GEORGIAN MEDICAL NEWS

ISSN 1512-0112

NO 11 (356) ноябрь 2024

ТБИЛИСИ - NEW YORK

ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

Monthly Georgia-US joint scientific journal published both in electronic and paper formats of the Agency of Medical Information of the Georgian Association of Business Press. Published since 1994. Distributed in NIS, EU and USA.

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.

GEORGIAN MEDICAL NEWS
No 11 (356) 2024

Содержание:

APPLICATION OF EARLY RISK FACTOR WARNING MODEL OF ACUTE KIDNEY INJURY COMBINED WITH CONTINUOUS RENAL REPLACEMENT THERAPY IN PATIENTS WITH SEVERE ACUTE PANCREATITIS

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Abstract.

Objective: The purpose of this study is to explore the application effect of early risk factor warning model of acute kidney injury combined with continuous renal replacement therapy in patients with severe acute pancreatitis, and to comprehensively evaluate the effects of this combined treatment model on patients'renal function recovery and complications through prospective studies. **Methods:** This study adopted a rigorous random grouping method to ensure the balance and randomness of the grouping and minimize the interference of confounding factors on the research results. Specifically, with the help of a computer-generated random number sequence, patients who met the inclusion criteria were randomly assigned to the combined treatment group and the traditional treatment group. **Results:** The incidence of acute kidney injury differed significantly between the two groups. The incidence of acute kidney injury in the traditional treatment group is as high as 35%, which is closely related to the natural course of the development of severe acute pancreatitis and the limitations of traditional treatment methods. **Conclusions:** The application of early risk factor warning model of acute kidney injury combined with continuous renal replacement therapy in patients with severe acute pancreatitis has excellent performance in improving patient prognosis, guiding clinical decision-making, and optimizing the allocation of medical resources.

Key words. Early risk factor warning model, acute kidney injury, renal replacement therapy, severe acute pancreatitis.

Introduction.

Severe acute pancreatitis (SAP) is a critical condition characterized by significant inflammation of the pancreas, which can lead to severe complications and high mortality rates. The severity of acute pancreatitis can vary widely, with approximately 20-30% of cases progressing to severe forms that may involve necrosis and multi-organ dysfunction [1]. The leading causes of acute pancreatitis include gallstones and excessive alcohol consumption, although other factors such as hyperlipidemia and certain medications can also contribute to its onset [2]. The pathophysiology of SAP involves the activation of pancreatic enzymes within the acinar cells, leading to autodigestion of the pancreas and the release of pro-inflammatory mediators into the systemic circulation. This process can trigger a systemic inflammatory response syndrome (SIRS), which is similar to the response seen in sepsis. The excessive release of cytokines such as interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α) plays a crucial role in the progression of the disease and the development of complications [3,4]. Clinical management of SAP focuses on supportive care, including fluid resuscitation, pain management, and nutritional support. Early enteral feeding is recommended, when possible, as it has been shown to improve outcomes in patients with necrotizing pancreatitis. Antibiotic prophylaxis is generally not recommended unless there is evidence of infection [2]. The use of imaging techniques, particularly computed tomography (CT), is essential for diagnosing complications and assessing the severity of pancreatitis. The CT Severity Index (CTSI) is often utilized to predict outcomes and guide management decisions [5]. Recent studies have highlighted the importance of pancreatic microcirculation in the context of SAP. Disturbances in pancreatic microcirculation have been correlated with histopathological tissue damage and increased mortality rates. Improving pancreatic microcirculation may enhance survival outcomes in patients with severe acute pancreatitis [6]. Additionally, research into the gut microbiota has suggested that dysbiosis may be associated with the severity of acute pancreatitis, indicating a potential area for therapeutic intervention [7]. In terms of prognosis, several clinical scoring systems, such as the APACHE II score and Ranson's criteria, are used to assess the severity of acute pancreatitis and predict outcomes. High levels of inflammatory markers, such as C-reactive protein (CRP) and procalcitonin (PCT), have been associated with worse outcomes and complications, including infected pancreatic necrosis 420. Overall, severe acute pancreatitis remains a complex clinical challenge that requires a multidisciplinary approach for optimal management. The focus on early identification of severe cases, timely intervention, and supportive care is crucial in improving patient outcomes and reducing mortality associated with this condition. Continuous renal replacement therapy (CRRT) is a vital treatment modality for critically ill patients, particularly those experiencing acute kidney injury (AKI) and hemodynamic instability. CRRT is often employed in intensive care units (ICUs) for patients with severe AKI, especially those requiring significant doses of vasoactive medications. The therapy can be tailored to the individual needs of patients, adjusting parameters such as fluid removal rates and dialysate composition to optimize outcomes. Studies have shown that CRRT can lead to improved survival rates and better recovery of renal function compared to intermittent hemodialysis, particularly in critically ill populations [8].

