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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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MORTALITY RISK ASSESSMENT AMONG PATIENTS, HOSPITALIZED FOR COVID-19

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Abstract.

In Georgia, the number of confirmed cases of Coronavirus were 1,85,5289. Among them, 17 132 patients died. Information on risk factors for mortality is insufficient.

The purpose of our research is to evaluate clinical features of heavy patients with severe COVID and determine prognostic factors of outcome. Factors associated with critical COVID-19 included older age and certain chronic medical conditions.

Methods: The clinical material of 250 chronically ill COVID-19 patients admitted to the intensive care unit was retrospectively studied. We divided the patients into two groups. The dead and the survivors.

Demographic data, comorbidities, chronic diseases, results of ultrasound, cardiography, computed tomography and laboratory characteristics were studied.

Results: In patients with chronic diseases, in the intensive care unit during COVID-19, the relative chance of survival decreases: CRP3 - OR=0.98(95% CI:0.97-0.99Hydrothorax- OR=0.24(95% CI:0.06-0.95); Sepsis/Septic shock - OR=0.07(95% CI:0.01-0.39); WBC - OR=0.86(95% CI:0.74-0.99); Mechanical lung ventilation - OR=0.01(95% CI:0.00-0.05)); increase survival relative chance-pO_2 - OR=1.03(95% CI:1.0-1.06).

Conclusions: Predictors of mortality in patients with chronic diseases: coagulation characteristics, inflammatory markers, sepsis, and artificial lung ventilation. Risk factors for covid-19 mortality need to be studied to increase pandemic preparedness.

Key words. Covid-19, mortality, risk factors.

Introduction.

The Covid-19 pandemic was caused by the severe acute respiratory syndrome, coronavirus 2 (SARS-CoV-2) which lasted from March 2020 to May 2023 [1]. More than 689 million people were infected, and it caused 6.9 million deaths worldwide, according to the WHO data. In Georgia, the number of confirmed cases of Coronavirus were 1 855 289. Among them, 17 132 patients died [2].

Although there is a certain number of prognostic features, the contradiction concerning predictors of mortality persists. The investigation of risk factors of the outcome may increase readiness to the pandemic [3].

The purpose of our research is to evaluate clinical features of heavy patients with severe COVID and determine prognostic factors of outcome. Factors, associated with critical COVID-19 included older age and certain chronic medical conditions.

Materials and Methods.

The clinical material of 270 chronically ill COVID-19 patients admitted to the intensive care unit was retrospectively studied. We divided the patients into two groups. The dead (107) and the survivors (163).

We used a structured questionnaire form developed by us, which contained information about patients: demographic data, comorbidities, chronic diseases, results of ultrasound, cardiography, computed tomography and laboratory characteristics were studied.

Statistical analysis.

• During the quantitative data assessment, we will calculate the average, mean square deviation. However, for qualitative data, we calculated frequency and percentage.

• The credibility of differences between groups in case of quantitative data will be detected using the student's t criterion. While comparing, the equality of dispersions was assessed according to the Levene's Test method. For qualitative data, the assessment of differences (discrepancies) will be performed using F (Fisher's) criterion.

• The relative chance was detected according to the multiple binary logistic regression analysis.

The clinical material was processed using the program package SPSS 23.

Results.

The table 1 shows patients' distribution, based on demographic features and harmful habits.

Table 1. Patients' distribution according to the demographic features and harmful habits.

As we see from this table 1, no gender difference was revealed. In the lethality group, the rate of patients, older than 65 is credibly high.

The difference, according to the concomitant diseases is significant (Table 2).

In both groups, the rate of patients, in whose anamnesis, cardiologic diseases were reported is high. Among them, in the lethal outcome group, rates of following conditions are credibly high: heart failure, suffered myocardial infarction, pulmonary hypertension, arterial hypertension, heart defects. Angina pectoris rate is incredibly higher. In the lethality group, the mean of the ejection fraction is credibly lower than this of survivors. Hence: EF%=50.85+8.57, - 48.28+9.45 (t=2.31; p=0.0216).

Concerning pulmonary diseases, COPD and hydrothorax prevailed in anamnesis. Besides, the rate of hydrothorax was high in the group of lethality.

Concerning endocrine pathologies, in both groups, the equally high frequency (more than 30 percent) of diabetes was pronounced. Of kidney diseases, the renal failure is incredibly more.

