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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 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 ბაზებში.

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 საყურადღებო!

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, შემავჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრაფიის ფოტოსურათები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების 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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Abstract.

Abstract: In the era of advanced technologies and improvement of each branch of medicine, thanks to advances in technology and clinical research, new preventive and therapeutic strategies have been developed for cardiovascular diseases. Speckle tracking study is no exception. The aim of the study: to assess the need for the introduction of speckle tracking echocardiography in conjunction with a routine method for the early diagnosis of any myocardial dysfunction, including the left atrium in females, in particular in the peripausal period.

Materials and methods: This study had a prospective design with an observation period of one year. The study involved 150 female patients, aged 47 to 53 years, with a known hormonal level, in accordance with the peripausal period. The study was conducted at the BMC of the Presidential Affairs Administration of the Republic of Kazakhstan, Department of Functional Diagnostics. All tests were performed using IBM SPSS Statistics 20 (IBM, USA) with a confidence level of 95%.

Results of the study: All 150 subjects underwent routine echocardiography, after which we divided them into two main groups: 90 women (60%) formed a cohort of individuals with existing left ventricle (LV) diastolic dysfunction, the remaining 60 women, or 40%, were individuals without existing LV diastolic dysfunction. Speckle tracking echocardiography was performed. During the study, in the cohort of individuals with left ventricle diastolic dysfunction (LVDD) according to the results of routine echocardiography, 85 patients out of 90 patients had basal segment systolic dysfunction. This amounted to 94.5% of patients. In the remaining 5 patients (5.5%), no regressive changes in systole were detected. In the second cohort of sixty women with no LVDD on routine echocardiography, only 50, or 83.4%, had normal systolic function on the basal section. The remaining 16.6% - 10 patients, without changes in diastolic function on routine echocardiography, showed systolic dysfunction and pre-diastolic pathology during the speckle tracking echocardiography (ST-ECHO) examination.

Conclusions: The routine echocardiography method in our study showed that it often cannot be a method for preventing the development of myocardial systolic dysfunction in individuals with existing diastolic dysfunction of the left ventricle myocardium. A direct relationship was found between the presence of LV systolic dysfunction of the basal layers on speckle tracking echocardiography examination in women even without pronounced LV diastolic dysfunction. Thus, left ventricle diastolic dysfunction accompanies left ventricle systolic dysfunction (LVSD) in almost 60% of cases. This means that it is mandatory and recommended to introduce ST-ECHO to the routine examination of echocardiography, as an informative method-predictor of further adverse cardiovascular events.

Key words. Speckle-tracking echocardiography, myocardial dysfunction, left atrium, peripause.

Introduction.

In the new era of digitalization and improvement of every branch of the medical branch, thanks to advances in technology and clinical research, new preventive and therapeutic strategies have been developed for cardiovascular diseases. In particular, researchers have focused on finding early indicators of myocardial damage to prevent the onset of overt adverse coronary events in the light of cardiac dysfunction [1,2].

Detailed observation of diastolic dysfunction has become increasingly important for the assessment of pathological conditions characterized by elevated left ventricular filling pressure without overt left ventricular dysfunction, especially in the early stages, such as heart failure with preserved ejection fraction, cardiomyopathies and many similar functional and organic pathologies. They are characterized by impaired relaxation properties of the left ventricle, leading to chronically elevated left ventricular filling pressures with subsequent left atrial dysfunction in the early stages and marked left atrial remodeling and dilation that occur in the late stages of the disease [3]. These features, combined with preserved left ventricular size and systolic function, make the diagnostic assessment of diastolic dysfunction in heart failure with preserved function unclear. This creates a complexity.

Assessment of diastolic function is recommended for every echocardiographic examination. It is known that international position papers have been issued in an attempt to standardize the assessment and classification of diastolic dysfunction. However, the algorithms include only traditional echocardiographic diastolic parameters and leave a "gray zone" of uncertain diastolic function [4].

