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## Clinical vascular syndromes of thalamic strokes in anterior and paramedian vascular territories: a prospective hospital-based cohort study

**Abstract. Background.** The article covers pathophysiological features and patterns of the occurrence of neurological, neuropsychological, and clinical vascular syndromes of thalamic strokes in anterior and paramedian vascular territories. The features of neurological clinical picture, topical, and neuroimaging diagnosis of thalamic strokes in anterior and paramedian vascular territories are analyzed and described. We purposed to describe and analyze the clinical and neuroimaging features of vascular syndromes of thalamic strokes in anterior and paramedian vascular territories in a prospective hospital-based cohort study. **Materials and methods.** We have prospectively recruited 319 acute stroke patients, admitted within 24 hours from the onset of the stroke symptoms to the Neurological Center at an academic hospital (Oleksandrivska Clinical Hospital) in Kyiv, Ukraine. Comprehensive neurological, clinical, laboratory, ultrasound, and neuroimaging examinations were performed to all patients. **Results.** MRI/CT-proven thalamic stroke was diagnosed in 34 (10.6 %) of 319 patients, forming a study group. Twenty-two of 34 patients (average age  $61.9 \pm 10.2$  years) were diagnosed with an acute isolated ischemic thalamic infarction, and 12 patients (average age  $59.0 \pm 9.6$  years) were diagnosed with an acute thalamic hemorrhage. **Conclusions.** Specific neurological features of clinical vascular syndromes of acute thalamic strokes in anterior and paramedian vascular territories were analyzed, compared, and described.

**Keywords:** thalamus; stroke; thalamic stroke; clinical features; syndrome; vascular territory; anterior vascular territory; paramedian vascular territory

### Background

Worldwide, stroke is the second leading global cause of death, accounting for 11.8 % of total deaths [1–17]. According to the World Health Organization, 15 million people suffer from stroke each year. Of these, 5 million die and another 5 million are permanently disabled [10, 18, 19]. In addition, more young people are affected by stroke in low- and middle-income countries. On average, stroke occurs 15 years earlier causes more deaths in people living in low- and middle-income countries, when compared to those in high-income countries [8, 20–22].

The thalamus plays an important role in different brain functions including memory, emotions, sleep-wake cycle, executive functions, mediating general cortical alerting responses, processing of sensory (including taste, somatosensory, visual, and auditory) information and relaying it to the cortex, and sensorimotor control [23]. Thalamic stroke, both alone and in combination with infarcts involving other structures, is not rare, accounting for approximately 11 to 23–25 % of cases of all posterior circulation strokes, especially in combination with damage to other structures [24, 25]. However, currently, there are not enough published prospective hospital-based co-

hort studies that report and analyze pathophysiological features and patterns of the occurrence of neurological, neuropsychological, and clinical vascular syndromes of the thalamic strokes in anterior and paramedian vascular territories, and their topical diagnosis using clinical, neurological, and neuroimaging methods in a prospective hospital-based cohort study [25–31].

Neurological and neuropsychological symptoms of thalamic strokes are invariably investigated by doctors during an objective examination of the patient, being an integral part of establishing a syndromological, topical, and clinical diagnosis. An analysis of the description of the clinical manifestations of thalamic vascular syndromes in a historical aspect, an assessment of the pathophysiology, features and patterns of the occurrence of certain stroke syndromes in different vascular territories are important for a better understanding of a disease. The determination of vascular thalamic syndrome allows solving two main issues: the presence of damage to a specific vascular territory and a topical diagnosis of the central nervous system damage (thalamic stroke) [30]. Given all this, we performed a comprehensive clinical and neuroimaging analysis of the treatment results and assessed the outcomes of the disease in 34 patients with thalamic stroke, among whom 22 patients had isolated thalamic infarction and 12 — hemorrhage in the thalamus.

**The purpose** of this study is to describe and analyze the clinical and neuroimaging features of vascular syndromes of thalamic strokes in anterior and paramedian vascular territories in a prospective hospital-based cohort study, providing a comprehensive clinical and neuroimaging analysis.