No credible discrepancies were found concerning oncologic, neurologic, gastroenterologic, psychiatric or hepatologic diseases. Performed operations and manipulations are given in the table 3.

The surgical procedures performed by the two groups do not appear to differ significantly.

At the next level of investigation, we studied treatment complications in both groups.

The initial rate of the degree of lung injury was high in both groups - in the lethality group 13.42+7.10, in the survivor group 12.81+6.8 (p=0.480).

Table 1. *Assessment of mortality based on sex, age, harmful habits.*

Factors		**Mortality**		**Survival**		**F**	**p**
		n	**%**	**N**	**%**		
Gender	Female	59	55.14	92	56.44	0.04	0.8339
Age	Above 65 years	86	80.37	90	55.21	19.16	<0.0001
Bad habits	Nicotine	28	26.17	49	30.06	0.48	0.4901
	Alcohol	5	4.67	3	1.84	1.80	0.1807
	Drug addiction	0	0.00	1	0.61	0.66	0.4188

Table 2. *Mortality assessment, based on concomitant diseases.*

		Mortality		**Survival**		**F**	**p**
		n	**%**	**N**	**%**		
Cardiological diseases	Heart failure	58	54.21	54	33.13	12.27	0.0005
	Post myocardial infarction	31	28.97	26	15.95	6.69	0.0102
	Pulmonary hypertension	35	32.71	17	10.43	22.16	<0.0001
	Arterial hypertension	102	95.33	137	84.05	8.27	0.0043
	Angina pectoris	19	17.76	17	10.43	3.01	0.0838
	Heart defect	44	41.12	48	29.45	3.95	0.0480
	Arrhythmia	31	28.97	37	22.70	1.35	0.2471
	Cardiomyopathy	11	10.28	11	6.75	1.07	0.3012
	Pericardial effusion	10	9.35	12	7.36	0.34	0.5617
Neurological diseases	Post stroke	13	12.15	18	11.04	0.08	0.7812
	Other neurological pathologies (neuropathy)	2	1.87	2	1.23	0.18	0.6706
	Transient ischemic attack	4	3.74	6	3.68	0.00	0.9806
	Severe head trauma	1	0.93	2	1.23	0.05	0.8234
	Epilepsy	3	2.80	4	2.45	0.03	0.8602
	Dementia	19	17.76	24	14.72	0.44	0.5071
	Alzheimer's disease	0	0.00	0	0.00		
Pulmonology/ Physiatric diseases	Post pneumonia	1	16.82	45	27.61	4.23	0.0406
	Post TBC	1	0.93	5	3.07	1.35	0.2465
	COPD	13	12.15	23	14.11	0.21	0.6444
	Post PE	0	0.00	4	2.45	2.67	0.1033
	Hydrothorax	37	34.58	26	15.95	13.04	0.0004
	Bronchial asthma	1	0.93	1	0.61	0.09	0.7645
	Lung abscess	0	0.00	0	0.00		
	Pleuritis	1	0.93	0	0.00	1.53	0.2177
Endocrine diseases	Diabetes	34	31.78	50	30.67	0.04	0.8491
	Obesity	7	6.54	21	12.88	2.80	0.0953
	Hypothyroidism or gout	5	4.67	17	10.43	2.87	0.0914
Gastroenterological diseases	Stomach or duodenal ulcer pathology	9	8.41	7	4.29	1.96	0.1623
	Varicose veins of the esophagus	0	0.00	0	0.00	-	-
	Gastritis / erosion	10	9.35	13	7.98	0.15	0.6945
	Gallstone disease	1	0.93	5	3.07	1.35	0.2465
	Pancreatitis	0	0.00	0	0.00	-	-
Psychiatric diseases	Schizophrenia	0	0.00	1	0.61	0.66	0.4188
	Anxiety Disorders	0	0.00	0	0.00	-	-
Hepatological diseases	Hepatitis C	1	0.93	10	6.13	4.51	0.0346
	Hepatitis B	1	0.93	3	1.84	0.36	0.5485
	Chronic liver failure	1	0.93	0	0.00	1.53	0.2177
	Liver cirrhosis	2	1.87	3	1.84	0.00	0.9864
Angiological diseases	Varicose veins of the blood vessels of the limbs	13	12.15	15	9.20	0.60	0.4391
	Carotid artery occlusion or stenosis	1	0.93	5	3.07	1.35	0.2465
	Aneurysm of the thoracic aorta	0	0.00	0	0.00	-	-
	Abdominal aortic aneurysm	1	0.93	2	1.23	0.05	0.8234

