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D. V. Marshalov¹, I. A. Salov¹, E. M. Shifman², A. P. Petrenko¹, Zh. L. Silchenko¹
CONCEPT, DEFINITION AND CLASSIFICATION
OF THE INTRAABDOMINAL HYPERTENSIA
IN PREGNANCY

¹ *V. I. Razumovsky Saratov State Medical University, Department of Obstetrics and Gynecology of Medical Faculty, Saratov, Russia,*

² *Peoples' Friendship University of Russia, Department of Anesthesiology and Intensive Care, Moscow, Russia*

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Д. В. Маршалов, И. А. Салов, Е. М. Шифман, А. П. Петренко, Ж. Л. Сильченко

ПОНЯТИЕ, ОПРЕДЕЛЕНИЕ И КЛАССИФИКАЦИЯ ВНУТРИБРЮШНОЙ ГИПЕРТЕНЗИИ ПРИ БЕРЕМЕННОСТИ

В современной литературе недостаточно данных о клинической оценке внутрибрюшной гипертензии (ВБГ), ее практической значимости в течении и исходе беременности, прогностической ценности. Определения ВБГ имеют некоторые разногласия, что может формировать недостаточно правильное представление клиницистов об исследуемом процессе. В статье основное внимание уделено методологическим аспектам проблемы ВБГ при беременности. Проведен формально-логический анализ понятийного аппарата, существующих классификаций ВБГ, предложены собственное определение и классификация.

Ключевые слова: внутрибрюшная гипертензия, беременность, понятие, определение, классификация.

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D. V. Marshalov, I. A. Salov, E. M. Shifman, A. P. Petrenko, Zh. L. Silchenko
CONCEPT, DEFINITION AND CLASSIFICATION OF THE INTRA-ABDOMINAL HYPERTENSIA DURING PREGNANCY

The mention of intraabdominal hypertension (IAH) in pregnancy is quite often seen in the medical literature. Studies about the relationship of the original chronic IAH in pregnancy and obstetrics, perinatal complications are of particular interest. However, there are insufficient data on the IAH clinical evaluation, its practical importance in the course and outcome of pregnancy, predictive value in obstetrics textbooks, practical guidelines and recommendations. According to the value of IAH under critical conditions can be suggested its pathogenetic role in the development of obstetric pathology. It should be noted that in the literature IAH determination has some differences that can generate unclear defi-

dition by clinicians about the process under the study. The exact level of intra-abdominal pressure (IAP) in obstetrics, which is characterized as IAH is still a matter of debate. In the present study it was concluded that it is wrong to allocate only IAP level as the only parameter characterizing IAH. The article focuses on the methodological aspects of IAH in pregnancy. Formal and logical analysis of the conceptual apparatus, the existing classifications of IAH were held, our own definition and classification were offered.

We made an attempt to formulate the concept of IAH in obstetrics in terms of understanding it as a system, which may be in condition of compensation-decompensation.

Key words: intra-abdominal hypertension, pregnancy, concept, definition, classification.

The problem of formulating the concept and definition of the essence of intra-abdominal hypertension (IAH) is one of the important in the study of this condition. The accumulation of a large number of scientific facts that characterize the current stage of development of medicine requires a more careful attention to the methodological aspects in theoretical and practical issues.

Conceptual system — is an important part of scientific research. The meaning and definition of the scientific study is difficult to overestimate, it is in them where aspects of reality are reflected in the abstract summary form. Such important categories as logical judgment, reasoning, cannot be determined without definition, the laws of logic and logical methods of scientific research: the definition, the proof of the axioms, assumptions, there can be a causal connection between the phenomena cannot be applied. There cannot be understanding between researchers.

E. K. Voishvillo and M. G. Degtyaryov formulate a definition as follows: “We summarize some of the classes in terms of things, i. e. sets qualitatively similar in some respects items. Generalizations are achieved by allocating it to the total, which is typical for this class of objects” [15].

So, “high” level of intra-abdominal pressure (IAP) is summarizing indication for abdominal hypertension. It should be noted that the definition of literature IAH have some differences that can cause the incorrect conception of clinicians about the process under study.

