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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.

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GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებშიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и http://www.nlm.nih.gov/bsd/uniform_requirements.html В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректур авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

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

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

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

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალებების შედეგების ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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SURGICAL TREATMENT OF COMPLICATED GASTRIC CANCER IN YOUNG AND MIDDLE-AGED PATIENTS

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Abstract.

Introduction: The high frequency of complicated forms of gastric cancer in young and middle-aged patients is associated with faster and more biologically aggressive tumor growth, as well as with a delay in diagnosis. The study aimed to evaluate the efficacy, safety, and technical feasibility of surgical interventions for complicated forms of gastric cancer in young and middle-aged patients.

Patients and Methods: We studied 98 patients with complicated forms of gastric cancer from IIB to stage IV according to the TNM8 classification with a predominant lesion of the antrum and body of the stomach. We performed open, laparoscopic, or robot-assisted surgeries of various scopes (R0 or R1), mostly gastrectomy and subtotal distal resection of the stomach. We compared the clinical manifestations of the disease, the time of surgery, intraoperative blood loss, postoperative complications, survival, and quality of life in 2 groups of patients divided by age: 19 young patients (mean age 39.4±4.4 years) and 79 middle-aged patients (mean age 53.9±5.8 years).

Results: Clinical manifestations of gastric cancer were more pronounced in young patients. The number of postoperative complications in patients of Group 2 was significantly higher (7.8% to 5.26%) compared to Group 1 ($p<0.05$). Rehabilitation in patients who underwent laparoscopic surgery was significantly ($p<0.05$) faster than with the traditional method. The overall survival of young patients with IIB-IV stages of gastric cancer was 0.8 months less, and among patients with III-IV stages it was 2.4 months less than in the group of middle-aged patients and did not depend on the surgery scope.

Conclusions: There were no statistically significant differences between the groups in terms of intraoperative blood loss, duration of surgery and hospital stay. Increased surgery duration of in middle-aged patients significantly correlated with the number of postoperative complications. Extended surgeries do not significantly increase the number of lethal, life-threatening complications. Combined surgeries in the R0 scope in patients with advanced gastric cancer (including with carcinomatosis) improved the quality of life of patients yet did not increase in overall survival, which determines the reasonable limits of surgical aggression.

Key words. Gastroenterology, surgery, stomach cancer, surgical treatment, young age.

Introduction.

Gastric cancer is the fifth most common and third leading cancer death worldwide, resulting in over 1,000,000 new cases

and 783,000 deaths in 2018 [1]. Most often, it occurs in the age group of 50-70 years. However, over the past 50 years, several studies reported on the clinical and pathological features of gastric cancer in young adults [2]. Women are more common among younger patients (for gastric cancer of all ages, the male to female ratio is 2:1). Diffuse and undifferentiated histological types are more often diagnosed in younger patients than in older people, in whom the intestinal type is more common. Moreover, in young people, the disease is usually detected at a later stage [3]. In 2019, based on an analysis of 84 stomach cancer registries in 34 countries, a forecast was made: the incidence of stomach cancer will decrease until 2035, but at the expense of older people. However, the incidence of people under 50 years of age will increase. The rate of decline in incidence differs in various countries, and mortality remains high [4].

Considerable evidence suggests the role of genetic factors in the pathogenesis of gastric cancer. Hereditary or familial gastric cancer and hereditary diffuse gastric cancer (HDGC) are common in patients younger than 40 years [2]. An almost universal finding in young patients is the high incidence of progressive lesions compared with older patients; this is often attributed to a delay in diagnosis [5]. It is believed that gastric cancer in young patients spreads faster and is biologically more aggressive and is often detected already concomitant with life-threatening complications [6]. In young patients, cancer of the cardio-esophageal junction is less common compared to cancer of the antrum, and obviously has a worse prognosis [2].

Purpose of the study. The work evaluated the effectiveness, safety, and technical feasibility of surgical interventions for complicated forms of gastric cancer in young and middle-aged patients.

Materials and Methods.

The study included 98 patients aged 28-59 with gastric cancer who were treated in the clinics of faculty surgery of I.M. Sechenov First Moscow State Medical University in 2011-2021. The patients were divided into 2 groups by age: young patients (Group 1, up to 45 years old) – 19 people (19.39%), and middle-aged patients (Group 2, 45-59 years old) – 79 people (80.61%), according to the current WHO classification (See Appendix: Tables 1, 2). The mean age was 51.12 years. The gender balance was as follows: 40 women (40.82%), 58 men (59.18%). The compared groups of young and middle-aged patients were homogeneous and did not differ significantly ($p=0.12$).

