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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

ლინდა D-დიმერის დონის მომატება, ხოლო 125-ში (57,3%) - C-რეაქტიული ცილის მანვენების. გამო-
ჯანმრთელდა ყველა ორსული; 17 (7,8%) ესაჭიროე-
ბოდა მკურნალობა რენიმაციული და ინტენსიური
თერაპიის განყოფილების პირობებში. ორსულობა
ბოლომდე მიიყვანა 188 (86%), ვადაზე ადრე იმშო-
ბიარა 22 (9,9%) ქალმა; 8 (3,6%) ქალს განუვითარდა
აბორტული გამოსავალი. საკეისრო კვეთის სისშირემ
შეადგინა 65 (29,7%), OR=1.61 95% 0.85 3.06; P>0,05.

COVID-19-ის გავრცელებას ორსულებში ოდესის

რეგიონში აქვს პანდემიისათვის დამახასიათებელი
სურათი. ცხიმოვანი ცვლის დარღვევა ორსულებში
COVID-19-ით ავადობის სარწმუნო რისკ-ფაქტორია.
COVID-19 წარმოადგენს რისკის ფაქტორს ვადამდე-
ლი მშობიარობისა და ადრეულ ვადაზე ორსულობის
შეწყვეტისათვის (OR=4,23 95% CI 1.35 - 13.25; P<0,05).
ორსულებსა და პრენატალურ პაციენტებზე COVID-
19-ის გავლენის შესახებ სარწმუნო მონაცემების
მიღებისათვის აუცილებელია მულტიცენტრული
კვლევების გაგრძელება ამ მიმართულებით.

MODERN CLASSIFICATION OF POSTERIOR CIRCULATION STROKE: CLINICAL DECISION MAKING AND DIAGNOSIS (REVIEW)

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Posterior circulation strokes (PCS) account for approximately 20-25% of ischemic strokes [1-4]. These strokes are less represented in the scientific literature, are more difficult to diagnose, have a more severe clinical course and have higher mortality compared to anterior circulation strokes [5-12]. Terminological definitions and classification of PCS have been discussed and changed over the years. That is why we consider it necessary to focus the attention of physicians on the modern classification of PCS.

We aimed to provide a narrative review of the modern classification of posterior circulation stroke.

Material and methods. This article is the part of the research topic named "To determine the features of the course and consequences of stroke in patients of different age groups, taking into account genetic and infectious factors and comorbid pathology" for 2018-2021 with the state registration number - 0118U003695.

A comprehensive electronic literature search on Scopus, Web of Science, MEDLINE, ScieLo, PubMed, The Cochrane Library, EMBASE, Global Health, CyberLeninka, RINC databases, and databases of government scientific libraries of Ukraine, European Union, United Kingdom, and the USA for the period 1991–2021. It was performed to identify scientific publications that discussed the modern classification of PCS. The applicable articles are cited and referenced. No limit is placed on publication time or the language of the article. All relevant articles were identified and screened by two authors (MP and OF), and disagreements were resolved by consensus. The results are summarized narratively.

Results and discussion. PCS is classically defined as an infarction within the vertebrobasilar arterial system (VBS). The posterior circulation is supplied by the bilateral vertebral (VA) and basilar arteries (BA). VBS serves as a critical arterial supply to the cervical spinal cord brainstem, cerebellum, thalamus, and occipital lobes [13]. VAs arise from the right and left subclavian arteries and travel cranially through the transverse foramina of the cervical vertebrae [14].

First studied in the XIX century, PCS remains poorly understood compared to anterior stroke. Terminological definitions and classification of PCS have been discussed and changed over the years [15]. Neuroimaging techniques have revolutionized

an understanding of clinical aspects, causes, mechanisms, treatment programs, and consequences of PCS [16].

Anatomic Classification

According to the modern classification, PCS are divided into three intracranial anatomical areas [17, 18] (Fig. 1):

- *proximal* territory, covering the medulla oblongata and the posterior lower part of the cerebellum, which are supplied with blood by intracranial VA, the largest branch of the VA - posterior inferior cerebellar artery (PICA), and numerous branches of the paramedian arteries that branch from them;

- *middle* territory of the posterior circulation that includes the pons Varolii, the anterior-lower part of the cerebellum, which is supplied with blood by BA, one of the lateral branches of the BA - anterior inferior cerebellar artery (AICA), deep perforated, and paramedian arteries;

- *distal* territory of the posterior circulation covers the mid-brain, upper part of the cerebellum, thalamus, occipital lobe, and the area of the posterior temporal lobes of the cerebral hemispheres that are vascularized by the rostral part of the BA, its branches - superior cerebellar artery (SCA), AICA, deep perforated arteries, and posterior villous artery.