According to the decision of the International Conference of Experts on Intra-abdominal Hypertension and Abdominal Compartment Syndrome, IAH is persistent or recurrent abnormal increase recorded by IAP greater than 12 mm Hg [8]. The key word in this definition: “pathological”, there by conclusion that IAH — a pathological condition is generating. Perhaps this conclusion is based on the analysis of normal and pathological variables IAP. Since the normal level of IAP is 0–5 mm Hg, IAP over these values are pathological [3]. Then the following definition looks illogical: “IAH level 5–7 mm Hg is considered to be the norm in adult patients under critical condition” [5]. Is it norm of pathology?

The medical literature is quite common to come across mention of IAH in pregnancy, but it is described by IAH in pregnancy as a phenomenon, seen as a given and it has a priori character. Is there a pregnancy IAH corresponding to this concept? When does it occur? How to evaluate it?

The publications have been recently appeared which prove the fact of having high IAP during pregnancy, and these studies are limited only by the third trimester and the postpartum period. The authors note that the level of IAP in uncomplicated pregnancy reaches 15–22 mm Hg [1; 2; 10], at contractions — 25 mm Hg [10], and after a surgical delivery — 16 mm Hg, which exceeds the IAP level in general surgical population [2; 11; 12].

The dictionary of medical terms defines hypertension as “high blood pressure, i. e. excess of arterial blood pressure above normal blood pressure observed in the persons of a definite age group”. In this definition, the main feature of hypertension is the excessive pressure above normal pressure.

“Hypertension (hypertensio; hyper + lat. tensio — voltage, syn. hypertension) — is the increased hydrostatic pressure in the blood vessels, hollow organs or body cavities” this definition was given by the large medical dictionary (2000). The main determining factor for hypertension in this definition is high pressure, which can be considered as a variant of norm.

On the other hand, the arterial, pulmonary, portal, intracranial hypertension are considered as pathological conditions. Under all of these conditions there is diagnosed one or another degree of polysystemic dysfunction on the basis of the same pathogenetic factors — high pressure. All of them are registered in the International Classification of Diseases (ICD).

So, the “high” IAP (more than 12 mm Hg) during pregnancy is the norm, or it is an IAH or IAH should be called physiological?

Concerning the problem of IAH, researchers are constantly use three terms — IAP, IAH, syndrome of IAH (IAHS). However, some authors identify these concepts using them alternately [8]. Thus, V. A. Gurianov et al. write in their work: “...morbid obesity and pregnancy are a chronic form of IAHS” [7].

According to the explicit definition rule, the scope of defining the concept should be equal to the amount determined by the concept. The main part of the notion of IAHS is a syndrome. Syndrome is consistently observed as a set of symptoms (signs) with common pathogenesis. Which kind of complex symptoms of IAH can be identified by normal pregnancy?

In our opinion, the increase in IAP during pregnancy without showing clinical symptoms and without resulting in organ (system) dysfunction can be regarded as a physiological IAH. The closest analogy is the concept of a physiological blood loss, specific for obstetrics concept. If IAH causes any systemic violations (like in case with blood loss) in pregnant, it should be considered pathological.

After the formulation of the concept of pathological IAH, the next step is its definition (creating definition). This term denotes a logical method that has to disclose the content of the concept and the result of the application of this technique, also this word means approval, revealing the essence of any object, and an indication of minor party items, including those that are not sufficient to distinguish it from all other objects, and so are called incomplete definitions. Usually they are used when the power is insufficient study subjects. Apparently, we have faced exactly this situation in this paper.

Moreover, it is useful to recall the following definition “diagnosis is a brief conclusion about the disease, its nature, complications and outcomes, formulated by physician on the basis of his observations, the patient’s complaints, the results of objective research methods and expressed in terms of the stipulated accepted classification and nomenclature of disease” before finding a IAH place in the structure of the diagnosis [14]. That way, IAH can be complication or outcome of the disease, but it cannot be disease entities (entity of the disease).

So, in one case due to pathological IAH, for example, obesity, severe adhesions in the abdominal cavity, multiple pregnancy, or a combination of these factors can lead to the development of aorto-caval syndrome, functional intestinal, placental insufficiency, pre-eclampsia and will carry the primary character. In other case, the abnormal IAH may occur secondarily due to inadequate therapy, capillary leak in severe pre-eclampsia and sepsis.

