degree of combined general anesthetics according to the different adequateness operated with appliance of endotracheal for the diagnosis of non- toxic nodular goiter at the time of surgical operation of thyroid gland.

2. To learn the changes of dynamic signs of various homeostasis belong to the combined general anesthetics according to the adequateness operated with appliance of laryngeal mask airway for the diagnosis of non- toxic nodular goiter at the time of surgical operation of thyroid gland.

3. To determine role of bispectral index monitoring (BIS) and adequacy with the depth level of anesthesia of hormonal, hemodynamic, metabolic changes on various stages of combined general anesthesia.

4. To evaluate as comparative the variant of endotracheal anesthetics with variant of combined general anesthetic operated with appliance of laryngeal mask airway with the diagnosis of non- toxic nodular goiter at the time of surgical operation of thyroid gland.

5. To evaluate positive and negative sides of each applied anesthetics with appliance of combined laryngeal mask airway and ETT for the diagnosis of non- toxic nodular goiter at the time of surgical operation of thyroid gland.

General provision for issued defence

1. According to the surgical diseases of TG the appliance of LMA conducted on anesthesia process on applied operation does not cause undesirable changes on reaching oxygen to the tissue and

arterial blood gases, for the reason of deficiency of mechanical effect to the mucous membrane of trachea has little effect on hemodynamics and it should be considered as alternative to the applied general anesthesia with intubation of trachea. There were a few contradictions to appliance laryngeal mask airway with mean of general anesthesia on surgical treatment of non- toxic nodular goiters.

2. The idea that the LMA replicability the function of the endotracheal tube during anesthesia in thyroid surgery confirms by monitoring of ventilation parameters and blood gas content at the term of general anesthesia;

3. Hemodynamic reaction of patient in the located process of LMA is significantly (85 - 90 %) lower than the reaction to the intubation on its trachea. Hemodynamics and stress response was stable in the patients of general anesthesia who confirms the possibility of adequate protection against applied surgical aggression on the thyroid gland by using a laryngeal mask airway, propofol and fentanyl on the regularity of general anesthesia.

4. General anesthesia with laryngeal mask by using isoflurane in operations on TG is observed with stability of hemodynamics. BIS- monitoring results show that the reaction of the central nervous system is adequately blocked during induction and the patient regains consciousness at the time of leaves the anesthesia.

5. Aldrete's score level was maximal during the initial postoperative period of isoflurane based anesthesia with using LMA, cortisol and ACTH levels were significantly lower and this technique accelerated postoperative rehabilitation, recovery of consciousness, respiration, and postoperative discoloration of the patient's throat significantly to less than before hand.

Scientific novelty of the research: Additional effects of endotracheal intubation anesthesia during thyroid surgery: trauma to the oral cavity and upper respiratory tract, unnecessary stimulation of cardiovascular reactions, mistaken esophageal intubation, bronchospasm, cough reflex, postoperative laryngospasm The safety

of general anesthesia using a laryngeal mask to prevent symptoms such as pharyngitis, laryngitis, and hoarseness has been noted as an alternative to the intubation tube, and the laryngeal mask has been validated as an index finger technique. During general anesthesia with the use of a laryngeal mask, the volume of gas mixture loss is reduced by 0.3%; There is no statistically significant difference between S_pO_2 levels in either group. Unlike endotracheal anesthesia, general anesthesia with a laryngeal mask airway does not require the use of muscle relaxants; changes in the level of a number of stress factors are noted at lower levels ($25 \pm 1.5\%$) than in intubation anesthesia; There was no difference in the dynamics of BIS monitoring in both methods of anesthesia. Compared with endotracheal anesthesia, the level of Aldrete scale was maximal in the initial postoperative period of anesthesia with laryngeal mask, the duration of postoperative rehabilitation is reduced, the recovery period of consciousness and respiration is shortened ($35 \pm 5\%$), postoperative sore throat after intubation anesthesia $75 \pm 5\%$ becomes less ($P < 0.01$); Hyperdynamic changes in hemodynamic parameters are not observed in the exclusion of LMA. The results of the examinations confirm that patients under general anesthesia using a laryngeal mask airway have adequate protection against surgical aggression on the thyroid gland.