## Materials and methods

The materials and methods of this prospective hospital-based cohort study of acute ischemic stroke patients were reported previously [29–31]. Briefly, from 2001 to 2011 all study participants were admitted to the Neurological Center of Oleksandrivska Clinical Hospital (Kyiv, Ukraine) that consists of an admission department, clinical department of neurology, department of cerebrovascular pathology with intensive care/stroke unit, and a research department of neurology. Patients were admitted to the hospital within the first 24 h since the first stroke symptoms occurred. All stroke cases were reviewed by at least two board-certified neurologists trained in cerebrovascular diseases. Clinical history, 12-lead electrocardiogram, blood testing, carotid ultrasound, head computed tomography (CT) and/or brain magnetic resonance imaging (MRI) were obtained for all study participants. Stroke was defined according to criteria of the World Health Organization, American Heart Association/American Stroke Association guidelines for adult stroke, and was confirmed by neuroimaging [32, 33]. The etiology of stroke was classified according to the TOAST criteria [34]. The National Institutes of Health Stroke Scale, the Modified Rankin Scale, the Barthel index, and the Charlson Comorbidity Index were determined for all participants. Secondary stroke prevention

was prescribed according to the American Heart Association/American Stroke Association and the European Stroke Organisation guidelines immediately after the stroke diagnosis was made [35–41]. Stroke education programs were provided to all study participants [11, 16, 30, 42–45].

Parametric and non-parametric statistic methods were applied. The log-rank test was used for univariate comparisons of event-free survival between groups. A two-sided  $p < 0.05$  was considered significant for all analyses. All statistical analyses were performed using IBM SPSS Statistics Version 22.

## Results and discussion

In total, 319 adult patients with acute MRI/CT-proven stroke were screened. Among them, 204 (63.9 %) patients were diagnosed with an acute posterior circulation ischemic stroke, and 115 (36.1 %) individuals had an intracerebral hemorrhage. Thalamic stroke was diagnosed in 34 (10.6 %) of 319 patients, forming the study group. The distribution by stroke type in the study group was as follows:

— 22 patients (12 men, 10 women aged 50 to 84 years; average age  $61.9 \pm 10.2$  years) were diagnosed with an acute isolated thalamic stroke;

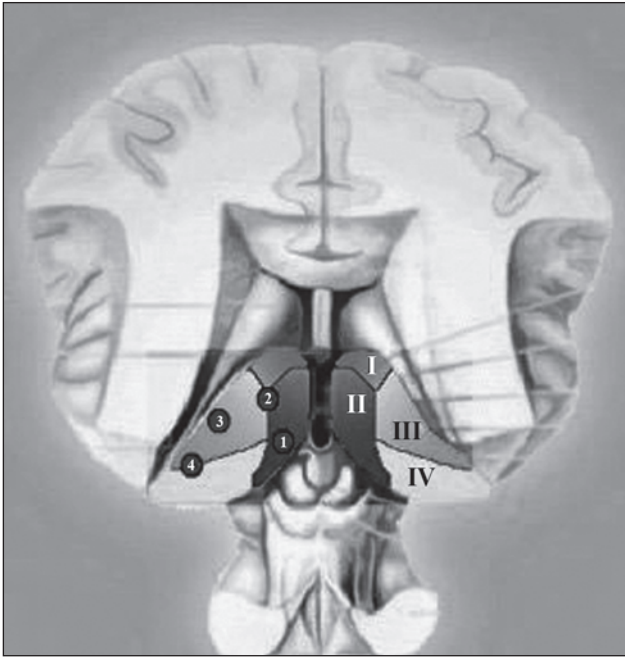
— 12 patients (5 men, 7 women aged 57 to 75 years; average age  $59.0 \pm 9.6$  years) had a proven diagnosis of thalamic hemorrhage.

Seven (31.8 %) of 22 patients with isolated thalamic stroke were diagnosed with lesions of small arteries, or *lacunar stroke* (focal diameter  $\leq 1.5$  cm), with the typical risk factors background (arterial hypertension, diabetes mellitus) and absence of stenosis of large arteries and a potential source of cardioembolism. Lacunar thalamic infarction was more often determined in the posterolateral adjacent zone (in 5 patients) and in the inferolateral classic vascular territories of the thalamus (in 2 patients).