The physical status of patients before surgery according to the ASA (American Society of Anesthesiologists) classification in the young age group: II – 8 (42.11%) patients, III – 11 (57.89%)

Table 1. Comparison of the studied groups of young and middle-aged patients.

Gender	Group	
	Young patients (aged 18-44). N = 19 (Group 1) total (%)	Middle-aged patients (aged 45-59) N = 79 (Group 2) Total (%)
Female	11 (57.89%)	29 (36.71%)
Male	8 (42.11%)	50 (63.29%)
	p	
Fisher's exact test	0.12	
Affected part of the stomach	Group 1	Group 2
Antrum	4 (21.05%)	33 (41.77%)
Cardia	2 (10.53%)	7 (8.86%)
Subtotal lesion	3 (15.8%)	9 (11.39%)
Body of the stomach	10 (52.62%)	29 (36.71%)
Total lesion	0	1 (12.64%)
	χ^2	
Value	df	p
3.25	4.00	0.52
Stage	Group 1	Group 2
IIB	6 (31.58%)	14 (17.72%)
IIIA	3 (15.79%)	14 (17.72%)
IIIB	3 (15.79%)	18 (22.79%)
IIIC	1 (5.26%)	10 (12.66%)
IV	6 (31.58%)	23 (29.11%)
	χ^2	
Value	df	p
5.99	4.00	0.54
Histology of stomach cancer after surgery	Group 1	Group 2
Highly differentiated adenocarcinoma	0	6 (7.6%)
Ulcerated adenocarcinoma of solid cribriform structure	0	1 (1.27%)
Medullary cancer	0	1 (1.27%)
Undifferentiated cancer	1 (5.26%)	4 (5.06%)
Poorly differentiated adenocarcinoma	15 (78.95%)	43 (54.43%)
Signet ring cell carcinoma	1 (5.26%)	9 (11.39%)
Moderately differentiated adenocarcinoma	2 (10.53%)	15 (18.98%)
	χ^2	
Value	df	p
4.68	6.00	0.79
According to Lauren	Group 1	Group 2
Diffuse	16 (84.21%)	53 (67.09%)
Intestinal	1 (5.26%)	14 (17.72%)
Mixed	2 (10.53%)	12 (15.19%)
	χ^2	
Value	df	p
2.42	2.00	0.30
Surgery	Group 1	Group 2
Gastropancreatoduodenal resection	0	1 (1.27%)
Gastrectomy	9 (47.37%)	28 (35.44%)
Distal subtotal resection of the stomach	9 (47.37%)	47 (59.49%)
Proximal resection of the stomach	1 (5.26%)	2 (2.53%)
Resection of the stomach stump	0	1 (1.27%)
	χ^2	
Value	df	p
1.83	4.00	0.77
Surgery type	Group 1	Group 2
Laparoscopic	4 (21.05%)	19 (24.05%)

Open	13 (68.42%)	58 (73.42%)
Robot-assisted	2 (10.53%)	2 (2.53%)
χ^2		
Value	df	p
2.51	2.00	0.29
Billroth	Group 1	Group 2
Billroth 1	5 (26.32%)	31 (39.24%)
Billroth 2	4 (21.05%)	16 (20.25%)
No	10 (52.63%)	32 (40.51%)
χ^2		
Value	df	p
1.76	2.00	0.42
Stenotic gastric tumor	Group 1	Group 2
Yes	8 (42.11%)	23 (29.11%)
No	11 (57.89%)	56 (70.89%)
Fisher's exact test		
Fisher-exact P value	0.29	
Stenotic gastric tumor	Group 1	Group 2
No	11 (57.89%)	56 (70.89%)
Stenosis of the antrum	2 (10.53%)	14 (17.72%)
Stenosis of the cardia	2 (10.53%)	7 (8.86%)
Stenosis of the body of the stomach	4 (21.05%)	2 (2.53%)
χ^2		
Value	df	p
5.29	3.00	0.15
Lymphadenectomy	Group 1	Group 2
D1	0	1 (1.27%)
D2	15 (78.95%)	64 (81.01%)
D2.5	4 (21.05%)	14 (17.72%)
χ^2		
Value	df	p
0.34	2.00	0.84
Cytoreductive/none	Group 1	Group 2
Yes	6 (31.58%)	14 (17.72%)
No	13 (68.42%)	65 (82.28%)
Fisher's exact test		
Fisher-exact P value	0.21	
Tumor grows into the serosa	Group 1	Group 2
Yes	12 (63.16%)	43 (54.43%)
No	7 (36.84%)	36 (45.57%)
Fisher's exact test		
Fisher-exact P value	0.61	
Ingrowth	Group 1	Group 2
Yes	7 (36.84%)	31 (39.24%)
No	12 (63.16%)	48 (60.76%)
Fisher's exact test		
Fisher-exact P value	1.00	
Ingrowth (detailed)	Group 1	Group 2
Duodenum	0	3 (3.8%)
None	12 (63.16%)	48 (60.76%)
Big omentum	0	2 (2.53%)
Mesentery of the large intestine	0	4 (5.06%)
Diaphragm	0	2 (2.53%)
Small omentum	0	1 (1.27%)
Liver	1 (5.26%)	0
Esophagus	2 (10.53%)	4 (5.06%)
Pancreas	4 (21.05%)	15 (18.99%)

