

## CLINICAL FEATURES OF DIFFERENT PATHOGENETIC SUBTYPES OF ISCHEMIC STROKE IN WOMEN OF FERTILE AGE DEPENDING ON FACTORS AND BACKGROUND DISEASES



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### ФЕРТИЛ ЁШДАГИ АЁЛЛАРДА ИШЕМИК ИНСУЛТНИНГ ТУРЛИ ПАТОГЕНЕТИК СУБТИПЛАРИНИНГ КЛИНИК ХУСУСИЯТЛАРИНИНГ ОМИЛ ВА ФОН КАСАЛЛИКЛАРИГА БОҒЛИҚЛИГИ

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### КЛИНИЧЕСКИЕ ОСОБЕННОСТИ РАЗНЫХ ПАТОГЕНЕТИЧЕСКИХ ПОДТИПОВ ИШЕМИЧЕСКОГО ИНСУЛЬТА У ЖЕНЩИН ФЕРТИЛЬНОГО ВОЗРАСТА В ЗАВИСИМОСТИ ОТ ФАКТОРОВ И ФОНОВЫХ ЗАБОЛЕВАНИЙ

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**Резюме.** Тадқиқотнинг мақсади фертил ёшдаги аёлларда ишемик инсультнинг ўткир даврида миёдаги клиник ва морфологик ўзгаришларни ўрганиш. Тадқиқотлар Республика патологик марказининг танатология бўлимида ўтказилди. Биз томондан фертил (15 ёшдан 49 ёшгача) аёлларда ишемик инсульт билан касалланган 150 нафар аёл ўртасида ретроспектив таҳлил ўтказилди. Шикоятларни ўрганиш, касалликнинг ривожланиш тарихи, неврологик ҳолат, миёа артерияларининг лаборатория маълумотларини таҳлил қилишни ўз ичига олган клиник-анамнестик усул орқали беморларни текшириш. Тадқиқот натижалари. Фертил ёшдаги аёлларда фон касалликлари ишемик инсультнинг патогенетик вариантини аниқланиб, артериал гипертензия ва гемодинамик қон томирида асосий ва миёа артерияларининг аномалликлари, лакунар қон томирида артериал гипертензиянинг устунлигини аниқланди; аритмия, сурункали ревматизм, кардиоэмболия касаллиги, атеротромботик қон томирида атеросклероз билан биргаликда артериал гипертензия, Атеросклероз, вақтинчалик ишемик хужумлар, аёлларда сурункали ревматик юрак касаллиги, диабет ва аритмия иккинчи ўринда туради. Барча беморларда ишемиянинг ярим шар шаклида локализацияси устунлик қилди. АТИ билан оғриган беморларда кун давомида фокал неврологик симптомларнинг милтилловчи ривожланиши кузатилди. Хулоса: шундай қилиб, вертебробазилар АТИ ва кардиоэмболик инсультнинг устунлиги, аниқ ва доимий неврологик етишимовчилик ва ўлимнинг юқори фойзи билан тасдиқланди.

**Калит сўзлар:** бош миёанинг микротомлар тўқимаси, инсульт соҳалари, артериолалар ва прекапиллярлар, микрогематомалар.

**Abstract.** The aim of the study was to investigate clinical and morphologic changes of the brain in the acute period of ischemic stroke course in women of fertile age. Material and methods of the study. The research was carried out in the thanatology department of the Republican Pathology Center. We carried out a retrospective analysis among 150 patients with ischemic stroke in women of fertile age (from 15 to 49 years), female subjects. A clinical and anamnestic method was performed, which included the study of complaints, history of the disease, neurologic status, and analysis of laboratory cerebral artery data. The existence of such anomalies, in addition, sharply limited the possibilities of including the circumflex circulation after the development of ischemic stroke. Results of the study. In women of fertile age background diseases determined the pathogenetic variant of ischemic stroke. We revealed the prevalence of arterial hypertension and anomalies of the main and cerebral arteries in hemodynamic stroke, arterial hypertension in lacunar stroke, heart rhythm disturbances, chronic rheumatic heart disease, ischemic heart disease, in cardioembolic stroke, arterial hypertension combined with atherosclerosis in atherothrombotic stroke. There was a prevalence of atherosclerosis, CHD, transient ischemic attacks, chronic rheumatic heart disease in women, with diabetes mellitus and arrhythmia in the second place. Hemispheric localization of ischemia prevailed in all patients. In patients with ATI there was a flickering development of focal neurologic symptomatology within a day. Conclusions: Thus, the severity of vertebrobasilar ATI and CES was confirmed by the