Assessment of global left ventricular strain has shown its role in diagnostic and prognostic evaluation in cardiac pathologies. Recently, more attention has been paid to the analysis of left atrial strain. Left atrium (LA) speckle tracking echocardiography correlates with invasive measurements of left ventricular filling pressure and left atrial fibrosis compared with invasive measurements [5]. In the study by Potter et al., the use of speckle tracking echocardiography instead of left atrial volume provided reclassification of diastolic function with high feasibility (97%), which resulted in a 75% reduction in indeterminate diastolic function, and the degrees of diastolic dysfunction determined by left atrial strain were associated with incident heart failure [6]. Speckle tracking correlates with symptoms in patients with heart failure, independent of ejection fraction. Accordingly, these growing data have led to the inclusion of speckle tracking echocardiography as an additional parameter to the standard echocardiographic algorithm in the latest EACVI guidelines

for the assessment of diastolic function in preserved ejection fraction, and should therefore always be performed for careful classification of diastolic function, especially in equivocal cases, and to optimize therapeutic management.

Materials and Methods.

This study had a prospective design with a 12-month follow-up period. The study included 150 female patients, aged 47 to 53 years, with known hormonal levels, in accordance with the peripausal period. The study was conducted at the BMC of the Presidential Affairs Department of the Republic of Kazakhstan, Department of Functional Diagnostics.

According to the results of electrocardiography, all study participants had sinus rhythm, with a heart rate of 60-90 beats / min. Exclusion criteria were congenital and acquired heart defects, coronary heart disease, atrial fibrillation, heart failure with an ejection fraction of less than 50%, chronic kidney disease, liver and thyroid dysfunction.

Upon recruitment to the study, all participants underwent a thorough medical history, laboratory data, electrocardiography, echocardiography with tissue Doppler, and speckle tracking echocardiography. The level of hormonal status was determined by the level of estradiol and follicle-stimulating hormone (FSH), and the obstetric gynecological history was carefully studied.

The longitudinal deformation of the left ventricle was measured globally and regionally (basal, middle, apex) in all patients using speckle tracking echocardiography, and all patients underwent an assessment of the longitudinal deformation of the left atrium. The normal level of speckle tracking echocardiography of the left ventricle was defined as $\leq -18\%$, for the left atrium -35% . The study protocol was approved by the LEC of the NAO Medical University Astana (MUA) on 12/19/2019, Protocol No. 1. All subjects signed an informed consent before inclusion in the study.

Echocardiographic examination:

Full 2D and Doppler echocardiography was performed by 2 experienced physicians at rest (GE Vivid E9 with 1–5 MHz transducer) according to ASE recommendation. Left ventricular end-diastolic volume, left ventricular end-systolic volume, and ejection fraction were calculated from apical two- and four-chamber views based on the modified Simpson method. Diastolic parameters including mitral inflow velocity (E and A waves), mitral annular Doppler tissue velocity (septal and lateral e'), left atrial volume index (LAVI), and tricuspid regurgitation peak velocity were measured by averaging over three consecutive cardiac cycles to assess diastolic function. Isovolumic relaxation time (IVRT) and myocardial performance index (MPI) was also measured using tissue Doppler technique. Then, all patients underwent echocardiography with assessment of longitudinal myocardial deformation in 16 segments and determination of the type of blood circulation. Speckle tracking echocardiography of the left atrium with determination of reservoir, conduit and pump functions [7-9].

Statistical analysis:

The results of quantitative variables with normal distribution were expressed as mean \pm standard deviation, and numerical variables different from normal distribution were expressed

as median with interquartile range. Qualitative variables were presented as number and percentage. For comparison of numerical variables with and without normal distribution, the "Student's t-test" and "Mann-Whitney U-test" were used, respectively. In addition, the chi-square test was used to compare nominal variables.

All tests were performed using IBM SPSS Statistics 20 (IBM, USA) with a confidence level of 95%.

Limitations of the single-center design:

The study was conducted at the Clinical Hospital of the Presidential Administration of the Republic of Kazakhstan, which specializes in outpatient diagnostics. The study used an expert-class echocardiography device (VIVID-90) and was conducted by a senior functional diagnostics physician with over 20 years of experience. The study was conducted as part of a prospective analysis, selecting a specific cohort of patients: women aged 45-55 years in the perimenopausal period, with a follow-up duration of 1 year. All patients were informed about the upcoming studies and signed informed consent forms.

Results.

All 150 women in the period of peripause, over 45 years old took part in the study. The average age was 49 ± 1.5 years. There were no statistically significant differences between the study groups of women in age and the state of being in peripause ($p = 0.07$).

All 150 subjects underwent a routine echocardiographic study, after which we divided them into two main groups: 90 women (60%) made up a cohort of people with existing diastolic dysfunction of the LV, the remaining 60 women, or 40%, were people without existing diastolic dysfunction of the LV.