χ^2		
Value	df	p
7.84	9.00	0.55
Carcinomatosis: yes/no	Group 1	Group 2
Yes	3 (15.79%)	6 (7.59%)
No	16 (84.21%)	73 (92.41%)
Fisher's exact test		
Fisher-exact P value	0.37	
Metastatic organ damage	Group 1	Group 2
Yes	1 (5.26%)	14 (17.72%)
No	18 (94.74%)	65 (82.28%)
Fisher's exact test		
Fisher-exact P value	0.29	
Ascites	Group 1	Group 2
Yes	2 (10.53%)	7 (8.86%)
No	17 (89.47%)	72 (91.14%)
Fisher's exact test	1.00	
Anesthetic Risk ASA	Group 1	Group 2
IIA	3 (15.79%)	10 (12.66%)
IIB	4 (21.05%)	9 (11.39%)
IIIA	10 (52.63%)	39 (49.37%)
IIIB	2 (10.53%)	21 (26.58%)
χ^2		
Value	df	p
2.91	3.00	0.41

Table 2. Age distribution of the compared groups of young and middle-aged patients.

	Group	C3	Median	CO	Min	Max	Q1	Q3
Age	1	39.40	41.00	4.87	28.00	44.00	39.00	43.00
	2	53.90	55.00	4.26	45.00	59.00	50.00	58.00

patients. In the middle-aged group, the risks of ASA surgery were: II – 17 (21.52%) patients, III – 62 (78.48%) patients ($p = 0.41$). The risk of ASA III surgery included patients with comorbid pathology and oncological complications. There were no statistically significant differences when comparing both study groups in terms of physical status before surgery according to the ASA classification.

Before surgery, all the patients underwent diagnostic examinations: esophagogastroduodenoscopy (EGD) with biopsy, X-ray examination of the esophagus, stomach and duodenum using oral contrast, multi-layer spiral computer tomography (MSCT) of the chest, abdominal organs, and small pelvis with contrast. To resolve the issue of treatment tactics, all the patients were discussed at a multidisciplinary oncoconsilium.

Surgery scope was determined by the localization and size of the tumor, prevalence (involvement of neighboring organs), life-threatening complications of the oncological process, and age and general condition of the patient. Gastrectomy with resection of the abdominal and lower thoracic esophagus was performed for total and subtotal lesions and tumors of the upper third of the body of the stomach. Indications for subtotal distal resection of the stomach were tumors of the antrum and the lower third of the stomach body with no precancerous changes in the mucous membrane in its proximal part (such as polyps or severe dysplasia). Proximal resection was performed for cancer of the cardial part of the stomach, up to 4 cm in size and not grown into the serous cover.

Radical surgery R0 was the removal of the affected organ within healthy tissues along with areas of regional metastasis without residual manifestations of the tumor process. R1 surgery was the removal of the affected organ within healthy tissues along with areas of regional metastasis with the presence of a microscopically detectable residual tumor (at the resection margins). The final diagnosis was based on postoperative pathomorphological examination of the material. As part of combined treatment, patients began to receive adjuvant chemotherapy on average 4-6 weeks after surgery in the absence of severe complications and after normalization of clinical and laboratory parameters. A total of 70 patients (71.43%) received postoperative adjuvant chemotherapy.

Statistical analysis was performed using Jamovi v. 2.2.0; SPSS version 23.

The study was approved by the local ethical committee of Sechenov University, in accordance with the Declaration of Helsinki, Protocol No. 14-19 of 11/13/2019.

Results.