**Introduction.** Stroke imposes special responsibilities on family members of the patient and is a heavy socio-economic burden on society. No more than 15% of the surviving patients return to work, and 20-25% of patients need outside help until the end of their lives [1]. A different situation is observed in the economically developed countries of Western Europe and the USA, Canada, and Japan. There is a steady trend towards a decrease in morbidity and mortality from cerebrovascular pathology mainly due to active stroke prevention carried out on a national scale and with financial support from the government, for example in Japan by 67%, and in the USA by 42% [9]. It seems extremely important that in Russia people die from cerebrovascular pathology at a younger age than in Western countries. Thus, in the USA, among all deaths from diseases of the circulatory system, less than 10% occur before the age of 65, while in Russia 30% of patients die at this age [2,5]. At the same time, the incidence of people of working age is increasing. The mortality rate for vascular diseases of the brain is one of the highest in the world. In the structure of the total mortality of the population, stroke ranks second, second only to cardiac pathology; The 30-day mortality rate is 35%, and approximately 50% of patients die during the year, i.e. every second. Disability after a stroke is 3.2 per 10,000 population, ranking first among all causes of primary disability[3,7].

Stroke imposes special responsibilities on family members of the patient and is a heavy socio-economic burden on society. No more than 15% of the surviving patients return to work, and 20-25% of patients need outside help until the end of their lives [4,8]. A different situation is observed in the economically developed countries of Western Europe and the USA, Canada, and Japan. There is a steady trend towards a decrease in morbidity and mortality from cerebrovascular pathology mainly due to active stroke prevention carried out on a national scale and with financial support from the government, for example in Japan by 67%, and in the USA by 42% [9].

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every second. Disability after a stroke is 3.2 per 10,000 population, ranking first among all causes of primary disability[11].

**The aim of the study:** clinical features of different pathogenetic subtypes of ischemic stroke in women of fertile age, depending on factors and background diseases

**Materials and methods of the study:** In the period from 2021-2024, a retrospective analysis was conducted in the thanatology department of the Republican Pathoanatomical Center among 150 patients with ischemic stroke in women of fertile age (from 15 to 49 years) 137 were women. The clinical and anamnestic method included the study of complaints, the history of the disease, neurological status, and analysis of laboratory data of cerebral arteries. The existence of such anomalies, in addition, sharply limited the possibility of turning on the circulatory system after the development of an ischemic stroke.

In women of fertile age, background diseases determine the pathogenetic variant of ischemic stroke. The predominance of arterial hypertension and abnormalities of the main and cerebral arteries in hemodynamic stroke, arterial hypertension in lacunar stroke (LKI); cardiac arrhythmias, chronic rheumatic heart disease, coronary heart disease (CHD) in cardioembolic stroke (CEI), arterial hypertension in combination with atherosclerosis in atherothrombotic stroke (ATI) was revealed. The prevalence of atherosclerosis, coronary heart disease, transient ischemic attacks, chronic rheumatic heart disease in men, and diabetes mellitus and cardiac arrhythmias in women was noted. Hemispheric localization of ischemia prevailed in all patients. Patients with ATI had a flickering development of focal neurological symptoms during the day. The severity of vertebrobasilar ATI and CEI was confirmed by the predominance of impaired consciousness and respiratory disorders, severe and persistent neurological deficits, and a high percentage of deaths. With LKI, neurological disorders are minimal. The pathogenetic subtype of AI was determined by the algorithm of rating testing of 8 clinical and paraclinical signs. Statistical data analysis was performed using Statistica 6.0 software packages (StatSoft, Inc., USA). At  $p < 0.05$ , the differences were considered statistically significant.

