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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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AGE–DEPENDENT IMMUNE STATUS CHANGES IN CHRONIC PANCREATITIS PATIENTS

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Abstract.

Introduction: The negative consequences of constant stress exposure in patients with chronic pancreatitis (CP) develop an immune deficiency, which also depends on the nature of the body's immune response, which may vary at different ages.

The aim of the study: To study and analyze the state of the immune system of patients with chronic pancreatitis in the age aspect.

Materials and methods: We examined the immune system (IS) of 161 patients with CP aged 21 to 78 years, mean age - (58.17±2.46) years, which were divided according to biological age into three groups: up to 45 years (54 patients), from 46 to 65 years (76 subjects), older than 65 years (31 patients). The following indicators of immunity were studied: the number of the total population of T-lymphocytes (CD3), B-cells (CD72), subpopulations of T-helpers/inducers (CD4) and T-suppressors/killers (CD8), natural killers (CD16), which determined in a cytotoxic test using monoclonal antibodies of classes CD3, CD4, CD8, CD16, CD72 by enzyme-linked immunosorbent assay according to the level of expression of membrane antigens.

Results and discussion: Secondary immunodeficiency by T-suppressor type, insignificant nonspecific activation of humoral immunity, and decrease in complement activity was established in patients with CP. Changes in the T-cell level of immunity due to the probable decrease in the level of CD3, CD4, CD8, CD16, and CD 72 in young patients by 44.8; 36.1; 24.4; 32.2, and 18.4 %%, respectively ($p<0.001$); in middle age, immune deficiency deepened, which was manifested by a decrease in these indicators by 54.6; 37.2; 29.9; 41.4 and 25.6 %%, respectively ($p<0.001$); in patients over 65 years of age, probable T-lymphocytopenia was determined by 66.4; 47.8; 37.7; 70.8; 41.5 %% ($p<0.001$) compared with the control group.

Conclusions: Based on the regression-correlation analysis, it is proved that the age of patients, duration of CP, level of fecal α-elastase, and structural state of the pancreas according to ultrasound criteria are reliable predictors of immunodeficiency in CP.

Key words. Chronic pancreatitis, age, immune status, pancreas.

Introduction.

For the last decade, the citizens of Ukraine have been living in a state of chronic stress due to the instability of the political and economic situation. In this regard, along with neurological disorders, doctors with exacerbations of chronic pathology are most often consulted, among which cardiovascular and gastrointestinal diseases are in the lead. The constant stressful effect on the human body is manifested by the activation of the sympathetic-adrenal system, the release of hormones with vasoconstrictive properties [1-4]. The pancreas is one of the first organs to respond to a decrease in functional activity in the presence of prolonged ischemia, which is manifested by both minor changes in the structure and significant degeneration of the gland, which leads to severe insufficiency. In recent years, there has been a clear increase in the prevalence of pancreatic pathology in young people of working age, but the exacerbation of the chronic process in the case of "favorable conditions" occurs in all age groups [5,6]. Chronic pancreatitis (CP) is a polyetiological disease. Manifestation of the inflammatory process in the pancreas begins with the damaging effect on the pancreas of one or a combination of several etiological factors, which include malnutrition, abuse of fatty foods and alcohol, smoking, atherosclerotic changes in blood vessels, and others [7-9].

The pancreas has great compensatory properties. For a long time, progressive exocrine insufficiency of the pancreas is clinically manifested only by malabsorption syndrome, and disorders of pancreatic secretion are manifested only in severe gland damage [1,6]. Among the negative consequences of constant stress exposure in patients with CP develops immune deficiency, which also depends on the nature of the body's immune response, which may vary at different ages [10,11]. There are insufficient reports on the study of immune status depending on the biological age of patients with CP, which motivated this study.

The aim of the study.

To study and analyze the state of the immune system of patients with chronic pancreatitis in the age aspect.

Materials and methods.

The study design is a retrospective observational study. We examined the immune system (IS) of 161 patients with CP aged 21 to 78 years, mean age - (58.17±2.46) years, which were divided according to biological age into three groups: up to 45 years (54 patients), from 46 to 65 years (76 subjects), older than 65 years (31 patients). The control group consisted of 25 healthy individuals, representative of age and sex. The examination was conducted on the basis of the Non-Profit Enterprise "Odesa Regional Clinical Medical Center of the Odesa Regional Council" and in the outpatient department of the Ternopil City Hospital №2. Sources of information were "Medical cards of an outpatient" (f. 025/o) and "Medical cards of an inpatient" (f.003/o) of patients of different ages and genders on CP during 2014-2021. The diagnosis of "chronic pancreatitis" was established on the basis of a clinical protocol in accordance with the Order of the Ministry of Health of Ukraine№638 of 10.09.2014.