Clinical and morphological data in patients of both groups were analyzed. We assessed complaints of pain in the epigastric region, weight loss, weakness, nausea, vomiting, lack of appetite, and dysphagia. Notably, 4 patients had no complaints – 1 patient of Group 1 (5.26%) and 3 patients of Group 2 (3.8%) (Figure 1).

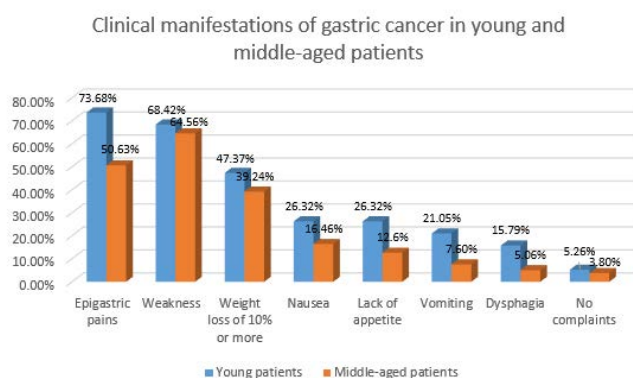


Figure 1. Clinical manifestations of gastric cancer in young and middle-aged patients.

Thus, the clinical manifestations of gastric cancer were more pronounced in young patients.

Tumor stenoses of the cardia of the stomach occurred in 2 (10.53%) young patients and 7 (8.86%) middle-aged patients, tumor stenoses of the stomach body in 2 (10.53%) and 2 (2.53%) patients, tumor stenoses of the antrum of the stomach in 2 (10.53%) and 14 (17.72%) patients, respectively ($p=0.15$) (Table 1).

The tumor invaded the serous membrane of the stomach in 12 (63.16%) patients from Group 1 and in 43 (54.43%) patients from Group 2. The tumor directly grew into the esophagus in 2 (10.53%) young patients and in 4 (5.06%) middle-aged patients, into the pancreas in 4 (21.05%) and 15 (18.99%) patients, respectively, into the liver in 1 (5.26%) young patient, into the lesser omentum in 1 (1.27%) middle-aged patient, into the diaphragm in 2 (2.53%) patients, into the mesentery of the colon in 4 (5.06%) patients and into the greater omentum in 2 (2.53%) patients of middle age ($p=0.55$) (Table 1).

All the 98 patients with gastric cancer underwent surgical interventions: gastrectomy – 9 (47.37%) young patients and 28 (35.44%) middle-aged patients, distal subtotal resection – 9 (47.37%) and 47 (59.49%) patients, proximal resection of the stomach – 1 (5.26%) and 2 (2.53%) patients, re-resection of the stomach stump – 0 and 1 (1.27%) patients, gastropancreatoduodenal resection – 0 and 1 (1.27%) patients, respectively ($p=0.77$).

Of the 98 surgeries, 13 (68.42%) and 58 (73.42%) were open, 4 (21.05%) and 19 (24.05%) were laparoscopic, 2 (10.53%) and 2 (2.53%) were robot-assisted, respectively ($p=0.29$) (Table 1).

Resection of the upper horizontal branch of the duodenum was performed on 17 (89.47%) and 77 (97.47%) patients, atypical peritumor resection of the liver on 2 (10.53%) and 6 (7.6%) patients, the lower thoracic and abdominal esophagus was resected in 5 (26.32%) and 24 (30.38%) patients, diaphragmatic crura were resected in 2 (10.53%) and 7 patients (8.86%), cholecystectomy was performed on 6 (31.58%) and 27 (34.18%) patients, the mesocolon was removed in the area of 6-10 cm in the immediate vicinity of the middle colic vessels due to direct ingrowth of the tumor conglomerate in 14 (73.68%) and 54 (68.35 %) patients, splenectomy was performed on 2 (10.53 %) and 8 (10.13 %) patients, resection of the transverse colon

on 1 (5.26 %) and 2 (2.53 %) patients, planar resection of the pancreatic capsule on 4 (21.05%) and 15 (18.99%) patients, adnexectomy on 1 (5.26%) and 2 (2.53%) patients, respectively. Hysterectomy was performed on 1 (1.27%) middle-aged patient, esophagectomy on 1 (1.27%) middle-aged patient ($p>0.05$). Thus, no statistically significant differences in the removed organs in young and middle-aged patients were found.

