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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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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.

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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 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.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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MICROBIOLOGICAL FEATURES OF A LAPAROTOMY WOUND COMPLICATED BY POSTOPERATIVE EVENTRATION AGAINST THE BACKGROUND OF AN ONCOLOGICAL PROCESS

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Abstract.

This article presents the results of a study of the qualitative and quantitative microflora content of the wound exudate of a laparotomy wound complicated by eventration in patients with malignant neoplasms of the abdominal cavity. This study aimed to investigate the peculiarities of the qualitative and quantitative composition of the laparotomy wound microflora in cancer patients with postoperative eventration. After all, postoperative event is always accompanied by the occurrence of purulent-septic complications from the laparotomy wound. These microbiological features should be taken into account in order to timely prevent or treat postoperative event in cancer patients, that is, in the appointment of antimicrobial therapy, features of purulent wound treatment, etc. We studied 34 patients with surgical diseases of the abdominal cavity with postoperative eventration. We studied the species content of microorganisms, their population level, the index of constancy, the frequency of species detection, the index of significance, and the index of quantitative dominance. The microbiological spectrum of laparotomy wound exudate, in case of postoperative eventration in patients with malignant neoplasms of the abdominal cavity, is characterized by a probable predominance of the number of cultivated strains of the genus *Proteus*, *Pseudomonas aeruginosa*, the appearance of yeast-like fungi of the genus *Candida* and the absence of *S. aureus* growth in the early stages. There was an increase in the population level of *E. coli*, *Pseudomonas aeruginosa*, and microorganisms of the genus *Proteus*, with a prevalence of the latter compared to non-cancer patients, and a lower number of *Staphylococcus aureus* colonies. The dominant microorganisms of wound exudate are *E. coli* and *Enterococcus faecalis*; in patients with malignant abdominal neoplasms, the highest coefficient of quantitative dominance is observed in microorganisms of the genus *Proteus*. The presence of secondary immunodeficiency, cachexia, anaemia, etc. in patients with malignant neoplasms of the abdominal cavity causes a 'sluggish' purulent-inflammatory process in the laparotomy wound area in the event of postoperative eventration.

Key words. Microorganisms, eventration, laparotomy wound, wound exudate, oncological process.

Introduction.

The problem of eventration still remains extremely relevant, since the mortality rate of this postoperative complication does not tend to decrease and reaches up to 24%, and according to some authors - up to 65% [1-4].

The key role in the development of postoperative eventration belongs to purulent and septic complications of the laparotomy wound. The incidence of laparotomy wound septicaemia reaches a maximum after operations accompanied by a disruption

of the integrity of the hollow organs, as well as in purulent inflammatory diseases of the abdominal cavity [5-9].

It is well known that oncological abdominal pathology is associated with secondary immunodeficiency, cachexia, anaemia, etc., which certainly affects the rate of regeneration and the risk of developing purulent and septic complications of the laparotomy wound [10-13]. Postoperative entrapment is a postoperative complication that is always accompanied by purulent-septic complications of the postoperative wound.

To date, however, there is no clear data on the microbiological characteristics of the laparotomy wound in the development of eventration, specifically in the case of abdominal cancer.

The study of microbiological features of postoperative eventration against the background of malignant abdominal neoplasm will allow to better understand the etiopathogenesis of this complication and develop effective methods of its prevention.

Therefore, the aim of the study was to investigate the peculiarities of the qualitative and quantitative microflora content of wound exudate of a laparotomy wound complicated by eventration in patients with malignant tumours of the abdominal cavity.

Materials and Methods.

To achieve this goal, we studied 34 patients with surgical diseases of the abdominal cavity who developed postoperative eventration during 8 days of the early postoperative period [14-16].

The main group consisted of 16 patients with malignant neoplasms of the abdominal cavity in the III-IV stages of the disease.

The comparison group comprised 18 patients with acute surgical non-cancerous pathology of the abdominal cavity.

The distribution of patients, depending on the abdominal surgery performed, is presented in Table 1.

Of this number of patients, 19 (55.9%) female and 15 (44.1%) male. The average age of the patients was 61.3 ± 2.08 years. Both groups of patients were representative in terms of age and gender.