Nephrological diseases	Kidney failure	13	12.15	9	5.52	3.82	0.0518
	Bladder disease	1	0.93	3	1.84	0.36	0.5485
	Amyloidosis of the gums	0	0.00	0	0.00	-	-
Oncological pathologies	Gastrointestinal tract (stomach, esophagus, intestine)	1	0.93	3	1.84	0.36	0.5485
	Brain	1	0.93	0	0.00	1.53	0.2177
	Lung/median	1	0.93	4	2.45	0.82	0.3669
	Liver	0	0.00	1	0.61	0.66	0.4188
	Pancreas	0	0.00	2	1.23	1.32	0.2517
	Mammary gland	3	2.80	9	5.52	1.12	0.2909
	Thyroid gland	1	0.93	1	0.61	0.09	0.7645
	Uterus	2	1.87	7	4.29	1.18	0.2792
	Prostate gland	2	1.87	6	3.68	0.73	0.3923
	kidney	0	0.00	0	0.00	-	-
	Skin and soft tissues	0	0.00	0	0.00	-	-
	Oncohematology	0	0.00	2	1.23	1.32	0.2517
Therapy	Conducted chemotherapy or radiation therapy	2	1.87	8	4.91	1.67	0.1973
Hematological diseases	Anemia	17	15.89	22	13.50	0.30	0.5863
	Coagulopathy	1	0.93	5	3.07	1.35	0.2465

Table 3. *Transferred operations and manipulations.*

Factors		**Mortality**		**Survival**		**F**	**p**
		n	**%**	**n**	**%**		
Conducted surgery	Aortocoronary shunting	11	10.28	8	4.91	2.86	0.0920
Cardiology	Coronary angioplasty	18	16.82	19	11.66	1.45	0.2288
	Valve prosthesis	1	0.93	1	0.61	0.09	0.7645
Pulmonology	Lobectomy	0	0.00	3	1.84	1.99	0.1594
Neurosurgery	Trepanation of the skull-valve	1	0.93	3	1.84	0.36	0.5485
Endocrinology	Strumectomy	1	0.93	3	1.84	0.36	0.5485
	Thyroid resection	0	0.00	3	1.84	1.99	0.1594
Surgery	Gastric resection	3	2.80	5	3.07	0.02	0.9010
	Bowel resection	3	2.80	2	1.23	0.88	0.3491
	Cholecystectomy	6	5.61	9	5.52	0.00	0.9760
	Appendectomy	4	3.74	7	4.29	0.05	0.8219
	Hernia surgery/plasty	5	4.67	2	1.23	3.05	0.0819
	Mastectomy performed	1	0.93	5	3.07	1.35	0.2465
	Hysterectomy	7	6.54	8	4.91	0.33	0.5681
	Bariatric surgery	0	0.00	1	0.61	0.66	0.4188
	Nephrectomy	0	0.00	1	0.61	0.66	0.4188
	Splenectomy	0	0.00	2	1.23	1.32	0.2517
	Operative interventions on blood vessels	4	3.74	4	2.45	0.37	0.5444
	Traumatological surgery	8	7.48	6	3.68	1.89	0.1701
Vaccinations performed	**Vaccinations performed**	2	1.87	4	2.45	0.10	0.7509

Pulmonary artery pressure - in the mortality group was 51.51+13.28, in the survivor group it was 44.66+12.84. There was no significant difference between the survival and lethality groups according to the mean value of lung damage.

The absolute majority of patients had acute respiratory failure (98% and more), respiratory distress (66% and more), cytokine storm (28% and more).

The comparison between lethal outcomes and recovered patients showed that there are credible discrepancies between patients in terms of following complications:

Unspecified shock, embolism of the lower or upper limb artery, myocardial infarction, sudden cardiac arrest, acute renal failure, gastroduodenal bleeding, hyperglycemia, pulmonary hypertension, anemia, coagulopathy, spontaneous pneumothorax, hydrothorax.

Manipulations and surgical operations, performed during the treatment are given in table 5.

High-flow oxygenation HF and non-invasive CPAP were required for the majority of patients in both groups. Rates of the artificial lung ventilation and pleural drainage as well as coronography, performed coronary angioplasty (stenting), performed hemotransfusion, tracheostomy, bronchoscopy, esophagoduodenoscopy – ligation/application were credibly high in the lethality group.