Table 1 shows the average parameters that we determined for absolutely each patient from the 2 groups.

The next step was an additional examination of each of the 150 patients, regardless of the group belonging to the LV diastolic function within the framework of speckle-tracking echocardiography. The parameters are given in Table 2.

During the study, in the cohort of individuals with the presence of LV diastolic dysfunction according to the results of routine echocardiography, out of 90 patients, 85 patients had systolic dysfunction of the basal segment. This amounted to 94.5% of patients. In the remaining 5 patients (5.5%), regressive changes in systole were not detected.

In the second cohort of sixty women without LV diastolic dysfunction on routine echocardiography, only 50, or 83.4%, had normal systolic function on the basal section. The remaining 16.6% - 10 patients, without changes in diastolic function on routine echocardiography, showed indicators of systolic dysfunction and pre-diastolic pathology when examined on ST-ECHO.

The area under the ROC curve of the correlation between the presence of LV diastolic dysfunction and the basal segment was 0.772 ± 0.068 (95% CI: 0.639–0.904, $p = 0.001$). The cutoff value of the basal segment at the cutoff point was -21.50 . When the basal segment was equal to or higher than the P value, a high risk of LV diastolic dysfunction was predicted. The sensitivity and specificity of the method were 87.5% and 65.4%,

Table 1. Shows the average parameters that we determined for absolutely each patient from the 2 groups.

Group statistics of ECHO					
	factor	N	mean	standard deviation	standard error of the mean
E/e	DDL V have	90	11.10	1.050	.111
	DDL V not	60	6.78	.666	.086
MMILV	DDL V have	90	101.00	6.106	.644
	DDL V not	60	83.75	5.488	.709
EPAP	DDL V have	90	31.54	1.664	.175
	DDL V not	60	25.70	1.522	.196
RVT	DDL V have	90	36.96	1.669	.176
	DDL V not	60	25.68	3.322	.429
EF	DDL V have	90	54.71	2.536	.267
	DDL V not	60	60.77	2.205	.285

Table 2. Values of SR. with ST-tracking echo.

Group statistics					
	factor	N	mean	Standard deviation	standard error of the mean
ST common	DDL V have	90	-16.89	.827	.087
	DDL V not	60	-20.07	1.572	.203
ST LA	DDL V have	90	-31.89	1.869	.197
	DDL V not	60	-35.60	.978	.126

Table 3. Difference in statistical values.

ECHO	Without DDLV	With DDLV	P
E/e	60	90	0,001
MMILV	60	90	0,002
EPAP	60	90	0,000
RVT	60	90	0,001
EF	60	90	0,000
ST-ECHO	SDLV	SDLV	P
ST common	10	85	0,0
ST LA	10	85	0,0

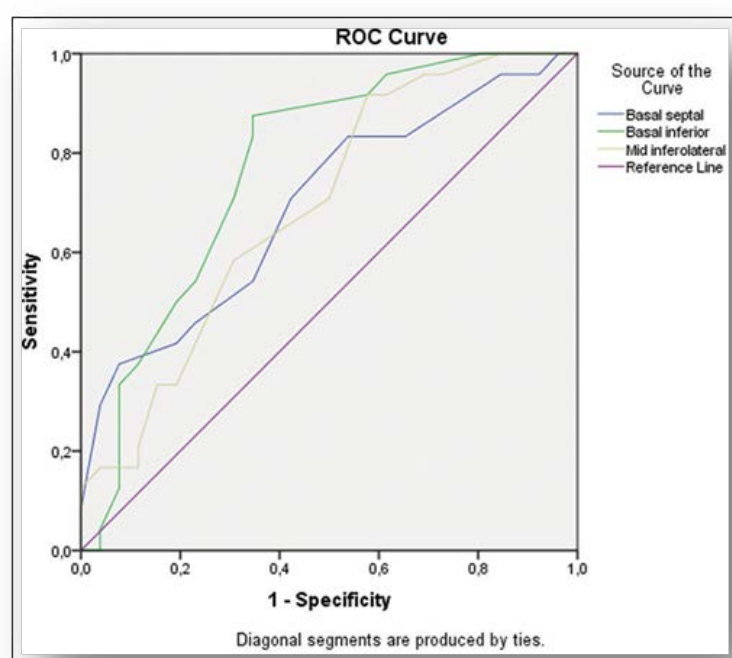


Figure 1. ROC curve of the relationship between left ventricular diastolic dysfunction and speckle-tracking echocardiography segments.

