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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. 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.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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RESULTS OF PERCUTANEOUS TREATMENT OF LIMITED FLUID FORMATIONS AFTER ABDOMINAL SURGERY

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Abstract.

The purpose of the study: Evaluation of the results of percutaneous drainage in the treatment of visceral and non-visceral fluid formations that developed in the abdominal cavity in the postoperative period.

Material and methods: The study involved 64 patients who underwent percutaneous drainage under ultrasound control, and 30 patients who underwent open surgical drainage. The clinical variables were analyzed along with the results of the interventions.

Results: The average hospital stay of patients who underwent open surgical drainage (11.10 ± 3.42 days) was longer than that of patients who underwent percutaneous drainage (9.13 ± 1.63 days). The average time of temperature decrease during percutaneous drainage was 4.31 ± 1.75 days, and with open surgical drainage -4.94 ± 2.01 days.

Percutaneous drainage was successful in 96.8% of patients, and an unsuccessful result was observed in 3.2% of patients. In patients who underwent open surgical drainage, these rates were 80% and 20%, respectively. Compared with percutaneous drainage, complications were more frequent in patients who underwent open surgical drainage and amounted to 12.4% and 16.7%, respectively.

Conclusion: Percutaneous drainage under ultrasound control has a lower mortality rate compared to open surgical drainage, as well as reduces hospital stay and in most cases can replace drainage with traditional open or laparoscopic intervention.

Key words. Ultrasound observation, percutaneous drainage, abdominal abscess, postoperative complications.

Introduction.

The vast majority of researchers note the high efficiency of drainage of intra-abdominal abscesses under ultrasound control [1-17,9]. Treatment using this technique is achieved in 40.5-80% of patients [5,9]. The duration of treatment is 7-20 days, but with pelvic abscesses it increases to 38-48 days [9,10,13]. Complications in the form of lesions of the gastrointestinal tract and large vessels occur in 6 - 8.6% of cases [9,13], with mortality 5,3-14% [4,6,8,9], and in cases of pus development in the omentum is 44% [6,11]. There is an opinion that [8], the puncture method has no independent significance, and therefore its use is advisable only for patients with high operational risk or to improve the general condition of the patient.

Percutaneous drainage under ultrasound control is a minimally invasive procedure that is usually well tolerated by patients and therefore should be preferable to percutaneous drainage [3,8,9]. As reported in the scientific literature, the indicators of technical success of percutaneous drainage are very high [5,10,11]. However, various surgical complications may occur during this intervention, such as bleeding and sepsis [6,12-15]. "Open"

interventions for intra-abdominal abscesses are performed only if visualization of the abscess on ultrasound is difficult and puncture drainage is impossible, as well as when pus comes into contact with a postoperative wound. In such cases, the method of surgical treatment of abscesses consists in a wide opening of the pus and its adequate drainage [3,8,11].

There are a number of studies evaluating the clinical results of percutaneous drainage of intra-abdominal abscesses of various etiologies, including abscesses not associated with surgery. In most studies, a high clinical effect has been achieved [5,11]. However, research papers devoted to this approach to the treatment of postoperative fluid formations are rare.

The aim of the study was to evaluate the effectiveness of ultrasound-controlled drainage in cases of postoperative collection of intra-abdominal fluid in the abdominal cavity and its effect on treatment results.

Materials and Methods.

The study included 94 patients who, from 2016 to 2023, had intraperitoneal fluid formations detected in the surgical departments of the Azerbaijan State Institute of Advanced Medical Training and in the surgical departments of the Republican Clinical Hospital in the postoperative period and underwent drainage under ultrasound control.

Patients with clinical suspicion of intraperitoneal fluid formation underwent a detailed anamnesis and clinical examination, as well as a general blood test, kidney and liver functional tests, urine microscopy, serological tests for hepatitis B and C, HIV. The diagnosis is confirmed by ultrasound examination of the abdominal cavity and, if necessary, computed tomography of the abdominal cavity.

Inclusion criteria: patients of both sexes aged 20 to 70 years who underwent abdominal surgery, and patients with a fluid formation size of more than 5 cm on ultrasound/computed tomography, for whom conservative treatment did not help.

Exclusion criteria: patients under 20 years of age and over 70 years of age. Unstable patients with uncorrected concomitant coagulopathy or patients who refused this treatment were excluded from the study.

A total of 94 patients were included in the presented study. The group of patients who underwent percutaneous drainage – n=64. The group of patients with open surgical drainage-n = 30.

The operations used in the study.