The study of laboratory data showed that at the hospital level, inflammatory markers, and indicators (signs) of anemia are significant (Table 6).

Table 4. *Complications during the treatment period.*

Factors		Mortality		Survival		F	P
		n	%	N	%		
Complications during treatment	COPD COPD	13	12.15	12	7.36	1.76	0.1857
	Acute respiratory failure	106	99.07	161	98.77	0.05	0.8234
	Shock unspecified	29	27.10	4	2.45	42.00	<0.0001
	Artery embolism of the lower or upper extremities	4	3.74	0	0.00	6.28	0.0128
	Mesenteric artery thrombosis	0	0.00	0	0.00	-	-
	Myocardial infarction	10	9.35	3	1.84	8.12	0.0047
	Pericardial efusion	5	4.67	8	4.91	0.01	0.9300
	Ventricular fibrillation	0	0.00	0	0.00	-	-
	atrial fibrillation	0	0.00	1	0.61	0.66	0.4188
	Ischemic stroke	2	1.87	6	3.68	0.73	0.3923
	Spontaneous hemorrhagic stroke	4	3.74	1	0.61	3.49	0.0629
	Liver failure	3	2.80	3	1.84	0.27	0.6010
	Kidney failure	29	27.10	3	1.84	45.87	<0.0001
	Bacterial pneumonia	96	89.72	146	89.57	0.00	0.9688
	Sepsis Septic shock	59	55.14	7	4.29	134.94	<0.0001
	Gastroduodenal bleeding	8	7.48	1	0.61	9.71	0.0020
	Hyperglycemia	6	5.61	2	1.23	4.35	0.0380
	Cytokine storm	38	35.51	47	28.83	1.33	0.2493
	Urinary tract infection	29	27.10	46	28.22	0.04	0.8417
	Pulmonary hypertension	7	6.54	2	1.23	5.74	0.0173
	ARDS	72	67.29	108	66.26	0.03	0.8610
	Anemia	30	28.04	18	11.04	13.30	0.0003
	Coagulopathy	10	9.35	3	1.84	8.12	0.0047
	Spontaneous pneumothorax	4	3.74	0	0.00	6.28	0.0128
	Hydrothorax	47	43.93	39	23.93	12.36	0.0005
	Emphysema (subcutaneous)	3	2.80	1	0.61	2.12	0.1462
	Pneumomediastinitis	3	2.80	1	0.61	2.12	0.1462
	Encephalopathy (unspecified)	8	7.48	10	6.13	0.19	0.6669
	Bedsore	1	0.93	2	1.23	0.05	0.8234
	Laryngitis-tracheitis	0	0.00	1	0.61	0.66	0.4188
	Anticoagulant-associatedsubcutaneous hematomas	2	1.87	4	2.45	0.10	0.7509
ARDS (acute respiratory distress syndrome), COPD (Chronic obstructive pulmonary disease).							

Table 5. *Manipulations and operations performed during the treatment period.*

Factors	Mortality		Survival		F	p
	n	%	n	%		
Pleural drainage	12	11.21	5	3.07	7.41	0.0069
Mechanical ventilation	98	91.59	16	9.82	510.58	<0.0001
High-flow oxygenation HF	95	88.79	154	94.48	2.93	0.0881
non-invasive CPAP ventilation	96	89.72	151	92.64	0.70	0.4027
Coronarography	8	7.48	4	2.45	3.86	0.0504
Performed coronary angioplasty (stenting)	5	4.67	0	0.00	7.93	0.0052
Evacuation of intracerebral hematoma	1	0.93	0	0.00	1.53	0.2177
Decompression trepanation	0	0.00	0	0.00	-	-
Hemodialysis	2	1.87	0	0.00	3.08	0.0803
Median drainage	0	0.00	0	0.00	-	-
Laparotomy	1	0.93	1	0.61	0.09	0.7645
Limb amputation	0	0.00	0	0.00	-	-
Conducted hemotransfusion	25	23.36	11	6.75	16.25	0.0001
Cholecystectomy	0	0.00	1	0.61	0.66	0.4188
Bowel resection	1	0.93	0	0.00	1.53	0.2177
Tracheostomy	10	9.35	3	1.84	8.12	0.0047
Bronchoscopy	43	40.19	10	6.13	57.18	<0.0001
Esophagogastroduodenoscopy - ligation/application	6	5.61	2	1.23	4.35	0.0380
Hernia surgery/plasty	1	0.93	0	0.00	1.53	0.2177

