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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 ВИНИТИ 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 ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

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. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

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

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

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

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-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 საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ 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 შეღებვის 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 ფჩხილებში 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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SURGICAL TREATMENT OF OBSTRUCTIVE JAUNDICE IN BENIGN DISEASES OF THE BILIARY TRACT

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Abstract.

Introduction: Obstructive jaundice (OJ) remains a significant clinical and diagnostic challenge due to the high risk of hepatic failure and homeostasis disturbances. The main causes of OJ include biliary calculi (≈50%), malignant tumors (up to 40%), and biliary strictures (≈10%). Postoperative complications occur in 15.6–63.4% of cases, with mortality rates reaching 25–30%, highlighting the need for timely biliary decompression and the use of minimally invasive treatment methods to improve outcomes.

Aim: To analyze the outcomes of the implementation and optimization of surgical treatment methods in patients with benign obstructive jaundice, with a focus on the effectiveness of modern surgical and minimally invasive technologies.

Study Design: Single-center prospective non-randomized comparative study.

Methods: The study analyzed data from 142 patients with cholelithiasis and benign obstructive jaundice (BOJ) (33% men, 67% women; mean age 64.5 ± 5.4 years). Patients were divided into a study group (n = 69), treated using newly developed surgical techniques, and a control group (n = 73), treated with conventional surgical approaches. The primary causes of BOJ were calculous cholecystitis with multiple choledocholithiasis (≈35–36%), Mirizzi syndrome, and postcholecystectomy syndrome. Disease severity was evenly distributed among mild, moderate, and severe forms, with no statistically significant differences between the groups. In the study group, choledochoduodenostomy using the clinic-developed technique was more frequently performed (77%), whereas in the control group the Yurash–Vinogradov technique predominated (71%).

Results: In patients with BOJ, the study group demonstrated a significant reduction in postoperative complications according to the Clavien–Dindo classification (7.2% vs. 24.7%, p = 0.005) and no mortality, whereas four deaths (5.5%) occurred in the control group. Postoperative pain intensity was significantly lower in the study group on postoperative day 7 (p = 0.028) and at discharge (p = 0.007). The mean length of hospital stay was 8.3 ± 0.7 days compared to 12.8 ± 0.8 days in the control group (p = 0.019). The incidence of restenosis decreased from 6.8% to 2.9% (p = 0.023), and hospitalizations for late complications were significantly reduced, with a relative risk of 5.67 (p < 0.001). Quality-of-life scores assessed by the SF-36 and GSRS questionnaires were significantly higher in the study group at 6 and 12 months postoperatively (p < 0.05). The developed surgical approaches were associated with fewer postoperative complications, shorter hospital stay, reduced postoperative pain, and more favorable postoperative quality-of-life scores during follow-up.

Conclusions: The developed surgical techniques for benign obstructive jaundice were associated with lower postoperative complication rates (7.2% vs. 24.7%, p = 0.005), lower postoperative pain intensity, shorter hospital stay, and more favorable postoperative quality-of-life scores during follow-up. These findings support the clinical relevance of the proposed approaches, although they should be interpreted in the context of the non-randomized study design.

Key words. Choledocholithiasis, Mirizzi syndrome, benign obstructive jaundice, biliodigestive anastomoses, quality of life.

Introduction.

Benign obstructive jaundice continues to represent a significant clinical and diagnostic challenge, as no universal treatment strategy has yet been established. This condition may lead to the development of hepatic failure and cause pronounced disturbances of metabolic and water–electrolyte homeostasis.

Obstructive jaundice (OJ) is a relatively common complication in surgical practice and, according to various authors, occurs in 2.6–23.7% of cases [1,2].

In diseases of the hepatopancreatoduodenal region, OJ develops in 12.0–25.2% of patients, emphasizing its clinical significance as a symptom that requires timely diagnosis and a differentiated therapeutic approach [3].

According to the literature, the main causes of obstructive jaundice overall include biliary calculi (approximately 50% of cases), malignant neoplasms (up to 40%), and strictures or stenoses of the biliary tract (about 10%) [4,5].

The diagnosis and differential diagnosis of conditions leading to obstructive jaundice remain challenging, complicating the determination of optimal surgical tactics and the timing of operative intervention [6,7].

Despite significant advances in biliary surgery, a comprehensive understanding of the pathogenesis of systemic disturbances caused by biliary obstruction is still lacking. Impaired bile outflow triggers a cascade of pathological changes affecting not only the hepatobiliary system but also the patient's overall condition. Consequently, the problem of effective treatment

of patients with obstructive jaundice remains highly relevant despite notable progress in surgical techniques and technologies [8,9].

Postoperative complications in patients with obstructive jaundice are reported with high frequency, ranging from 15.6% to 63.4%, while mortality rates may reach 25–30% [10,11].

These figures are 3–4 times higher than those observed after preliminary biliary decompression, underscoring the importance of timely drainage of the biliary tract prior to definitive surgical intervention [12].