Percutaneous drainage technique: The day before the start of the intervention, treatment with appropriate antibiotics was started. The location of the abscess was clarified by ultrasound examination, and a safe drainage route was planned to avoid damage to the abdominal organs. The area in which the intervention will be performed has been treated locally with betadine and alcohol. With the observance of aseptic

measures, adequate local anesthesia was provided using 2% lidocaine. A 5 mm long skin incision was made with a scalpel at the planned entrance. The "trocar method" was used [9]. A catheter with a retainer (Devon®, 8F/10F, length 22 cm) was placed on an acute mandrel and injected under ultrasound control. During ultrasound imaging, it was confirmed that it was in a liquid cavity, and the mandrel was removed. Its location in the cavity was once again confirmed by the removal of the contents during aspiration. After the catheter was connected to the drainage bag, it was fixed by sewing it to the skin with an unabsorbable surgical thread (Ethicon®), and a sterile bandage was applied. Gravity drainage was provided in all catheters, and in order not to block its exit with necrotic tissues and blood clots, it was washed 3-4 times a day with 10 ml of saline sodium chloride solution. The sensitivity of the microflora was studied, and appropriate antibiotics were used intravenously or intramuscularly. Ultrasound examinations were performed every other day to control the volume of the cavity and confirm the location of the tip of the catheter in the cavity. The catheter was removed when drainage stopped or became minimal, as well as when the formation disappeared or decreased in size during repeated imaging.

Open surgical drainage technique: During open surgical drainage, patients were forced to starve for at least 6 hours. The localization of the abscess or other liquid formations was clarified by ultrasound examination. All operations were performed under general or epidural anesthesia (3 ml of 1.5% lidocaine). The area in which the intervention was performed was treated locally with betadine and alcohol. The abdominal wall was opened in layers using ultrasound. After determining the location of the abscess, a hemostatic clamp was used to access the abscess cavity. The abscess cavity was completely aspirated and thoroughly rinsed with saline solution (0.9%). A thorough examination was conducted to confirm the absence of other intra-abdominal pathologies. By placing a large-diameter drainage, it was separately brought out through the contraperture, and the abdominal wall was closed in layers by suturing. In the postoperative period, patients underwent regular dynamic monitoring with monitoring of temperature, pulse and number of breaths. Drainage activity was recorded daily, and the response to treatment was evaluated based on clinical and laboratory parameters, as well as serial ultrasound examinations. The sensitivity of the microflora was studied, and appropriate antibiotics were used intravenously or intramuscularly. If necessary, a saline solution was used to rinse the cavity. The duration of hospital stays, and the duration of temperature decrease were recorded for each patient. The patients were monitored for 3 months, during which they were registered and received appropriate treatment. The patients were discharged home on an outpatient basis with clinical improvement, provided they followed a proper diet and took oral antibiotics.

The effectiveness of treatment was determined by the following criteria [5]:

- After treatment of the abscess, patients recovered with improved symptoms, decreased white blood cell count, improved appetite and general condition.
- There were no relapses or infectious complications within 3 months after catheter removal.

- Significant reduction in size (reduction >60%) without signs of fluid accumulation or multiple accumulation during subsequent ultrasound examinations.

Statistical analysis: The data was entered into Microsoft Excel software, and the Statistical package for Social Sciences (SPSS) software version 21.0 was used for data analysis. The indicator $p < 0.05$ was considered statistically reliable. The difference between the severity of the operated groups was not statistically significant. Postoperative parameters were considered statistically significant when $p < 0.05$.

Qualitative variables are represented in percentages, frequencies and proportions, categorical variables are represented in frequencies and percentages, and continuous variables are represented as an average value \pm standard deviation (SD).

The association of qualitative variables was analyzed using Fisher's exact criterion, and quantitative variables were analyzed using Student's t-test.

The study was carried out in accordance with the principles of the Helsinki Declaration. All patients included in the study voluntarily agreed to participate in it and subsequent publications of information in scientific sources without any obstacle, subject to confidentiality conditions.

The study was approved by the local Ethics Committee of Azerbaijan State Institute of Advanced Medical Education named after A. Aliyev, Baku., Protocol No. 4 dated 03/27/2023.

Results.

Of the 94 patients who participated in the study, 64 were included in the percutaneous drainage group under ultrasound control, and 30 were included in the conventional open surgical drainage group. The average age of the patients was 42 ± 8 years. In the percutaneous drainage group, the majority of patients were aged 41 to 50 years, and in the surgical drainage group - aged 21 to 30 years (Table 1).