**Results and discussion:** Clinical manifestations of different subtypes of ischemic stroke in women of fertile age depend in a certain way on the nature of the background disease, its stage and course. Common to all strokes, they had a sudden onset against the background of long-term background diseases, and the development of all subtypes of ischemic stroke was preceded by decompensation of cerebral hemodynamics. Arterial hypertension

(AH) of stage II was observed in all subtypes of ischemic stroke with a predominance in hemodynamic stroke (HDI), lacunar stroke (LKI), atherothrombotic stroke (ATI), including in combination with atherosclerosis, and 64.3% of able-bodied patients did not receive adequate therapy before the development of ischemic stroke, and in 23.7% cases of hypertension were detected for the first time. In 43.9% of patients, the duration of hypertension was 5-7 years, in 9.3% it had a crisis course. Atherosclerosis in patients of working age was more common among patients with ATI and less common in LKI, GDI and CEI. In 65.4% of patients with AI, hereditary burden of cardiovascular pathology was revealed. Cardiac arrhythmia was observed in 61.5% of patients with cardioembolic stroke (CEI) and in 4.8% of patients with GDI. At the same time, only 54.7% of patients systematically took antiarrhythmic drugs and only 7.5% took antiplatelet agents. It was noted that with persistent and permanent forms of atrial fibrillation (AF), the risk of developing transient ischemic attacks (TIA) increases significantly ( $p < 0.05$ ). Coronary heart disease (CHD) was more often recorded in aTi and CEI, forming a favorable background for subsequent vascular catastrophes. Due to the increase in angina attacks, 10.6% of patients with ATI and 12.9% with CEI were initially hospitalized in the cardiology department. 8.5% of patients with ATI and 11.5% with CEI had TIA immediately before the development of ischemic stroke. This, apparently, was due to a more pronounced systemic lesion of the vascular basin in atherosclerosis and its combination with hypertension in cardiac pathology, which could be both a consequence and a component of the pathological process. Chronic rheumatic heart disease (CRD) occurred in 15.4% of patients with CEI and 3.2% of patients with GDI. The activity of the rheumatic process was detected in 2 patients. In 2 cases, CEI developed after surgery - restenosis of the left atrioventricular orifice, in 2 - after prosthetics of the aortic valve, in 3 - after coronary artery bypass grafting on the background of warfarin therapy. In 4 patients, thromboembolism was noted against the background of myocardial infarction. According to the literature data, the number of known potential cardiac sources of embolism is constantly increasing and currently amounts to about 30 variants [5]. Among patients with GDI of working age, abnormalities of the structure of the main and cerebral arteries occurred in 30.6% of cases. Hypoplasia of the vessels of the vascular circle and insufficiency of anastomosis development between the terminal branches were of the greatest importance. In recent years, there has been a "rejuvenation" of stroke, which is associated with an increase in extreme factors and influences, a complication and acceleration of work processes, the rhythm of life in general, with psychoemotional overloads, physical inactivity. Despite the achievements of mod-

ern angioeducation, many problems of stroke have been insufficiently studied. The concept of risk factors and background diseases in the development of ischemic stroke (AI) is interesting and not fully disclosed, taking into account its heterogeneity in people of working age [4].

The analysis of the localization of the ischemic focus depending on the subtype of AI in patients did not reveal any regularity, with all subtypes of AI, hemispheric localization of the ischemic focus prevailed. The localization of AI in the vertebrobasilar basin ranged from 11.5 to 13%.

The clinical manifestations of different subtypes of AI were similar, characterized by the predominance of focal neurological symptoms over general cerebral ones. Neurological symptoms in each subtype of AI were determined by the localization of an ischemic focus corresponding to the vascular basin involved in the process. The general cerebral symptoms in the acute period were apparently caused by cerebral edema, hypertension syndrome, and dyshemodynamic disorders. In 76.9% of patients with ATI, there was a gradual, flickering development of focal neurological symptoms within 24 to 48 hours.

Among the analyzed clinical subtypes of AI in patients of working age, ATI and CEI were the most severe. The severity of vertebrobasilar ATI and CEI was confirmed by the predominance of impaired consciousness ( $p < 0.05$ ) and respiratory disorders ( $p < 0.05$ ) in this localization of the process. By the end of the first week, the cerebral symptoms had almost completely regressed ( $p < 0.05$ ) in GDI and LKI, remaining in 20-30% of patients with ATI and in 10-20% of patients with CEI with hemispheric and vertebrobasilar localization of the process, respectively.