Postoperative mortality varies significantly depending on the etiology of jaundice: in benign obstruction it ranges from 5.6% to 6.3%, whereas in malignant obstruction it reaches 10.6–25.7% [13,14].

It should be noted that in some cases mortality following palliative procedures may exceed that after radical surgery, which is attributed to severe general condition of patients and delayed presentation [15]. The leading cause of death in patients with benign obstructive jaundice remains progressive hepatic failure developing after biliary surgery [16-17].

Our studies have made it possible to identify the most rational treatment strategies for patients with obstructive jaundice under modern conditions, with an emphasis on minimally invasive technologies [18,19]. The use of such approaches contributes to a reduction in postoperative complications, shorter recovery time, and improved overall patient prognosis.

Aim:

To analyze the outcomes of the implementation and refinement of surgical treatment methods in patients with benign obstructive jaundice, with an emphasis on the effectiveness of modern surgical and minimally invasive technologies.

Materials and Methods.

The study was conducted in accordance with the principles of the Declaration of Helsinki. The research complied with institutional ethical standards and guidelines for studies involving human participants. The study was based on the clinical experience of the adult surgical department of the University Hospital of the Non-Profit Joint Stock Company "Semey Medical University" and the Department of Hospital Surgery during the period from January 2021 to January 2024.

Study Design: Single-center prospective non-randomized comparative study.

Patient allocation: Patients were enrolled consecutively during the study period. This was not a randomized trial. Allocation to the study group or control group was determined by the surgical strategy selected by the treating team based on the clinical presentation, preoperative imaging, intraoperative findings, anatomical characteristics of the biliary lesion, and feasibility of the clinic-developed reconstructive procedure. Patients treated with the clinic-developed patented techniques were included in the study group, whereas patients managed with conventional surgical approaches comprised the control group.

Inclusion Criteria:

1. Patients with benign obstructive jaundice;
2. Age between 18 and 90 years;
3. Provision of written informed consent for surgical treatment using the proposed method and for the use of clinical data for research purposes.

Exclusion Criteria:

1. Patients with malignant obstructive jaundice of hepatobiliary origin;
2. Refusal to participate in the study;
3. Age under 18 years or over 90 years;
4. Presence of acute myocardial infarction, acute cerebrovascular accident, exacerbation of chronic diseases, or psychiatric disorders;
5. Pregnancy in the third–fourth trimester and the lactation period.

The outcomes of surgical treatment were analyzed in 142 patients with cholelithiasis complicated by benign obstructive jaundice. The cohort included 47 men (33.1%) and 95 women (66.9%), with a mean age of 64.5 ± 5.4 years. All patients were divided into two groups according to the surgical approach used: the study group and the control group.

The study group comprised 69 patients (48.6%) who underwent diagnostic and therapeutic management using innovative surgical techniques developed at our clinic [20]. Specifically, 53 patients (76.8%) underwent restoration of bile outflow in obstruction of the terminal common bile duct by performing choledochoduodenostomy according to the clinic-developed technique (Patent of the Republic of Kazakhstan No. 108142). In 5 patients (7.2%), a clinic-developed hepaticojejunostomy technique was used for Mirizzi syndrome types III–IV (Patent of the Republic of Kazakhstan No. 107273). In 11 patients (16%), cholecystohepaticocholangioplasty was performed for the presence of cholecystohepaticocholangiary fistulas types III–IV using the authors' technique developed at the clinic (Patent of the Republic of Kazakhstan No. 107801).

The control group included 73 patients (51.4%) treated using conventional surgical methods. Among them, 52 patients (71.2%) underwent choledochoduodenostomy according to the Yurash–Vinogradov technique; 4 patients (5.5%) underwent choledocholithotomy with Kehr T-tube drainage of the common bile duct; 3 patients (4.1%) underwent Roux-en-Y hepaticojejunostomy; 6 patients (8.2%) underwent disconnection of a cholecystoduodenal fistula (Mirizzi syndrome type V according to the Csendes–Beltrán classification, 2008) with closure of the duodenal defect using double-layer sutures; and 8 patients (11%) underwent hepaticojejunostomy with a Braun enteroenterostomy and placement of a Shalimov plug.

Despite their proven effectiveness, the use of conventional surgical techniques is associated with certain limitations, which prompted the development and implementation of novel surgical approaches aimed at improving treatment outcomes in patients with obstructive jaundice.

The distribution of patients by age categories is presented in Table 1 [21].

Table 1 demonstrates a comparable distribution of patients across young, middle-aged, elderly, and senile age groups in both study cohorts. Overall, patients older than 60 years predominated, accounting for 69.7% (n = 99) of the total study population. Benign obstructive jaundice was least frequently

observed in patients aged 18–44 years, comprising only 7.7% (n = 11).

The mean age of all examined patients was 64.5 ± 5.4 years: 64.5 ± 5.6 years in the study group and 64.6 ± 5.3 years in the control group. No statistically significant age differences were identified between the groups.