*Non-lacunar stroke* with a diameter of foci lesion  $> 1.5$  cm was detected in 15 (68.2 %) patients. It arose as a result of occlusion of the thalamic arteries, branches of the posterior cerebral artery. Ischemic damage to the thalamus in 4 (18.2 %) patients was due to *cardioembolism* (hypokinesia after myocardial infarction in two cases, atrial fibrillation in one case, pathology of the heart valves in one case); 11 (50.8 %) individuals were diagnosed with *atherothrombotic* intracranial subtype of ischemic stroke. Non-lacunar thalamic infarcts were mainly localized in the classic thalamic territories (in 11 patients), less often — in the border vascular zones (in 4 people).

In 9 (40.9 %) of 22 patients with isolated thalamic stroke, the lesion was localized in the right thalamus, in 12 (54.5 %) — in the left thalamus, and in one (4.6 %) case, a bilateral lesion of the thalamus was detected. In 15 (68.2 %) patients, foci of lesion were found in the classic vascular thalamic territories (paramedian and lower lateral), in 7 (31.8 %) cases, foci of lesion were detected in the borderline vascular territories (central and posterolateral).

Thus, according to the thalamic stroke localization in the examined patients, four vascular and anatomical terri-



**Figure 1. Schematic representation of thalamic territories and localization of thalamic strokes. On the left, the classic thalamic territories are: I – anterior, II – paramedian, III – lower lateral, IV – posterior. On the right, the topographic structure of thalamic strokes in the examined patients is as follows: 1 – paramedian, 2 – central, 3 – posterolateral, 4 – inferolateral**

tories with specific clinical manifestations were identified (Fig. 1):

- paramedian;
- lower lateral;
- central;
- posterolateral.

### **Clinical vascular syndromes of thalamic strokes in anterior vascular territory**

Vascular lesions in the anterior territory of the thalamus with occlusion of the tuberothalamic artery cause severe neuropsychological disorders and behavioral syndromes, behavior change syndrome named *anomie* (from the French “anomic” – lawlessness, abnormality). The main manifestations of anomie syndrome are as follows: periodically onset excitement, explosions of inadequately strong emotions, illegal behavior. Disorder of the emotional sphere manifested itself in *dysthymia* (from the Greek – despondency, sadness) that consists of such symptoms as sensations of hopeless everyday life, pessimism, spleen, anxiety, loss of strength, suppressed sadness. Symptoms of dysthymia, although similar to the manifestations of depression, are not so pronounced.

It should be noted that the feeling of unpleasantness and the elements of negative emotions seem to be inseparable from each other with a stroke in the anterior territory of the thalamus. By their nature, they reflect a connection with subcortical dysfunction [46].

### **Clinical vascular syndromes of thalamic strokes in paramedian vascular territory**

#### **Unilateral stroke of the paramedian vascular territory**

Unilateral stroke of the paramedian vascular territory clinically manifested itself in *posteromedian thalamic syndrome*. The main symptoms of the syndrome were impaired consciousness, memory, vertical gaze palsy, pronounced neuropsychological disorders, and psychosensory disorders – hallucinosis. It is believed that the depression of consciousness is a result of damage to the posterior parts of the dorsomedial and intralaminar nuclei, as well as a violation of their relationship with the ascending reticular formation and the cerebral cortex [47]. The mechanism of the occurrence of hallucinosis is not fully established. Since the thalamus is an important link of the subcortical-cortical functional loop with feedback, a stroke of the paramedian thalamic territory can generate the excessive impulse to the cortex of the temporal lobe, which is involved in the perception and processing of visual information, which causes the development of hallucinosis [48]. The occurrence of selective impaired upward gaze confirms that paramedian thalamic infarction has a pathological effect on the supranuclear tracts responsible for vertical gaze control without damage to the rostral midbrain [49].