Intraoperative peritoneal carcinomatosis was detected in 3 (15.79%) young patients and in 6 (7.6%) middle-aged patients. ($p=0.37$). At the same time, 1 (5.26%) young patient and 2 (2.53%) middle-aged patients had a limited peritoneal lesion (peritoneal carcinomatosis index P1), 2 (10.53%) and 4 (5.06%) patients, respectively, had attritions separated by an unchanged peritoneum (peritoneal carcinomatosis index P2). Small ascites up to 200 ml in the abdominal cavity was detected in 2 (10.53%) and 7 (8.86%) patients, respectively ($p=1.00$) (Table 1).

Histologically, the tumors were represented by poorly differentiated adenocarcinoma in 15 (78.95%) patients from Group 1 and in 43 (54.43%) patients from Group 2, moderately differentiated adenocarcinoma in 2 (10.53%) and 15 (18.99%) patients, highly differentiated adenocarcinoma in 0 and 6 (7.6%) patients, undifferentiated adenocarcinoma in 1 (5.26%) and 4 (5.06%) patients, ulcerated solid-cirriiform adenocarcinoma in 0 and 1 (1.27 %) patients, medullary cancer in 0 and 1 (1.27%) patients, signet ring cell carcinoma in 1 (5.26%) and 9 (11.39%) patients, respectively ($p = 0.79$) (Table 1).

The distribution of young and middle-aged patients depending on the histological classification of gastric cancer according to Lauren (1965): intestinal subtype – 1 (5.26%) young patient and 14 (17.72%) middle-aged patients, diffuse subtype – 16 (84 .21%) and 53 (67.09%) patients, mixed subtype – 2 (10.53%) and 12 (15.19%) patients, respectively ($p=0.3$) (Table 1).

The malignant process stages were assessed according to the International TNM8 system (2017) in a cohort prospective and retrospective study. The results were as follows: 6 (31.58%) young patients and 14 (17.72%) middle-aged patients had Stage IIB, 3 (15.79%) and 14 (17.72%) had Stage IIIA, 3 (15.79%) and 18 (22.79%) had Stage IIIB, 1 (5.26%) and 10 (12.66%) patients had Stage IIIC, 6 (31.58%) and 23 (29.11%) has Stage IV, respectively. In 13 (68.42%) young patients and in 65 (82.28%) middle-aged patients, the disease was detected at stages III-IV (Table 1). Peritoneal washings were performed to decide on further adjuvant treatment options.

Of the study group, 13 (68.42%) young patients and 65 (82.28%) middle-aged patients underwent R0 surgery, 6 (31.58%) and 14 (17.72%) had R1cytoreductive surgery, 3 (15.79%) and 6 (7.6%) had peritoneal carcinomatosis, 4 (21.05%) and 15 (18, 99%) underwent planar resection of the pancreatic capsule; in 2 (2.53%) middle-aged patients the circular resection margin was doubtful due to the direct attachment of the tumor to the body of the pancreas.

The mean surgery time in young patients was 248.9 ± 77.06 minutes, and in middle-aged patients it was 255.8 ± 71.35 minutes ($p=0.64$) (Table 3).

Intraoperative blood loss in young patients averaged 471.1 ± 146.55 ml, in middle-aged patients 525.9 ± 200.78 ml ($p=0.32$) (Table 3).

Table 3. Distribution of young and middle-aged patients by intraoperative blood loss, duration of surgery, hospital stay.

	Group	C3	Median	CO	Min	Max	Q1	Q3
Intraoperative blood loss (ml)	1	471.10	500.00	146.55	200.00	700.00	400.00	500.00
	2	525.90	500.00	200.78	100.00	1000.00	400.00	600.00
Surgery duration (minutes)	1	248.90	250.00	77.06	140.00	435.00	190.00	290.00
	2	255.80	240.00	71.35	150.00	540.00	210.00	282.50
Hospital stay (bed days)	1	15.80	15.00	4.16	9.00	25.00	13.50	18.00
	2	17.50	16.00	6.00	8.00	35.00	14.00	20.00

Table 4. Postoperative complications in young and middle-aged patients according to Clavien-Dindo.

