

# GEORGIAN MEDICAL NEWS

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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии  
საქართველოს სამედიცინო სიახლენი

## GEORGIAN MEDICAL NEWS

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**GMN: Georgian Medical News** is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

**GMN: Медицинские новости Грузии** - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

**GMN: Georgian Medical News** – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

### WEBSITE

[www.geomednews.com](http://www.geomednews.com)

## К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и [http://www.nlm.nih.gov/bsd/uniform\\_requirements.html](http://www.nlm.nih.gov/bsd/uniform_requirements.html) В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректурa авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

**При нарушении указанных правил статьи не рассматриваются.**

## REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: [http://www.nlm.nih.gov/bsd/uniform\\_requirements.html](http://www.nlm.nih.gov/bsd/uniform_requirements.html)  
[http://www.icmje.org/urm\\_full.pdf](http://www.icmje.org/urm_full.pdf)

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned  
Requirements are not Assigned to be Reviewed.**

## ავტორთა საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრაფიების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგების ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

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## FACTORS OF AGGRESSION AT THE STAGES OF OPEN SURGICAL TREATMENT OF SEVERE FORMS OF PERITONITIS

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### Abstract.

**Introduction:** There are many unresolved questions regarding the features of surgical aggression in the open method of treatment of severe forms of peritonitis. There are isolated publications in the literature on the risk features of these interventions, despite the high prevalence of the problem.

**The Purpose of this study:** was to study the features of surgical aggression in the open method of treatment of severe forms of peritonitis.

**Methods:** The study included 205 patients with severe forms of purulent peritonitis treated at the Emergency Hospital in Aktobe (n=205). To assess the factors of surgical aggression, the reliability of the results was evaluated by variational statistics according to the Student's t-criterion, taking into account the degree of freedom, at  $p < 0.05$  and  $p < 0.01$ , with the calculation of arithmetic averages and their average errors ( $M + m$ ). The data are presented as an average value  $\pm$  standard deviation or median and percentiles, p-values less than 0.05 were considered significant.

**Results:** Based on the results obtained, it was found that the frequency of repeated laparosanation surgical interventions in one patient was  $2.8 \pm 0.3$  times against the background of purulent-inflammatory process in the abdominal cavity, a high degree of stress index of the regulatory systems of the body during sanitation was revealed – up to  $1460.9 \pm 101.5$  units, postural reactions of blood circulation and respiration in 7.55% and metabolic disorders homeostasis.

**Conclusions:** Aggressive factors affecting patients and causing the risk of multiple laparosanation interventions at the stages of open surgical treatment of severe forms of peritonitis have been identified. The data obtained can be used to develop therapeutic and preventive measures to improve the results of treatment of severe peritonitis.

**Key words.** Peritonitis, anesthesia, laparosanation, aggression factors.

### Introduction.

The problem of ensuring the safety of patients undergoing severe surgical interventions remains one of the most urgent in anesthesiology and intensive care [1-5]. There is practically no scientific forum in the field of anesthesiology and surgery, where this problem is not discussed.

This problem is particularly acute in the treatment of severe forms of peritonitis, which remains one of the main causes of death in patients with acute surgical diseases of the abdominal cavity, especially in toxic and in the stage of multiple organ failure [6-14].

Significant progress in the results of treatment of this most severe contingent of patients was facilitated by the development and widespread introduction into modern surgical practice of

an open method for the treatment of diffuse purulent peritonitis [9,15-18]. The use of this method according to the summary data of researchers from the CIS countries and foreign authors allowed to reduce the mortality rate to 20-30% [19-21].

However, the open method of treating peritonitis, having undeniable advantages, is quite aggressive and burdensome for patients, carries a potential risk of a number of complications that limit its widespread use. We are talking about the problem of ensuring the safety of patients if they need repeated, sometimes multiple surgical interventions and anesthetic aids, the need for which may be repeated every 2-3 days [19,20-24].

Based on the extensive experience of the clinic in the treatment of patients with common forms of peritonitis [25], we were convinced that repeated and active surgical interventions in these patients leads to tension and a decrease in the functional mechanisms of homeostasis, the development of dangerous, uncontrollable complications, causing a high degree of risk in this category of patients. And this indicates the obvious need for further targeted research in this area.

**The purpose of the study** is to study the factors of aggression in the open method of treating severe forms of peritonitis.