In our study group, paramedian vascular territory (in 6–27.3 % of patients) corresponded to the classic thalamic territory, and the development of a stroke was accompanied by damage to the posteromedian thalamus, including the nucleus of the medial longitudinal fasciculus, the posterior divisions of the dorsomedial and intralaminar nuclei: central, lateral, parafascicular. The development of the posteromedian thalamic syndrome was typical for a unilateral stroke of the paramedian vascular territory, it manifested as an acute depression of consciousness, cognitive impairment, and impaired upward gaze. Clinically, depression of consciousness was detected in all patients: stunning (in 2 patients) manifested itself in a restriction of activity and a slowdown of mental reactions; stupor (in 3 patients) was characterized by a deeper depression of consciousness; one patient with bilateral thalamic infarction was diagnosed with coma with a complete loss of perception of the world and herself. It is believed that the depression of consciousness is a consequence of damage to the posterior parts of the dorsomedial and intralaminar nuclei, as well as a violation of their connection with the ascending reticular formation and cerebral cortex [47].

In most cases, cognitive impairment manifested itself in a memory disorder: in one patient with left-sided lesion of the paramedian vascular territory of the thalamus, retrograde amnesia (loss of memory for events preceding a stroke) was revealed, and in two patients with right-sided damage, anterograde amnesia (loss of memory for events after a stroke) was determined. In one patient with left hemisphere lesion of the paramedian thalamus region, ideomotor and constructional apraxia were detected. In another case with a lesion of the right paramedian vascular territory of the thalamus, anosognosia and ignoring the left half of the space, impaired perceptions of reality in the form of hallucinosis were observed. With left-, right-sided lesions, speech disorders were noted. Vertical gaze palsy was detected in three patients with left-sided paramedian

lesion of the thalamus. A stroke of the paramedian vascular territory of the thalamus also manifested itself in behavioral syndromes — anomie and dysthymia.

### **Bilateral stroke of paramedian vascular territory**

More severe neurological dysfunction and symptoms occurred with a **bilateral stroke of paramedian vascular territory**. There is a **paramedian thalamic stroke syndrome** with akinetic mutism, amnesic disorders, which often occur when the dorsomedial nuclei of the thalamus is affected. In our observation, a patient with bilateral paramedian thalamic infarction one year after a stroke developed thalamic dementia, which occurs when the medial dorsal nuclei of the thalamus was damaged along with the mammillary bodies [29, 50]. Bilateral infarction of the paramedian territory occurs due to atheromatous or embolic occlusion of the common branch of the thalamo-subthalamic artery known as artery of Percheron.

Resuming, we would like to highlight that unilateral stroke of the paramedian vascular territory of the thalamus manifested itself in posteromedian syndrome (depression of consciousness, vertical gaze palsy, cognitive impairment); more severe symptoms are observed in case of a bilateral stroke (paramedian thalamic infarction syndrome). Moreover, the severe dysfunction of the emotional sphere, such as syndromes of anomie and dysthymia, are revealed in patients with stroke of the paramedian vascular territory of the thalamus.

## **Conclusions**

The knowledge of the vascular syndromes of the thalamus was and remains an extremely important component of the supervision of a patient with thalamic stroke, and is an integral part of establishing a topical and clinical diagnosis. It is necessary to continue to analyze clinical observations and the pathology of the nervous system in patients with isolated thalamic infarcts.

## **Author contributions**

*S.M. Vynychuk* — study concept and design, statistical analysis, interpretation of data, literature overview, critical revision of the manuscript for important intellectual content; *M.M. Prokopiv* — study concept and design, data acquisition, statistical analysis, interpretation of data, literature overview, critical revision of the manuscript for important intellectual content; *L.M. Trepet* — study design, data acquisition, statistical analysis, interpretation of data; *O.Ye. Fartushna* — study concept and design, literature overview, statistical analysis, interpretation of data, article concept and design, drafting the article, critical revision of the manuscript for important intellectual content.

**Conflicts of interests.** Authors declare the absence of any conflicts of interests and their own financial interest that might be construed to influence the results or interpretation of their manuscript.

