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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 ბაზებშიდან.

WEBSITE

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 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. Корректур авторам не высылаются, 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.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. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგის 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.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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THE INFLUENCE OF THE ONCOLOGICAL PROCESS ON THE MECHANICAL STRENGTH OF THE POSTOPERATIVE SCAR OF THE LAPAROTOMY WOUND

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Abstract.

The aim: to examine mechanical strength of the postoperative scar of the laparotomy wound depending on the stage of oncological process at various terms after surgery performed.

Materials and Methods: examined 194 physical bodies of deceased persons, according to the protocols of the pathological examination (in which the card numbers of the patients are indicated) and who underwent surgical intervention on the organs of the abdominal cavity.

Results: Summarizing the results of the study, it should be noted that on the 1st day after surgery, the mechanical strength of the postoperative scar of the laparotomy wound does not depend on the stage of the oncological process and the type of surgery performed, which proves that there is no significant difference in the above-mentioned study groups. Reduced mechanical strength of the postoperative scar was found in the main group on the 1st day of the study. Similar to the 1st day situation is seen on the 2nd and 3rd days of the research. This confirms the morphological experimental studies carried out earlier, which indicate that malignant neoplasm in the body considerably inhibits and slows down the processes of maturation of the granulation tissue. The study once again proves the negative influence of the presence of a malignant neoplasm on the mechanical strength of the postoperative scar of a laparotomy wound **Conclusions:** Oncological process negatively affects the mechanical strength of the postoperative scar. Mechanical strength of the postoperative scar of the laparotomy wound is directly proportional to the stage of oncological process and the size of the tumor removed.

Key words. Postoperative eventration, abdominal organs, malignant neoplasms, granulation tissue.

Introduction.

In spite of the development of modern medicine, occurrence of postoperative eventration remains on a high level and constitutes from 0,5 to 2,35%. Lethal outcome in the development of this complication is 40-65%, especially when purulent postoperative wound appears [1].

Eventration occurs most frequently after urgent abdominal surgery in weakened patients of old and elderly ages with low immune and biological status of the body.

Despite the development of modern medicine, the incidence of postoperative eventration remains at a fairly high level and ranges from 0.5 to 2.35%. Mortality in the development of this complication reaches 40-65%, especially when it occurs against the background of purulent postoperative wound [2].

Most often, eventration occurs after emergency surgical interventions on the abdominal organs in weakened elderly and senile patients with low immunobiological state of the body [3,4].

Patients with malignant neoplasms of the abdominal organs with the signs of secondary immune deficiency, cachexia, anemia etc., constitute the highest risk group. All these factors directly affect the rate of regeneration and the risk of occurrence of purulent-septic complications from the side of the postoperative wound [5,6].

The study of the mechanical strength of the postoperative scar of the laparotomy wound depending on the stage of oncological process and the volume of surgery at various periods of the surgery will allow determination of the influence of oncological process on regeneration rate of the laparotomy wound.

The objective of the article to examine mechanical strength of the postoperative scar of the laparotomy wound depending on the stage of oncological process at various terms after surgery performed.

Materials and Methods.

In order to realize the set goal, we examined 194 physical bodies of deceased persons, according to the protocols of the pathological examination (in which the card numbers of the patients are indicated) and who underwent surgical intervention on the organs of the abdominal cavity.

The main group included 147 patients with malignant neoplasms of the abdominal organs in the III-IV stages of the disease, who died during the first 7 days of the postoperative period.

Depending on the stage of oncological disease and the volume of surgery performed, the main group was divided into two subgroups.

The group of comparison included 47 patients with acute surgical noncancerous pathology of the abdominal organs, who died within the same terms.

Table 1 presents the patients distributed depending on the surgery performed on the abdominal organs.

There were 89 (45,9%) females and 105 (54,1%) males involved in the study. Their average age was $65,9 \pm 0,59$ years. The average length of the laparotomy wound was $27,1 \pm 0,25$ cm. Both groups of patients were comparable by their age, gender, and length of the postoperative wound.