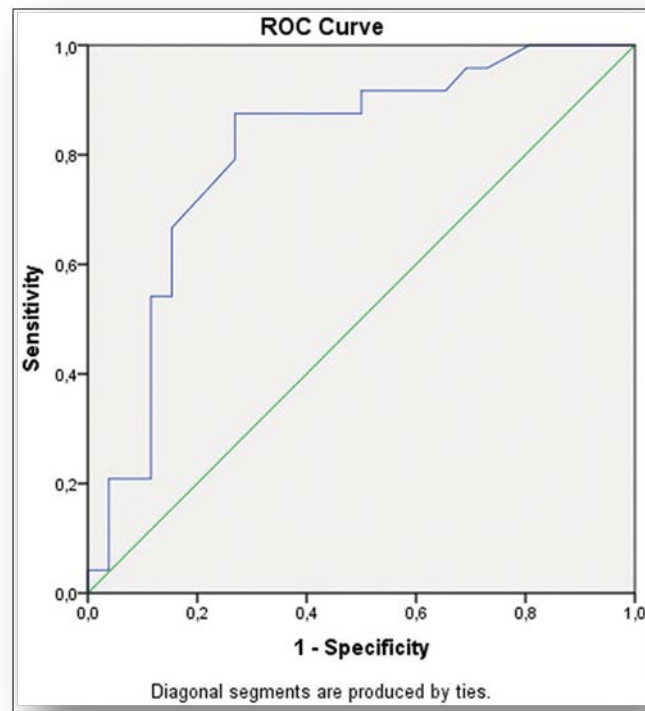


Figure 2. ROC curve of the model for predicting left ventricular diastolic dysfunction based on the result of logistic regression.

respectively. The area under the ROC curve of the correlation between the presence of LVDD and the basal segment was $AUC\ 0.692 \pm 0.074$ (95% CI: 0.547–0.838, $p = 0.020$).

According to Figure 1, the area under the ROC curve of the correlation between the presence of left ventricular diastolic dysfunction and the basal septal segment of the left ventricle was 0.696 ± 0.075 (95% CI: 0.549–0.842, $p = 0.018$).

The cutoff value of the basal septal segment at the cutoff point was -19.50. When the basal septal segment was equal to or greater than this value, a high risk of left ventricular diastolic dysfunction was predicted. The sensitivity and specificity of the method were 70.8% and 57.7%, respectively.

The area under the ROC curve of the correlation between the presence of left ventricular diastolic dysfunction and the lower basal segment was 0.772 ± 0.068 (95% CI: 0.639–0.904, $p = 0.001$).

The threshold value of the basal lower segment at the cutoff point was -21.50. When the basal lower segment was equal to or greater than this value, a high risk of left ventricular diastolic dysfunction was predicted. The sensitivity and specificity of the method were 87.5% and 65.4%, respectively.

The area under the ROC curve of the correlation between the presence of hypertension and the mid-lateral segment was $AUC\ 0.692 \pm 0.074$ (95% CI: 0.547–0.838, $p = 0.020$). The cutoff value of the mid-lateral segment at the cutoff point was -20.50. The sensitivity and specificity of the method were 70.8% and 50.0%, respectively.

ROC analysis was used to assess the quality of the resulting logistic regression model.

The area under the ROC curve was 0.806 ± 0.065 (95% CI: 0.679–0.933, $p < 0.001$), indicating a “very good” predictive quality of the model.

A binary logistic regression was constructed to determine the probability of patients belonging to the LVDD group by entering 2-basal septal, 4-basal inferior, and 11 mid-inferior lateral parameters into the analysis using the Wald stepwise selection method. As a result, one logistic regression equation was selected with a correct prediction rate of 80% with a sensitivity of 87.5% and a specificity of 73.1%. The classification threshold in the model (cutoff value) was defined as 0.43. In cases where $p < 0.43$ was taken into account after calculations, the patient was considered to have a higher risk of having LVDD than not.

Discussion.