All patients received standard antimicrobial therapy 30-40 minutes before surgery and during the early postoperative period, according to clinical protocols. Cephalosporins, carbapenems, and fluoroquinolones were used. All patients received standard postoperative treatment during their hospital stay, according to the protocols for the provision of medical care to patients with emergency surgical pathology of the abdomen [17-19].

Biological material was collected on the 3rd - 8th day of the early postoperative period for bacteriological examination of wound exudate during dressing changes.

Methods of microbiological research.

For the qualitative and quantitative assessment of aerobic and optional anaerobic pathogens, peritoneal exudate was inoculated on Endo medium, thioglycolic medium, yolk agar, anaerobic blood agar and cultured at 37°C for seven days. For the biochemical identification of gram-negative flora, test systems Biomern were used on a Mini Api device (France). Sabouraud medium was used to determine the growth of pathogenic fungi.

After incubation, the number of colony-forming units (CFU) detected in the test material was counted and presented in decimal logarithms (lg CFU). The species content of microorganisms, their population level, coefficient of constancy (C%), frequency of species detection (Pi), significance coefficient (S), and quantitative dominance coefficient (QDC) were studied.

Statistical analysis

The statistical analysis of the results was carried out using Microsoft Excel and the PAST statistical processing software package. Shapiro-Wilk criteria were used to check the regularity of data distribution in the samples. Differences between the study groups were determined using the Mann-Whitney criteria. The result was considered reliable if the probability coefficient was ≤ 0.05 , which is generally accepted in biomedical research.

Results.

The growth of *E. coli*, *Enterococcus faecalis*, *Staphylococcus aureus* (*S. aureus*), microorganisms of the genus *Proteus* (*P. vulgaris*, *P. mirabilis*, *P. morgani*) and *Pseudomonas*

aeruginosa was found in both experimental groups. Also, in the main group, the growth of yeast-like fungi of the genus *Candida* was also noted [20-22].

Analyzing the results of the study of the species content of wound exudate, which are presented in Table 2, it should be noted that the highest coefficient of constancy and frequency of occurrence of the species was in *Enterococcus faecalis*, in both study groups, throughout the observation period.

On day 6-8 of the study, an increase in the number of cultivated *E. coli* strains was observed, with a slight constant prevalence of the coefficient of persistence and frequency of occurrence of the species in the comparison group, but such dynamics and the difference between the two study groups is not significant.

In the comparison group, the number of colonized *S. aureus* strains significantly increased ($p < 0.05$) on days 6-8 of observation, in contrast to the main group, where the growth of these microorganisms only appears in the specified period. The coefficient of persistence and the frequency of occurrence of the species in *S. aureus*, on days 6-8 of the study, in the comparison group is higher than in the main group, but this difference is not significant.

There was an increase in the number of cultivated strains of *Proteus* on days 6-8 of observation, but this dynamics in the comparison group was not significant. The coefficient of persistence and the frequency of occurrence of the species in the genus *Proteus* is consistently higher in the main group, but this difference is not significant.

Table 1. Distribution of patients in both study groups, depending on the surgical intervention performed, abs. %.

Surgery performed	Group of patients		Abs.	%
	Comparison	Main		
Distal gastric resection	6	3	9	26,5
Gastrectomy	1	2	3	8,8
Small intestine resection	3	1	4	11,8
Right hemicolectomy	2	4	6	17,6
Left hemicolectomy	3	2	5	14,7
Hartmann surgery	3	4	7	20,6
Total:	18	16	34	100

Table 2. Species content of laparotomy wound microflora complicated by eventration in oncological pathology of abdominal organs, at different follow-up periods, abs. %.

Test Group	M/o	Term after surgery, day					
		3-5 day			6-8 day		
		s	C%	Pi	s	C%	Pi
Comparison n=18	<i>E. coli</i>	8	44,4	0,24	12	66,7	0,23
	<i>Enterococcus faecalis</i>	14	77,8	0,42	17	94,4	0,32
	<i>Staphylococcus aureus</i>	4	22,2	0,12	10	55,6	0,19
	Strains of <i>Proteus</i>	5	27,8	0,15	8	44,4	0,15
	<i>Pseudomonas aeruginosa</i>	2	11,1	0,06	5	27,8	0,1
Main n=16	<i>E. coli</i>	5	31,3	0,17	9	56,3	0,16
	<i>Enterococcus faecalis</i>	12	75,0	0,4	14	87,5	0,25
	<i>Staphylococcus aureus</i>	-	-	-	6	37,5	0,11
	Strains of <i>Proteus</i>	6	37,5	0,2	11	68,8	0,2
	<i>Pseudomonas aeruginosa</i>	4	25,0	0,13	9	56,3	0,16
	Yeast-like fungi <i>Candida</i>	3	18,8	0,1	7	43,8	0,13