## **References**

1. Benjamin E.J., Muntner P., Alonso A. [et al.]. On behalf of the American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. *Heart disease*

*and stroke statistics 2019 update: a report from the American Heart Association. Circulation. 2019. Vol. 139(10). P. e56–e528.*

2. Johnson W., Onuma O., Owolabi M., Sachdev S. *Stroke: a global response is needed. Bulletin of the World Health Organization. 2016. Vol. 94. P. 634–634A.*

3. Vynychuk S.M., Fartushna O.Ye. *Cerebrospinal and commissural diaschisis in acute stroke patients: case analysis. Meždunarodnyj nevrološkički žurnal. 2018. Vol. 5(99). P. 20–25.*

4. Fartushna O.Ye., Vynychuk S.M. *Brain injury in patients with acute TIA: clinical features in different TIA subtypes. Meždunarodnyj nevrološkički žurnal. 2017. Vol. 3(89). P. 13–18.*

5. Feigin V.L., Norrving B., Mensah G.A. *Global burden of stroke. Circulation Research. 2017. Vol. 120(3). P. 439–448.*

6. *Global Health Estimates. Geneva: World Health Organization; 2012. Режим доступу: [http://www.who.int/healthinfo/global\\_burden\\_disease/en/](http://www.who.int/healthinfo/global_burden_disease/en/).*

7. Lees R., McGrane F., Fartushna O., Broomfield N.M., Quinn T.J., Dani K., Forbes K., Dawson J. *Vascular cognitive impairment/vascular dementia. The pattern of cognitive impairment in stroke survivors with carotid stenosis. International Journal of Stroke. 2014. Vol. 9. P. 323–324.*

8. Owolabi M.O., Akarolo–Anthony S., Akinyemi R. [et al.]. *The burden of stroke in Africa: a glance at the present and a glimpse into the future. Cardiovasc. J. Afr. 2015. Vol. 26(2). Suppl. 1. P. S27–38.*

9. Wilkins E., Wilson L., Wickramasinghe K. [et al.]. *European cardiovascular disease statistics 2017. Brussels: European Heart Network, 2017. 188 p.*

10. *World Stroke Organization. Global Stroke Fact Sheet. 26.02.2019. Режим доступу: [https://www.world-stroke.org/images/WSO\\_Global\\_Stroke\\_Fact\\_Sheet\\_final.pdf](https://www.world-stroke.org/images/WSO_Global_Stroke_Fact_Sheet_final.pdf).*

11. Віничук С.М., Прокопів М.М. *Гострий ішемічний інсульт. Київ: Наукова думка, 2006. 286 с.*

12. Віничук С.М., Фартушина О.Є. *Рання реабілітація після гострих ішемічних порушень мозкового кровообігу. Міжнародний неврологічний журнал. 2016. № 8(86). С. 34–39.*

13. Евтушенко С.К., Филимонов Д.А., Евтушенко И.С. *Новые факторы риска развития инсульта у лиц молодого возраста. Журнал неврологии и психиатрии им. С.С. Корсакова. Спецвыпуск. 2015. Т. 115. № 12. С. 3–12.*

14. Фартушина О.Є., Прокопів М.М. *Актуальність проблеми цереброваскулярних захворювань, транзиторних ішемічних атак та вдосконалення їх діагностики в системі охорони здоров'я в Україні. Проблеми військової охорони праці: [Зб. наук. праць Української військово-медичної академії. За ред. проф. Білого В.Я.]. Київ: УВМА, 2007. Вип. 19. С. 335–342.*

15. Фартушина О.Є., Віничук С.М. *Виявлення та усунення васкулярних чинників ризику важливий напрямок первинної профілактики транзиторних ішемічних атак та/чи інсульту. Український медичний часопис. 2015. № 1(105). С. 23–27.*

16. Фартушина О.Є., Віничук С.М. *Транзиторні ішемічні атаки. Київ: ВД «Авіцена», 2014. 216 с.*

17. Feigin V.L., Nguyen G., Cercy K. [et al.]. *GBD 2016 Lifetime Risk of Stroke Collaborators. Global, regional, and country-specific lifetime risks of stroke, 1990 and 2016. N. Engl. J. Med. 2018. Vol. 379(25). P. 2429–2437.*