Practical importance of research: Anesthesia method with LMA appliance should be accepted as an alternative variant to its by removing the undesirable sides of general endotracheal anesthesia's variant and it was considered suitable for practical anesthesiology on the operations of thyroid gland. Above mentioned general anesthesia variant should be applied complication spontaneous breathing or artificial ventilation, this makes it possible to use it successfully in practical anesthesiology as a non-invasive method.

Appliance of result of research: The methodical recommendation arising from the results of the dissertation was applied in the scientific-practical departments of endocrine surgery, anesthesiology and reanimatology and intensive care of the Scientific Center of Surgery named after acad. M.A. Topchubashov PLE.

Approbation of scientific work: The dissertation materials were presented as a poster at the World Congress on "Regional Anesthesia and Pain" held by the American Society of Anesthesiologists on April 19, 2018 in New York. Materials of the dissertation are Scientific Center of Surgery named after acad. M.A. Topchubashov PLE was held with the participation of employees of the departments of endocrine surgery and anesthesiology and reanimatology and intensive care, the 2nd department of Surgery of the Azerbaijan Medical University (February 15, 2020) and it was discussed at the meeting of the scientific seminar under the at the same center (February 19, 2021).

The Structure and construction of dissertation: The dissertation is written in A4 format, "Times New Roman" in 14 fonts and 1.5 line spacing in the Azerbaijani, consists of 160 pages (number of characters 203.728) and containing the results obtained from the table of contents (2 p.), the list of abbreviations and symbols (1 p.), the introduction (7 p.), the literature review, the material and method of research, the results obtained and their discussion- it consists of 5 chapters (109 p.), Conclusion (11 p.), Conclusions (1 p.), Practical recommendations (1 p.), List of used literature (28 p.). The bibliography covers 206 sources. The dissertation is illustrated with 13 schedules, 38 pictures and graphics. The schedules were compiled by Microsoft Word- 2013 and schematic drawings were made in Paint; The photos were taken with a digital camera and placed in the text.

Relation of research to the problem plan of medical sciences. The subject of the dissertation is included in the research plan of the Scientific Center of Surgery named after acad. M.A.Topchubashov PLE (State Registration № 0106AZ00883).

Publications: 9 abstracts, 3 theses and one methodical recommendation on the topic of the dissertation were published.

MATERIAL AND METHODS

The analysis realized in 2 groups with the aim of solving problem that we have set: the 1st main group – general anesthesia applied with the appliance of laryngeal mask airway in 60 patients (main group) and with the same indication appliance of general anesthesia with intubation of trachea in 40 patients (control group) at the time of conducting thyroidectomy according to the demand of cytology analysis results from the taken biopats by the means of thin needle aspiration biopsy from the noodle subsidiaries of thyroid gland (TG) in the Endocrine Surgical Department of Scientific Center of Surgery named after acad. M.A. Topchubashov PLE in 2017 – 2019 years. The patients who has concomitant diseases had not entered to these 2 groups. Patients under 45 years of age predominated in both groups (60% in the main group and 57.5% in the control group). The number of women are more than men in 4.5 time in main group, 3.44 time in control group in all age groups. In both groups, we assessed the physical condition of patients according to the American Association of Anesthesiologists' proposed ethics classification (ASA): 100 patients with ASA I was suitable only TG pathology, no concomitant disease and their general condition of normal persons .