Mechanical strength of the postoperative scar of the laparotomy wound was measured by means of the method similar to that of G.V. Petrovych (2010), during the first 7 days of the early postoperative period after creation of ICP, by measuring the level of ICP at the moment of rupture of the postoperative scar of the laparotomy wound, under general intravenous anesthesia (chloral hydrate solution 200-250 mg/kg) [7].

After removing the sutures from the skin of the laparotomy wound, the edges of the latter were separated to see well the line of sutures of the muscle-aponeurotic layer, and the sutures

Table 1. Distribution of patients of both groups of the research depending on the surgery performed, abs., %.

Surgery	Group of patients		Abs.	%
	Comparison	Main		
Distal resection of the stomach	7	23	30	15,6
Gastrectomy	4	14	18	9,3
Resection of the small intestine	12	4	16	8,2
Right hemicolectomy	9	48	57	29,4
Left hemicolectomy	5	24	29	14,9
Resection of the sigmoid colon	7	15	22	11,3
Hartmann's operation	3	19	22	11,3
Total:	47	147	194	100

were removed. Then a latex container (condom) was introduced into the abdominal cavity through a small lateral opening. The latter was inflated with air using a compressor and the level of pressure was measured by means of the manometer Car Air Pump (model № CZK-3668), at the moment of the beginning of the rupture of the wound edges of the muscle-aponeurotic layer.

All the patients during their hospital stay were provided with standard postoperative treatment according to the protocols of medical aid given to patients with urgent surgical pathology of the abdominal organs [8].

Intra-abdominal pressure (IBP) and abdominal perfusion pressure (ABP) were determined 3 times a day during the first 12 days of the early postoperative period.

The ICP level was measured through the bladder in the following way: after its complete emptying, 25.0 ml of physiological solution was injected through the Foley catheter. A device for transvesical ICP measurement was attached to the catheter [8-10].

The obtained digital data in cm of water column were translated into mm Hg, as this unit of measurement is widely used in clinical practice, based on the calculation that 1 mm Hg is approximately equal to 1.36 cm of water column [9].

APT was defined as the difference between mean arterial pressure (SBP) and ICP ($AP = SBP - ICP$). SBP was defined as the sum of one systolic blood pressure (SBP) and two diastolic blood pressures arterial pressure (BP) divided by 3 ($SBP = (BP + DBP + DBP)/3$) [9,10].

The average level of ICP and APT was calculated by dividing the sum of the above values obtained during the first 10 days of the early postoperative period, divided by the number of observations.

Statistical analysis.

The obtained results were statistically processed by means of electronic tables Microsoft Excel and the package of statistical processing program PAST. Shapiro-Wilk tests were used to check the normality of data distribution in the samples. Differences between research groups were determined using the Mann-Whitney test. The result was reliable when the probability ration was $\leq 0,05$, which is commonly accepted in medical-biological studies.

Results.

As already mentioned, patients with malignant neoplasms present the signs of secondary immune deficiency, cachexia, anemia etc., which produces an extremely negative effect on the reparative processes of the laparotomy wound [9].

The study of the mechanical strength of the postoperative scar of the laparotomy wound considering the stage of oncological process will allow determination of a certain dependence with the degree of tumor spreading. For this purpose, the main group was divided into two subgroups. The first subgroup included 67 physical bodies of the deceased patients with I-II degrees of oncological process, and the second subgroup included 80 patients with III-IV degrees.

Evaluating the results of the research presented in Table 2, reduced mechanical strength of the postoperative scar is found in the main group on the 1st day of the study, though the difference is not reliable. Similar to the 1st day situation is seen on the 2nd and 3rd days of the research, but a reliable difference between the group of comparison and the second subgroup of the main group is determined. During the late terms of the observation, the parameters of both subgroups of the main group were reliably lower than that of the group of comparison. Mechanical strength of the postoperative wound during the whole period of the study increases gradually in all the research groups. The parameters of the second subgroup of the main group are lower than that of the first one, though this difference becomes reliable beginning with the 4-5th day of the study.