1. n - number of observations; 2. m/o - microorganisms; 3. s - number of strains cultivated; 4. C% - coefficient of constancy; 5. Pi - frequency of occurrence of the species.

In both test groups, on days 6-8 of the study, there was an increase in the number of cultivated strains of *Pseudomonas aeruginosa*, but such dynamics is significant only in the main group ($p < 0.05$). Also, during the study period, there was a significant ($p < 0.05$) predominance of the number of cultivated strains, the coefficient of constancy and the frequency of occurrence of strains in *Pseudomonas aeruginosa* in the main group.

In the main group, in contrast to the comparison, the growth of yeast-like fungi of the genus *Candida* was observed, the number of strains of which significantly increased on days 6-8 of the study ($p < 0.05$).

Thus, in case of eventration against the background of the oncological process, the predominance of the number of cultivated strains of the genus *Proteus*, *Pseudomonas aeruginosa*, the appearance of growth of yeast-like fungi of the genus *Candida*, as well as the absence of *S. aureus* growth in the early stages is characteristic.

The results of the study of the population level of wound exudate microorganisms presented in Table 3 indicate a significant increase in the number of *E. coli* colonies on days 6-8 of observation in both test groups. During all the study periods, there was an unlikely difference between the two study groups of patients [23, 24].

On days 6-8 of observation, there was an increase in the population level of *Enterococcus faecalis*, but such dynamics were significant only in the comparison group. The difference between the two study groups was not significant during the entire study period.

The population level of *Staphylococcus aureus* in the

comparison group significantly increased on day 6-8 of observation and exceeded that of the main group at this time.

On the 6-8th day of observation, an increase in the population level of microorganisms of the genus *Proteus* was noted, with the significant dynamics in the main group. Also, in the above terms, the indicators of the main group were significantly higher than the comparison group.

There was an increase in the population level of *Pseudomonas aeruginosa* in both test groups on days 6-8 of observation, but such dynamics was significant only in the main group. The difference between the two study groups during the entire study period was not significant.

In the main group, during the entire study period, there was an unreliable increase in the number of colonies of yeast-like fungi of the genus *Candida*.

Thus, with the development of eventration in cancer patients, a significant increase in the population level of *E. coli*, m/o of the genus *Proteus*, as well as *Pseudomonas aeruginosa*, with a probable predominance of m/o of the genus *Proteus* and a smaller number of colonies of *Staphylococcus aureus*, compared with non-cancer patients, is noted in the laparotomy wound exudate.

From the point of view of describing microbial diversity, it is important to determine the quantitative dominance coefficient (QDC) of each type of wound exudate microorganism (Table 4).

The dominant microorganism, according to the determined QDC, in both test groups, during the entire study period is *E. coli*, followed by *Enterococcus faecalis*. In the main group, on the 6-8th day of the study, high values of QDC were observed

Table 3. Population level of microflora of laparotomy wound complicated by eventration in case of oncological pathology of abdominal organs, at different observation periods ($M \pm m$), lg CFU/cm³.