Serum and mononuclear cells of venous blood were taken to assess the immune system (IS) of patients with CP. The following indicators of immunity were studied: the number of the total population of T-lymphocytes (CD3), B-cells (CD72), subpopulations of T-helpers/inducers (CD4) and T-suppressors/killers (CD8), natural killers (CD16), which determined in a cytotoxic test using monoclonal antibodies of classes CD3, CD4, CD8, CD16, CD72 flow cytometry according to the level of expression of membrane antigens. The immunoreactive index (IRI) was also calculated like CD4/CD8 ratio. A normal CD4/CD8 ratio should be between 1.6 and 2.2. Functional activity of B-lymphocytes was assessed by the concentration of serum Ig of the main classes (M, G, A), which was determined in the serum and was carried out by Manchini immunodiffusion test. The results were evaluated graphically. The activity of the complement system was determined by hemolytic test CH50 for 50.0% hemolysis, assuming the norm content of complement activity (285.00±6.63) hem.un.

Assessment of excretory pancreatic insufficiency (EPI) was determined by the level of fecal α-elastase (FαE) by enzyme-linked immunosorbent assay using standard BIOSERV-ELASTASE1-ELISA kits. The content of FαE>200 mcg/g indicated the absence of EPI, from 150 to 200 mcg/g - moderate (EPI moderate),>100 mcg/g - severe EPI.

The structural state of the pancreas was assessed according to the Cambridge classification, assessing the severity of the process. A healthy pancreas is characterized by a normal size, clear contours, homogeneous parenchyma, and the size of the Pancreatic duct up to 2 mm. Assessment of the state of the pancreas (changes in the ducts and parenchyma) in patients with CP was performed by summarizing ultrasound data to determine the severity of the process: 1-2 signs indicated a mild degree, 3-5 signs - moderate, more than 5 signs - severe.

Compliance of the distribution of clinical trial data with the law of normal distribution was checked using the Shapiro–Wilk test. Arithmetic means to value and standard error (M±m) were used to describe the data. When testing statistical hypotheses, the null hypothesis was rejected at a level of statistical significance (p) less than 0.05. Non-parametric tests were used for populations whose distribution differed from "normal": to compare two independent samples, the Mann-Whitney U-test was used. The presence and probability of differences between sample means of independent samples were assessed using One-way ANOVA followed by post-hoc Tukey HSD (Honestly Significant Difference) test. Analysis of the relationship between the two traits in the presence of a normal distribution was evaluated by the results of Pearson's correlation analysis (r), with a distribution other than normal, a nonparametric Spearman's rank correlation method (R) was used. The software-mathematical complex for a personal computer "Microsoft Excel 2016" (Microsoft) and computer programs for statistical analysis and data processing "STATISTICA ® 8.0" (StatSoft Inc., USA) and IBM ® SPSS ® Statistics Version 16.0 were used.

Results and discussion.

Cellular and humoral components of IS characterize the visceral pool of protein in the human body. Therefore, it was considered important to solve the problem of nutritional deficiency in CP and to analyze the state of patients' IS. The Table 1 shows the indicators of IS determined in the contingent of patients with CP.

Table 1. *Indicators of the immune system of patients with CP.*

IS indicator	Comparison group	
	Control group	**Patients with CP**
CD3, %	65,22±2,80	46,75±0,41*
CD4, %	42,61±1,37	31,09±0,30*
CD8, %	21,08±1,25	16,07±0,19*
CD16, %	13,36±1,30	9,69±0,14*
CD72, %	10,13±1,04	8,84±0,19*
IPI (CD4/CD8)	2,01±0,06	1,83±0,05*
Ig G, g/l	10,32±0,17	11,85±0,19*
IgA, g/l	1,84±0,09	2,24±0,05*
IgM, g/l	1,45±0,08	2,18±0,07*
CIC, con.un.	65,34±1,26	177,94±4,15*
Complement (C_{H50}), hem.un.	286,00±6,63	179,58±2,45*
Note: * - the probability of differences in indicators for the control group (p<0,05).		

At the same time, all studied subpopulations of lymphocytes decreased quantitatively in patients with CP. The level of CD8 cells (T-suppressors/cytotoxic killers) also decreased, but not as progressively, so IPI, which reflects the ratio of lymphocytes with helper and suppressor activity, tended to decrease. T-lymphocytopenia of the 1st degree was stated. with IPI>1.7, which indicated that patients had minor signs of systemic inflammation, and it is important to note that the study included patients with CP in the phase of unstable and stable remission. A significant decrease in the NK population was found, and a decrease in NK is a generally accepted indicator of the weakening of antitumor and antiviral protection, which indicates a violation of the nutritional status of CP with the formation of secondary immunodeficiency. There was a significant decrease in the level of B cells (CD72). In parallel, a significant increase in all Ig classes, which showed a slight nonspecific activation of B-lymphocytes, and more significant was the increase in IgA and M. The obtained data confirm the pathogenetic role of chronic inflammation in CP, which complicates the course of CP and may. It was found that in all patients with CP the level of CIC in the serum was elevated, which indicated the presence of an inflammatory component in CP and may be associated with the accumulation of protein catabolism in destructive-dystrophic processes in CP because it is known Cyto-immune complex (CIC) is not only an immunological indicator but also an indicator of existing endogenous intoxication.