Women constituted the majority of patients with obstructive jaundice, accounting for 67% (n = 95). The study and control groups were comparable in terms of age and sex distribution, ensuring the validity of the comparative analysis.

Patients with benign obstructive jaundice were admitted to the hospital both on an emergency and elective basis. Detailed information on the mode of hospitalization is presented in Table 2.

In the vast majority of cases, patients were admitted on an emergency basis. The distribution of this parameter between the study groups revealed no statistically significant differences ($\chi^2 = 0.016$, $p > 0.1$).

Within the framework of our study, pain syndrome was identified as the most common clinical manifestation of benign obstructive jaundice, observed in 123 patients (86.6%). Visible manifestations of jaundice were recorded in 112 patients (78.9%). Signs of cholangitis were detected in 56 patients (39.4%) (see Table 3).

Statistically significant differences between the study and control groups were identified for the symptoms of nausea ($p = 0.025$) and pruritus ($p = 0.010$). No statistically significant differences were observed for the remaining clinical manifestations.

During the study, the main etiological factors of benign obstructive jaundice were identified; these are presented in Table 4.

Analysis of the distribution of the main causes of benign obstructive jaundice in the study and control groups revealed no statistically significant differences for the majority of etiological factors ($p > 0.1$). The most frequent cause in both groups was calculous cholecystitis in combination with multiple choledocholithiasis, accounting for 36.2% in the study group and 34.2% in the control group ($\chi^2 = 0.061$, $p > 0.1$).

Other causes, including various types of Mirizzi syndrome, postcholecystectomy syndrome, and its associated complications, also demonstrated no statistically significant differences between the groups.

No cases of calculous cholecystitis associated with Mirizzi syndrome type V were observed in the study group, compared with 8.2% in the control group; however, the p-value exceeded 0.05, precluding the conclusion of statistically significant differences.

Thus, the distribution of etiological factors of benign obstructive jaundice was comparable between the study cohorts, ensuring the validity of subsequent comparative analyses of clinical and laboratory parameters.

Based on the E.I. Galperin classification (2014), the severity of benign obstructive jaundice was assessed in the study population. Table 5 presents the distribution of patients in the study and control groups according to the severity of benign obstructive jaundice [22].

Table 1. *Classification of Age Groups (Data from the Authors' Own Study).*

Age group	**Study group**				**Control group**			
	men (n=25)		*women (n=44)*		*men (n=22)*		*women (n=51)*	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Young age (18–44 years)	*2*	8,0	2	4,5	0	0,0	7	13,7
Middle age (45–59 years)	7	28,0	9	20,5	5	22,7	11	21,6
Elderly age (60–74 years)	12	48,0	22	50,0	10	45,5	23	45,1
Senile age (75–90 years)	4	16,0	11	25,0	7	31,8	10	19,6

Table 2. *Hospitalization rates for patients with obstructive jaundice of benign origin (data from own study).*

Group	**Emergency Hospitalization**		**Planned hospitalization**	
	n	%	n	%
Study group (n=69)	60	87,0	9	13,0
Comparison group (n=73)	64	87,7	9	12,3
Total	124	87,3	18	12,7

Table 3. *Clinical Manifestations of Benign Obstructive Jaundice (Data from the Authors' Own Study).*

Clinical manifestations of the disease	**Core Group (n=69)**		**Comparison Group (n=73)**		x2	R
	n	%	n	%		
Jaundice	54	78,3	60	82,2	0,346	>0,1
Fever	23	33,3	27	37	0,207	>0,1
Chills	27	39,1	29	39,7	0,005	>0,1
Pain syndrome	60	87,0	63	86,3	0,013	>0,1
Nausea	47	68,1	61	83,6	4,647	0,025
Vomiting	40	58	48	65,8	0,912	>0,1
Itchy skin	45	65,2	62	85	7,423	0,010
Weakness	59	85,5	63	86,3	0,018	>0,1
Darkening of urine	53	76,8	60	82,2	0,632	>0,1

Table 4. *The main etiological factors of benign obstructive jaundice (data from our own study).*

Causes of obstructive jaundice	**Core group (n=69)**		**Comparison group (n=73)**		x2	P/t
	n	%	n	%		
Calculous cholecystitis (CX) + Multiple choledocholithiasis (MHL)	25	36,2	25	34,2	0,061	>0,1
KH+ MHL+ narrowing of the terminal portion of the choledoch	7	10,1	9	12,3	0,169	>0,1
CH+ MHL+ Mirizzi syndrome (SM) type II	10	14,5	14	19,2	0,554	>0,1
XX+CM III type	8	11,6	9	12,3	-	>0,1
KH+SM IV type	8	11,6	6	8,2	-	>0,1
KX+ CM Va,b тип	0	0,0	6	8,2	-	>0,05
KH+ MHL+ Strangulated stone of the Vater papilla	2	2,9	5	6,8	-	>0,1
Postcholecystectomy syndrome (PCES), residual choledocholithiasis (RCL)	6	8,7	3	4,1	-	>0,1
PCES + recurrent choledocholithiasis + stricture of hepaticojejunostomy (according to RC)	1	1,4	0	0,0	-	-
PCES + extended stricture of the bile ducts and terminal portion of choledochus	0	0,0	1	1,4	-	-
PCES + RCL + stricture of biliodigestive anastomosis (Yurash-Vinogradov)	1	1,4	0	0,0	-	-
KH+ Intrahepatic hepaticolithiasis (Caroli disease)	1	1,4	0	0,0	-	-