Postoperative complications	Degree of complication according to Clavien-Dindo	Group 1 ađc. (%)	Group 2 ađc. (%)
Gastrostasis	I	–	1 (1.27%)
Micro-leakage of esophagojejunostomy that does not require surgical treatment	II	–	2 (2.53%)
Pancreatitis	II	–	2 (2.53%)
Right lower lobe pneumonia	II	–	1 (1.27%)
Bleeding	IIIb	1 (5.26%)	1 (1.27%)
Lethality	V	–	1 (1.27%)
Total		1	8

Postoperative complications occurred in 1 patient of Group 1 (5.26%) and in 7 patients of Group 2 (8.86%). In 1 (1.27%) middle-aged patient, gastrostasis was detected on the 2nd day after surgery (I degree of complications according to Clavien-Dindo); he underwent conservative treatment with a positive effect – gastrostasis regressed. Bleeding occurred in 2 patients: in 1 young patient (5.26%) on the 1st day after surgery from the area of lymphadenectomy in the projection of the celiac trunk and from the area of lymph node dissection No. 12V (IIIb degree of complications according to Clavien-Dindo), and in 1 middle-aged patient (1.27%) on the 4th day after surgery from the area of atypical peritumoral resection of the left lobe of the liver (IIIb degree of complications according to Clavien-Dindo). In both cases, an emergency relaparotomy and revision of the abdominal organs was performed, and the intra-abdominal bleeding was stopped. Micro-leakage of esophagojejunostomy with the need for tube feeding for 10-14 days occurred in 2 middle-aged patients (2.53%) (II degree of complications according to Clavien-Dindo); postoperative pancreatitis manifested by hyperamylasemia occurred in 2 middle-aged patients (2.53%) (II degree of complications according to Clavien-Dindo); both received massive antibacterial and detoxification therapy with a positive effect. In 1 patient of Group 2, right-sided lower lobe pneumonia developed on the 4th day (1.27%) (II degree of complications according to Clavien-Dindo), a course of antibiotic therapy was performed with a positive effect (Table 4). Thus, in the postoperative period, complications occurred more often in patients from the middle age group.

Mortality in the postoperative period (in the hospital): 1 58-year-old female patient from Group 2 (1.27%) died in the hospital on the 14th day of the postoperative period due to developed pulmonary embolism (V degree of complications according to Clavien-Dindo). This patient with stage IV T4N2M1 gastric cancer underwent laparoscopic gastrectomy with resection of the abdominal esophagus and the formation of

Roux-en-Y hardware anastomosis, D2 lymphadenectomy, and transverse colectomy.

Analysis of such criteria as the prevalence of the tumor process, the number of removed organs, the volume of the operation performed, the stage of the disease, the pathomorphological examination of the postoperative drug, and gastric stenosis by the tumor revealed no statistically significant differences ($p > 0.05$) between groups of young and middle-aged patients (Table 1).

The inpatient treatment in young patients after laparoscopy was 13 ± 3 days, in middle-aged patients 15 ± 4 days; in case of traditional surgery, it was 16 ± 4 days and 18 ± 6 days, respectively; in case of robot-assisted surgery, it was 19 ± 6 days and 17 ± 4 days, respectively ($p > 0.05$). The transfer time from the intensive care unit to the surgical unit in young patients was 4 ± 1 days, in middle-aged patients 5 ± 1 days ($p > 0.05$). Young patients began to eat on day 4 ± 1 after surgery, middle-aged patients on day 5 ± 1 ($p > 0.05$).

The mean overall survival for IIB-IV stages in both groups was 28.6 months, for IIB-IV stages it was 18 months (Figure 2).

The average overall survival for young patients (IIB-IV stages) was 20 months, for middle-aged patients it was 31.2 months. The mean survival in the group of young patients was 10 months, for middle-aged patients it was 21 months ($p = 0.311$) (Figure 3).

The mean overall survival for IIB-IV stages patients (both age groups) who underwent R0 resection was 32.6 months, the survival median was 23 months. The mean overall survival for IIB-IV stages patients (both age groups) who underwent R1 resection was 24.6 months, the survival median was 18 months ($p = 0.447$) (Figure 4).

Discussion.

Gastric cancer is the fifth most commonly diagnosed malignant tumor, but its incidence is declining worldwide [7-11]. However, it is the third leading cause of cancer death in men and fifth in

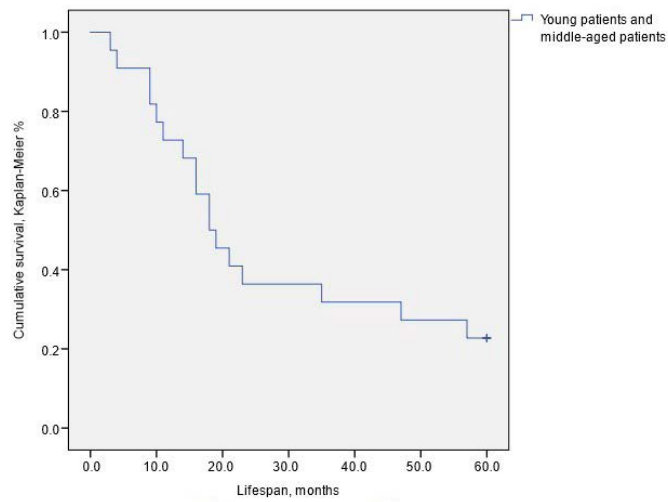


Figure 2. Kaplan-Meier curve for young and middle-aged patients (IIB-IV stages).