The choice of anticoagulation during CRRT is crucial, as it can significantly impact the therapy's effectiveness and safety. Heparin has traditionally been the most commonly used anticoagulant; however, citrate has gained popularity due to its ability to enhance circuit survival and reduce the need for blood transfusions. Citrate anticoagulation can also minimize complications associated with heparin, such as bleeding and thrombocytopenia, making it a favorable option in many clinical settings [9].

In view of this, the purpose of this study is to explore the application effect of early risk factor warning model of acute

kidney injury combined with continuous renal replacement therapy in patients with severe acute pancreatitis, and to comprehensively evaluate the effects of this combined treatment model on patients'renal function recovery and complications through prospective studies. It has multiple impacts on disease incidence, survival rate, and inflammatory indicators, in order to provide a more scientific and effective clinical treatment plan for severe acute pancreatitis complicated by acute kidney injury, reduce patient mortality, and improve their quality of life.

Methods.

Data collection and organization:

This study extensively collected clinical data from patients with severe acute pancreatitis. The information collected is comprehensive and detailed, including patients' demographic information, such as age, gender, ethnicity. This basic information helps to initially understand the distribution of characteristics of the patient group; detailed past medical history, such as whether they suffer from hypertension, diabetes, Chronic diseases such as coronary heart disease, as well as previous history of kidney disease, these basic diseases are often closely related to the occurrence of acute kidney injury Relevant and can be used as an important risk assessment factor. The clinical manifestations on admission cover symptoms, signs and other aspects, such as the degree, location and duration of abdominal pain, whether it is accompanied by fever, jaundice, and abdominal tenderness and rebound tenderness. Physical signs, etc. These clinical manifestations can intuitively reflect the priority of the patient's condition and provide immediate condition information for the early warning model. Laboratory examination data is the focus of collection, involving blood routine, blood biochemistry, coagulation function, inflammatory indicators and other items. The white blood cell counts and neutrophil ratio in routine blood tests can reflect the body's inflammatory response; blood biochemical indicators such as blood creatinine, urea nitrogen, cystatin C, blood amylase, lipase, etc., can not only reflect kidney function, It can also assist in judging pancreatic damage; coagulation function indicators such as prothrombin time, partial thromboplastin time, fibrinogen, etc. are of great significance for assessing whether patients have a hypercoagulable state and predicting possible thrombotic complications; Inflammation markers such as C Reactive protein (CRP), procalcitonin (PCT), tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6), etc., play a role in the systemic inflammatory response caused by severe acute pancreatitis. It plays a key role, and its level changes are closely linked to the occurrence and development of acute kidney injury.

Patient Inclusion and Exclusion Criteria.

The precise definition of patient inclusion criteria is the cornerstone of ensuring the scientificity and validity of research. First of all, the research subjects must clearly meet the diagnostic criteria for severe acute pancreatitis. According to the latest guidelines jointly formulated by the International Association of Pancreatology (IAP) and the American Pancreatic Association (APA), the patients must have typical symptoms of acute abdominal pain and serum amylase. Or the lipase activity exceeds 3 times the upper limit of normal, and combined with imaging examinations, such as abdominal enhanced CT showing inflammatory changes, edema, necrosis or peripancreatic leakage in the pancreatic parenchyma, etc., the diagnosis can be confirmed. For the diagnosis of acute kidney injury, the criteria of the Kidney Disease Improving Global Outcomes Organization (KDIGO) are strictly followed, that is, an increase in serum creatinine ≥26.5 μmol/L within 48 hours or an increase in creatinine exceeding 1.5 times the baseline value within 7 days. In view of the critical significance of acute kidney injury staging in assessing the severity and prognosis of the disease, the study further subdivided the acute kidney injury staging of included patients and included patients in stages 1-2, aiming to focus on patients whose early intervention is expected to reverse the progression of kidney injury.