Thus, pathological IAH during pregnancy is a complication which is defined as “the pathological process, which is, first, the adverse deviation from the typical (“uncomplicated”) under physiological course of pregnancy associated with pathogenic and morphological features of the latter, and secondly, adverse effect of medical or surgical treatment of complications of pregnancy or as “another defeat (disease) caused by a complication that is complication’s complication”.

The exact level of IAP, which is characterized as IAH is still a matter of debate. Interval 15–18 mm Hg dominated in the literature before [8], with some works were describing the negative impact of the IAP already at a level of less than 8 mm Hg [4]. Currently, according to the recommendations of the World Society of the Abdominal Compartment Syndrome (WSACS) is the level of IAH 12 mm Hg [8]. It should be noted that the reduced level is the average value of the index which affects the development of organ dysfunction that results from a multicenter study of patients requiring intensive care.

Focusing only on IAP figures, some researchers have come to ambiguous conclusions. Thus, E. E. Frezza et al. in his article “Morbid obesity causes chronic increase of intraabdominal pressure” make a conclusion about the absence of IAH in patients with morbid obesity, the level of IAP does not reach 12 mm Hg [6].

However, in previous studies it was observed that the level 7.5 mm Hg already leads to the manifestation of organ failure and requires initiation of therapy [4].

Level differences as a criterion and severity of IAH are given in Table 1.

The logical conclusion is that it is wrong to choose IAP figures as the only parameter characterising IAH.

It is obvious that IAP rise over the normal range, even without any clinical symptoms, will eventually lead to organ and system dysfunction. However, the greater importance is the rate of increase [9].

Usually pathological processes are considered as acute and chronic in traditional medicine (states are described as a fulminant, sub-acute, protracted, and so on, are comparative and descriptive, occupying an intermediate position among the main ones). When analyzing the characteristics of IAH during pregnancy, it is considered as a chronic, protracted process that is clearly reflected in the well-known classification (Table 2).

We draw attention to the fact that the current classification of IAH defines pregnancy as a factor in the development of chronic forms of IAH, along with such conditions as obesity and ascites, thus associating pregnancy with the pathology, resulting in the IAH as a complication. Is it true?

It should be noted that the division of chronic IAH by severity is not provided in this classification. This is explained by fact that the patient with chronic form of IAH has time to adapt as compared to the rapid rise of IAP.

Table 1

Classification of Intra-abdominal Hypertension

IAH degree	IAH level		
	J. M. Burch et al. (1996)	M. Sugrue, K. M. Hilman (1998)	L. N. G. Malbrain et al. (2006)
I degree	7.5–11 mm Hg	10–15 mm Hg	12–15 mm Hg
II degree	11–18 mm Hg	15–25 mm Hg	16–20 mm Hg
III degree	18–25 mm Hg	25–35 mm Hg	21–25 mm Hg
IV degree	> 25 mm Hg	> 35 mm Hg	> 25 mm Hg

Forms of Intra-abdominal Hypertension

Form	Develops over	Etiological factor
Chronic	Weeks, months	Pregnancy, obesity, ascites, tumor
Subacute	Some days	With a combination of etiologic factors and predisposing conditions
Acute	Hours, days	Trauma, intra-abdominal bleeding, pneumoperitoneum
Hyperacute	Minutes, seconds	When laughing, coughing, physical activity

The question is: up to what IAP level, at its prolong rise, does adaptation (compensation) keep, which is not manifested with organ dysfunction signs? Which criteria of compensation has chronic IAH? When should we talk about acute IAH against a background of chronic, as decompensation of chronic IAH?

The literature presents a large number of similar examples: myocardial infarction, as a manifestation of acute heart failure with coronary heart disease, which is a chronic form of heart failure, chronic form of acute liver failure is a rapid decline in the functions of liver and other organs that develops over several weeks after aggravating factors action (indirect: bleeding from varicose veins, sepsis, etc., direct: drug-induced hepatotoxicity) in a patient with previously compensated chronic liver failure, or terminal liver failure, which occurs in chronic decompensated patients due to progressive irreversible deterioration at the background of chronic liver disease, acute renal failure in the chronic form, caused by diffuse sclerosing glomerulonephritis, asthma status in bronchial asthma, acute fetal distress at chronic intrauterine hypoxia, etc.