Table 5. *Distribution of patients according to the severity of benign obstructive jaundice according to the classification of E.I. Galperin (2014).*

Class	**Indicators**	**Points**	**Core Group (n=69)**		**Comparison Group (n=73)**		x2	P
			n	%	n	%		
Class A (mild)	Total bilirubin < 60 μm mol/L Total protein > 65 g/L Prothrombin index > 80% There is no cholangitis	1 1 1 1	16	23,2	13	17,8	0,632	>0,1
Class B (intermediate)	Total bilirubin 65–200 μm mol/L Total protein 55–64 g/L Prothrombin index 60-80% Cholangitis (intermittent)	2 2 2 2	28	40,6	31	42,5	0,052	>0,1
Class C (severe degree)	Total bilirubin > 200 μm mol/l Total protein < 55 g/l Prothrombin index < 60% There are cholangitis phenomena	3 3 3 3	25	36,2	29	39,7	0,184	>0,1

Table 6. *Types of Surgical Interventions for Benign Obstructive Jaundice (Data from the Authors' Own Study).*

Types of surgery	**Study group (n=69)**		**Control group (n=73)**	
	n	%	n	%
Choledochoduodenostomy according to Yurash–Vinogradov	-	-	52	71,2
Roux-en-Y hepaticojejunostomy	-	-	11	15,1
Hepaticocholangioplasty (disconnection of cholecystoduodenal fistula with closure of duodenal defect)	-	-	10	13,7
Cholecystohepaticojejunostomy using the clinic-developed technique (Patent of the Republic of Kazakhstan No. 107273)	5	7,2	-	-
Cholecystohepaticocholangioplasty using the clinic-developed technique (Patent of the Republic of Kazakhstan No. 107801)	11	16,0	-	-
Choledochoduodenostomy using the clinic-developed technique (Patent of the Republic of Kazakhstan No. 108142)	53	76,8	-	-

Analysis of the distribution of patients according to the severity of benign obstructive jaundice in the study and control groups demonstrated no statistically significant differences between the groups ($p > 0.1$).

Thus, the severity of the disease was comparable in both groups, allowing them to be considered homogeneous with respect to this parameter for subsequent analysis.

Indications for selection of the clinic-developed procedures. The choice of the patented clinic-developed procedures was based on the level of biliary obstruction, the extent of bile duct wall involvement, and the anatomical characteristics identified preoperatively and intraoperatively.

Choledochoduodenostomy (Patent of the Republic of Kazakhstan No. 108142) was selected in patients with distal common bile duct obstruction or narrowing, including multiple choledocholithiasis with impaired bile passage to the duodenum, when the local anatomy allowed creation of a tension-free biliodigestive anastomosis.

Hepaticojejunostomy / cholecystohepaticojejunostomy (Patent No. 107273) was used in patients with Mirizzi syndrome type III–IV and extensive destruction of the wall of the common hepatic duct, when biliary reconstruction on a Roux-en-Y jejunal loop was considered the most appropriate reconstructive option.

Cholecystohepaticocholangioplasty (Patent No. 107801) was used in patients with cholecystohepaticocholangiary fistulas type III–IV, when the residual gallbladder wall and local anatomy permitted repair of the bile duct defect using the authors' reconstructive technique.

Depending on group allocation, patients underwent different types of surgical interventions, the details of which are presented in Table 6.

In the study group, three types of surgical interventions, refined at the Department of Hospital Surgery of the Non-Profit Joint Stock Company "Semey Medical University," were applied. The most frequently performed procedure was choledochoduodenostomy using the clinic-developed technique, performed in 76.8% of patients. In the control group, the predominant procedure was choledochoduodenostomy according to the Yurash–Vinogradov technique, performed in 71.2% of patients.

Patients were followed postoperatively for a minimum of 2 years. The mean duration of follow-up was 27.5 ± 3.3 months in the study group and 29.4 ± 4.5 months in the control group.

Quality of life was assessed using two instruments: the widely accepted SF-36 questionnaire (The 36-Item Short Form Survey) and the Russian-adapted Gastrointestinal Symptom Rating Scale (GSRS) [23].

Preoperative baseline quality-of-life assessment was not consistently available because a substantial proportion of patients were admitted on an emergency basis and required urgent biliary decompression. Therefore, the quality-of-life analysis was limited to postoperative between-group comparisons during follow-up.