Depletion of the complement system in patients was stated, which confirms the thesis of depletion of the visceral protein pool in patients with CP.

When analyzing the state of IS, it was considered appropriate to determine the effect of biological age on the parameters of immunity (data are given in the Table. 2). According to the data obtained, it can be argued that with age in CP, the effects of immune deficiency increase. In all age groups after 45 years (middle and elderly age) T-lymphocytopenia of the II degree was noted, and there was a decrease in all studied subpopulations of T-lymphocytes. The above-mentioned

Table 2. *Indicators of the immune system in groups of patients with CP of different ages.*

IS indicator	Control group (n=25)	Group of patients with CP by age		
		up to 45 years (n=54)	46-65 years (n=76)	over 65 years (n=31)
CD3, %	65,22±2,80	45,04±1,11*	42,17±0,67* p_1<0,02	39,20±0,96* p_1, p_2<0,02
CD4, %	42,61±1,37	31,62±0,51*	30,84±0,56* p_1<0,01	28,83±0,69* p_1, p_2<0,02
CD8, %	21,08±1,25	16,98±0,39*	16,30±0,35*	15,32±0,36* p_2<0,05 p_1<0,02
CD16, %	13,36±1,30	10,11±0,23*	9,48±0,14*	7,83±0,39* p_2<0,05 p_1<0,001
CD72, %	10,13±1,04	8,53±0,33*	8,06±0,25*	7,15±0,29* p_1, p_2<0,05
IPI (CD4/CD8)	2,01±0,06	1,79±0,04*	1,69±0,04*	1,58±0,03* p_1, p_2<0,05
Ig G, g/l	10,32±0,17	11,05±0,60*	11,37±0,25*	12,41±0,22* p_1, p_2<0,001
IgA, g/l	1,84±0,09	2,11±0,11*	2,36±0,12*	2,65±0,17* p_1, p_2<0,05
IgM, g/l	1,45±0,08	2,09±0,18*	2,09±0,17*	2,49±0,09* p_1, p_2<0,05
CIC, con.un.	65,34±1,26	159,44±6,72*	186,21±5,96* p_1<0,001	211,30±10,41 p_1, p_2<0,001
Complement (C_{H50}), hem. un.	286,00±6,63	182,05±5,47*	185,19±5,29*	159,90±4,97 p_1, p_2<0,001

Notes:
1. * - the significance of differences in relation to the control group (p <0,001);
2. p_1 - the significance of differences in the group of patients with CP up to 45 years;
3. p_2 - the significance of differences in the group of patients with CP 46-65 years.

tendency to immunodeficiency by T-suppressor type was preserved and deepened - IPI decreased, but not less than 1.5, which indicated the presence of a minor systemic inflammatory process, which decreased with age. The presence of changes in the T-cell component of immunity due to a statistically significant decrease in the level of CD3, CD4, CD8, CD16, and CD72 in young patients compared with controls (p<0.001). On average, these figures decreased statistically significant compared with the control group (p<0.001), in patients over 65 years of age, statistically significant T-lymphocytopenia was determined (p<0.001). In addition, the subpopulation of T-lymphocytes of the study parameters in middle-aged (p<0.001) and elderly (p<0.02) patients decreased compared to the corresponding parameters in patients under 45 years of age. This can be explained by a decrease in active immunity in older people with CP.

However, the increase in the levels of the studied Ig indicated the presence of nonspecific activation of B-lymphocytes with a decrease in their total number. Thus, there was a probable increase statistically significant in IgG, IgA, IgM in patients with CP at a young age (p<0.001), in the middle age group of patients (p<0.001) and over the age of 65 years (p<0.001), respectively, compared with healthy people. The identified trends in the reduction of complement activity in young patients on average and in the elderly (p<0.001) and the increase in CIC in the contingent were confirmed and deepened with the aging of patients (p<0.001).

Thus, the phenomena of immunodeficiency by T-suppressor type, depletion of complement, accumulation of CIC increased with age, reliably confirming the presence of visceral protein pool deficiency in patients with CP. In addition, the violation of the IS of patients with CP, of course, is a pathogenetic factor in pathological changes in other parts of the nutritional metabolism, a factor in complicating the clinical course and prognosis of CP.