The next question is how to classify on the basis of the existing IAH severity (see Table 1) to determine the severity of acute IAH, which may be the cause of acute surgical pathology, on the background of IAH at pregnancy? These questions currently have no answers.

We have already touched on the essence of the issue in the definition of the syndrome of IAH, which can also be considered from the standpoint of the dialectical relationship of form and content categories. Under the content we understand a set of existing elements and processes under the form — the internal structure of the content, the laws of the relationship between elements.

Currently, IAH definition of the syndrome looks like: “This is a resistant increase in IAP greater than 20 mm Hg (with APP (abdominal perfusion pressure) < 60 mm Hg, or without it), which is associated with the manifestation of organ failure/dysfunction” [8].

From the analysis of this definition, it follows that the form is a syndrome of IAH and the content, in the context of pregnancy is an abnormal abdominal hypertension, manifested with organ failure/dysfunction.

In this definition SIAP also presents another category of content “APP < 60 mm Hg or without it”, which can be seen as a cause, effect or condition.

Based on the fact that this indicator reflects the adequacy of visceral blood flow, apparently, perfusion-metabolic imbalance should be considered as the most competent concept in determining the probable basis (cause) of the polysystemic dysfunction, including the whole of pathological changes.

However, the reason is not implementing its decisive role without conditions that are a combination of factors and circumstances that are required for the occurrence of a

particular investigation. In our case the IAHS development. These conditions should be considered as the overall reactivity, determined by a combination of age, comorbidity and the degree of genetically determined to respond to the possibility of stressors. These provisions in the pathogenesis IAHS are still virtually ignored, although they largely determine its specificity.

It is well known that during pregnancy all of the woman's body systems undergo a functional reorganization, representing an adaptive and a protective process, that is in violation of adaptation can take such a nature that it stops to be a protective and takes on the character of the pathological process that begins to threaten the patient's life and can cause its death.

Thus, based on the laws of formal and dialectical logic, and on basic tenets of the theory of determinism, we consider it is appropriate definition of the syndrome of an abdominal hypertension: abdominal hypertension syndrome is a complication that occurs when IAH under conditions of varying resistance of the organism with the development of perfusion-metabolic imbalance and manifested by various degrees of organs and tissues dysfunction.

Of course, we should say that we do not claim on the full and final definition of the IAHS, it may have disadvantages and can be considered as an intermediate or training.

The following predisposing factors played the role in the IAHS development of obstetric patients:

Factors contributing to the abdominal wall stretch reduction:

1) *Associated directly with pregnancy and labor:*

— painful tension of abdominal wall (contractions, inadequate analgesia in the post-operative period);

— edema (pre-eclampsia/eclampsia);

— convulsive readiness/convulsions (pre-eclampsia/eclampsia).

2) *Are not associated directly with pregnancy and labor:*

— obesity (especially abdominal type);

— availability of post-operative scars on the anterior abdominal wall;

— suturing of the abdominal wall in its high tension (for surgical interventions in the later stages of pregnancy);

— infiltrates, hematoma of abdominal wall (postoperative wound complications).

Factors contributing to the increase in abdominal contents:

1) *Associated directly with pregnancy and labor:*

— polyhydramnios;

— multiple pregnancy;

— macrosomia.

2) *Are not associated with pregnancy and labor:*

— hepato- and splenomegaly;

— tumors of the abdominal cavity;

— abdominal aortic aneurysm;

— intestinal ileus.

Factors contributing to the pathological accumulation of fluid and gas in the abdominal cavity:

1) *Associated directly with pregnancy and labor:*

— ascites, caused by abnormal pregnancy (ovarian hyperstimulation syndrome, HELLP-syndrome);

— hemoperitoneum (impaired ectopic pregnancy, uterine rupture);

— delayed gastric emptying and intestinal contents, constipation, flatulence.

- 2) *Are not associated with pregnancy and labor:*
- pancreatitis, peritonitis;
 - ascites, caused by decompensation of chronic portal hypertension (cirrhosis of the liver, liver cancer, pancreatic cancer, Budd–Chiari syndrome);
 - postoperative intestinal paresis, pneumatosis of the intestine;
 - pneumoperitoneum (after laparoscopic diagnostics and treatment).