Grouping method and sample size.

This study adopted a rigorous random grouping method to ensure the balance and randomness of the grouping and minimize the interference of confounding factors on the research results. In terms of gender, it is also ensured that the ratio of men to women is roughly equal in the combined treatment group and the traditional treatment group to avoid the impact of gender differences on efficacy evaluation. Through this stratified randomization strategy, the baseline characteristics of the two groups of patients are as similar as possible, providing a fair and reliable basis for subsequent comparative analysis. The sample size is determined based on scientific statistical methods and comprehensive consideration of multiple factors. Referring to the empirical data of previous similar studies, combined with the main observation indicators set in this study, such as the incidence of acute kidney injury, 28-day survival rate, time for renal function to return to normal, etc., statistical software was used to estimate the sample size. Taking the incidence rate of acute kidney injury as an example, assuming that the incidence rate in the traditional treatment group is 30%, it is expected that the combined treatment group can reduce it to 15%. The test level is set to $\alpha = 0.05$, $1 - \beta = 0.90$ (β is the type II error probability, based on the sample size calculation formula for comparing the two sample rates, it was estimated that the required sample size for each group was approximately 120 cases. The combined treatment plan implements CRRT, and the entire treatment process closely follows the established standardized process. The medical staff use extremely high professionalism and rigorous attitude to ensure that every step is accurate. During the establishment of vascular access, the internal jugular vein, femoral vein, or subclavian vein should be carefully selected for central venous catheterization based on the patient's individual conditions, such as vascular conditions, emergency severity, etc. Taking internal jugular vein catheterization as an example, medical staff, under the real-time guidance of ultrasound and with superb puncture technology, carefully and accurately insert the catheter to ensure a successful one-time puncture and minimize the risk of vascular damage and bleeding. After the catheter placement is completed, the catheter should be properly fixed, the puncture site should be strictly sterilely bandaged, and any abnormalities such as bleeding and hematoma should be closely observed to lay a solid foundation for subsequent blood purification treatment. At the same time, patients

in the combined treatment group simultaneously received conventional treatment for severe acute pancreatitis, including fasting and gastrointestinal decompression.

Results.

In terms of renal function recovery, the combined treatment group showed obvious advantages. Taking blood creatinine as an example, before treatment, the blood creatinine levels of the two groups of patients were in a high and similar range, reflecting that the kidney function has been seriously threatened. As treatment progresses, the decline in serum creatinine in the traditional treatment group is relatively slow. On the 7th day of treatment, the average serum creatinine value only dropped to about 70% of the initial value, while in the combined treatment group, the early risk factor warning model for acute kidney injury was more accurate. Under the guidance, continuous renal replacement therapy (CRRT) was started in a timely manner, and the serum creatinine dropped rapidly. By the 7th day of treatment, the average serum creatinine value had dropped to about 50% of the initial value and continued to decline steadily during the subsequent treatment period, with a faster trend. Close to the normal range. Urine output monitoring also showed significant differences. The average time for patients in the traditional treatment group to return to normal levels (urine output per hour was stable above 0.5-1 ml/kg) was as long as 9.5 days. Some patients even continued to recover after 2 weeks of treatment. There was oliguria; patients in the combined treatment group recovered significantly faster, with an average of only 6.5 days. Most patients could reach normal urine output standards in about 1 week of treatment, which fully demonstrates that combined treatment can more effectively promote renal excretion function. recovery and reduce kidney damage. The incidence of acute kidney injury differed significantly between the two groups. The incidence of acute kidney injury in the traditional treatment group is as high as 35%, which is closely related to the natural course of the development of severe acute pancreatitis and the limitations of traditional treatment methods. In the face of complex pathophysiological changes such as systemic inflammatory response and microcirculation disorders caused by severe acute pancreatitis, traditional treatments are difficult to comprehensively and timely curb the occurrence and development of acute kidney injury. The incidence of acute kidney injury in the combined treatment group was only 18%. Thanks to the early and accurate screening of the early warning model, high-risk patients were identified in advance, and CRRT intervened in a timely manner. Through multiple functions such as clearing inflammatory mediators and maintaining internal environment stability, effectively blocks the pathological process of acute kidney injury and significantly reduces its incidence. Comparison of the incidence of multiple organ dysfunction syndrome (MODS) also highlights the advantages of combination therapy. The incidence of MODS in the traditional treatment group reached 40%. This is because once severe acute pancreatitis is complicated by acute kidney injury, an inflammatory storm rages in the body, and the functions of multiple organs are successively damaged under multiple attacks such as inflammatory mediator attacks and insufficient perfusion. The incidence of MODS in the combined treatment group was controlled at 22%.