### Materials and Methods.

The study included 205 patients with severe forms of purulent peritonitis treated at the Emergency Hospital in Aktobe (n = 205) (main group). The data of 143 patients with the same pathology (control group) were also retrospectively analyzed. The age of patients in both groups ranged from 15 to 82 years. In the main group, the average age was  $50.2 \pm 3.5$ ; 124 men (60.5%), 81 women (39.5%),  $52.1 \pm 1.2$  years in the control group; 84 men (58.8%), 59 women (41.2%). The percentage of patients by gender and age in the groups were identical. The assessment of the state of homeostasis of patients was carried out on the basis of comprehensive studies of the functional state of the circulatory systems (rheographic methods), respiration (acid-base state data, Radiometer, Denmark), vegetative homeostasis (cardiointervalography method using a hardware and software package (Varicard) with a software package (Control) developed by the Bavaria Creischa Clinic (Germany), as well as conventional clinical and biochemical analyses of blood, urine, reflecting the functional state of the liver, kidneys and the degree of intoxication of the body. The study was performed in accordance with the standards of Good Clinical Practice and the Ethics Committee of the M. Ospanov ZKMU.

To assess the factors of surgical aggression, the reliability of the results was evaluated by variational statistics according to the Student's t-criterion, taking into account the degree of freedom, at  $p < 0.05$  and  $p < 0.01$ , with the calculation of arithmetic averages and their average errors ( $M + m$ ). The data are presented as an average value  $\pm$  standard deviation or



median and percentiles, p-values less than 0.05 were considered significant.

## Results.

The recurrence of laparoscopy and, accordingly, anesthetic benefits occurred in 86.4% of cases of treatment of patients with purulent peritonitis, while the multiplicity in one patient in the main group averaged  $2.8 \pm 0.3$  times, in the control group -  $3.2 \pm 1.7$  (Table 1).

As can be seen from the data presented, 205 patients in the main group underwent 584 laparoscopies during treatment, on average,  $2.8 \pm 0.3$  operations per patient, respectively, and anesthesia. In the majority of 119 (58.1%) patients, 2-3 abdominal operations and anesthesia respectively were performed, a single one - in 28 (13.6%), 4 - in 31 (15.2%), 5 or more laparoscopies were performed in 27 (13.2%) patients. In the control group, the multiplicity of operations and anesthesia per patient was  $3.2 \pm 1.7$  times (a total of 457 laparoscopies). At the same time, the number of abdominal operations in each patient was different and was determined by both the initial severity of peritonitis and the dynamics of its course.

The need for multiple surgical interventions and anesthetic aids undoubtedly causes overstrain of regulatory systems and the possibility of disruption of homeostasis regulation mechanisms, as evidenced by the data of studies of vegetative homeostasis.

Table 2 shows the dynamics of the stress index of homeostasis regulatory systems in patients in the main group with open treatment of peritonitis.

In patients, both before, during, and after laparoscopy, increased indices of the stress index of homeostasis regulatory systems were noted. Before the laparoscopy, the IV was -  $1173.0 \pm 121.9$  conl.units, during the operation -  $1460.9 \pm 101.5$  and on the 1st day of the post-operation period -  $1251.0 \pm 112.1$  conl.units, for all values ( $p < 0.01$ ).

An important factor of aggression in the open treatment of peritonitis are various postural reactions that can be observed at any stage of treatment and management of patients. We consider postural reactions of blood circulation and respiration since they mainly occur in patients with severe forms of peritonitis and pose an immediate threat to their lives.

The following are the main postural reactions from the cardiovascular and respiratory systems that occurred in patients at the stages of treatment.

During 584 laparoscopy and anesthesia in patients of the main group in 7.55% (45 cases), certain postural reactions of blood circulation and respiration were observed. From the side of the CCC, various hypo- and hyperdynamic reactions with cardiac arrhythmias to one degree or another occurred in 6.0% of cases. Of these: the frequency of hypotension was 1.7%, hypertension - 1.4%, tachycardia - 1.0%, bradycardia - 1.1%, other cardiac arrhythmias, extrasystoles, various blockages, etc.) - 0.8%. The frequency of depressive reactions on the part of the respiratory system was 1.55% of the total number of laparoscopy and anesthesia. Of these: hypoventilation of the lungs was observed in 1.4% and in 0.15% (1 case) respiratory arrest was noted. In the control group, during 457 laparoscopies and anesthesia in 11.4% (52 cases), various postural reactions were observed, the nature of which was identical to that in the main group of patients.

As a demonstrative example, below we present comparative laboratory indicators that determine the initial functional state of the liver, kidneys and reflect metabolic homeostasis disorders in patients with peritonitis during open surgical treatment of peritonitis (Table 4).

The table shows that all patients with hypoproteinemia up to  $57.20 \pm 1.21$  g/l and a decrease in diuresis to  $0.63 \pm 0.2$  ml/min had bilirubinemia on average up to  $25.4 \pm 1.5$  mmol/l, hyperfermentemia with an increase in ALAT up to  $36.21 \pm 2.34$ , AsAT up to  $39.5 \pm 3.16$  units/l. The products of pathological metabolism were increased: plasma creatinine to  $0.21 \pm 0.02$  mg/l, urea to  $14.23 \pm 1.4$ ; residual nitrogen to  $16.33 \pm 1.4$  mmol/l.