According to the latest data from the World Health Organization, it is possible that cardiovascular pathology, functional in its own way, is one of the main links in the structure of the leading problems of the new era, as well as the adult generation [10–12]. The issue of the result of cardiac dysfunction is widespread globally, more often in a comorbid cohort of patients, due to chronic heart failure with different ejection fraction indices, according to the classification [10]. Particular attention and caution are drawn to patients with undifferentiated chronic heart failure, with a preserved ejection fraction. Along with the presence of a cardiovascular burden, new treatment approaches are needed. For the effectiveness of the latter, additional diagnostic methods are needed that provide a wider range of information. In the sources listed below, the authors indicate that one of these is speckle tracking echocardiography [14].

According to the scientific article on the role of speckle-tracking echocardiography in the diagnosis and treatment of cardiovascular diseases, E.G. Nesukai and A.A. Danilenko, Speckle-tracking echocardiography (SPECKLE-TRACKING) is a new technique for assessing myocardial function [13]. This

recently developed technique is quantitative and allows for an accurate assessment of myocardial function by analyzing the movement of speckles (radial spots) detected on conventional 2-dimensional sonograms. Speckle-tracking echocardiography is a non-invasive imaging method that objectively and quantitatively assesses global and local myocardial function, due to contractility. Global longitudinal deformation is the most clinically used parameter in speckle-tracking echocardiography, according to E.G. Akramova [11]. This technique is at the forefront due to the fact that the cardiologist is able to perform early diagnostics, allowing to identify and even prevent the presence of the slightest myocardial dysfunction before an obvious and unfavorable cardiovascular event occurs [15]. Routine sonography methods have a place in the diagnosis of existing clinical signs of pathology.

In the framework of this study, diastolic dysfunction of the left ventricle is considered as a model for assessing deformation, contractility and other functions of the heart muscle, including remodeling and hypertrophic processes of the left ventricle, and involvement of the atria in the process is not excluded. In recent studies (D.V. Vdovenko, R.A. Libis, V.E. Oleynikova, S.N. Kupriyanova, E.G. Akramova), the authors described in detail the longitudinal deformation of the myocardium by layers, putting forward the significance of even minimal deviations, paying attention to the levels of peak systolic deformation of the left ventricle and the rate of deformation at rest [11]. At the same time, routine echocardiographic parameters such as ejection fraction etc., remained unchanged in the routine cohort of patients examined, initially. Moreover, there are reports that speckle tracking echocardiography can act as a sensitive marker and predictor of advanced diagnostics of early LV myocardial dysfunction, at a multifaceted slice level. A prospective study by Asian scientists presents a detailed analysis of strain to identify various characteristics of circumferential and longitudinal strain in individuals with existing left ventricular diastolic dysfunction. Systolic dysfunction can be easily and accurately detected using speckle-tracking echocardiography [15].

Relevant data are still emerging today, due to the intensive use of speckle-tracking echocardiography in certain patient groups [10,12].

For future guidelines and research work, the question of supplementing the left atrium data and a complete study of right ventricular function is still open, focusing on the outcome of the feasibility of the picture.

Ultimately, speckle-tracking echocardiography has high sensitivity and specificity and can be used in general clinical practice as a simple and cost-effective indicator of the risk of subclinical, early pathology to prevent and reduce the number of adverse cardiovascular events [13].

Conclusion.

The routine echocardiography method in our study showed that it often cannot be a method for preventing the development of systolic myocardial dysfunction in individuals with existing diastolic dysfunction of the left ventricular myocardium. A direct relationship was found between the presence of systolic dysfunction of the LV basal layers on ST-echo examination in women even without pronounced diastolic dysfunction of the LV.

Thus, the use of speckle-tracking echocardiography as an additional version of routine echocardiography allows us to adequately assess whether there is a subclinical violation of the minimal structure in the prism of systolic function of the left ventricle and the structured state of the left atrium in patients [13]. The detection of changes in the physiological and biomechanical processes of the heart at the stage of still preserved ejection fraction was also prognostically important. Analysis of the overall assessment of the speckle-tracking study, in parallel with routine echocardiographic studies, namely the basal segments of the left ventricle, left atrium, can be a prognostically significant indicator for pre-diagnosis of the development of cardiovascular events in women in the peripapusal period (in our case, over 45 years old), regardless of the presence of LVDD. Thus, LVDD accompanies LVSD, almost in 60% of cases [10]. This means that it is mandatory and recommended to introduce ST-ECHO to the routine echocardiographic examination, as an informative predictor of further adverse cardiovascular events.

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None.