The presence of possible influences of the main characteristics of CP (duration of CP, degree of EPI on the level of FαE, etc.) on the state of immunological parameters using the correlation-regression method was analyzed. These studies are given in the table 3. According to the obtained data, it can be stated that the studied factors influencing the CP of patients of our contingent are reliable in most indicators of IS, correspond to the level of moderate correlation, and in some parameters - and significant (influence of ultrasound characteristics on levels of CD4, CD8, CD16, FαE at the level of complement and CIC). Given the peculiarities of clinical studies (individuality and polymorbidity of patients, polyetiology of CP, multifactorial pathogenesis, etc.), we can conclude that the identified level of reliability and severity of correlations allows recognition of these factors as predictors of the formation and depth of immune deficiency.

Table 3. *Correlation between the immune status of patients of different ages with CP and the main characteristics of the disease.*

Couple in the regression relationship	**Age of the patient, years**	**Duration of CP, years**	**FαE level, μg/g**	**Ultrasound, point**
CD3, %	-0,468 n=161 p<0,05	-0,396 n=161 p<0,05	0,359 n=161 p<0,05	-0,459 n=161 p<0,05
CD4, %	-0,298 n=161 p>0,05	-0,335 n=161 p>0,05	0,398 n=161 p<0,05	-0,641 n=161 p<0,02
CD8, %	-0,454 n=161 p<0,05	-0,352 n=161 p<0,05	0,381 n=161 p<0,05	-0,639 n=161 p<0,02
CD16, %	-0,351 n=161 p<0,05	-0,322 n=161 p>0,05	0,409 n=161 p<0,05	-0,593 n=161 p<0,05
CD72, %	-0,293 n=161 p>0,05	-0,311 n=161 p>0,05	0,352 n=161 p<0,05	-0,388 n=161 p<0,05
IPI (CD4/CD8)	-0,198 n=161 p>0,05	-0,206 n=161 p>0,05	0,215 n=161 p>0,05	-0,199 n=161 p>0,05
Ig G, g/l	-0,298 n=161 p>0,05	-0,250 n=161 p>0,05	0,388 n=161 p<0,05	-0,463 n=161 p<0,05
IgA, g/l	-0,319 n=161 p>0,05	-0,348 n=161 p<0,05	0,267 n=161 p>0,05	-0,265 n=161 p>0,05
IgM, g/l	-0,233 n=161 p>0,05	-0,268 n=161 p>0,05	0,217 n=161 p>0,05	-0,317 n=161 p>0,05
CIC, con.un.	-0,345 n=161 p<0,05	-0,393 n=161 p<0,05	0,529 n=161 p<0,05	-0,349 n=161 p<0,05
Complement (C_{H50}), hem. un.	-0,412 n=161 p<0,05	-0,324 n=161 p>0,05	0,551 n=161 p<0,05	-0,458 n=161 p<0,05
Notes: n - the number of pairs in the correlation analysis; p - the degree of reliability of the correlation dependence.				

Thus, the age of patients, the duration of CP in each case, the state of EPI on the level of FαE, as well as the structural state of pancreas on ultrasound criteria are predictors of the formation and progression of immunodeficiency in CP.

Conclusions.

1. Secondary immunodeficiency by T-suppressor type, insignificant nonspecific activation of humoral immunity, and decrease in complement activity was established in patients with CP.

2. Changes in the T-cell level of immunity due to the probable decrease in the level of CD3, CD4, CD8, CD16, and CD 72 in young patients by 44.8; 36.1; 24.4; 32.2, and 18.4 %%, respectively (p<0.001); in middle age, immune deficiency deepened, which was manifested by a decrease in these indicators by 54.6; 37.2; 29.9; 41.4 and 25.6 %%, respectively (p<0.001); in patients over 65 years of age, probable T-lymphocytopenia was determined by 66.4; 47.8; 37.7; 70.8; 41.5 %% (p<0.001) compared with the control group.

3. With the increasing age of patients with CP there was nonspecific activation of humoral immunity due to an increase in IgG, IgA, IgM in patients with CP of young age by 6.7; 13.3; 30.1 %% (p<0.001); at 9.6; 25.1; 30.1 %% in middle age (p<0.001) and 16.9; 30.9; 41.4 %% over the age of 65 years (p<0.001), respectively, compared with healthy people. The identified trends in the reduction of complement activity by 56.6% in young patients by 54.8% on average and by 78.2% in the elderly (p <0.001) and the increase in CIC in the contingent were confirmed and deepened with the aging of patients by 58.9; 75.8 and 69.1 %%, respectively (p<0.001).

4. Based on the regression-correlation analysis, it is proved that the age of patients, duration of CP, level of fecal α-elastase, and structural state of the pancreas according to ultrasound criteria are reliable predictors of immunodeficiency in CP.

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