Test Group	Term after surgery, day	
	Day 3-5	Day 6-8
Comparison n=18	<i>E. coli</i> s=6 4,1 ± 0,49	<i>E. coli</i> s=12 5,3 ± 0,23 $p_1 < 0,05$
	<i>Enterococcus faecalis</i> s=14 3,5 ± 0,19	<i>Enterococcus faecalis</i> s=17 4,5 ± 0,19 $p_1 < 0,05$
	<i>Staphylococcus aureus</i> s=4 2,5 ± 0,29	<i>Staphylococcus aureus</i> s=10 4,3 ± 0,29 $p_1 < 0,05$
	m/o <i>Proteus</i> s=5 2,5 ± 0,26	m/o <i>Proteus</i> s=8 3,2 ± 0,32 $p_1 > 0,05$
	<i>Pseudomonas aeruginosa</i> s=2 2,3 ± 0,35	<i>Pseudomonas aeruginosa</i> s=5 2,8 ± 0,28 $p_1 > 0,05$
Main n=16	<i>E. coli</i> s=5 4,2 ± 0,3 $p > 0,05$	<i>E. coli</i> s=9 5,4 ± 0,29 $p > 0,05$; $p_1 < 0,05$
	<i>Enterococcus faecalis</i> s=12 3,2 ± 0,23 $p > 0,05$	<i>Enterococcus faecalis</i> s=14 4,0 ± 0,29 $p > 0,05$; $p_1 > 0,05$
	-	<i>Staphylococcus aureus</i> s=6 3,1 ± 0,38 $p < 0,05$
	m/o <i>Proteus</i> s=6 2,9 ± 0,31 $p > 0,05$	m/o <i>Proteus</i> s=11 4,1 ± 0,21 $p < 0,05$; $p_1 < 0,01$
	<i>Pseudomonas aeruginosa</i> s=4 2,2 ± 0,17 $p > 0,05$	<i>Pseudomonas aeruginosa</i> s=9 3,4 ± 0,22 $p > 0,05$; $p_1 < 0,05$
Yeast-like fungi <i>Candida</i> s=3 2,8 ± 0,23 $p > 0,05$	Yeast-like fungi <i>Candida</i> s=7 3,2 ± 0,21 $p_1 > 0,05$	

1. n - number of observations; 2. m/o - microorganisms; 3. s - number of strains cultivated; 4. p - difference between both test groups; 5. p_1 - difference against the values of the 3-5th day of observation.

Table 4. Significance coefficient and quantitative dominance of the microflora of the wound exudate of a laparotomy wound complicated by eventration in oncological pathology of the abdominal cavity, at different follow-up periods, abs.

Test Group	M/o	Term after surgery, day					
		3-5			6-8		
		s	CS	QDC	s	CS	QDC
Comparison n=18	<i>E. coli</i>	6	0,28	137,6	12	0,26	131,8
	<i>Enterococcus faecalis</i>	14	0,23	117,4	17	0,22	111,9
	<i>Staphylococcus aureus</i>	4	0,17	83,9	10	0,21	107,0
	m/o <i>Proteus</i>	5	0,17	83,9	8	0,16	79,6
	<i>Pseudomonas aeruginosa</i>	2	0,15	77,2	5	0,14	69,7
Main n=16	<i>E. coli</i>	5	0,27	137,3	9	0,23	139,5
	<i>Enterococcus faecalis</i>	12	0,21	104,6	14	0,17	103,4
	<i>Staphylococcus aureus</i>	-	-	-	6	0,13	80,1
	m/o <i>Proteus</i>	6	0,19	94,8	11	0,18	105,9
	<i>Pseudomonas aeruginosa</i>	4	0,14	71,9	9	0,15	87,9
	Yeast-like fungi <i>Candida</i>	3	0,18	91,5	7	0,14	82,7

1. n - number of observations; 2. m/o - microorganisms; 3. s - number of strains cultivated; 4. S - significance coefficient; 5. QDC – quantitative dominance coefficient.

for *Proteus* species, and in the comparison group - for *Staphylococcus aureus*.

Discussion.

Summing up the results of the study, it should be noted that in the development of postoperative eventration, the microbial spectrum of wound exudate during the first 6 days is represented by *E. coli*, *Enterococcus faecalis*, *S. aureus*, m/o of the genus *Proteus* and *Pseudomonas aeruginosa*, but in the oncological process there are certain features - no growth of *S. aureus* and the appearance of growth of yeast-like fungi of the genus *Candida*. In both test groups, the highest frequency of species occurrence was in *Enterococcus faecalis*. The lowest frequency of occurrence of the species in the comparison group was in *Pseudomonas aeruginosa*, and in the main group - in yeast-like fungi of the genus *Candida* [25].

The highest coefficient of significance and quantitative dominance in both test groups was observed for *E. coli*. In the comparison group, the lowest coefficient of significance and quantitative dominance is observed for *Pseudomonas aeruginosa*. In the main group, the lowest coefficient of significance is observed for yeast-like fungi of the genus *Candida*, and quantitative dominance - for *Pseudomonas aeruginosa*.