Statistical analysis was performed using standard methods of biomedical statistics. Categorical variables were compared using Pearson's χ^2 test or Fisher's exact test when expected cell counts were small. Continuous variables are presented as mean ± standard error and were compared using Student's t-test for independent samples; when distributional assumptions were not met, the Mann–Whitney U test was used. A p-value < 0.05 was considered statistically significant.

Results.

The severity of postoperative complications was evaluated using the Clavien–Dindo classification, which is described in Table 7 [24]. Various postoperative complications were observed and categorized according to this scale.

In total, 5 postoperative complications (7.2%) were recorded in the study group, affecting 5 patients (7.2%). Of these, only one complication was classified as grade II according to the Clavien–Dindo scale—a postoperative pancreatitis requiring pharmacological therapy.

In the control group, a significantly higher number of complications was observed: 18 events (24.7%) in 13 patients (17.8%). These complications spanned various severity grades

Table 7. *Postoperative complications in patients classified according to the Clavien–Dindo scale.*

Nature of complications	**Severity of complications**	**Main group, n=69**		**Comparison group, n=73**		**T**
		Quantity	%	Quantity	%	
Minimal subcutaneous fluid accumulation (seroma)	*AND*	2	2,9	3	4,1	0,45
Minimal bleeding between skin sutures	*AND*	2	2,9	1	1,4	0,73
Postoperative pancreatitis	*II*	1	1,7	1	1,4	0,89
Cholangitis	*II*	-	-	4	5,5	0,078
Minimal bile flow after removal of Kehr drainage	*II*	-	-	1	1,4	0,88
Blind pocket *formation*	*III a*	-	-	2	2,7	0,65
Excessive intra-abdominal biliary discharge. Partial failure of biliodigestive anastomosis	*III b*	-	-	1	1,4	0,88
Stricture of the terminal portion of the choledochus after Kehr drainage	*III b*	-	-	1	1,4	0,88
Hepatic-renal impairment	*IVb*	-	-	2	2,7	0,65
Massive pulmonary embolism	*V*	-	-	1	1,4	0,88
DIC syndrome	*V*	-	-	1	1,4	0,88
Total	-	5	7,2	18	24,7	0,005

Note: *Results from the authors' own study.*

according to the Clavien–Dindo classification, including more severe forms. The difference in complication rates between the groups was statistically significant ($\chi^2 = 7.922$, $p = 0.005$), indicating a significant reduction in adverse outcomes in the study group.

No deaths occurred in the study group. In the control group, 4 deaths (5.5%) were reported. The causes of death included hepatorenal failure due to severe intoxication (2 cases), massive pulmonary embolism (1 case), and disseminated intravascular coagulation (DIC) syndrome (1 case). All fatalities occurred in the early postoperative period (postoperative days 2–3). However, the difference in mortality between groups was not statistically significant ($p > 0.05$).

Thus, these results suggest that the clinic-developed approaches for the treatment of patients with benign obstructive jaundice (BOJ) offer distinct advantages. This is supported by statistically significant differences in several clinical, laboratory, and postoperative parameters compared with patients receiving conventional treatment.

Additionally, postoperative pain intensity was assessed using the Visual Analog Scale (VAS). The results are presented in Figure 1.

Analysis of the data presented in Figure 1 revealed differences in postoperative pain intensity between the study groups, predominantly in favor of the study group.

On postoperative day 3, the pain level in the study group was 28.9% lower compared with the control group; however, this difference was not statistically significant ($p > 0.05$). By day 7, the difference increased to 38.7%, reaching statistical significance ($p = 0.028$). At the time of discharge, pain reduction in the study group reached 72.7% compared with the control group, which was also statistically significant ($p = 0.007$).

These findings indicate the effectiveness of the clinic-developed surgical and therapeutic approaches used in the study group in managing postoperative pain.

The duration of hospitalization differed significantly between the study groups, as illustrated in Figure 2.

In the study group, the mean duration of hospitalization was 8.3 ± 0.7 days, whereas in the control group it was 12.8 ± 0.8 days. The difference between groups was statistically significant, representing a 54.2% reduction in favor of the study group ($p = 0.019$), indicating a more favorable postoperative course and faster patient recovery with the use of the clinic-developed surgical approaches.

Among long-term complications, the incidence of restenosis was analysed (Figure 3). Restenosis occurred in 6.8% of patients in the control group, compared with only 2.9% in the study group. The calculation of the relative risk ($RR = 2.36$) and statistical significance ($p = 0.023$) demonstrates a significant reduction in the incidence of this complication with the proposed treatment methodology.

Hospitalization due to late postoperative complications was required significantly more often in patients treated with conventional surgical methods compared with the study group. These data are presented in Figure 4.

Differences between the groups in hospitalization frequency were statistically significant, with a relative risk (RR) of 5.67 and a p-value < 0.001. Only hospitalizations directly related to the primary disease were included in the analysis.

Thus, nearly all indicators of the long-term postoperative period in the study group demonstrated significant advantages compared with the control group, indicating a more favorable clinical course and effective prevention of complications.

