Ключевые слова: общественное здоровье, стратегия промоции здоровья, медицинские работники, профилактическая работа, профилактика болезней.

Key words: public health, health promotion strategy, medical workers, preventive work, disease prevention.

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CHARACTERISTIC OF INTRAOPERATIVE TEMPERATURE HOMEOSTASIS AND PREVENTION OF INADVERTENT INTRAOPERATIVE HYPOTHERMIA

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The aim of research is to determine the characteristics of intraoperative temperature homeostasis and develop methods of prevention of inadvertent intraoperative hypothermia. The study included study of temperature homeostasis in 160 surgical patients. The patients of the test group were operated on in the conditions of correction of their temperature homeostasis was provided by local applying of polyethylene terephthalate polymer coating. The patients of the control group underwent surgeries without using any techniques aimed to correct their temperature homeostasis. Was found out a progressive decrease in temperature in all parts of the body as well as in integral indicators of temperature homeostasis in the intraoperative period. The most pronounced decrease in the temperature of the surgical patients was observed at 60th minute of the surgical procedure was observed on the skin of hips and arms. Prevention of decrease in the temperature was possible by insulating thighs and arm of the patients with shielding materials.

Key words: temperature homeostasis, inadvertent intraoperative hypothermia, prevention.

This article is a part of research work "Optimizing the quality of anaesthesia and intensive care patients based on age and gender dimorphism clinical and functional, immune and metabolic changes", state registration number 0114U006326.

Inadvertent intraoperative hypothermia (IIH) is unplanned drop of core body temperature of the patient below 36°C. Its registration in the perioperative period are from 40 to 90% [8].

There are the factors that can contribute to the patient's temperature loss in the operating room is transcutaneous losses (make up to 60% of total heat losses), breathing losses (make up to 20% of total losses), convection losses (make up to 15%), conductive loss (make up to 5%) [9].

IIH is known to increase the risk of cardiac and infectious postoperative complications. IIH can contribute to increased postoperative blood loss and as a consequence needs for transfusion. Patients who experienced IIH during the operation, wake up more slowly, and their awakening is often accompanied by muscular shivering. Perioperative hypothermia leads to prolonged terms of hospital staying and may be a cause of nosocomial mortality [2-4, 7]. Moreover, all general anesthesia medications considerably influence on the thermoregulation by changing thresholds of compensatory cardiovascular reactions, reducing heat production, perspiration and muscle thermogenesis [1].

Hence, IIH prevention must become an inseparable part of planning and performing on surgical operations in all areas of surgery.

The purpouse of research is to determine the characteristics of intraoperative temperature homeostasis and develop methods of prevention of inadvertent intraoperative hypothermia.

Materials and methods. Our study, which included two phases, was carried out for the period from August, 2015, to October, 2016, in surgical in-patient departments of Poltava. Phase I included ascertaining prospective open-label study of temperature homeostasis in 100 patients operated on for surgical pathology of abdominal organs, aged from 18 to 83 years old, whom have been measured the changes in basal body and internal body temperature in standard operating conditions during the surgical operation in standard conditions of operating room (air temperature was 23^0C and relative humidity of the air equaled 55% in accordance with current safety standards). Phase II represented double randomized prospective study of temperature homeostasis in 160 patients underwent elective surgical operations for pathologies of abdominal organs. The operations, open laparotomies, were performed under total intravenous anesthesia, prolonged myoplegia, artificial lung ventilation, and airway intubation. The patients similar by the age, sex, extent and type of surgery and anesthesia, were divided into 2 groups of 80 people. The patients of the test group were operated on in the correction of their temperature homeostasis was provided by local applying of polyethylene terephthalate polymer coating «Leina-Werke», Germany. The patients of the control group underwent surgeries in standard of operating room without using any techniques aimed to correct their temperature homeostasis.