18. *Institute for Health Metrics and Evaluation (IHME). Findings from the Global Burden of Disease Study 2017. Seattle, W.A.: IHME, 2018.*

19. *World Stroke Organization. Facts and Figures about Stroke. Режим доступу: <http://www.world-stroke.org/compo>*

- nent/content/article/16-forpatients/84-facts-and-figures-about-stroke.
20. GBD 2016 Causes of Death Collaborators. Global, regional, and national age-sex specific mortality for 264 causes of death, 1980–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* (London, England). 2017. Vol. 390(10100). P. 1151–1210.
  21. Wang H., Naghavi M., Allen C. [et al.]. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2016. Vol. 388(10053). P. 1459–1544.
  22. Фартушина О.Є., Віничук С.М. Епідеміологія транзиторних ішемічних атак в структурі гострих порушень мозкового кровообігу в Україні та інших країнах. *Міжнародний неврологічний журнал*. 2017. № 5(91). С. 105–111.
  23. Chen X.Y., Wang Q., Wang X. et al. Clinical features of thalamic stroke. *Curr. Treat. Options Neurol*. 2017. Vol. 19(2). P. 5.
  24. Виничук С.М., Яльнская Т.А., Виничук И.С. Инфаркты в вертебробазиллярном бассейне: клиника и диагностика. *Международ. неврол. журн.* 2005. № 3. С. 13–21.
  25. Lopez-Serna R., González-Colrmona P., López-Martinez M.J. Bilateral thalamic stroke due to occlusion of the artery of Percheron in a patient with patent foramen ovale: a case report. *Med. Case Reports*. 2009. Vol. 3. P. 7392.
  26. Bogousslavsky J., Regli F., Uske A. Thalamic infarcts: clinical syndromes, etiology, and prognosis. *Neurology*. 1988. Vol. 38(6). P. 837–48.
  27. Cheng H., Tian Y., Hu P., Wang J., Wang K. Time-based prospective memory impairment in patients with thalamic stroke. *Behavioral Neuroscience*. 2010. Vol. 124(1). P. 152–158.
  28. Steinke W., Sacco R.L., Mohr J.P. [et al.]. Thalamic stroke. Presentation and prognosis of infarcts and hemorrhages. *Arch. Neurol*. 1992. Vol. 49. P. 703–710.
  29. Виничук С.М., Прокопів М.М., Тренет Л.Н. Изолированный инфаркт таламуса: клинические синдромы, диагностика, лечение и исход. *Український медичний часопис*. 2012. № 2. С. 87–93.
  30. Виничук С.М., Прокопів М.М., Тренет Л.Н. Таламические инсульты; *Нац. мед. ун-т ім. А.А. Богомольца, Александр. клинич. б-ца, г. Киев, Украина. Киев: Агат-Принт, 2018. 91 с.: ил. Библиогр.: с. 82–91.*
  31. Vynychuk S.M., Prokopiv M.M., Trepet L.M., Fartushna O.Y. Thalamic stroke outcomes: a prospective hospital-based cohort study. *Meždunarodnyj nevrološkičeskij žurnal*. 2019. № 8(110). P. 23–27.
  32. Kernan W.N., Ovbiagele B., Black H.R. [et al.]. Guidelines for the prevention of stroke in patients with stroke and transient ischemic attack: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2014. Vol. 45. P. 2160–2236.
  33. Aho K., Harmsen P., Hatano S. [et al.]. Cerebrovascular disease in the community: results of a WHO collaborative study. *Bull. World Health Organ*. 1980. Vol. 58. P. 113–130.
  34. Adams H.P., Bendixen B.H., Kappelle L.J. [et al.]. Classification of subtype of acute ischemic stroke. Definitions for use in a multicenter clinical trial. TOAST. Trial of Org 10172 in Acute Stroke Treatment. *Stroke*. 1993. Vol. 24. P. 35–41.
  35. Ringleb P., Schellinger P.D., Hacke W. [et al.]. [European Stroke Organisation 2008 guidelines for managing acute cerebral infarction or transient ischemic attack. Part 1]. *Der Nervenarzt*. 2008. Vol. 79. P. 936–957.