This classification takes into account the presence of vascular syndromes of the posterior circulation and brainstem in the case of damage only to the deep arteries, not superficial. In addition, this classification accounts for the previously mentioned features of the distribution of intra-stem branches of arteries, as well as arteries of the posterior circulation of the cerebellum and thalamic vascular areas.

According to the modern classification, strokes in the mentioned above *proximal*, *middle*, and *distal* areas are divided into *medial*, *lateral*, *dorsal*, *combinations of medial and lateral strokes*, and *classic thalamic stroke (anterior, paramedian, lower lateral, and posterior)* [13,19-24]. Clinical and neuroimaging allows accurately verifying the topography of the brainstem, cerebellar, thalamic stroke, and the corresponding arterial area involved in the pathological process in the case of PCS. Infarcts of certain parts of the brainstem, cerebellum, or thalamus are identified as isolated.

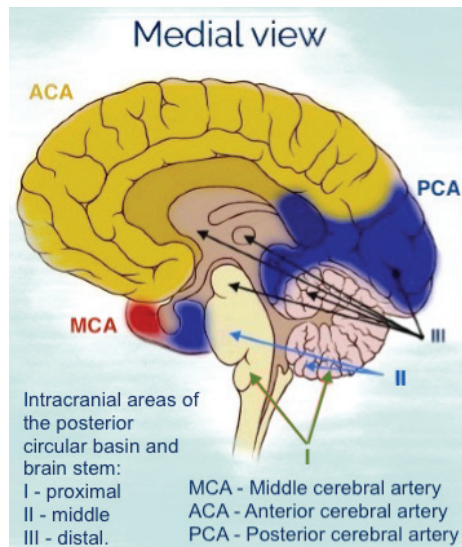


Fig. 1. Intracranial areas of the posterior circular basin and brain stem:

I - proximal area (medulla oblongata, posterior inferior part of the cerebellum); II - middle territory (pons Varolii, the anterior or lower part of the cerebellum); III - distal territory (midbrain, upper part of the cerebellum, thalamus, occipital lobe, and a part of the posterior temporal lobe of the brain)

Quite often, several anatomical structures of the posterior circular basin are affected. They are classified as multiple infarctions/strokes. These are also isolated infarctions that occur in at least two arteries iso- or bilaterally and are always small in size.

Combined or associated infarctions are ischemic lesions of various structures of the brainstem or brainstem and other areas of the blood supply by the VBS (thalamus, cerebellum, occipital, and temporal lobes of the brain); lesions of the cerebellum and other areas (medulla oblongata, pons Varolii, midbrain, thalamus, occipital lobes of the brain); thalamus and other areas (midbrain, occipital lobes) [25-28].

Etiologic Classification

According to etiological factors, according to the criteria of TOAST, all posterior circular infarctions are divided into lacunar and non-lacunar [13,29-33]:

- *lacunar infarctions* are formed due to damage to small paramedian arteries, as well as deep perforated arteries, caused by microangiopathies due to hypertension, often are associated with diabetes, in the absence of sources of cardioembolism and stenosis of the vertebral arteries (VA);

- *non-lacunar infarctions caused by cardioembolism* are formed due to the lesions of short and/or long enveloping branches of VA and BA in the presence of sources of cardioembolism and the absence of stenosis of the large VA;

- *non-lacunar infarcts caused by macroangiopathy* are formed due to occlusive lesions of large-diameter arteries (VA and BA) in the extra- or intracranial areas.

Given the data of the above classification, clinical and neuroimaging analysis can improve the diagnosis and description of specific symptoms, vascular syndromes, clinical forms of PCS of different localization, and reveals the essence of the PCS, in particular the presence of neurological symptoms and the mechanism of their occurrence. Stroke education programs should be provided to all PCS patients as a part of medical care to prevent recurrent cerebrovascular events, improve the length and quality of life [34-43].

Functional Outcome

Correct formulation of the clinical diagnosis in PCS patients is also critical for predicting the functional outcomes of stroke. The short-term and long-term functional outcomes after an infarction in different intracranial vascular territories of the posterior circulation basin had certain features of the evolution of functional and neurological recovery [13,44,45]. The defeat of even small arteries of the posterior circulation causes much more frequent disability of the patient after 3 months of observation compared with occlusion of small arteries of the internal carotid artery [46]. Particularly high risk of disability was observed in patients with occlusive processes of large in diameter (vertebral and basilar) arteries, which required much more active treatment and careful care of patients. Recent studies highlighted that cerebellar infarctions had a significantly better functional outcome compared to infarctions of the medulla oblongata in the short and long-term perspective when midbrain infarctions — on the 90th day of the prospective observation [47].