Discussion.

The results of this study have profound clinical significance and wide application value and point out the direction for the optimization of treatment strategies for severe acute pancreatitis complicated by acute kidney injury. From the perspective of improving patient prognosis, the combined treatment model brings vitality to patients through multi-dimensional synergy. The early risk identification of the early warning model is like an accurate “disease compass”, which can identify high-risk patients with acute kidney injury in the budding stage of the disease, so that subsequent treatment can be targeted. The timely intervention of CRRT creates good conditions for the repair of damaged kidneys by virtue of its efficient removal of inflammatory mediators, fine regulation of the internal environment, and effective support of kidney function. The rapid recovery of renal function not only reduces the damage to the kidney itself and prevents the condition from worsening to renal failure, but also reduces the source of a series of complications caused by acute kidney injury, such as water and electrolyte disorders, acid-base imbalance and other effects on other organs. This series of chain reactions shows that combined treatment directly targets the core pathophysiology of severe acute pancreatitis complicated by acute kidney injury, breaks the limitations of traditional treatment, and provides a solid guarantee for improving the prognosis of patients. In terms of clinical decision-making guidance, this study provides doctors with a scientific and precise action guide. In the past clinical practice, the risk prediction of acute kidney injury in patients with severe acute pancreatitis mostly relied on empirical judgment, lacking a quantitative and accurate indicator system, and the selection of treatment timing was also subjective. The establishment of an early warning model for acute kidney injury risk factors integrates multi-dimensional clinical information and uses advanced algorithms for quantitative analysis, which can provide doctors with objective and accurate risk assessment results, allowing doctors to predict based on the model when facing patients. Clearly determine the patient’s risk level of acute kidney injury and plan treatment plans in advance. When the early warning model indicates that the patient is a high-risk group, doctors can decisively initiate targeted treatment measures such as CRRT to avoid worsening of the condition due to delayed treatment opportunities. This precise decision-making model based on the early warning model has greatly improved the standardization and scientificity of clinical treatment, reduced the blindness of medical decision-making, and helped achieve early and precise intervention for severe acute pancreatitis complicated by acute kidney injury.

From the perspective of optimal allocation of medical resources, the combined treatment model is also of great significance. In the current context of tight medical resources, how to rationally allocate resources to maximize their effectiveness is an urgent problem that needs to be solved. For patients with severe acute pancreatitis, traditional treatment models often adopt a “one size fits all” routine due to the lack of early and accurate identification, resulting in some high-risk patients not receiving timely and effective intensive treatment, while some low-risk patients may be over-medicated. resulting in a waste of medical

resources. The early risk factor warning model for acute kidney injury can accurately screen out high-risk patients who really need high-level treatment such as CRRT and achieve "precise investment" of medical resources.

For low-risk patients, close observation and conservative treatment can be carried out according to conventional treatment paths to avoid unnecessary medical intervention; for high-risk patients, superior medical resources should be concentrated and combined treatment can be carried out in a timely manner to ensure that patients receive the best treatment during the golden treatment period. This not only improves the utilization efficiency of medical resources, but also maximizes the overall prognosis of the patient group under limited resource conditions, providing a feasible solution for the efficient operation of the medical system.

Conclusion.

In summary, the application of early risk factor warning model of acute kidney injury combined with continuous renal replacement therapy in patients with severe acute pancreatitis has excellent performance in improving patient prognosis, guiding clinical decision-making, and optimizing the allocation of medical resources. The clinical treatment of acute pancreatitis complicated by acute kidney injury has opened up a new path, has extremely high promotion and application value, and is expected to become the standard model of clinical treatment in the future, bringing benefits to more patients.

Availability of Data and Materials.

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate.

Ethical approval was obtained from Qingdao Jiaozhou Central Hospital Ethics Committee; consent was obtained from all participants.

Funding.

The study was supported by the 2023 qingdao medical and health scientific research guidance project (No. 2023-WJZD145).

Conflict of interest.

The authors declare no conflicts of interest statement.

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