Premedication was performed by intramuscular injection of (50-100 mkg/kg) midosalam and under general anesthesia inhaled anesthetic - isoflurane 0.8-1.5 h%, intravenous midosalam (for retrograde amnesia- 150-200 mkg/kg), anesthetic - induction dosage - Propofol - 1.5-2.5 mg / kg, narcotic analgesic - fentanyl - 0.1 mg and in addition to those listed in the control group, we used muscle relaxant - Arduan (pipekuronium bromide) - 0.06-0.08 mg / kg in both 2 groups. The ventilation realized in main group by keeping of spontaneous breathing provided with laryngeal mask but in control group it realized keeping artificial compulsory breathing on ventilation regime by the means of classic intubation of trachea. Gained result statistically conducted monitoring of stress markers and gaseous context of blood, balance of alkaline – acid, breathing,

blood vessel system after and during anesthesia. The motion of general anesthesia (induction, regulation of anesthesia and recovery) depends on directly with the affect period and concentration that forming in the tissue, dosage of them, pharmacokinetics of using drugs. In both groups, general anesthesia was performed against the background of spontaneous and artificial lung ventilation: in the main group, lung ventilation was provided under general anesthesia with spontaneous respiration with LMA support and in the control group with tracheal intubation with forced artificial respiration. At the term of surgical operation was $60.5 + 5.5$ minutes ; the general term of anesthesia was $82.5-5$ minutes. There was no significant difference between the total doses of propofol used in both groups: the dose of propofol used in the main group was 0.08 ± 0.004 mg / kg / min, and in the control group it was 0.08 ± 0.08 mg / kg / min. The recovery period (end of surgery, removal of the laryngeal mask or endotracheal tube) occurred in a shorter period of time in the main group of patients than in the control group. In the main group of patients, recovery of free breathing and consciousness occurred in 8.4 ± 1.12 minutes, , while in the control group it took 16.6 ± 1.3 minutes ($p < 0.05$). We spent 10.5 ± 1.05 seconds on the laryngeal mask airway and 9.5 ± 4.0 seconds on the ETT and one patient repeated the intubation. Our researches certify that, when we use laryngeal mask airway the deficiency of gas mixture no more 7 % and such results show us creating adequate hermeticity of laryngeal mask airway and LMA is the effective means for provide conductivity of respiratory tract as endotracheal intubation tube; to conduct effective ventilation of lungs, all term of general anesthesia in both appliance on the surgical treatment of nontoxic nodular goiter of thyroid gland is possible.

In our study, we studied the gas composition of the blood and the dynamics of the alkaline-acid balance in both 2 groups. As we known that tracheal intubation provides conductivity of adequate respiratory tract. Our examinations in the control group confirmed all these once more. The results of the blood gas and alkaline acid balance tests confirmed that there was no significant difference

between the levels of SpO₂ (oxygen saturation level in the blood) in each of the two groups at all stages of the examination. Adequacy of applied general anesthesia by using either laryngeal mask airway or ETT show stability of blood gas and alkaline acid balance in the background of lung ventilation in both group. We have already researched the influence of applied general anesthesia with laryngeal mask air way to hemodynamic system.

Conducted researches confirm that the main indicators of hemodynamics in the stages of general anesthesia with a LMA are less varied than the same parameters in the background of general anesthesia with endotracheal tubing. According to the above mentioned, we can confirm that general anesthesia with a laryngeal mask is a less invasive method than endotracheal intubation in terms of its effect on hemodynamic parameters. We have researched comparatively the influence of the influence of applied general anesthesia with laryngeal mask airway to hemodynamic system. As the result of research we can say that the indicators of hemodynamics in the applied general anesthesia with a LMA changes are less than intubation of trachea.

Thus, despite the adequacy of anesthesia, intubation of the trachea has a greater effect on the indicator, causing a reaction in the hemodynamic system: the pulse rate during the application of the laryngeal mask airway in the main group was 72.0 ± 2.0 and in the 2nd group of tracheal intubation 16.3 % ($p < 0.05$) less than same indicator. Blood pressure (BP) indicators were similar: systolic BP was 13.6% lower in the baseline group, diastolic BP 9.5% and average BP 7.3% lower from the control group. Mentioned results certify the absence of laryngeal reflex during the application of the

Thus, at the case of optimal influence to the beat number of heart and arterial pressure while located LMA at the initial anesthesia, the intubation of trachea also influences more than certain functions. Hemodynamic indicators in all stages are stable in the term of regulation of anesthesia in both 2 groups; such situation shows us adequacy and effectiveness of anesthesia. At the time of location of mask on applied anesthesia with laryngeal mask systolic

arterial pressure was 14.3 %, number of beat per minute is 16.2 % diastolic arterial pressure was 9.6 % and average arterial pressure was 6.1% lower than at the same stage of tracheal intubation anesthesia ($p < 0.05$).