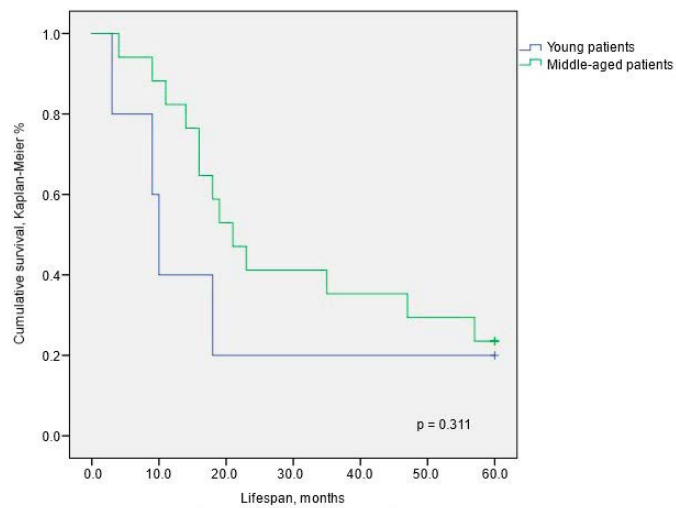


Figure 3. Kaplan-Meier curves for young and middle-aged patients (IIB-IV stages) ($p=0.311$).

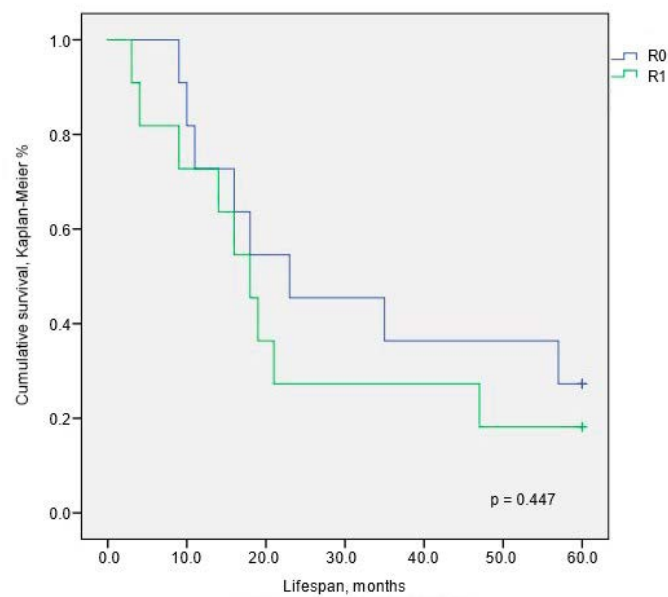


Figure 4. Kaplan-Meier curves for young and middle-aged patients (IIB-IV stages, R0 and R1 resection) ($p=0.447$).

women [7]. The incidence of gastric cancer in people younger than 50 years is increasing [4]. Patients from the middle age group were compared with the young age group, since the peak incidence occurs over the age of 50 [18].

Comparing groups of young and middle-aged patients by gender revealed that in the young age group, women predominated – 11 (57.89%), and in the group of middle-aged patients, men predominated – 50 (63.29%).

In the clinical picture in young and middle-aged patients, the most pronounced symptoms were pain syndrome (73.68% and 50.63%), weakness (68.42% and 64.56%), and weight loss by 10% or more (47.37% and 39.24%). The pain syndrome was masked as non-tumor diseases of the stomach; this made patients delay seeking medical attention and caused poor detection at an early stage of the disease.

In the group of young patients, the highest frequency of gastric lesions is in the body of the stomach – 10 patients (52.63%); and in the group of middle-aged patients is in the antrum – 33 patients (41.77%) and the body of the stomach – 29 patients (36.71%) ($p = 0.52$).