The results of the longitudinal analysis of quality of life, assessed using the SF-36 questionnaire, are presented in Figure 5.

Comparison of the overall SF-36 scores revealed statistically significant differences between the groups at 6 and 12 months postoperatively. The magnitude of these differences was moderate, amounting to 12.4% ($p = 0.047$) and 14.3% ($p = 0.038$), respectively.

Figure 6 presents the results of quality-of-life assessment using the specialized Gastrointestinal Symptom Rating Scale (GSRS).

The overall quality of life score according to the GSRS at discharge differed between the groups by 14.6%; however, this difference did not reach statistical significance. At 3 months postoperatively, the difference increased to 47.3% and was statistically significant ($p = 0.023$). Further substantial improvements in the study group compared with the control group were observed at 6 and 12 months postoperatively, with differences of 83.8% ($p = 0.005$) and 105.7% ($p = 0.003$), respectively.

Discussion.

Analysis of postoperative complications according to the Clavien–Dindo classification revealed statistically significant differences between the groups: the study group demonstrated a marked reduction in complication rates ($\chi^2 = 7.922$, $p = 0.005$). No deaths occurred in the study group, whereas 4 fatalities were recorded in the control group. However, the difference in mortality did not reach statistical significance, which may be attributed to the limited sample size.

Comparative analysis of pain intensity showed a pronounced reduction in the study group. As presented in Figure 1, the level of postoperative pain in the study group was 72.7% lower at the time of discharge compared with the control group.

These findings suggest potential advantages of the clinic-developed approaches for the treatment of benign obstructive jaundice. The observed reduction in postoperative complications, lower postoperative pain intensity, and shorter hospital stay indicate that these techniques may improve short-term clinical outcomes; however, the results should be interpreted with caution given the non-randomized design and the absence of multivariable adjustment. The absence of fatalities in the study group, despite the lack of statistical significance, is also a positive clinical indicator. These results are consistent with previously published studies, where optimization of surgical techniques contributed to improved postoperative outcomes and reduced complications [25]. These observations are also supported by accumulated clinical experience in the diagnosis of calculous biliary pathology [26].

Significant differences in quality-of-life indicators between the study and control groups were observed, primarily during the outpatient follow-up period. Notably, both assessment tools—the general SF-36 questionnaire and the specialized GSRS—

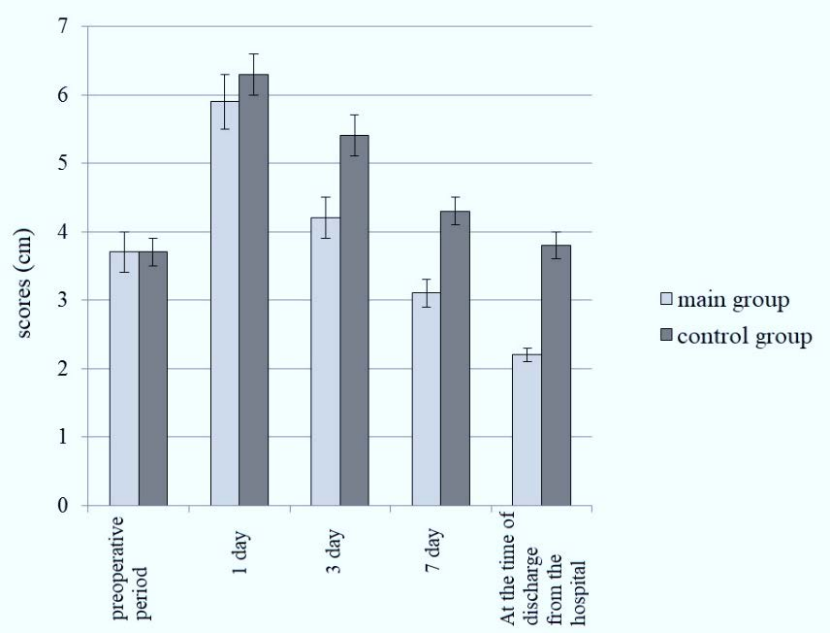

Figure 1. *Comparative Assessment of Postoperative Pain Intensity Using the Visual Analog Scale (VAS).*