Samples of diagnoses in patients with PCS

Taking into account the modern classification of PCS, we would like to share samples of correct formulation of the clinical diagnosis in patients with PCS:

- Intracerebral hemorrhage into the right hemisphere and cerebellar vermis, lightni zourse of the disease complicated by blood breakthrough into the ventricular system, subarachnoid space, and dislocation of the brain stem.

- Lateral infarction of the medulla oblongata with the development of alternating Wallenberg syndrome, atherothrombotic subtype.

- Lacunar lateral infarction of the pons Varolii with the development of incomplete hemisensory syndrome (cheiro-pedoral) in a patient with hypertension and diabetes.

- Infarction of the lower lateral area of the thalamus with the development of Degerin-Russi syndrome, cardioembolic subtype.

- Infarction of the posterolateral area of the thalamus with the development of full hemisensory syndrome, atherothrombotic subtype.

- Paramedian infarction of the right thalamus, combined with infarction of the posterior temporal lobe of the brain, cardioembolic subtype.

- Myocardial infarction of the middle part of the pons Varolii on the right, combined with infarction of the left hemisphere of the cerebellum, atherothrombotic subtype.

Conclusions. Classification of PCS is extremely important in the compilation of statistics on causes of morbidity and mortality. It is crucial to know what kinds of PCS are prevalent in an area and how these prevalence rates vary with time.

We provided a comprehensive narrative review of the modern anatomical and etiological classification of PCS. Summarizing the results of this literature overview, we would like to address an essential question about the formation of a clinical diagnosis in patients with PCS and offer the following provisions:

1. In the case of PCS with medullar, pons, mesencephalon, cerebellum, or thalamic infarction, vascular area (proximal, middle, distal), a clinical variant of infarction, and anatomical-topographic analysis should be considered in the formation of the diagnosis. Also, it should be noted if the infarction is isolated or combined with other infarctions.

2. In the case of ischemic infarction in different parts of the brain stem or cerebellum, the wording of the diagnosis “ischemic stroke in the vessels of the vertebrobasilar arterial system” should not be used, as it only partially reveals the nature of

stroke, including the presence of clinical neurological symptoms and their mechanism. Therefore, such a definition cannot be considered methodologically correct.

3. The diagnosis of different parts of the brainstem is not recommended to replace with the diagnosis of “thrombosis” or “embolism” of a particular artery, because the intracranial vascular areas of adjacent areas of the brainstem overlap, forming a vascular association.

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SUMMARY

MODERN CLASSIFICATION OF POSTERIOR CIRCULATION STROKE: CLINICAL DECISION MAKING AND DIAGNOSIS (REVIEW)

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Posterior circulation strokes correspond to around 20–25% of all strokes. These strokes are challenging to diagnose because of the complexity of especially the structures, differences in presenting symptoms, clinical evaluation, diagnostic testing, and management strategy. Little is published about the modern classification of posterior circulation stroke.

We aimed to provide a narrative review of the modern classification of posterior circulation stroke.

A comprehensive electronic literature search was performed on Scopus, Web of Science, MEDLINE, ScieLo, PubMed, The Cochrane Library, EMBASE, Global Health, CyberLeninka, RINC databases, and databases of government scientific libraries of Ukraine, European Union, United Kingdom, and the USA for the period 1991–2021. It was done to identify scientific publications that discussed the modern classification of posterior circulation stroke.

A narrative review of the modern classification of posterior circulation stroke is presented and discussed. We provided a comprehensive narrative review of the classification of posterior circulation stroke.

Keywords: posterior stroke, classification, posterior circulation stroke, vertebrobasilar, review.

РЕЗЮМЕ

СОВРЕМЕННАЯ КЛАССИФИКАЦИЯ ВЕРТЕБРАЛЬНО-БАЗИЛЯРНЫХ ИНСУЛЬТОВ: ПРИНЯТИЕ КЛИНИЧЕСКОГО РЕШЕНИЯ И ПОСТАНОВКА ДИАГНОЗА (ОБЗОР)

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Инсульты вертебрально-базиллярного бассейна составляют около 20-25% от всех инсультов, являются более слож-

ными в диагностике, имеют худший прогноз и неблагоприятное течение.

Цель исследования - обзор научной медицинской литературы о современной классификации инсульта вертебрально-базиллярного бассейна.