A total of 98 surgeries were performed on young and middle-aged patients. Stage III-IV stomach cancer was detected in 13 (68.42%) young patients and 65 (82.28%) middle-aged patients ($p = 0.54$), which confirms the data of other authors on the late detection of this disease in the studied groups of patients [12,13]. This group of patients underwent surgeries for health reasons (decompensated tumor stenoses of the stomach; recurrent bleeding from a stomach tumor).

Most often, patients from both study groups underwent gastrectomy (9 (47.37%) young patients and 28 (35.44%) middle-aged patients) and distal subtotal resection (9 (47.37%) and 47 (59.49%), respectively ($p = 0.77$)).

Moreover, traditional surgeries prevailed in both age groups: young patients – 13 (68.42%) and middle-aged patients – 58 (73.42%) ($p = 0.29$). This predominance over laparoscopy is associated with a locally advanced tumor process and the need for laparotomic access for more effective tumor removal [14].

When a comprehensive examination showed no data on the impossibility to resect the primary tumor and no absolute contraindications to surgical intervention, the question was raised of performing cytoreductive resection or gastrectomy as part of the combined treatment. Moreover, when performing cytoreductive surgeries, we took into account the possibility of stenosis of the stomach or duodenum, the age of patients and subsequent intra-abdominal chemotherapy. When distant metastases were detected in the abdominal cavity, we sought to remove them as completely as possible by expanding the intervention on the lymphatic drainage pathways, by resection of neighboring organs, and by excision of peritoneal disseminations.

Among young patients, 4 (21.05%) extended surgeries were performed, and 14 (17.72%) ($p=0.84$) among middle-aged patients; combined surgeries were performed in 6 (31.58%) and 25 (31.65%) patients, respectively ($p=0.55$) (Table 1).

Compared ratios of different histological types of tumors in young and middle-aged people reveal low-grade

adenocarcinoma (G3) was most common for both age groups: 15 (78.95%) and 43 (54.43%), respectively. The predominance of poorly differentiated adenocarcinoma in young and middle-aged individuals corresponds to the data obtained in previous studies [12,15,16]. However, a significant predominance in the incidence of moderately differentiated adenocarcinoma (G2) was found in middle-aged patients – 15 (18.98%) over the group of young patients – 2 (10.53%) ($p=0.79$). Diffuse histological subtype according to the Lauren classification (1965) prevailed in both studied groups of patients – 16 (84.21%) and 53 (67.09%) ($p = 0.3$), respectively.

Postoperative complications mainly occurred in the group of middle-aged patients. The study showed that 7 out of 8 (87.5%) middle-aged patients with postoperative complications had a locally advanced form of the disease ($p>0.05$), and a longer surgery time (273 minutes) in middle-aged patients was significantly correlated ($p<0.05$) with the development of postoperative complications.

The mean overall survival for patients of both age groups (IIB-IV) stages who underwent R0 resection was 32.6 months, the median survival was 23 months. The mean overall survival for patients of both age groups (IIB-IV stages) who underwent R1 resection was 24.6 months, the median survival was 18 months ($p=0.447$) (Figure 4), which is consistent with the data described in previous studies [16]. Studies show that surgery for locally advanced tumors does not increase patient mortality [9-11,17-19]; at the same time, surgery improves the quality of life of patients: the cause of pain, dysphagia and bleeding is eliminated, which contributes to a significant relief of the patient's condition.

Rehabilitation in young and middle-aged patients after laparoscopy was compared with rehabilitation after traditional and robot-assisted surgery. Hospitalization period, the period of transfer from the intensive care unit to the surgical department, and the beginning of independent food intake were not statistically significantly different in both ages ($p>0.05$).

Our studies demonstrate that the long-term results of surgical treatment of complicated forms of gastric cancer in young and middle-aged patients are comparable and depend on the stage of the disease, and R0 surgery does not increase life expectancy ($p>0.05$).

Conclusions.

The malignant process of the stomach in young people is highly aggressive; therefore, the diagnosis is made at the stage of locally advanced tumor growth or in case of generalization manifestations, often on the verge of developing life-threatening complications, which makes it necessary to perform cytoreductive surgeries.

Extended surgeries do not, as expected, increase the number of postoperative complications and mortality in young patients but effectively improve the quality of life of patients because they eliminate the cause of pain, dysphagia, and bleeding. All this creates additional opportunities for chemotherapy and radiation therapy in the postoperative period. R0 surgeries in the advanced form of the disease (including with elements of

carcinomatosis) does not significantly increase overall survival in all patients ($p>0.05$), which determines the reasonable limits of surgical aggression.

Conflict of interest statement.

The author declare that they have no conflict of interests.

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