We registered the type of anesthesia medication, time of spontaneous breathing recovery, consciousness and muscle tone recovery in the post-operative period, the development of postoperative muscle shivering (POMS) and post-operative nausea and vomiting (PONV). Vital signs of patients (heart rate, blood pressure, body external temperature) were monitored by the monitor UM 300-12 («UTAS», Ukraine) and recorded during surgery and 30 minutes prior the surgery and after it. External temperature was measured on the skin of the anterior surface of the chest, arms (Tarm), thighs (Tthigh), shin (Tshin), calves (Tcalf) with calculation of mean T skin (Tms) [5]. Measuring of core body temperature was performed upon the tympanic membrane by using a infrared thermometer «UT-101» («A & D Company, Ltd.», Japan). Mean body temperature (Tmb) was calculated taking into account core T of the body (Tc) and Tms [2]. In describing the results of the study we indicated the number of observations (n), the average arithmetical (M), bias (m), median (Me) and Quartile scale (50L, 50U). Comparison of the two groups by their quantitative indicators was performed by using Wilcoxon-Mann-Whitney (U) test with calculation of the amount of ranks Σr, the comparison by qualitative indicators was calculated by using Pearson criteria ($\chi 2$). Correlations between the phenomena were calculated by using the Spearman correlation (R). A minimum margin of error-free prediction was considered as P = 0.95 and, and, respectively, the probability of error level was calculated as p = 0.05.

Results and their discussion. In the Phase I of the study we found out a progressive decrease in temperature in all parts of the body as well as in integral indicators of temperature homeostasis (Tmb and Tms). The most pronounced decrease in the temperature of the surgical patients was observed at 60th minute of the surgical procedure with following stabilization of temperature dynamics (Fig. 1).

Significant correlation of skin temperature decrease occurrences at 60th min below the limit value to fix IIH was observed on the skin of hips and arms; this corresponds to the data of other authors [1]:

- the value of correlation between IIH occurrences and Tshin: R = 0,2; p = 0.07;
- the value of correlation between IIH occurrences and Tarm: R = 0,6; p = 0.03;
- the value of correlation between IIH occurrences and Tthigh: R = 0,5; p = 0.03;
- the value of correlation between IIH occurrences and Tcalf: R = 0,2; p = 0.07.

In the Phase II of the study we implemented IIH preventive measures based on the results obtained at the first phase of the study. The results showed that IIH prevention was possible by insulating thighs and arm of the patients with shielding materials (Fig. 2).

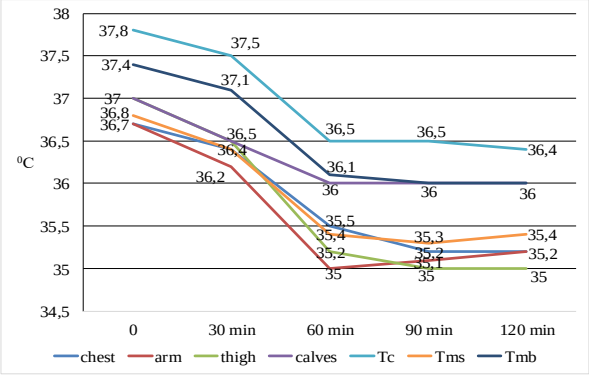

Figure 1. Dynamics of temperature in various parts of the body and integral indicators of temperature homeostasis during the surgical operation (n = 100).

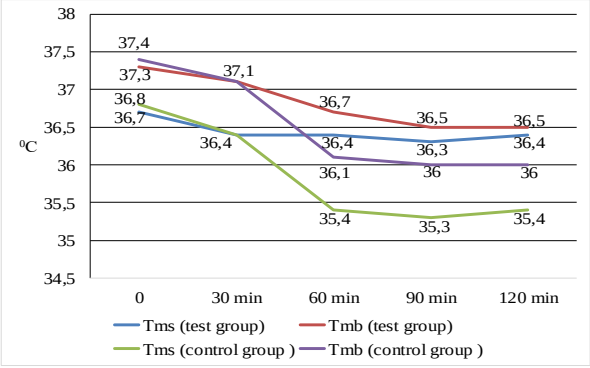

Figure 2. Dynamics of integrated indicators of temperature homeostasis during the surgical operation.

At the 60th min of the surgical intervention, when decrease in temperature reached critical valuesoccu, the indicators of IIH occurrence rate in both groups differed significantly (Table 1).