Table 1. Age distribution of patients with intraabdominal abscesses in the study cohort.

Age (in years)	Percutaneous drainage n=64	Open surgical drainage, n=30
21-30	9 (14,06)	10 (33,33)
31-40	21 (32,81)	8 (26,67)
41-50	22 (34,38)	5 (16,67)
51-60	11 (17,19)	6 (20,00)
61-70	1 (1,56)	1 (3,33)

The most common symptom in patients who underwent percutaneous drainage was abdominal pain, which manifested itself in 84.4% of patients. The second most frequently observed symptom was fever, which was detected in 65.6% of cases. The third, most common symptom was nausea/vomiting, which was found in 48.4% of patients. In the group of patients who underwent open surgical drainage, abdominal pain was also the most common symptom and was evaluated positively in 73.3% of patients (Table 2).

Both the percutaneous drainage groups (26.6%) and the open surgical drainage groups (30%) were dominated by patients with abscesses that occurred after operations on the uterus, ovaries

Table 2. Distribution of symptoms accompanying intraabdominal abscesses in the study population.

Symptoms	Percutaneous drainage n=64	Open surgical drainage n=30
Abdominal pain	54 (84,4%)	22 (73,3%)
Fever	41 (65,6%)	18 (6,0%)
Jaundice	14 (21,9%)	4 (13,3%)
Nausea or vomiting	31 (48,4%)	13 (43,3%)
Anorexia	19 (29,7%)	17 (56,7%)
Weight loss	11 (17,2%)	10 (33,3%)
Diarrhea	3 (4,7%)	5 (16,7%)

Table 3. Distribution of patients with the development of intraabdominal abscesses in the study population by performed operations.

The first operation performed	Percutaneous drainage n=64	Open surgical drainage n=30	total n=94	p- value (Fisher's Exact test)
Appendectomy	4 (6,3%)	6 (20,0%)	10 (10,64%)	>0,05
Cholecystectomy and drainage of the choledochus	4 (6,3%)	4 (13,3%)	8 (8,51%)	>0,05
Crohn's disease	0	2 (6,7%)	2 (2,13%)	>0,05
Suturing of a perforated ulcer	1 (1,6%)	1 (3,3%)	2 (2,13%)	>0,05
Meckel's diverticulectomy	7 (10,9%)	1 (3,3%)	8 (8,51%)	>0,05
Operations for pancreatitis	8 (12,5%)	0	8 (8,51%)	>0,05
Vagotomy, pyloroplasty	13 (20,3%)	0	13 (13,83%)	>0,05
Vagotomy, antrumectomy	2 (3,1%)	2 (6,7%)	4 (4,26%)	>0,05
Splenectomy	1 (1,6%)	1 (3,3%)	2 (2,13%)	>0,05
Echinococcectomy	3 (4,7%)	1 (3,3%)	4 (4,26%)	>0,05
Resection for diverticulitis of the colon	4 (6,3%)	3 (10,0%)	7 (7,4%)	>0,05
Operations on the uterus, ovaries and bladder	17 (26,6%)	9 (30,0%)	26 (27,7%)	>0,05

p < 0.05 is considered statistically significant

Table 4. Distribution of patients by abscess localization in the study group.

Localization	Percutaneous drainage n=64	Open surgical drainage n=30	total n=94	p- value (Fisher's Exact test)
Liver	20 (31,3%)	6 (20,0%)	26 (27,7%)	<0,05
Ileocecal	3 (4,7%)	3 (10,0%)	6 (6,4%)	
Lesser sac	9 (14,1%)	2 (6,7%)	11 (11,7%)	
Paracolic	3 (4,7%)	3 (10,0%)	6 (6,4%)	
Pelvis	3 (4,7%)	6 (20,0%)	9 (9,6%)	
Paranephral	4 (6,3%)	3 (10,0%)	7 (7,4%)	
Lumbar abscess	3 (4,7%)	4 (13,3%)	7 (7,4%)	
Under the diaphragm	9 (14,1%)	1 (3,3%)	10 (10,6%)	
Subhepatic	9 (15,6%)	2 (6,7%)	11 (11,7%)	

p - < 0.05 is considered statistically significant

Table 5. Comparison of variables in percutaneous drainage (n = 64) and open surgical drainage (n = 30) groups.

Parameters	Percutaneous drainage (M ± m)	Surgical drainage (M ± m)	p (Student's t-test)
Average length of hospital stay (in days)	9,13±1,63	11,10±3,42	<0,001
Average temperature reduction time	4,31±1,75	4,94±2,01	>0,05

p - < 0.05 is considered statistically significant

Table 6. Common complications found in patients undergoing percutaneous and open surgical drainage of an intraabdominal abscess.