The dynamics of hemodynamics in the examination stages confirmed that the LMA was an effective, adequate method, but less invasive than the endotracheal tube. As we known, the operations applied to the thyroid gland and applied anesthesiology manipulation on this period entered to the list of stress factor for organism. Thus, applied induction irritates neurovegetative defense of organism partially before beginning of general anesthesia. Take into consideration we researched how applied anesthesia influenced to stress factor than classic intubation anesthesia by the means of appliance of laryngeal mask airway. We evaluated concluded result as comparatively in the various stage of examination in both 2 groups by determining 20 patients who have the cortisol, ACTH and glycemia level on blood from the stress factor.

The result of the examination certified that, the level of cortisol on all stage of examination never changes in main group, staying in normal indicators all the term of surgical operation shows that the anesthesia is stable. (Table 1)

Table 1

Dynamics of blood levels of cortisol in the stages of general anesthesia in the examination groups (n=20)

Indicator	Group	Stages of analysis			
		I	II	III	IV
Cortisol (normal range- 101.2-535 nmol/L)	I	135,5±45,6	148.3±19,5	340,6±36,9	337,9±31,1
	II	138,4±43,6	156,2±47,7	367,6±27,3	369,2±36,2

Note: Statistical accuracy of the difference between the indicators: compared to the first stage: * - $p < 0.05$; Compared with stage II: ^ - $p < 0.05$; Compared to group II: # - $p < 0.05$;

This result confirmed that the stress response to the introduction of the laryngeal mask airway was lower than the body's response to the intubation of the trachea. At the end of the operation, during the removal ETT and LMA in stage IV, ACTH levels were close to normal in both groups, but in the control group, ACTH levels were 6.3% higher than in the main group and cortisol levels were 8.4% higher (so it was statistically incorrect) the results also confirmed the adequacy of the anesthesia. The results of cortisol on blood is same with ACTH results on blood in both 2 groups. (Table 2)

Table 2

Comparative dynamics of the amount of ACTH between the main and control groups

Groups	ACTH (normal range -7,2-63,3 pg/ml)		
	II stage	III stage	IV stage
I (n=10)	40,9±10,6 (19,07-58,5)	140,3±15,6 (70,7-58,43)	64,5±3,20 (56,5-68,4)
II (n=10)	44,3±14,0 [#] (34,62-98,3)	145,2±36,8* (137,2-30,68)	68,9±5,49 [^] (62,2-9,06)

*Note: Statistical accuracy of the difference between the indicators: compared to stage I: * - $p < 0.05$; Compared with stage II: [^] - $p < 0.05$; Compared to group II: [#] - $p < 0.05$;*

We also determined the level of glycemia from stress markers in each of the 2 groups during the examination stages. Thus, the level of glycemia is one of the indicators of the condition of the sympatho-adrenal system, which can change during anesthesia and surgery. During the induction phase of general anesthesia and the application of the laryngeal mask airway, the glycemia level increased by 4.4% compared to the first stage and was 4.6 ± 0.07 mmol / l ($p > 0.050$). On the examination of glucose level on blood there was no any changes on the glycemia level and the statistics was not same ($p > 0,05$) for the initial indicator it was $4,5 \pm 0,06$ mmol/l in the 2nd stage of main group. We observed that the indicators of

glycemia were stable in the 3rd stage of main group - level of glycemia was $4,6 \pm 0,07$ mmol/l. (Table 3)