Factors contributing to the reduction of stretch the abdominal wall and abnormal fluid accumulation in the abdomen, also attributed the syndrome of “capillary leakage”.

Factors contributing to the development of the syndrome of “capillary leakage”:

- 1) *Associated directly with pregnancy and labor:*
- ovarian hyperstimulation syndrome;
 - pre-eclampsia/eclampsia/HELLP-syndrome;
 - fluid therapy in the amount of more than 150 ml/kg daily in pregnant with pre-eclampsia/eclampsia, cumulative positive water balance.
- 2) *Are not associated directly with pregnancy and labor:*
- acidosis;
 - coagulopathy (platelets less than 50,000/mm³ or activated partial thromboplastin time is 2 times higher than normal, or international normalized ratio greater than 1.5);
 - bacteremia;
 - sepsis;
 - polytransfusion (more than 10 doses of packed red blood cells per day).

The presence of these factors in patients is an indication for permanent monitoring of IAP.

We developed the scale to evaluate IAHS severity in pregnancy (Table 3).

Main criteria include the IAP level and the presence of organ dysfunction. The level of IAP is assessed taking into account the gestational age and body mass index. At the I trimester IAP pathological levels in pregnant women without obesity is over 8 mm Hg, with obesity — 12 mm Hg, in II trimester — 13 and 16 mm Hg, in the III trimester — 21 and 23 mm Hg.

Table 3

Scale for Intra-abdominal Hypertension Syndrome Diagnosis in Obstetrics

Criteria of IAHS	Scoring of signs
The presence of conditions associated with IAHS	No: 0 points Yes: 2 points
The level of IAP (depending on pregnancy term)	Under physiological norm: 0 points Most of the physiological norm: 1 point
Signs of organ dysfunction Hemodynamic disorders Violations of urinary function of kidneys	Absent: 0 points Present: 1 point (estimated for each system separately, the maximum total score — 3)
Indicators of tissue perfusion	Norm: 0 points Fall: 1 point
Dynamics of changes for 4–6 hrs	Progression of disorders: 1 point No change: 0 point

The auxiliary criteria include indicators of tissue perfusion. Index of abdominal perfusion pressure (APP = BP mean-IAP) regarded as the most appropriate indicator of splanchnic perfusion, according to our research, is not informative in chronic gestational hypertension and pre-eclampsia. The study conducted in our clinic demonstrated highly informative assessment of the perfusion of internal organs, including the utero-feto-placental complex method to control the basal blood flow and transcutaneous oxygen tension in the area of the posterior vaginal side.

Dynamics of revealed changes is significant during 4–6 hrs. Aggravation indicates severe IAHS.

Each of the criteria has its score. With a score of less than 2 — IAHS is absent, 2 to 3 points — IAHS is compensated, 4–5 points — subcompensated, and with more than 5 points — decompensated. It should be noted that the importance of risk factors for IAHS is different at different terms of pregnancy — at complete one, it is mostly pronounced.

IAHS in obstetrics is clinically significant, but poorly studied problem. The available IAH criteria proposed by the World Society for the intra-abdominal compartment syndrome, do not take into account the peculiarities of the physiological changes during pregnancy and are not always applicable in obstetrics. The conventional algorithm of treatment of IAHS can be used in obstetric patients, but it has its own characteristics and needs further investigation.

In this article, we also attempt to make formal-logical analysis of available classifications of IAH, IAHS and synthesis of a new one, with taking into account the factor of pregnancy.

Following the analysis of presented classifications there considered main factors (members of the division) by which they are composed, such as: variants of the course (chronic, sub-acute, acute), and functions failure staging presented in the classification as IAH degree: I, II, III, IV) [8].

According to the definition of hypertension (“excess pressure over normal pressure observed in the members of a definite age group”), any excess over the normal IAP should be considered IAH. In case of the absence of clinical signs of organ dysfunction, similar to classification of disseminated intravascular coagulation syndrome proposed by the International Society on Thrombosis and Haemostasis [13], IAH should be defined as “overt”, with the appearance of the criteria of organ dysfunction — as “non-overt”. Although the “non-overt” IAH does not require intensive care, but doctors should be alert and make preventive measures.