Complications	Percutaneous drainage n (n %)	Surgical drainage n (n %)	p- value (Fisher's Exact test)
Bleeding	0	2 (6,7)	<0,05
Pinching of the catheter	3 (4,7)	0	
Displacement or exit of the catheter	2 (3,1)	0	
Infection of the catheter insertion site	1, (1,6)	0	
Empyema	1, (1,6)	0	
Formation of an intestinal fistula	1, (1,6)	0	
Intestinal obstruction	0	1 (3,3)	
Peritonitis	1, (1,6)	0	
Infection of the wound	0	2 (6,7)	
Total	9 (12,4)	5 (16,7)	

Note: $p < 0.05$ is considered statistically significant

and bladder, as well as patients with abscesses that occurred after appendectomy (20%) in the open surgical drainage group.

The majority of abscesses were isolated (81.3%) in patients in the percutaneous drainage group and multiple (50.76%) in patients in the open surgical drainage group. Due to its localization, liver abscesses prevailed, followed by subhepatic and pelvic abscesses. Other localizations in which an abscess forms in the percutaneous and open surgical drainage groups include in 11 patients in the small omentum, in 10 patients in the area under the diaphragm, in 7 patients in the hip muscle (psoas), in 7 patients in the paranephral region, in 6 patients in the ileocecal region and in 6 patients in the paracolic region.

The average hospital stays of patients who underwent open surgical drainage (11.10 ± 3.42 days) was longer than that of patients who underwent percutaneous drainage (9.13 ± 1.63 days). The average time of temperature decrease during percutaneous drainage (4.31 ± 1.75 days) and open surgical drainage (4.94 ± 2.01 days) is shown in Table 5.

Although percutaneous drainage was successful in 96.8% of patients, an unsuccessful result was observed in 3.2% of patients. In patients who underwent open surgical drainage, these rates were 80% and 20%, respectively.

Complications were more common in patients who underwent open surgical drainage (16.7%), compared with percutaneous drainage (12.4%). During percutaneous drainage, complications such as catheter pinching and displacement were observed, which amounted to 4.7% and 3.1%, respectively. In patients who underwent percutaneous drainage, 1.6% of cases showed the occurrence of a connection (fistula) with bowel defecation, empyema, peritonitis and infection of the catheter insertion site. In the open surgical drainage group, wound infection and bleeding were observed in 6.7% of cases, and intestinal obstruction was observed in 3.3% of cases (Table 6).

Discussion.

In the presented study, abdominal pain (84.4%) and fever (65.6%) were the most frequently observed symptoms in both percutaneous drainage and open surgical drainage groups. The current study can be compared with the results of a study conducted by Durve A.S. et al., who observed pain in all cases (100%) and reported that it was accompanied by fever in 90% of cases [8]. In our study, the cause of the abscess in 35% of patients was unknown and was considered cryptogenic. However, in the studies conducted by Durve A.S. et al., the cause of the abscess

in 47.5% of patients remained unknown, and in this respect, it can be compared with our study [8].

In our study, liver abscesses (31.3% in the percutaneous drainage group and 20% in the open surgical drainage group), subhepatic accumulations (15.6% in the percutaneous drainage group), liquid pelvic derivatives (20% in the open surgical drainage group) were more common, which is comparable to the study presented by S.L. Rajak. and others [10]. This is also comparable to the study by Durve A.S. et al., which reported a higher incidence of visceral (parenchymal organs) abscesses (67%) compared with subdiaphragmatic and pelvic abscesses [8]. In a 2020 study conducted by Vanya R.A. et al., it is noted that the most common of fluid accumulations is a liver abscess (64%) [5].

Intraabdominal fluid accumulations are treated by drainage. This can be done using traditional open surgery or percutaneous intervention under visual supervision. In recent years, there has been a predominance of percutaneous drainage. This is mainly due to the fact that the intervention is easier, relatively atraumatic and has fewer complications. Akinci D. et al. notes that a small number (6.7%) of patients experienced catheter complications such as displacement, pinching or flexion of the catheter, and at that time the patients did not have serious complications [6]. The research of these authors is comparable to the current study, in which we found 7.8% of such complications.

In our study, the overall complication rate was 14.89%. Complications were higher with statistical significance ($p < 0.05$) in the open surgical drainage group (16.7%) compared with the percutaneous drainage group (12.4%). Dhurve A.S. in a 2018 study on percutaneous drainage of abscesses under ultrasound control, noted that complications account for less than 7.5% [8]. Akinci D. et al., Lucy B.C. et al. Similar complications were also observed in 3.1% and 10.3% of cases, respectively [6,11].