Laboratory characteristics	Mortality (0), Survival (1)	N	Mean	Std. Deviation	t	p
HB(g/l) (120.0 - 155.0)	0	107	106.67	24.03	-5.26	<0.0001
	1	162	120.34	18.43		
RBC (10^{12}/L) (3.80- 5.40)	0	107	3.59	0.85	-4.48	<0.0001
	1	162	4.00	0.63		
HCT (%) (36.0 - 45.0)	0	107	31.66	7.37	-4.06	0.0001
	1	162	34.95	5.86		
PLT (10^3 µl) (150 – 380)	0	107	174.03	89.00	-6.40	<0.0001
	1	162	258.84	116.37		
WBC (10^9/L) (4.0-11.00)	0	107	13.83	9.01	6.20	<0.0001
	1	162	8.88	3.81		
Myelocytes (%)0	0	107	0.75	1.49	2.17	0.0306
	1	162	0.41	1.11		
Metamyelocyte (%)0	0	107	0.46	1.15	3.21	0.0015
	1	159	0.11	0.58		
Bands NEU (%) (0.10 - 4.00)	0	100	14.03	9.31	7.47	<0.0001
	1	115	6.82	4.21		
NEU (%) (50.00 - 70.00)	0	100	73.91	14.53	0.61	0.5426
	1	115	72.83	10.89		
EOS (%) (1.00 - 5.00)	0	32	1.32	1.06	0.56	0.5788
	1	75	1.20	0.88		
BASO (%) (≤ 1.00)	0	9	0.85	1.61	1.63	0.1106
	1	30	0.36	0.28		
LYMPH (%) (20.0 - 45.0)	0	93	5.76	6.60	-6.57	<0.0001
	1	133	13.81	10.45		
MONO (%) (2.0 - 12.0)	0	93	3.63	2.60	-3.67	0.0003
	1	132	5.04	3.12		
E.S.R. (mm/h) (≤ 27)	0	104	55.71	34.29	4.30	<0.0001
	1	159	37.87	30.70		
PT (9.2 - 15.0)	0	107	16.44	5.35	7.14	<0.0001
	1	162	13.18	1.87		
PI (%) 70.00 - 120.00	0	107	75.90	16.40	-7.41	<0.0001
	1	162	88.46	11.41		
APTT (mn) (24.0 - 40.0)	0	105	34.38	16.53	3.92	0.0001
	1	158	27.98	9.96		
FIB (g/l) 2.0 - 4.0	0	105	305.36	82.53	3.56	0.0005
	1	162	265.48	99.35		
INR (**0.8 – 1.2**)	0	107	1.42	0.49	5.53	<0.0001
	1	162	1.16	0.26		
TT (mn) (11.00 - 21.00)	0	103	35.71	16.97	2.19	0.0294
	1	158	31.02	16.82		
Urea(mmol/l) (2.80-7.20)	0	105	13.34	10.21	8.09	<0.0001
	1	162	6.44	3.01		
Creatinin (µmol/L) (45.00 - 84.00)	0	107	162.84	137.97	7.60	<0.0001
	1	162	74.40	44.12		
Glicemia (4.0-6.4) (mmol/l)	0	107	160.55	53.83	3.16	0.0018
	1	162	143.39	35.42		
Total bilirubin (umol/l) (2.90- 19.00)	0	107	14.01	12.03	1.61	0.1086
	1	161	12.09	7.50		
Direct bilirubin (umol/l) (≤ 5.13)	0	107	6.29	8.38	2.12	0.0351
	1	161	4.80	2.60		
Indirect bilirubin (umol/l) (≤4.7)	0	106	9.50	17.62	1.73	0.0856
	1	161	6.94	5.41		