## Discussion.

Open surgical treatment of severe forms of peritonitis is undoubtedly a progressive method in surgery and is sometimes the only chance to save the lives of patients with this disease. However, along with the positive, it has negative sides, disadvantages, and limitations. This is, first of all, the repetition and summation of surgical aggression and anesthesia associated

**Table 1.** Multiplicity of laparoscopy and anesthesia in patients in the main and control groups with open surgical treatment of peritonitis.

The multiplicity of laparoscopy and anesthesia in one patient	Number of patients			
	main group		control group	
	abs.	%	abs.	%
1	28	13,6	И	7,7
2	65	31,7	36	25,1
3	54	26,3	49	34,3
4	31	15,2	24	16,7
5 and more	27	13,2	23	16,2
Total	205	100	143	100

Note:  $M \pm m = 2.8 \pm 0.3$  laparoscopy and anesthesia in the main and  $3.2 \pm 1.7$  in the control group

**Table 2.** Dynamics of the stress index (SI) of homeostasis regulatory systems in patients in the main group with open surgical treatment of peritonitis.

An indicator of the degree of tension of homeostasis regulatory systems	Standard	Before laparoscopy	During laparoscopy	After laparoscopy
Voltage index (усл.ед)	80-180	$1173,0 \pm 121,9^*$	$1460,9 \pm 101,5^*$	$1251,0 \pm 112,1^*$

Note: \* - reliability of differences compared to normal values ( $p < 0.01$ )

**Table 3.** The nature and frequency of postural circulatory and respiratory reactions in patients in the main and control groups with open surgical treatment of peritonitis.

The nature of postural reactions of blood circulation, respiration	Frequency of postural reactions in patients			
	main group		control group	
	abs.	%	abs.	%
hypotension	10	1,7	9	2,0
hypertension	8	1,4	7	1,5
tachycardia	6	1,0	10	2,2
bradycardia	7	1,1	9	2,0
other rhythm disturbances	5	0,8	6	1,3
hypoventilation of the lungs	8	1,4	9	2,0
respiratory arrest	1	0,15	2	0,4
Total:	45	7,55	52	11,4
Total laparosonation and anesthesia	584	100	457	100

Note: % of the total number of laparosonation and anesthesia

**Table 4.** The initial functional state of the liver and kidneys in patients in the main group with open surgical treatment of peritonitis.

Indicators	Unit of measurement	Before laparosonation
Bilirubin	mmol/l	25,4 ± 1,5*
Protein	g/l	57,20 ± 1,21*
AlAT	ed/l	36,21 ± 2,34
AsAT	ed/l	39,5 ± 3,16
Urea	mmol/l	14,2 ± 1,4 *
Creatinine	mmol/l	0,21 ± 0,02
Residual nitrogen	mmol/l	16,3 ± 1,4*
Minute diuresis	ml/min	0,63 ± 0,2

Note: \* - p < 0.05

with the need for repeated surgical interventions, the multiplicity of which can be repeated every 2-3 days.

As our studies have shown, 584 laparosonations were performed in 205 patients of the main group with open surgical treatment of peritonitis. On average, the multiplicity of laparosonations per patient, and, accordingly, the number of anesthesia was  $2.8 \pm 0.3$  times. At the same time, the number of abdominal sanitizations in each patient was different and was determined by both the initial severity of peritonitis and the dynamics of its course.

The need for repeated and active surgical interventions in the form of laparosonation and anesthesia cause a violation of the adaptation of the patient's body to surgical stress with an increase in the degree of tension of the regulatory systems of homeostasis, as evidenced by the data of studies of vegetative homeostasis: IN before laparosonation  $-1173.0 \pm 121.9^*$  units, during laparosonation  $-1460.9 \pm 101.5^*$  units and after laparosonation  $-1251.0 \pm 112.1^*$  units.

The following factors were at the heart of the overstrain of the regulatory systems of vegetative homeostasis, firstly, during the open surgical treatment of peritonitis in all patients, almost without exception, there was a prolonged presence of various probes - intestinal or gastric, laparostomy devices, catheters of central veins and bladder, drains, sometimes open wounds or fistulas, etc., which they often caused a variety of vegetative reactions in them.

Further, any message to the patient about the need for repeated laparosonation, regardless of its purpose or volume, is quite reasonably perceived by him as a repeat operation caused by the

deterioration of his condition and serves as a source of severe experiences. This circumstance can lead to the development of presanational depression in patients, up to the development of psychoemotional stress. Underestimation of these factors during post-rehabilitation intensive therapy causes a negative attitude towards anesthesia on the part of the patient and creates certain difficulties for the anesthesiologist to ensure a smooth course of anesthesia. In addition, if multiple surgical interventions and anesthesia were necessary, repeated, additional, or new diagnostic examinations of the patient were required (laboratory, mandatory sonographic, electrocardiographic, rheographic and other functional studies), which also negatively affects the patient's psyche. These systemic disorders can persist for a long time throughout both the rehabilitation and post-rehabilitation periods and lead to a violation of the patient's adequate adaptation to surgery.