Table 3

Dynamics of glycemia levels in the examination stages in both groups

Indicator	Groups	Stages of analysis			
		1	2	3	4
Glucose (mmol/l)	I	4,4±0,08	4,6±0,09 ^{^^}	4,5±0,07 ^{^^}	4,6±0,05 ^{*^}
	II	4,5±0,06	4,8±0,07 ^{***}	4,8±0,06 ^{**}	4,8±0,07 ^{**}

Note: Statistical accuracy of the difference between the indicators: compared to the first stage: * - $p < 0.05$; * - $p < 0,01$; ** - $p < 0.001$; Compared with group II: ^ - $p < 0.05$; ^^ - $p < 0,01$;

Thus, we can say that the applied anesthesia was effective by confirming the level of glycemia on a stress factor of general anesthesia by using a laryngeal mask airway.

On our examinations in the control group, we see that in the second stage which reflects the intubation of the trachea, the level of glycemia increased significantly by 6.2% compared to the initial values and was 4.9 ± 0.07 mmol/l ($p < 0.05$). On the third stage of anesthesia (during thyroidectomy) the level of glycemia did not change 4.8 ± 0.07 mmol / l ($p > 0.05$) as compared to the previous stages. The level of the glycemia stay as stable in 4th stage of 2nd group patient.

A comparative evaluation of the results of examinations in both groups, it was clear us that the level of glycemia was almost the same in both groups at the initial stage. The level of glycemia in main group realizing the location of LMA and intubation of trachea on 2nd stage was $4,9+0,07$ mmol/l, it was increased up to $4,6+0,07$ mmol/l in control group, thus the level of the stress factored glycemia earn applied traume samely in the both types of anesthesia.

At the same time, there was no statistical accuracy in the levels of these indicators in groups ($p < 0.05$). The dynamics of

examinations in both groups during surgery and in the stages of waking patients from anesthesia showed that in both stages there was no significant change in glycemic levels - in other words, the anesthesia was effective ($p < 0.05$).

Gained results suggest that we researched carefully at the results of the examination reveals less stress factors than intubation anesthesia when performing surgeries on non-toxic nodular subsidiaries of the thyroid gland under general anesthesia with a laryngeal mask airway. The recovery period (removal of the LMA or ETT) occurred in less time in the main group of patients than in the control group. In the main group of patients, recovery of free respiration and consciousness occurred in 8.4 ± 1.12 minutes, while in the control group it took 16.6 ± 1.3 minutes ($p < 0.05$). There were not any complications both anesthetic and surgical between the two groups. In the postoperative period 38.5% of patients in the control group complained of discomfort throat, while in patients using a laryngeal mask airway, such complaints were 25% less, and only 14% of patients. Discomfort in the throat and pharynx in the control group lasted longer than in the main group. Anesthetics that use of anesthesia in both groups was a little bit surface but enough adequate and it helped to administrative more easily. Patient's adequate respiration and consciousness are recovered faster than intubation anesthesia when using laryngeal mask airway for non use of myorelaxant.

Summary: LM has been new applied method for the providence of conductivity of respiration tract that was used in general anesthesia as the alternative variant to the endotracheal tube and face mask in most cases. LMA is a less invasive procedure than endotracheal intubation because it does not come into direct contact with laryngeal structures. However, LMA cannot reliably protect the respiration tract from aspiration and regurgitation. LM is also used in routine surgery, with the exception of some abdominal and thoracic pathologies. LM is also used in several critical situations, in patients who tracheal intubation was not possible and in cases that pre-intubation thought was difficult. LM has a minimal effect on the

pharyngeal and laryngeal structures and was in main place in the choice of anesthesia in pediatric practice, as it does not damage the tissues above and below part of the vocal cords. Intubation is more useful method for minimal influence than anesthesia on the activity of cardio-vascular system on the term of location LMA and being in the pharyngeal area. However, LMA cannot completely replace the intubation method in the surgical treatment of many pathological processes, the use of LMA completes the applied anesthesia with trachea intubation and it is improved of anesthesia techniques. In the unknown literature, we have not been able to find a detailed description of the problems of general anesthesia with the use of LM in thyroid surgery; the small amount of information available is contradictory and does not reflect all aspects of the problem. The above confirms the importance of research on the adequacy of the application and results of general anesthesia with the use of LMA in surgical diseases of the thyroid gland.