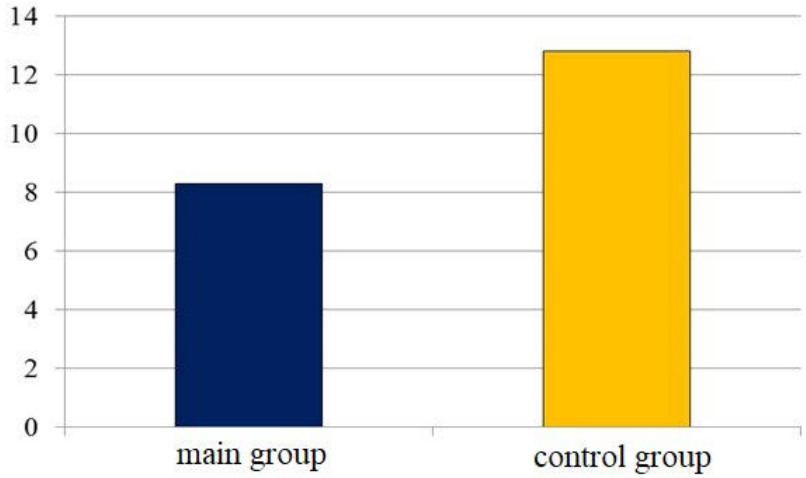

Figure 2. *Comparative Duration of Hospitalization in the Study Groups.*

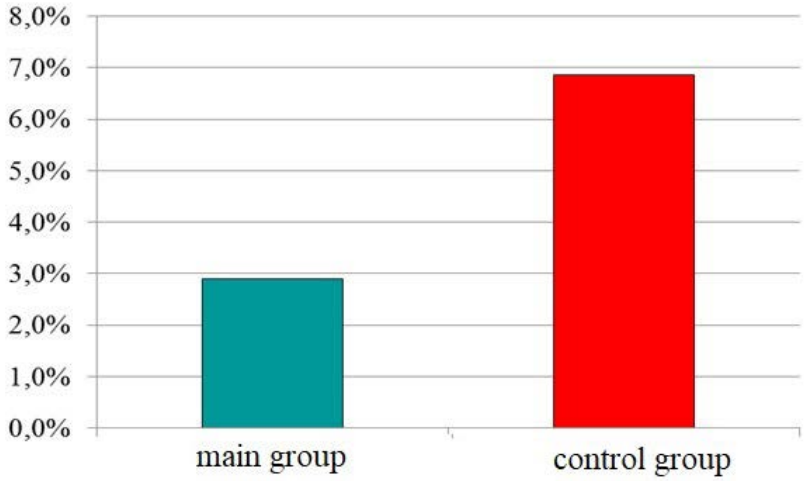

Figure 3. *Comparative Incidence of Restenosis in the Long-Term Postoperative Period.*

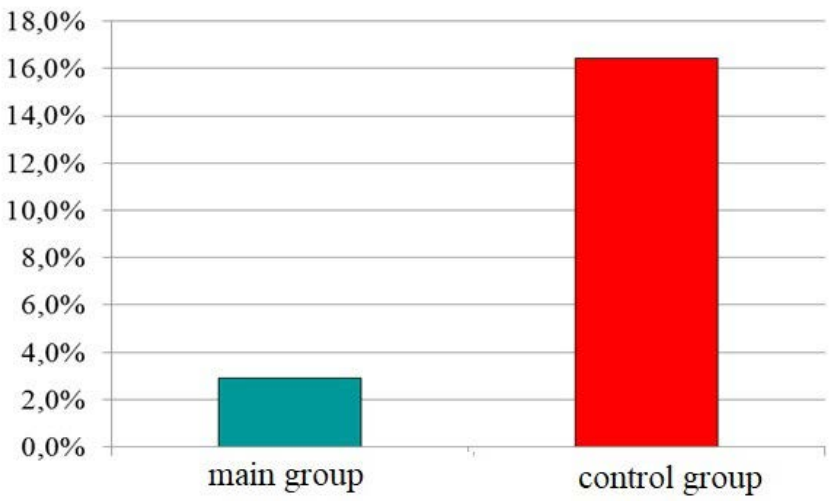

Figure 4. *Frequency of Hospitalizations Due to Hepatobiliary Pathology in the Study Groups (per 1 Year).*

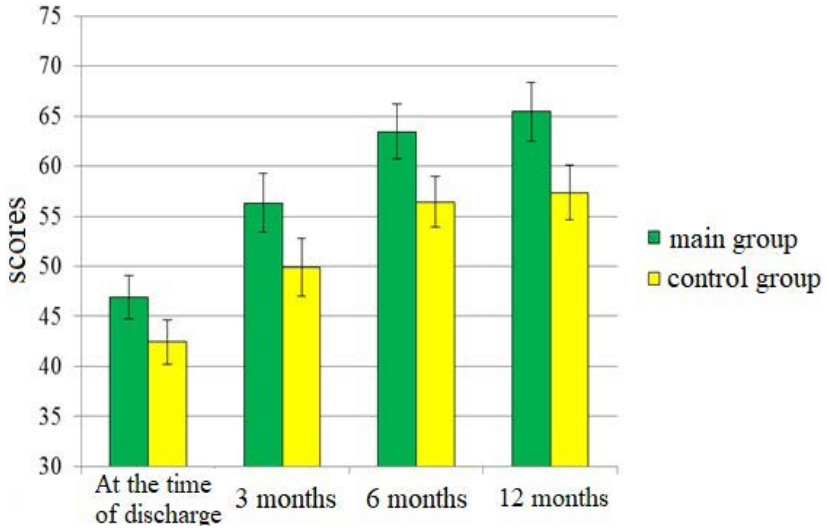

Figure 5. *Dynamics of Quality-of-Life Indicators Assessed by the SF-36 Questionnaire in the Study Groups and Their Statistical Comparison.*