Table 1

IIH occurrence rate according to results if measuring Tms and Tmb at the 60th min of the operation

Sign	Test group (n)		Control group (n)		χ^2	p
	Presence of sign	No sign	Presence of sign	No sign		
Tms	10	70	62	18	68,2	<0,01
Tmb	7	73	29	51	17,35	<0,01

It is known that the prevention of IIH reduces the number of postoperative complications [6]. The methods applied to prevent IIH were proven as effective regarding to the safety and comfort of the patient. The patients of the test group demonstrated significantly less occurrence of postoperative muscle shivering and postoperative nausea and vomiting (Table 2). Moreover, under the same schemes of anesthesia the patients of the test group demonstrated significantly earlier recovery of spontaneous breathing and muscle tone, their hemodynamic parameters were more stable (Table 3). Thus, having carried out the study we determined areas of the body with the highest values of heat losses. We have also revealed that maintaining

temperature of the covering patient's hips and arms with insulating material reduces the IIH incidence and do not interfere the comfort of the operating crew members.

Table 2

Occurrence of postoperative muscle shivering and postoperative nausea and vomiting

Sign	Test group (n)		Control group (n)		χ^2	p
	Sign is present	No sign	Sign is present	No sign		
POMS	10	70	32	48	15,6	0,01
PONV	3	78	12	68	6,0	0,03

Table 3

Data obtained from quantitative analysis of clinical parameters in the patients in postoperative period

Sign	Test group (n=80)					Control group (n=80)					U	p
	M±m	Me	50L	50U	Σr	M±m	Me	50L	50U	Σr		
Recovery time of spontaneous breathing, min	35,7±0,3	35	32	39	11083	58,02±0,5	57	37	61	5577	2172	<0,01
Time of satisfied head lift test, min.	160,3±36,1	170	160	230	11462	291±25,5	300	235	350	5191	2551	0,02
Pulse (beats per min).	65±0,6	66	42	76	11026 ,5	75,9±0,23	76	55	87	4904,5	2380, 5	0,02
Arterial systolic pressure, mmHg.	125,9±5, 4	126	116	127	5196	136,9±15,6	137	116	148	9682	18,1	<0,01

These measures contribute to the decreased occurrence of postoperative muscle shivering and postoperative nausea and vomiting, facilitate earlier recovery of spontaneous breathing, muscle tone, hemodynamic stabilization.

Conclusions

Was found out a progressive decrease in temperature in all parts of the body as well as in integral indicators of temperature homeostasis in the intraoperative period. The most pronounced decrease in the temperature of the surgical patients was observed at 60th minute of the surgical procedure with following stabilization of temperature dynamics. Significant correlation of skin temperature decrease occurrences at 60th min below the limit value to fix IIH was observed on the skin of hips and arms. IIH prevention was possible by insulating thighs and arm of the patients with shielding materials. The methods applied to prevent IIH were proven as effective regarding to the safety and comfort of the patient. The patients of the test group demonstrated significantly less occurrence of postoperative muscle shivering and postoperative nausea and vomiting, significantly earlier recovery of spontaneous breathing and muscle tone, their hemodynamic parameters were more stable.

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Реферати

ХАРАКТЕРИСТИКА ІНТРАОПЕРАЦІЙНОГО ТЕМПЕРАТУРНОГО ГОМЕОСТАЗУ І ПРОФІЛАКТИКА НЕНАВМИСНОЇ ІНТРАОПРЕЦІЙНОЇ ГІПОТЕРМІЇ

Шкурупій Д.

Метою дослідження є визначення характеристик інтраопераційного температурного гомеостазу та розробка

ХАРАКТЕРИСТИКА ИНТРАОПЕРАЦИОННОГО ТЕМПЕРАТУРНОГО ГОМЕОСТАЗА И ПРОФИЛАКТИКА НЕПРЕДНАМЕРЕННОЙ ИНТРАОПРЕЦИЙНОЙ ГИПОТЕРМИИ

Шкурупий Д.

Целью исследования является определение характеристик интраоперационного температурного гомеостаза

методів профілактики ненавмисної інтраопераційної гіпотермії. Дослідження включало вивчення температурного гомеостазу у 160 хірургічних хворих. Пацієнти досліджуваної групи перебували в умовах корекції їх температурного гомеостазу місцевим застосуванням полімерного поліетилентерефталатного покриття. Пацієнтам контрольної групи будь-яких методи, спрямовані на корекцію їх температурного гомеостазу, не застосовувались. Виявлено поступове зниження температури всіх частинах тіла, а також інтегральних показників температурного гомеостазу в інтраопераційному періоді. Найбільш виражене зниження температури хірургічних хворих спостерігалося на 60-й хвилині хірургічної процедури на шкірі стегон та рук. Запобігання зниженню температури було можливим завдяки ізоляції стегон та рук пацієнтів захисними матеріалами.