ALT (U/L) (≤ 34.00)	0	107	34.60	25.65	-2.89	0.0043
	1	161	43.61	24.04		
AST (U/L) (≤ 31.0)	0	107	48.53	42.10	1.14	0.2553
	1	161	44.19	19.36		
GGT (U/L) (9 – 39)	0	107	78.21	65.25	0.27	0.7878
	1	160	76.15	54.99		
ALP (U/L) (30 – 120)	0	107	97.42	45.31	0.85	0.3957
	1	161	93.05	38.25		
CRP (mg/L) (< 5.0)	0	102	123.46	78.13	13.60	<0.0001
	1	129	22.68	27.98		
PCT (ng/ml) (< 0,50).16 – 0.5)	0	85	5.99	15.05	3.92	0.0001
	1	109	0.35	0.40		
D-dimer (mg/L) (0.100 - 0.500)	0	103	3694.58	5554.32	6.08	<0.0001
	1	162	941.24	1245.92		
LDH (U/L) ≤ 248	0	106	1044.99	682.72	8.88	<0.0001
	1	162	520.33	255.62		
Ferritin (ng/mL) (20-200)	0	101	676.67	692.77	5.34	<0.0001
	1	161	353.73	261.74		
Tropinin (<0.023) (ng/ml)	0	36	0.17	0.71	1.70	0.0918
	1	62	0.02	0.03		
Na (mmol/l) (136-145)	0	107	146.39	8.23	2.77	0.0060
	1	162	140.79	23.63		
K (mmol/l(3.4-4.5)	0	107	4.11	0.95	3.97	0.0001
	1	161	3.77	0.42		
Ca (mmol/l) (1.15-1.27)	0	107	0.88	0.20	-1.08	0.2801
	1	162	0.91	0.16		
CL (mmol/l) (98-107)	0	107	106.93	10.49	4.33	<0.0001
	1	162	100.83	12.50		
Lac(mmol/l) (1-1.3)	0	107	3.54	3.96	6.47	<0.0001
	1	162	1.45	0.87		
pH (7.35-7.45)	0	106	7.35	0.14	-4.41	<0.0001
	1	162	7.41	0.06		
pCO2 (mmHg) (35-48)	0	107	41.52	14.74	3.95	0.0001
	1	162	36.26	6.81		
pO2(mmHg) (83-108)	0	107	73.24	32.02	-3.34	0.0010
	1	162	86.08	28.92		
HCO3 (mmol/l)	0	106	26.84	26.44	0.56	0.5730
	1	162	25.63	5.32		
BEecF (mmol/l) (-2-3)	0	105	0.99	12.12	-1.66	0.0986
	1	159	2.82	5.52		
SO2 (%)	0	107	86.30	15.34	-4.65	<0.0001
	1	162	93.72	10.82		

WBC (White blood cell count), RBC (erythrocytes), Hb (haemoglobin), PLT (platelet count), *HCT* (hematocrit,) LYM% (lymphocyte percentage), NEU% (neutrophil percentage), PT (prothrombin time), PI (prothrombin index), *CRP (*C-reactive protein) PCT (procalcitonin), TT (Thrombin Time), APTT(activated partial thromboplastin time) LDH (Lactate Dehydrogenase), ALT(alanine aminotransferase), AST(aspartate aminotransferase), GGT(Gamma-glutamyl transpeptidase), pH (hydrogen potential), pCO_2 (partial dioxide the carbon pressure), pO_2 (partial oxygen pressure), BEecf (base excess in the extracellular fluid), HCO_3 (bicarbonate), SpO2 (blood oxygen saturation), Na (sodium), K (potassium), Ca ionic (calcium ionic), Cl (chlorides).

Table 7. *Prognostic features of survival during severe acute COVID-19.*

	B	**S.E.**	**Wald**	**p**	**OR**	**95% C.I. for OR**	
CRP	-0.02	0.01	8.43	0.0037	0.98	0.97	0.99
pO2	0.03	0.01	6.63	0.0100	1.03	1.01	1.06
Hydrothorax	-1.44	0.71	4.14	0.0418	0.24	0.06	0.95
Sepsis, Septic shock	-2.61	0.85	9.38	0.0022	0.07	0.01	0.39
WBC	-0.16	0.07	4.45	0.0348	0.86	0.74	0.99
Mechanical lung ventilation	-4.38	0.70	39.24	0.0000	0.01	0.00	0.05
Constant	3.47	1.34	6.72	0.0095	32.06		

In the lethality group, amounts of hemoglobin, thrombocytes (platelets), lymphocytes, monocytes, prothrombin index, pH, pO2 and SO2are credibly low if compared to those, who recovered. However, amounts of metamyelocytes, band (rod nuclear) neutrophils, ESR, partial thromboplastin time, fibrinogen, urea, creatinine, glycemia, CRP, PCT, D-dimer, LDH, Ferritin, Na, K, CL, Lac and pCo2 are credibly high.

At the next level of the research, we performed regressive analysis. As independent predictors, we took the data, the frequency (rates) of which is credibly different in groups of lethality and favorable outcome (Table 7).