Проведен комплексный электронный поиск ретроспективной и текущей литературы в базах данных Scopus, Web of Science, MEDLINE, ScieLo, PubMed, The Cochrane Library, EMBASE, Global Health, CyberLeninka, RINC, a

также в базах данных государственных научных библиотек Украины, Европейского Союза, Великобритании, США и других стран за период 1991–2021 гг. для выявления научных публикаций, в которых обсуждается современная классификация инсульта вертебрально-базиллярного бассейна.

Проанализирована научная медицинская литература о современной классификации инсульта вертебрально-базиллярного бассейна. Представлен аналитический обзор современной классификации инсульта вертебрально-базиллярного бассейна.

რეზიუმე

ვერტებრალურ-ბაზილარული ინსულტების თანამედროვე კლასიფიკაცია:
კლინიკური გადაწყვეტილების მიღება და დიაგნოზის დასმა (მიმოხილვა)

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¹ა. ბოგომოლცის სახ. ეროვნული სამედიცინო უნივერსიტეტი, კიევი;
²უკრაინის სამხედრო-სამედიცინო აკადემია, კიევი, უკრაინა

ვერტებრალურ-ბაზილარული აუზის ინსულტები შეადგენენ არსებული ინსულტების დაახლოებით 20-25%. დაავადების დიაგნოსტიკა გაცილებით რთულია, გააჩნია ცუდი პროგნოზი და მიმდინარეობა. ვერტებრალურ-ბაზილარული აუზის ინსულტების თანამედროვე კლასიფიკაციის შესახებ გამოქვეყნებული სამეცნიერო ნაშრომების ოდენობა საკმაოდ მწირია.

კვლევის მიზანს წარმოადგენდა ვერტებრალურ-ბაზილარული აუზის ინსულტების თანამედროვე კლასიფიკაციის შესახებ სამეცნიერო სამედიცინო ლიტერატურის მოძიება და ანალიტიკური მიმოხილვა.

განხორციელდა 1991-2021 წლების მდგომარეობით

სამეცნიერო პუბლიკაციათა მომცველი ელექტრონული ლიტერატურის მოძიება მონაცემთა ბაზაში Scopus, Web of Science, MEDLINE, ScieLo, PubMed, The Cochrane Library, EMBASE, Global Health, CyberLeninka, RINC, აგრეთვე უკრაინის, ევროკავშირის, დიდი ბრიტანეთის, აშშ და სხვა ქვეყნების სახელმწიფო სამეცნიერო ბიბლიოთეკებში, რომლებშიც განიხილება ვერტებრალურ-ბაზილარული აუზის ინსულტების თანამედროვე კლასიფიკაცია.

ჩატარებული ანალიზის შედეგად წარმოდგენილია ვერტებრალურ-ბაზილარული აუზის ინსულტების თანამედროვე კლასიფიკაციის დეტალური ანალიტიკური მიმოხილვა.

CIRCADIAN RHYTHM DISORDERS AND NON-MOTOR SYMPTOMS IN DIFFERENT MOTOR SUBTYPES OF PARKINSON'S DISEASE

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Parkinson's disease (PD) is neurodegenerative disease, usually characterized by tritium of motor symptoms: bradykinesia, rigidity and rest tremor. The symptoms of PD are accompanied by degenerative changes concerning the brain, spinal cord and peripheral nerves. In Parkinson's disease there is a depletion of dopaminergic neurons in the compact part of the substantia nigra (SN) and significant changes in the red nucleus, hippocampus and cortical structures [1].

There are different algorithms of determination of engine subtype of PD, depending on the prevailing symptoms of motor disorders. Thus, recently there is an increase in the frequency of development of akinetic-rigidity (AR) and mixed (ART) (akinetic-rigidity-tremor) subtypes [2]. At the same time, a systematic

review of neuroimaging changes in different motor subtypes of CP indicates the «benign» course of tremor-dominant (TD) form compared with other. In patients with non-tremor-dominant (AR & ART) subtypes of PD, there is a deficiency of striato-thalamocortical and other thalamocortical pathways, which leads to a connection with cognitive and sensorimotor disorders, and in the tremor-dominant subtype there is a greater dysfunction of the cerebellar-thalamo-cortical pathway. TD, unlike other motor subtypes, has no changes in the cortico-basal pathways [3].

Recent studies show that phenotype of the disease depends not only on the prevalence of certain motor signs, but also on the non-motor symptoms. Determination of different profiles of the PD allows to improve forecasting of the course and manage-