Ключові слова: температурний гомеостаз, ненавмисна інтраопераційна гіпотермія, профілактика.

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и разработка методов профилактики непреднамеренной интраоперационной гипотермии. Исследование включало изучение температурного гомеостаза у 160 хирургических больных. Пациенты исследуемой группы находились в условиях коррекции их температурного гомеостаза местным применением полимерного полиэтилентерефталатного покрытия. Пациентам контрольной группы никакие методы, направленные на коррекцию их температурного гомеостаза, не применялись. Выявлено постепенное снижение температуры всех частей тела, а также интегральных показателей температурного гомеостаза в интраоперационном периоде. Наиболее выраженное снижение температуры хирургических больных наблюдалось на 60-й минуте хирургической процедуры на коже бедер и рук. Предотвращения снижения температуры было возможным благодаря изоляции бедер и рук пациентов защитными материалами.

Ключевые слова: температурный гомеостаз, непреднамеренная интраоперационная гипотермия, профилактика.

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IFFERENTIAL AND DIAGNOSTIC CRITERIA FOR HYPERMOBILITY OF THE ARTICULAR HEADS OF THE MANDIBLE, MUSCLE AND JOINT CONTRACTURE AND COMPRESSION-DISLOCATION DYSFUNCTION OF TEMPOROMANDIBULAR JOINT (ACCORDING TO THE DATA OF TMJ ZONOGRAPHY)

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The article deals with the results of systematic visual analysis of the TMJ zonograms of 67 patients with compression-dislocation dysfunction of TMJ, 29 patients with hypermobility of the articular heads of the mandible and 12 patients with a muscle and joint unilateral contracture of the mandible. The obtained data not only expand the scientific understanding of the pathogenesis of the aforementioned dysfunctions of TMJ, but also have practical significance for their more accurate differential diagnosis and ensuring adequate treatment of patients.

Key words: temporomandibular joint, dysfunction, zonography.

The present work is a fragment of RSW "Algorithm for surgical and conservative treatment of patients with cosmetic defects of tissues of the maxillofacial area, involutional ptosis of the skin of face and neck, pain syndromes of face, and prophylaxis of the formation of pathological cicatrically modified tissue" (state registration No. 0114U001910).

The diseases of temporomandibular joint (TMJ) constitute one of the most common pathologies of the maxillofacial area. According to many authors, more than 65% of population in different countries present with some or other symptoms of TMJ dysfunction [1, 3]. Given that the number of such patients is steadily increasing, and clinical manifestations of TMJ disruptions significantly impair the quality of life for millions of people, the problem of their diagnosis and treatment does not lose its relevance up to this day [4]. According to international classification of diseases, TMJ dysfunction is recognized as a separate nosological unit. However, it has not yet been specified that there are a number of various etiopathogenetically determined dysfunctional conditions of the joint [8]. The considerable efforts of specialists are being applied to studying the mechanisms of the occurrence of functional TMJ disorders. However, in spite of active scientific researches, their differential diagnostics causes considerable difficulties until now [2]. Diagnosis of muscle and joint dysfunctions of TMJ is based on anamnesis, clinical and radiological findings, such as orthopantomography, teleroentgenography, computer and magnetic resonance imaging, arthrophonography, and the like [6, 7]. Difficulties in diagnosing muscular and articular dysfunctions of TMJ are due to the similarity of patients' complaints, as well as to different interpretations of the results of additional studies, including the radiographic ones.

Despite the significant technical improvement of the ways for visualizing the TMJ components, the methods for analyzing the obtained images do not always allow researchers to give an adequate description of different nature of its muscle and joint disorders. At present, the most accessible method for visualizing the bone components of TMJ is the targeted computer radiography with closed and open mouth (zonography) [5, 9]. The significant experience in application of TMJ zonography has already