From our point of view, IAH should be evaluated by the degree of compensation as a single pathological process: compensation, subcompensation, decompensation. Framework for the diagnosis of these steps can also serve different characteristics within and inter-system save (or absence) of functional connections both in single-level (horizontal) and hierarchical (vertical) distribution. But this issue is so complex that remains under investigation. The obvious one is the definition of IAHS as the IAH decompensation stage.

According to types of clinical course, the term characteristics should be identified: rapidly progressive IAH — development of organ dysfunction symptoms persist within few hours, days, and slowly developing — development of the same symptoms within weeks.

So, we propose the following classification of IAH (Fig. 1).

IAH is divided according to two grounds: the current options (define specificity) and the degree of dysfunction.

According to the first ground, we offer a two-component model:

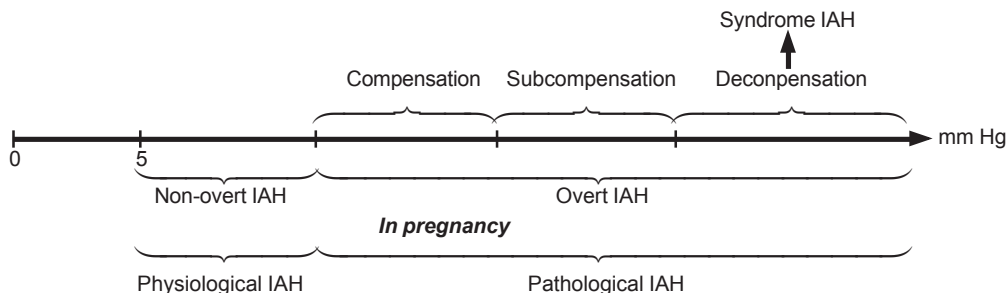


Fig. 1. Classifications of Intra-abdominal Hypertension

— by the presence of organ dysfunction clinical picture: overt, non-overt. With pregnancy the identical definitions of IAH are: physiological, pathological;

— at the time of development (rapidly progressing, slowly developing).

As for the second ground, we offer conventional in medicine, traditional division into three degrees of dysfunction: compensation, subcompensation, decompensation.

Thus, the formal-logical and dialectical study of the conceptual apparatus of IAH in pregnancy gave a possibility to formulate its concept, definition and classification.

REFERENCES

1. *Normative* postpartum intraabdominal pressure: potential implications in the diagnosis of abdominal compartment syndrome / S. S. Abdel-Razeq, K. Campbell, E. F. Funai [et al.] // *Am. J. Obstet. Gynecol.* – 2010. – Vol. 203 (2). – P. 149.
2. *Measurement* of Intra-abdominal Pressure in Pregnant Women at Term / A. Al-Khan, M. Shah, M. Altabban [et al.] // *J. Reprod. Med.* – 2011. – Vol. 56 (1/2). – P. 53–57.
3. *Continuous* intra-abdominal pressure measurement technique / Z. Balogh, F. Jones, S. D'Amours [et al.] // *Am. J. Surg.* – 2004. – Vol. 188. – P. 679–684.
4. *The abdominal* compartment syndrome / J. M. Burch, E. E. Moore, F. A. Moore, R. Franciose // *Surg. Clin. North. Am.* – 1996. – Vol. 76. – P. 833–842.
5. *Cheatham M. L.* Abdominal perfusion pressure: a superior parameter in the assessment of intra-abdominal hypertension / M. L. Cheatham, M. W. White, S. G. Sagraves // *J. Trauma.* – 2000. – Vol. 49. – P. 621–626.
6. *Morbid* obesity causes chronic increase of intra-abdominal pressure / E. E. Frezza, K. O. Shebani, J. Robertson, M. S. Wachtel // *Dig. Dis. Sci.* – 2007. – P. 52 (4). – P. 1038–1041.
7. *Gur'janov V. A.* Intensive care of pregnant women with arterial and abdominal hypertension / V. A. Gur'janov, G. N. Tolmachev, A. V. Volodin // *Novosti anesteziologii i reanimatologii.* – 2009. – Vol. 1. – P. 28–32 (in Russian).
8. *Results* from the International Conference of Experts on Intra-abdominal Hypertension and Abdominal Compartment Syndrome / M. L. Malbrain, M. L. Cheatham, A. Kirkpatrick, M. Sugrue // *Intensive Care Med.* – 2006. – Vol. 32. – P. 1722–1732.
9. *Marshalov D. V.* The role of chronic abdominal hypertension in obstetric pathology / D. V. Marshalov, A. P. Petrenko // III Vseros. obrazov. kongress "Anesteziya i reanimacija v akusherstve i neonatologii" : Mat. kongres. – M., 2010. – P. 70–72 (in Russian).
10. *Choice* of anesthesia surgical delivery, depending on the severity of intra-abdominal hypertension / D. V. Marshalov, E. M. Shifman, I. A. Salov, A. P. Petrenko // *Mat. XII ses. MNOAR.* – M., 2012. – Vol. 27 (in Russian).