The average hospital stay in the percutaneous drainage group (9.13 ± 1.62 days) was shorter ($p < 0.001$) compared with the surgical drainage group (11.10 ± 1.75 days). Various factors, such as the severity of the disease and the presence of multiple abscesses, tend to prolong the stay of patients receiving surgical treatment in the hospital. Politano A.D. et al. they also noted a relatively longer (28.1 ± 1.62 days) hospital stay in the open surgical drainage group compared with the percutaneous drainage group (13.5 ± 0.78 days) ($p < 0.001$) [12]. Nguyen D.L. et al. It was also noted that the open surgical drainage group had a longer hospital stay (15.5 days) compared to the percutaneous drainage group [13].

In the present study on percutaneous drainage, the reliable success rate was 96.8%. This compares well and correlates with the results of the study presented by Akinci D. et al. [6]. In a 2020 study conducted by Vanya R.A. et al., percutaneous drainage was successful in 84.4% of patients. In our current study, the failure rate in the percutaneous drainage group was 3.2%. Van Sonnenberg et al. note that when draining abscesses, they encounter failures in 8% of cases, which is higher than the corresponding indicator of the current study [14]. This also correlates with a study conducted by Akinci D. et al., which showed 6% of failures [6].

No deaths were reported in our study. This correlates with a study conducted by Van Sonnenberg et al., in which the mortality rate is zero [14]. Rafik S. et al. He also did not observe deaths in his study due to local accumulation in the pleural cavity [15]. Vanya R.A. et al. noted that the mortality rate was 1.1% [5]. In a 2011 study conducted by Politano A.D. et al., they noted a higher mortality rate in open surgical drainage (14.6%) compared with percutaneous drainage (4.2%) [12]. There is a good correlation between the studies of Lagan D. et al., Giovannini M. et al., and the research study presented by us, which presents it as an effective alternative method in patients at high risk of general anesthesia, referring to the fact that percutaneous drainage is more effective, has fewer complications and shorter hospital stay compared to by an open surgical method [16,17].

Conclusion.

Percutaneous drainage has been found to be a safe, minimally invasive and less traumatic method of intervention for fluid accumulation/abscesses in the abdominal cavity and what has proved successful.

The insertion of the catheter under ultrasound control provides real-time visualization of position and movement, is economical and does not contain ionizing radiation.

Percutaneous drainage has a lower mortality rate compared to open surgical drainage, as well as reduces hospital stay and in most cases can replace drainage with traditional open or laparoscopic intervention.

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Результаты чрескожного лечения ограниченных жидкостных образований после операций на брюшной полости

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Резюме

Цель исследования. Оценка результатов чрескожного дренирования при лечении висцеральных и невисцеральных жидкостных образований, развившихся в брюшной полости в послеоперационном периоде.

Материал и методы. В исследовании приняли участие 64 пациента, которым было проведено чрескожное дренирование под ультразвуковым контролем, и 30 пациентов, которым было проведено открытое хирургическое дренирование. Были проанализированы клинические переменные вместе с результатами вмешательств.

Результаты. Среднее время пребывания в стационаре пациентов, перенесших открытое хирургическое

дренирование ($11,10 \pm 3,42$ дня), было больше, чем у пациентов, перенесших чрескожное дренирование ($9,13 \pm 1,63$ дня). Среднее время снижения температуры при чрескожном дренировании составило $4,31 \pm 1,75$ дня, а при открытом хирургическом дренировании - $4,94 \pm 2,01$ дня.

Чрескожное дренирование было успешным у 96,8% пациентов, а неудачный результат наблюдался у 3,2% пациентов. У пациентов, которым проводилось открытое хирургическое дренирование, эти показатели составляли 80% и 20% соответственно. По сравнению с чрескожным дренированием осложнения были более частыми у пациентов, перенесших открытое хирургическое

дренирование, и составили 12,4% и 16,7% соответственно.

Заключение. Чрескожное дренирование под ультразвуковым контролем имеет более низкий процент смертности по сравнению с открытым хирургическим дренированием, а также сокращает время пребывания в стационаре и в большинстве случаев может заменить дренирование традиционным открытым или лапароскопическим вмешательством.

Ключевые слова: ультразвуковое наблюдение, чрескожное дренирование, абсцесс брюшной полости, послеоперационные осложнения.