The difference in the population level of the above-mentioned microorganisms between both experimental groups, in the given observation period, is insignificant.

During the subsequent observation periods, the microbial spectrum in the comparison group did not change, while in the main group, an increase in *S. aureus* was observed. In both test groups, the highest frequency of occurrence and the coefficient of persistence was also observed for *Enterococcus faecalis*. *Pseudomonas aeruginosa* had the lowest frequency and coefficient of persistence in the comparison group, and *S. aureus* in the main group.

In both test groups, the highest coefficient of significance and quantitative dominance was observed for *E. coli*. In the comparison group, the lowest coefficient of significance and quantitative dominance was observed for *Pseudomonas*

aeruginosa, and in the main group - for *S. aureus*.

In these terms of the study, a significant difference in the population level of microflora between both test groups of *S. aureus* and m/o of the genus *Proteus* was noted.

The probable dynamics of growth of the population level of microorganisms should be mentioned, in the comparison group - *E. coli*, *Enterococcus faecalis*, *S. aureus*, and in the main group - *E. coli* and m/o of the genus *Proteus*.

These microbiological features of the wound exudate in case of eventration in patients with malignant neoplasms of the abdominal cavity can be explained by the phenomena of secondary immunodeficiency, cachexia, anaemia, etc. that occurs in the oncological process and causes a 'sluggish' purulent inflammatory response [26].

This feature should be considered for the purpose of timely prevention or treatment of postoperative eventration since this category of patients has certain microbiological features of purulent-septic complications [27].

As already mentioned, wound infection has always developed. According to the results of the study, against the background of the oncological process, the predominant number of strains of m/o of the genus *Proteus*, *Pseudomonas aeruginosa*, and the appearance of yeast-like fungi of the genus *Candida* were characterized. Also, in the early stages, the absence of *S. aureus* growth was noted. Purulent-septic complications that occur against the background of malignant neoplasms of the abdominal cavity, especially in the advanced stages (III-IV stages of the oncological process) have certain features, as they occur against the background of existing pathological changes caused by cancer itself. These are the phenomena of secondary immunodeficiency, cachexia, anemia, hypoproteinemia, etc. This leads to a hyporesponse of the body to microbial pathogens, i.e., the course of the wound process is sluggish, with low adhesive (separating) ability. Therefore, *S. aureus* appears in more distant terms, and the wound exudate contains m/o of the genus *Proteus*, *Pseudomonas aeruginosa*, yeast-like fungi of the genus *Candida*, which is more characteristic of a chronic, sluggish purulent-septic process.

Conclusion.

1. The microbiological spectrum of laparotomy wound exudate, in case of postoperative eventration in patients with malignant neoplasms of the abdominal cavity, is characterized by a probable predominance of the number of strains of the genus *Proteus*, *Pseudomonas aeruginosa*, the appearance of yeast-like fungi of the genus *Candida* and the absence of *S. aureus* growth in the early stages.
2. During the development of postoperative eventration in patients with malignant neoplasms of the abdominal cavity, a significant increase in the population level of *E. coli*, *Pseudomonas aeruginosa*, as well as microorganisms of the genus *Proteus* is noted, with a probable predominance of the latter, compared to non-cancer patients, and a significantly lower number of *Staphylococcus aureus* colonies.
3. In patients with malignant neoplasms of the abdominal cavity in case of postoperative eventration, the dominant microorganisms of the wound exudate are *E. coli* and *Enterococcus faecalis*, but, among other microorganisms, the highest coefficient of quantitative dominance is observed in microorganisms of the genus *Proteus*.
4. We did not study the results of treatment in this article. We studied the peculiarities of the qualitative and quantitative composition of the laparotomy wound microflora in cancer patients with postoperative ventilation. In the treatment of postoperative enteritis in cancer patients, in addition to surgical treatment, it is necessary to take into account this microbial spectrum and prescribe appropriate antibiotics, taking into account the culture of wound exudate.

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 (approval ID: 04-11.02.2021). 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.

Authorship.

IKM contributed to conceptualizing the study and contributed to data collection.

OII contributed to the methodology. VYB contributed to writing the original draft. SII contributed to editing the manuscript.

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