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Спекл-трекинг эхокардиография для раннего выявления субклинической систолической дисфункции у женщин в перименопаузе без явной диастолической дисфункции

Тезисная часть: В эпоху передовых технологий и усовершенствования каждой отрасли медицины, благодаря достижениям в области технологий и клинических исследований, были разработаны новые профилактические и терапевтические стратегии и для сердечно-сосудистых заболеваний. Спекл-трекинговое исследование тому не исключение.

Цель исследования: оценить необходимость внедрения спекл-трекинг эхокардиографии совместно с рутинным методом для ранней диагностики любых дисфункций миокарда, в том числе и левого предсердия у лиц женского пола, в частности в перименопаузальном периоде.

Материалы и методы: данное исследование имело проспективный дизайн с продолжительностью периода наблюдения в год. В исследовании участвовало 150 пациенток женского пола, в возрасте от 47 до 53 лет, с известным гормональным уровнем, в соответствии с перименопаузальным периодом. Исследование проводилось в БМЦ Управления Делами Президента РК, отделении функциональной диагностики. Все тесты проводились с использованием IBM SPSS Statistics 20 (IBM, США) с доверительной вероятностью 95%.

Результаты исследования: всем 150 исследуемым было воспроизведено рутинное эхокардиографическое исследование, после которого мы разделили их на две основные группы: 90 женщин (60%) составили когорту лиц с имеющейся диастолической дисфункцией левого желудочка (ЛЖ), оставшиеся 60 женщин, а это 40%, явились лицами без имеющейся диастолической дисфункции ЛЖ. Произвели спекл-трекинговую эхокардиографию (СТ-ЭХОКГ).

В ходе исследования у когорты лиц с наличием диастолической дисфункции левого желудочка (ДДЛЖ) по результатам рутинной эхокардиографии (ЭХОКГ), из 90 пациенток, у 85 пациенток имелась систолическая дисфункция базального сегмента. Это составило 94,5 % пациенток. У оставшихся 5 пациенток (5,5%) регрессивные изменения со стороны систолы выявлены не были. У второй когорты шестидесяти женщин с отсутствием ДДЛЖ на рутинном ЭХОКГ, лишь у 50, а это 83,4%, систолическая функция на базальном срезе нарушена не была. Оставшиеся 16,6 %- 10 пациенток, без изменений диастолики на ЭХОКГ рутинном, выдали показатели нарушения систолы и пред диастолической патологии при исследовании на СТ-ЭХОКГ.

Выводы: рутинный метод эхокардиографии в рамках нашего исследования показал, что он зачастую не может быть методом предотвращения развития систолической дисфункции миокарда у лиц, с уже имеющейся диастолической дисфункцией миокарда левого желудочка. Выявлена прямая связь наличия систолической дисфункции ЛЖ базальных слоев на СТ-ЭХОКГ обследовании у женщин даже не имеющих выраженную диастолическую дисфункцию ЛЖ. Таким образом, ДДЛЖ сопутствует систолической дисфункции левого желудочка (СДЛЖ), практически в 60% случаев. Это означает обязательным и рекомендованным внедрить СТ-ЭХОКГ к рутинному обследованию ЭХОКГ, как информативный метод-предиктор дальнейших неблагоприятных сердечно-сосудистых событий.

Ключевые слова: Спекл-трекинг эхокардиография (SPECKLE-TRACKING), дисфункция миокарда, левое предсердие, перименопауза.

Speckle-tracking ექოკარდიოგრაფია ადრეული გამოვლენის სუბკლინიკური სისტოლური დისფუნქცია perimenopausal ქალები გარეშე აშკარა დიასტოლური დისფუნქცია