It reduces the relative chance of survival: CRP, WBC, hydrothorax, Sepsis/Septic shock, Mechanical lung ventilation, and increase pO2.

Discussion.

Patients with diabetes and obesity have unfavorable prognosis during viral diseases. However, in coronavirus diseases, the data are controversial [4]. Excess weight, in general, was associated with the increased need for breath support. Correlation between excess weight and lethality in hospital was not statistically significant. Similar trends were found in patients with obesity. Besides associations with BMI, diabetes was independently associated with the increase in COVID-19 severity, but not with death. According to our research, in terms of diabetes, no credible difference was detected between survival and lethal groups, accordingly 34(31.78%) and 50(30.67%), p=0.8499. However, it is worth to note hyperglycemia, developed during the treatment which was credibly higher in the lethality group. Obesity incredibly prevails in the lethality group [5].

According to the literature, heart failure worsens the COVID-19 prognosis [6-8].

By our research, the rate of patients, with heart failure in anamnesis is credibly high in the lethality group.

In accordance with CARDIO COVID 19-20 registry data, among patients with heart failure, during COVID, rates of supraventricular arrhythmia, acute coronary syndrome and hospital lethality were credibly higher [9]. Our research detected incredibly high rates of suffered myocardial infarction, pulmonary hypertension, cardiac defect, and incredibly high rates of angina pectoris in the lethality group.

It is worth to note the development of thrombosis among patients, hospitalized with COVID-19, which was associated with higher mortality and hemorrhage [10,11]. According to our study, in the lethality group, coagulopathy, arterial embolism of lower or upper extremities were credibly higher. In both groups, the thromboembolism of the pulmonary artery was detected.

According to the research, performed in India, in the first year of COVID-19, in comparison with Pre-COVID-19 and Post-COVID-19 periods, patients had more hypertension, myocardial infarction (NSTEMI). Left ventricular ejection fraction (LVEF) and coronary artery disease of multiple vessels.

In the second COVID-19 year, the patients had more STEMI, low LVEF, CAD of multiple vessels, primary PCI, multiple stents and more vasopressor and mechanical support [12]. According to the research, performed in New York, PCI patients with COVID-19, who had acute respiratory distress syndrome, were at much higher risk of dying in short term than patients, who never had COVID-19 [13]. Among patients, under our monitoring, 13 myocardial infarctions occurred. Of these, 10 (9.35%) in the lethality group and 3 (1.84%) among survivors, p=0.0047. 12 Coronography investigations were performed – 8(7.48%) lethality and 4(4.25) in survivors' group. 5(4.67%) coronary angioplasty was performed in the lethality group [14].

The pneumothorax and hydrothorax in COVID-19 patients are considered as unfavorable prognostic features [10,11]. By our data, although hydrothorax was reported in both groups, in the lethality group, credibly high rate of hydrothorax was found. The regressive analysis showed that at hospital stage, hydrothorax is the prognostic factor of the lethality.

According to the literature, hospital lethality developed strongly negative associations with pO_2, pCO_2 and pH [15]. By our research, in the lethality group, pH, pO_2 and SO_2 are credibly less than in the survivors. Regression analysis showed that pO_2 is the prognostic factor of survival.

Patients with COVID-19 had a higher probability of dying if they were older or had elevated WBC, K, P, Urea, Cr, and LDH readings [16]. According to our researchIn the lethality group, compared to the recovered, the average value of Myelocytes, WBC, DBIL, Urea was reliably high and there are reliably fewer: hemoglobin, thrombocytes, HCT, lymphocytes, monocytes.

Those patients with reduced capacity to generate thrombin have poor prognosis [17], Prothrombin index are credibly lower than in the lethality group. The mean value of PT, APTT, TT, and the level of D-dimer and is significantly higher in the lethality group, although there had no prognostic value.

COVID-19 patients with septic shock complications had a much higher death rate than those without septic shock [18]. Patients with COVID-19, with hydrothorax may have severe inflammation and a poor prognosis [19]. According to this study, septic shock and hydrothorax are prognostic factors mortality, Therefore, inflammation markers - CRP and WBC are a prognostic factor. Artificial lung ventilation is an indicator of the severity of the disease.

Conclusion.

- Predictors of mortality in patients with chronic diseases: coagulation characteristics, inflammatory markers, sepsis and artificial lung ventilation
- Risk factors for covid-19 mortality need to be studied to increase pandemic preparedness.

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