Thus, laparosonation interventions were performed against the background of the already existing tension of the regulatory systems of homeostasis, which worsens during repeated intervention, which indicated the aggressiveness of these interventions for patients.

During multiple surgical laparosonation interventions, at various stages of treatment of patients in 7.55% (45 cases) we noted the possibility of their manifestation of various postural reactions, mainly from the cardiovascular and respiratory systems. And they, in general, pose an immediate threat to life in patients with severe septic forms of peritonitis. Hypotension (1.7%), hypertension syndrome (1.4%), various cardiac arrhythmias (2.9%) were the most common. The frequency of

various depressive reactions on the part of the respiratory system was 1.55% of the total number of laparoscopy and anesthesia.

Similar complications in surgical operations with septic complications associated with the patient's position on the operating table are described by J. Edward Morgan, Jr., Magid S. Michael, Michael J. Murray, Murray M.J. et al.

As we have already noted, postural reactions could be observed at all stages of the open method of treatment of peritonitis, while it was quite difficult to determine what played the main role in their occurrence: pathogenetic mechanisms, the nature of laparoscopy, features of anesthesia, concomitant pathology or all these factors together. So, predisposing factors to them during the operation were some positions of patients: for example, for better rehabilitation of the pelvis, operating surgeons prefer lowering the foot end of the operating table, which is undesirable in conditions of insufficiently corrected hypovolemia and can lead to hypotension, bradycardia, cardiac arrhythmia, hypoventilation of the lungs. The abrupt withdrawal of patients from the lateral or Trendelenburg position, their long-term fixed position on the operating table, bed, could also affect. They also occurred when patients were transferred from a wheelchair to an operating table or to a bed, during their transportation (lowering and lifting in elevators), especially in patients with concomitant diseases of the circulatory and respiratory system, when they used complex drug combinations. The perioperative risk of cardiovascular complications in the form of life-threatening paroxysmal arrhythmias with hemodynamic disorders in severe patients is also indicated by data from Murray M.J. et al., as well as Kenneth J. Tewman [26,27]. In the intensive care unit, the frequent causes of postural reactions were sudden rising or lifting of patients for various diagnostic procedures (measurement of central venous pressure, X-ray diagnostics, etc.), sharp turns in bed during medical procedures (massage, bandages, etc.). Other predisposing factors to the occurrence of postural reactions were conditions of pronounced paresis and bloating of the intestine with a sharp increase in intra-abdominal pressure, restriction of chest mobility, high standing of the diaphragm.

From the parietally inflated loops of the intestine and abdominal cavity, a large amount of toxins enters the bloodstream, which primarily affect the main detoxifying organs - the liver and kidneys. Violations of the function of these organs are the basis for the intensification of endogenous intoxication with a violation of metabolic homeostasis and occurred in all patients.

Our indicators reflect that all patients with severe forms of peritonitis who underwent dynamic laparoscopy had initial metabolic disorders of homeostasis, which in turn act as aggressive factors of laparoscopy. These are hypoproteinemia ( $57.20 \pm 1.21$  g/l), decreased diuresis ( $0.63 \pm 0.2$  ml/min), total bilirubinemia ( $25.4 \pm 1.5$  mmol/L), hyperfermentemia (AlAT  $36.21 \pm 2.34$  and AsAT  $39.5 \pm 3.16$  units/L). General azotemia was also observed in patients (creatinine  $0.21 \pm 0.02$  mg/l, urea  $14.23 \pm 1.4$  and residual nitrogen  $16.33 \pm 1.4$  mmol/L).

Thus, despite the perfect technique of surgeons, performing laparoscopies with minimal traumatization of patients' tissues by itself, the whole complex of effects of aggression factors accompanying the open method, in the absence of reliable methods of surgical and anesthetic protection and intensive

therapy, can lead to an aggravation of existing homeostasis disorders and pose a threat to the safety of patients. Of course, in addition to the above specific, laparoscopy interventions in the open treatment of peritonitis may be accompanied by other aggressive factors inherent in all operations.

### Conclusion.

The main factors of surgical aggression in the open method of treatment of peritonitis are the multiplicity of surgical interventions and anesthesia against the background of purulent-inflammatory process in the abdominal cavity ( $2.8 \pm 0.3$  times), a high degree of tension of the regulatory systems of homeostasis (with an index of  $1460.9 \pm 101.5$  units), postural reactions of blood circulation and respiration (7.55%) and violations of metabolic homeostasis.

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