With vertebrobasilar localization of the lesion, the maximum severity of focal neurological symptoms ( $p < 0.05$ ) with the least positive dynamics of symptoms by the end of the first week ( $p < 0.05$ ) was noted in ATI. By the end of the week, in ATI and CEI, alternating syndromes amounted to 23.3 and 20%; vestibulo-cerebellar syndromes - 73.3 and 40%, bulbar syndrome - 30 and 20%, pseudobulbar syndrome - 16.7 and 10%, hemiparesis - 6.7 and 10%, respectively. A milder course of stroke of this localization in patients of working age occurred with GDI and LKI. The dynamics of focal symptoms in different subtypes of hemispheric AI was similar to that in AI in the vertebrobasilar system. ATI was the most severe in terms of severity and absence of regression of neurological deficit. With LKI, neurological disorders were minimal.

By the end of the month, adverse outcomes with the presence of neurological deficits, lack of work and household adaptation were observed in 58.6% of patients of working age who underwent ATI and CEI, which to a certain extent was deter-

mined by the localization of the lesion, its size, the peculiarity of the formation of collateral blood supply, timely restoration of blood flow, maximally impaired in ATI and CEI. Fatal outcomes in the localization of the lesion in the vertebrobasilar basin were 20% in case of CEI and 20% in case of ATI, and in the carotid basin, regardless of the localization of the lesion, 5.9% in case of CEI and 11.8% in case of ATI. All this confirms the severity of localization of ATI and CEI in the vertebrobasilar basin ( $p < 0.05$ ), and ATI in the carotid basin ( $p < 0.05$ ).

**Conclusions:** Thus, in women of fertile age, background diseases determine the pathogenetic subtype of AI. The predominance of hypertension and abnormalities of the main and cerebral arteries in GDI, hypertension in LKI, cardiac arrhythmias, CRBS, coronary heart disease in CEI, hypertension in combination with atherosclerosis and diabetes mellitus in ATI was revealed. Neurological symptoms in each subtype of AI were determined by the localization of the lesion, and hemispheric localization of the ischemic focus prevailed. A registry should be created for women with risk factors and background diseases for targeted and timely prevention of ischemic stroke.

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#### **КЛИНИЧЕСКИЕ ОСОБЕННОСТИ РАЗНЫХ ПАТОГЕНЕТИЧЕСКИХ ПОДТИПОВ ИШЕМИЧЕСКОГО ИНСУЛЬТА У ЖЕНЩИН ФЕРТИЛЬНОГО ВОЗРАСТА В ЗАВИСИМОСТИ ОТ ФАКТОРОВ И ФОНОВЫХ ЗАБОЛЕВАНИЙ**

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**Резюме.** Целью исследования явилось изучить клинику – морфологические изменения головного мозга в остром периоде течения ишемического инсульта у женщин фертильного возраста. Материал и методы исследования. Исследования проводились в танатологическом отделе Республиканском патологоанатомическом центре. Нами проведен ретроспективный анализ среди 150 больных ишемического инсульта у женщин фертильного возраста (от 15 до 49 лет). Был проведен клиничко-anamnestический метод, который включал изучение жалоб, историю развития заболевания, неврологического статуса, анализ лабораторных данных мозговых артерий. Существование подобных аномалий, кроме того, резко ограничивало возможности включения окольного кровообращения после развития ишемического инсульта. Результаты исследования. У женщин фертильного возраста фоновые заболевания определяли патогенетический вариант ишемического инсульта. Нами было выявлено преобладание артериальной гипертензии и аномалии магистральных и мозговых артерий при гемодинамическом инсульте, артериальной гипертензии при лакунарном инсульте (ЛКИ); нарушения сердечного ритма, хронической ревматической болезни сердца, ишемической болезни сердца (ИБС) при кардиоэмболическом инсульте (КЭИ), артериальной гипертензии в сочетании с атеросклерозом при атеротромботическом инсульте (АТИ). Отмечено превалирование атеросклероза, ИБС, транзиторных ишемических атак, хронической ревматической болезни сердца у женщин, на втором месте сахарный диабет и аритмия. У всех пациентов преобладала полушарная локализация ишемии. У больных с АТИ имело место мерцающее развитие очаговой неврологической симптоматики в течение суток. Выводы: таким образом тяжесть вертебробазиллярных АТИ и КЭИ подтверждалась преобладанием нарушения сознания и дыхательных расстройств, выраженным и стойким неврологическим дефицитом, высоким процентом летальных исходов.

**Ключевые слова:** микрососуды ткани головного мозга, инсультные зоны, артериолы и прекапилляры, микрогематомы.