The experimental studies carried out earlier are indicative of a certain effect of the surgical volume regarding oncological process on the morphological features of the laparotomy wound granulation tissue [10].

Examination of the mechanical strength of the postoperative scar of the laparotomy wound depending on the volume of surgery will enable to identify the role of the latter in occurrence of postoperative eventration.

For this purpose, the main group is divided into two subgroups. The first subgroup included 55 physical bodies of deceased people who underwent symptomatic surgery, that is, tumor volume after surgery remained unchanged. The second subgroup included 92 physical bodies of deceased people, who underwent radical or palliative surgery when tumor was completely removed, or its volume was partially reduced [11].

The results of the study presented in Table 3 are indicative of decreased mechanical strength of the postoperative scar in the main group, especially in the second subgroup on the 1st day after surgery performed, but the difference is not reliable. Similar situation is seen during the following terms of the study, except unreliable difference between the parameters of the comparison group and the first subgroup on the 2-3rd days of the study. The parameters of the second subgroup of the main group are lower than that of the first one, though this difference is reliable since the 4-5th day of the observation. Reliable increase of mechanical strength of the postoperative scar is found in all the research groups during the whole term of the observation.

Table 2. Mechanical strength of the postoperative scar of the laparotomy wound in patients with malignant neoplasms of the abdominal cavity depending on the stage of oncological process at different terms of the study ($M \pm m$), mmHg.

Term after surgery performed	Research groups of physical bodies of the deceased people		
	Comparison	Main	
		First subgroup	Second subgroup
1 st day	228,5 ± 11,36 n=12	213,8 ± 8,54 n=16; p>0,05	204,3 ± 8,23 n=20; p>0,05; p ₁ >0,05
2-3 days	316,2 ± 12,01 n=14	297,3 ± 9,32 n=18; p>0,05	270,1 ± 6,01 n=22; p<0,05; p ₁ >0,05
4-5 days	421,3 ± 13,89 n=11	377,1 ± 12,65 n=17; p<0,05	341,8 ± 7,77 n=20; p<0,001; p ₁ <0,05
6-7 days	582,3 ± 14,85 n=10	493,5 ± 9,85 n=16; p<0,001	452,4 ± 8,96 n=18; p<0,001; p ₁ <0,01

Note: n–number of observations; p–difference against the group of comparison; p₁ – difference between both subgroups of the main group.

Table 3. Mechanical strength of the postoperative scar of the laparotomy wound in patients with malignant neoplasms of the abdominal cavity depending on the type of surgery performed in different terms of the observation ($M \pm m$), mmHg.

Term after surgery performed	Research groups of physical bodies of deceased people		
	Comparison	Main	
		First subgroup	Second subgroup
1 st day	228,5 ± 11,36 n=12	219,5 ± 6,42 n=14; p>0,05	201,5 ± 8,55 n=22; p>0,05; p ₁ >0,05
2-3 days	316,2 ± 12,01 n=14	296,7 ± 9,69 n=14; p>0,05	274,6 ± 6,69 n=26; p<0,05; p ₁ >0,05
4-5 days	421,3 ± 13,89 n=11	379,6 ± 12,92 n=15; p<0,05	343,3 ± 8,21 n=22; p<0,001; p ₁ <0,05
6-7 days	582,3 ± 14,85 n=10	507,8 ± 9,77 n=12; p<0,001	452,1 ± 8,69 n=22; p<0,001; p ₁ <0,001

Note: n–number of observations; p–difference against the group of comparison; p₁ – difference between both subgroups of the main group.

Discussion.

Summarizing the results of the study, it should be noted that on the 1st day after surgery, the mechanical strength of the postoperative scar of the laparotomy wound does not depend on the stage of the oncological process and the type of surgery performed, which proves that there is no significant difference in the above-mentioned study groups. However, starting from 2-3 days, the mechanical strength of the postoperative scar, in the presence of metastatic tumor spread (stage III-IV of the oncological process), as well as radical or palliative surgical interventions, is significantly lower throughout the study period.