RESULTS

1. In general anesthesia when applying the laryngeal mask airway (II stage), systolic blood pressure was 14.3%, heart rate was 16.2%, diastolic blood pressure was 9.6%, and mean arterial pressure was 6.1% lower than at the same stage of endotracheal anesthesia ($p < 0, 05$). When the intubation tube was removed systolic blood pressure was 16,6%, diastolic pressure was 15.9%, mean arterial pressure was 6.9%, and pulse rate was 10.3% higher than in the main group ($p < 0.05$). Based on the above, we were able to confirm that general anesthesia with a laryngeal mask airway has less negative effect on hemodynamic parameters than endotracheal intubation.
2. During general anesthesia using a laryngeal mask airway we didn't use muscle relaxers and spontaneous lung respiration is maintained, there is no positive pressure in the respiratory tract and P_{peak} is not recorded differently from the control

group. This indicates that the volume of blood flowing to the heart and expelled to the aorta during anesthesia with LMA is not reduced, unlike endotracheal anesthesia.

3. During general anesthesia with a laryngeal mask airway, the levels of ACTH and cortisol in the blood are recorded at lower levels than under endotracheal anesthesia. Due to the sympathetic response to intubation in the second stage of anesthesia in the control group, the amount of ACTH was 7.6% higher than in the main group, and the amount of cortisol was 5% higher. At the end of the operation - during the removal and extubation of LM in stage IV, ACTH levels in both groups were close to normal, but in the control group, the amount of ACTH was 6.3% higher than in the main group, and cortisol was 8.4% higher.
4. Glycemia, one of the stress markers, did not exceed the upper limit of normal in both groups. However, in II stage of general anesthesia with tracheal intubation, the results were 4.3% higher than in the same stage of LM anesthesia and 4.1% higher than in stage IV ($p < 0.05$).
5. Compared with endotracheal anesthesia, the level of Aldrete scale was maximal in the initial postoperative period of general anesthesia with the using laryngeal mask airway and the duration of postoperative rehabilitation is reduced, the recovery period of consciousness and respiration is shortened ($35 \pm 5\%$), postoperative sore throat decreases by $\pm 5\%$. ($P < 0.01$).

PRACTICAL RECOMMENDATIONS

1. The drainage tube of the laryngeal mask airway allows it to enter the digestive system in isolation, it is possible to prevent regurgitation and aspiration at any time by injecting a direct gastric tube through the drainage tube.
2. During the peak period of thyroidectomy, thus during the mobilization and removal of the glandular portions by the

surgeon, it is expected that the LMA will be displaced as a result of the increased impact on the patient's neck. During this period, it is recommended to carry out special monitoring of lung ventilation and adequate gas exchange.

3. During anesthesia with LMA, if there is respiratory failure for any reason, inadequate ventilation and partial pressure of oxygen - $\text{PaO}_2 < 75$ mm Hg, partial pressure of carbon dioxide- $\text{PaCO}_2 > 45$ mm Hg with the fraction of inspired oxygen- F_iO_2 - 50-60%, immediate endotracheal intubation, artificial respiration is recommended.
4. In the course of general anesthesia with LMA, if for any reason there is a need for muscle relaxation and artificial ventilation, it is recommended to continue ventilation with tidal volume- V_t -6 ml / kg, the number of breaths (f) is 14-16. Such a calculation of the minute volume prevents the stomach from filling with air, increasing intra-abdominal pressure and compressing the diaphragm and lungs, and increasing the number of breaths prevents hypoventilation.

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