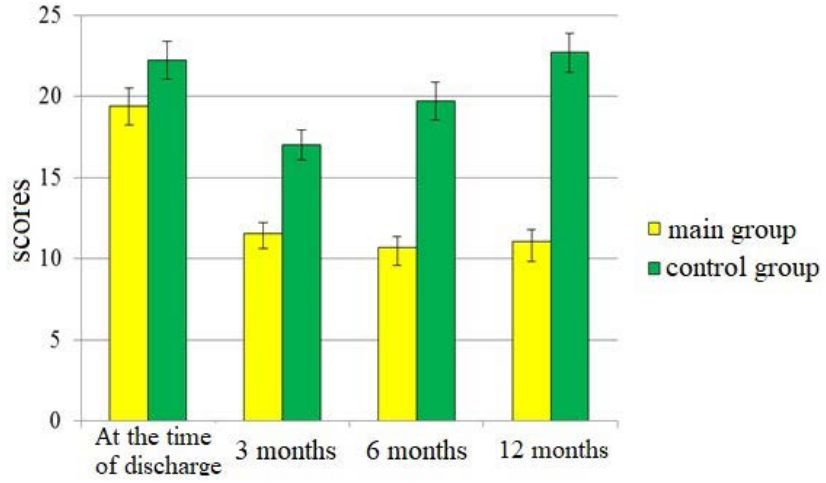

Figure 6. *Dynamics of Quality of Life Indicators Assessed Using the GSRS in the Study Groups.*

revealed similar trends; however, the GSRS demonstrated more pronounced and statistically significant differences between the groups. This is likely due to the higher sensitivity of the GSRS to the frequency and severity of complications characteristic of conventional surgical methods, making it a more appropriate instrument for evaluating quality of life in this patient population.

The results also demonstrated a substantial reduction in hospital stay, averaging 4.5 bed-days, indicating faster recovery and improved postoperative outcomes with the application of the clinic-developed surgical techniques.

Analysis of the SF-36 data showed that patients in the study group receiving the new surgical methods experienced higher postoperative quality-of-life scores in the study group during follow-up, with statistically significant differences compared with the control group at 6 and 12 months postoperatively. In contrast, according to the GSRS, statistically significant improvements in the study group compared with the control group were observed starting from the time of discharge, except for this initial stage, where differences were not statistically significant. The trend of improvement according to GSRS was more pronounced and persisted throughout the entire follow-up period.

Thus, the findings suggest that the newly developed surgical approaches are associated with fewer postoperative complications, shorter hospitalization, and more favorable postoperative quality-of-life scores during follow-up in patients with benign obstructive jaundice.

This study has several limitations. First, the study had a non-randomized design, and treatment allocation was based on clinical and anatomical criteria rather than random assignment; therefore, selection bias cannot be fully excluded. Second, the statistical analysis was primarily univariate, and residual confounding may have influenced the observed associations. Third, baseline preoperative SF-36 and GSRS data were not consistently available for comparative analysis, which limits interpretation of postoperative quality-of-life differences as intervention-attributable changes. These findings should therefore be interpreted with caution and confirmed in larger prospective studies with adjusted analyses and standardized baseline quality-of-life assessment.

Conclusion.

In this prospective non-randomized comparative study, the clinic-developed surgical techniques for benign obstructive jaundice were associated with lower postoperative complication rates, reduced postoperative pain intensity, shorter hospital stay, and more favorable postoperative quality-of-life scores during follow-up compared with conventional surgical approaches. The proposed reconstructive procedures may improve bile outflow and reduce the need for repeat interventions; however, these findings should be interpreted with caution because of the non-randomized design, predominantly univariate analysis, and the absence of baseline quality-of-life data.

Author Contributions.

Conceptualization, M.A., M.A.,S.A., A.A.; methodology, M.A., M.A., E.K., A.K.S.A., A.A.; software, M.A.,E.K., A.K., S.I., A.D., A.M., S.A.; validation, M.A., M.A., E.K., A.K., S.I., A.D., A.M., S.A., A.A., A.D., N.O., A.A., A.Zh., S.B.; formal analysis, M.A., M.A., S.A., A.A., A.A.; investigation, M.A., M.A., E.K., A.K., S.I., A.D., A.M.; data curation, M.A., M.A., E.K., A.K.,S.A., A.D., N.O., A.A., A.D., A.Zh., S.B.; writing—original draft preparation, M.A., M.A.,S.A., A.A.; writing—review and editing, M.A., M.A.,S.A., A.A. visualization, M.A., M.A.; supervision, M.A., M.A.,S.A.; project administration, M.A., M.A.,S.A.; funding acquisition, M.A., M.A.; All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest.

None of the authors have any conflicts of interest to disclose.

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