რეზიუმე: მოწინავე ტექნოლოგიებისა და მედიცინის თითოეული დარგის გაუმჯობესების ეპოქაში, ტექნოლოგიებისა და კლინიკური კვლევების მიღწევების წყალობით, გულ-სისხლძარღვთა დაავადებების ახალი პროფილაქტიკური და თერაპიული სტრატეგიები შემუშავდა. ლაქების თვალთვალის კვლევა არ წარმოადგენს გამონაკლისს. კვლევის მიზანი: შეფასდეს ლაქების თვალთვალის ექოკარდიოგრაფიის დანერგვის აუცილებლობა რუტინულ მეთოდთან ერთად ნებისმიერი მოკარდიუმის დისფუნქციის ადრეული დიაგნოზისთვის, მათ შორის ქალებში მარცხენა წინაგულის, განსაკუთრებით პერიპესალურ პერიოდში. მასალები და მეთოდები: ამ კვლევას ჰქონდა პერსპექტიული დიზაინი ერთი წლის დაკვირვების პერიოდით. კვლევაში მონაწილეობდა 150 ქალი პაციენტი, 47-დან 53 წლამდე ასაკის, ცნობილი ჰორმონალური დონით, პერიპესალური პერიოდის შესაბამისად. კვლევა ჩატარდა ყაზახეთის რესპუბლიკის პრეზიდენტის საქმეთა ადმინისტრაციის BMC-ში, ფუნქციური დიაგნოსტიკის დეპარტამენტში. ყველა ტესტი ჩატარდა IBM SPSS Statistics 20-ის (IBM, აშშ) გამოყენებით 95%-იანი სანდოობის დონით. კვლევის შედეგები: ყველა 150 სუბიექტს ჩაუტარდა რუტინული ექოკარდიოგრაფია, რის შემდეგაც ისინი ორ ძირითად ჯგუფად დავყავით: 90 ქალი (60%) წარმოადგენდა მარცხენა პარკუჭის დიასტოლური დისფუნქციის მქონე პირთა კოჰორტას, დანარჩენი 60 ქალი, ანუ 40%, იყო ის პირი, რომელსაც არ ჰქონდა მარცხენა პარკუჭის დიასტოლური დისფუნქცია. ჩატარდა ლაქებიანი ექოკარდიოგრაფია. კვლევის დროს, მარცხენა პარკუჭის დიასტოლური დისფუნქციის მქონე პირთა კოჰორტაში, რუტინული ექოკარდიოგრაფიის შედეგების მიხედვით, 90 პაციენტიდან 85-ს ჰქონდა ბაზალური სეგმენტის

სისტოლური დისფუნქცია. ეს შეადგენდა პაციენტების 94.5%-ს. დარჩენილ 5 პაციენტში (5.5%) სისტოლაში რეგრესიული ცვლილებები არ დაფიქსირებულა. მეორე კოჰორტაში, რომელიც შედგებოდა სამოცი ქალისგან, რომლებსაც რუტინულ ექოკარდიოგრაფიაზე არ აღენიშნებოდათ მარცხენა პარკუჭის დიასტოლური დისფუნქცია, მხოლოდ 50-ს, ანუ 83.4%-ს, ჰქონდა ნორმალური სისტოლური ფუნქცია ბაზალურ ნაწილში. დარჩენილ 16.6%-ს - 10 პაციენტს, რომლებსაც რუტინულ ექოკარდიოგრაფიაზე დიასტოლური ფუნქციის ცვლილებები არ აღენიშნებოდათ, ST-ECHO გამოკვლევის დროს აღენიშნებოდათ სისტოლური დისფუნქცია და პრედიატოლური პათოლოგია. დასკვნები: ჩვენს კვლევაში რუტინულმა ექოკარდიოგრაფიულმა მეთოდმა აჩვენა, რომ ის ხშირად არ შეიძლება იყოს მოკარდიუმის სისტოლური დისფუნქციის განვითარების პრევენციის მეთოდი მარცხენა პარკუჭის დიასტოლური დისფუნქციის მქონე პირებში. აღმოჩნდა პირდაპირი კავშირი ბაზალური ფენების მარცხენა პარკუჭის სისტოლური დისფუნქციის არსებობას შორის ST-ECHO გამოკვლევაზე ქალებში, მაშინაც კი, როდესაც მათ არ აღენიშნებოდათ მარცხენა პარკუჭის გამოხატული დიასტოლური დისფუნქცია. ამრიგად, მარცხენა პარკუჭის დისფუნქცია (LVPDD) შემთხვევათა თითქმის 60%-ში თან ახლავს მარცხენა პარკუჭის დისფუნქციას (LVPDD). ეს ნიშნავს, რომ სავალდებულო და რეკომენდებულია ST-ECHO-ის დანერგვა ექოკარდიოგრაფიის რუტინულ გამოკვლევაში, როგორც ინფორმაციული მეთოდი - შემდგომი არასასურველი გულ-სისხლძარღვთა მოვლენების პროგნოზირებადი.

საკვანძო სიტყვები: SPECKLE-TRACKING, მოკარდიუმის დისფუნქცია, მარცხენა წინაგული, პერიპაპუსი.