It should be noted that the oncological process without metastatic spread (stages I-II of the oncological process) and symptomatic surgical intervention (no effect on the tumor process) lead only in the longer term (4-5 days) to a probable decrease in the strength of the postoperative scar. However, it should be noted that the created ICH negatively affects the strength of the postoperative scar. Thus, a constant increase in ICP to 20 smH₂O leads to a decrease in the mechanical strength of the postoperative scar, but the latter returns to normal on the 7th day of observation [1,8,9,10].

It should be noted that the strength of the postoperative scar depends on the level of ICP, since the increase of the latter to 40 smH₂O leads to probably lower indicators.

Also, it should be added that the dynamics of the growth of the mechanical strength of the postoperative scar during the entire period of the study is improbable when the ICP increases to 40 smH₂O, which indicates a significant slowing down of

the processes of maturation of the granulation tissue of the laparotomy wound.

Therefore, the created ICH leads to a decrease in the mechanical strength of the postoperative scar of the laparotomy wound. The degree of negative influence of ICH on the strength of the postoperative scar is inversely proportional to the level of ICH [10].

Thus, the study once again proves the negative impact of the presence of a malignant neoplasm on the mechanical strength of the postoperative scar of a laparotomy wound, which is explained by a significant inhibition and slowing of the maturation of granulation tissue [5,7,10].

The results obtained indicate a certain dependence of the mechanical strength of the postoperative laparotomy wound scar on the degree of tumor spread throughout the body. That is, the higher the stage of the oncological process, the more pronounced the phenomena of secondary immunodeficiency, cachexia, anemia, etc. are, which directly affect the rate of reparative processes [5,9,10]. Therefore, the mechanical strength of the postoperative laparotomy wound scar is lower at the III-IV stages of the oncological process, where there are metastases, especially distant ones.

Worse maturation of the granulation tissue of the laparotomy wound after removal of the tumor element (radical or palliative surgery) is explained by a relatively greater surgical trauma, which leads to a deepening of the above pathological processes caused by malignancy. In symptomatic surgical interventions, the surgical trauma is much less since the tumor is not removed.

This means much less blood loss and a shorter duration of surgery. Similar results were obtained in the morphological study of granulation tissue of the laparotomy wound, depending on the type of surgical intervention performed [5,10].

Thus, summarizing the results of the study, it can be concluded that the mechanical strength of the postoperative scar of the laparotomy wound in cancer patients directly depends on the stage of the cancer process and the volume of the removed tumor.

Conclusion.

1. The mechanical strength of postoperative laparotomy wound scar is 1.12 times ($p < 0.05$) lower in stages I-II of oncological process and 1.23 times ($p < 0.01$) in stages III-IV compared to non-oncological pathology.

2. Performing symptomatic surgery in cancer patients leads to a decrease in the mechanical strength of the postoperative laparotomy wound scar by 1.1 times ($p < 0.05$), and by 1.22 times ($p < 0.01$) in radical and palliative surgery. Oncologic process in the body and surgery performed at the same time produce a negative effect on mechanical strength of the postoperative scar of the laparotomy wound since the second day of the early postoperative period.

Prospects of further studies.

In the future, we consider it reasonable to investigate the effect of malignant neoplasm on the mechanical strength of the postoperative scar of the laparotomy wound in the experiment and the influence of intra-abdominal hypertension on the morphological features of the granulation tissue of the postoperative scar of the laparotomy wound.

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Conflict of interest: The authors declare no conflict of interest.

Ethical approval: This study was approved by the Ethics Committee of Bukovinian Medical University and Bukovinian Clinical Oncology Center. Our study was conducted according to the Declaration of Helsinki adopted in 1975 and revised in 2008, and the ethical principles were entirely respected.

Data availability: The data of this study is available by request.

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