11. *The dependence of the dynamics of post-surgical intra-abdominal pressure in postpartum women with obesity on the method of anesthesia / D. V. Marshalov, E. M. Shifman, I. A. Salov, A. P. Petrenko // Mat. XII ses. MNOAR. – M., 2012. – Vol. 23 (in Russian).*

12. *Sugrue M. Intra-abdominal hypertension and intensive care / M. Sugrue, K. M. Hilman // Yearbook of intensive care and emergency medicine ; ed. by J. L. Vincent. – Berlin : Springer-Verlag, 1998.*

13. *Toh C. H. SCC on Disseminated Intravascular Coagulation of the ISTH. The scoring system of the Scientific and Standardisation Committee on Disseminated Intravascular Coagulation of the International Society on thrombosis and haemostasis: a 5-year overview / C. H. Toh, W. K. Hoots // J. Thromb. Haemost. – 2007. – Vol. 5. – P. 604–606.*

14. *Vasilenko V. H. Propedeutika vnutrennih boleznej / V. H. Vasilenko, A. L. Grebeneva, N. D. Mihajlova. – M. : Medicina, 1974 (in Russian).*

15. *Vojshvillo E. K. Logic / E. K. Vojshvillo, M. G. Degtjarev. – M. : Vlados-Press, 2001 (in Russian).*

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**Л. О. Мальцева, М. Ф. Мосенцев, О. І. Мальцева,
В. Г. Черненко, В. М. Лісничка**

НОВІ БІОМАРКЕРИ ТЯЖКОГО СЕПСИСУ ТА СЕПТИЧНОГО ШОКУ (аналітичний огляд)

*ДУ «Дніпропетровська медична академія МОЗ України»,
Дніпропетровськ, Україна*

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Л. А. Мальцева, Н. Ф. Мосенцев, О. И. Мальцева, В. Г. Черненко, В. Н. Лісничая

НОВЫЕ БИОМАРКЕРЫ ТЯЖЕЛОГО СЕПСИСА И СЕПТИЧЕСКОГО ШОКА (аналитический обзор)

Тяжелый сепсис и септический шок — распространенные и часто фатальные осложнения у больных, находящихся в критических состояниях. В то же время продолжается усиленный поиск адекватных и специфических биомаркеров сепсиса.

T. Lagu et al. (2012) идентифицировали быстрое и устойчивое увеличение частоты случаев тяжелого сепсиса в США от 415,280 в 2003 г. до 711,736 в 2007 г. (на 71 %). Соотношение пациентов с тяжелым сепсисом и дисфункцией одного органа уменьшилось с 51 % в 2003 г. до 45 % в 2007 г., тогда как соотношение пациентов с дисфункцией 3–4 органов и более увеличилось соответственно в 1,19 и 1,51 раза. В то же самое время наблюдалось ежегодное уменьшение стационарной летальности на 2 % ($p < 0,001$). Авторы связывают это с неукоснительным соблюдением алгоритма диагностики и интенсивной терапии тяжелого сепсиса и септического шока.

В статье представлены новые биомаркеры для диагностики тяжелого сепсиса и септического шока, оценки тяжести болезни и эффективности антимикробной терапии, прогнозирования осложнений и летальности в отделениях интенсивной терапии.

Ключевые слова: тяжелый сепсис, септический шок, биомаркеры.