  36. Adams R., Albers G., Alberts M. [et al.]. Update to the AHA/ASA Recommendations for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack. *Stroke*. 2008. Vol. 39. P. 1647–1652.
  37. Fartushna O.Y. Emergency therapeutic approach as a secondary prevention of an acute ischemic stroke in patients with TIA. *XX World Neurological Congress, 12–17.11.2011. Marrakesh, Morocco, 2011. P. 167.*
  38. Fartushnaya E.E., Vinichuk S.M. Reducing the risk of recurrent ischemic stroke, after transient ischaemic attack along with neuroprotective and antiaggregant therapy. *XIV International Congress of Rehabilitation Medicine and Immunorehabilitation, 16–21.10. 2009: abstract. Tel-Aviv, Israel. 2009. P. 67.*
  39. Виничук С.М., Фартушина О.Є. Диференційоване лікування транзиторних ішемічних атак — ефективний спосіб профілактики повторних гострих церебральних подій. *Міжнародний неврологічний журнал*. 2014. № 6. С. 87–92.
  40. Виничук С.М., Фартушина О.Є. Аторвастатин та його роль у профілактиці та лікуванні ішемічних порушень мозкового кровообігу. *Здоров'я України*. 2015. № 9. С. 3.
  41. Фартушина О.Є., Віничук С.М. Використання оптимальної дози препарату Торвакард — важливий напрямок зниження ризику розвитку повторних транзиторних ішемічних атак та/чи інсульту. *Семейная медицина*. 2015. № 3. С. 223–227.
  42. Виничук С.М., Фартушина О.Є. Рання реабілітація після гострих ішемічних порушень мозкового кровообігу. *Міжнародний неврологічний журнал*. 2016. № 8(86). С. 34–39.
  43. Виничук С.М., Фартушина О.Є. Освітні програми профілактики транзиторних ішемічних атак та/чи інсульту. *Укр. мед. часоп.* 2014. № 5. С. 49–51.
  44. Фартушина О.Є., Віничук С.М. Модифікація поведінкових чинників ризику як складова первинної профілактики транзиторних ішемічних атак та/чи інсульту. *Український медичний часопис*. 2014. № 6(104). XI/XII. С. 42–44.
  45. Фартушина О.Є. Патогенетичні підтипи транзиторних ішемічних атак: особливості неврологічної клініки, гемодинаміки та лікування [Текст]: Дис... канд. мед. наук: 14.01.15. Фартушина Олена Євгенівна; *Нац. мед. ун-т ім. О.О. Богомольця. Київ, 2012. 217 арк.: рис., табл. Библиогр.: арк. 187–217.*
  46. Аствацатуров М.И. Соматические основы эмоций. *Тр. ВМА*. 1935. Т. XX.
  47. Bassetti C., Mathis J., Gugger M. et al. Hypersomnia following paramedian thalamic stroke: a report of 12 patients. *Ann. Neurol*. 1996. Vol. 39(4). P. 471–480.
  48. Middleton F.A., Strick P.L. The temporal lobe is a target of output from the basal ganglia. *Proc. Natl. Acad. Sci. USA*. 1996. Vol. 93(16). P. 8683–8687.
  49. Clark J.M., Alberts G.W. Vertical gaze palsies from medial thalamic infarctions without midbrain involvement. *Stroke*. 1995. Vol. 26(8). P. 1467–1470.
  50. Victor M., Adams R.D., Collins G.H. The Wernicke-Korsakoff syndrome: a clinical and pathological study of 245 patients, 82 with post-mortem examinations. *Contemp. Neurol. Ser.* 1971. Vol. 7. P. 1–206.

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### Клінічні судинні синдроми таламічних інсультів передньої та парамедіанної судинних територій: проспективне клінічне когортне дослідження

**Резюме. Актуальність.** У статті проаналізовано і описано патофізіологічні особливості та закономірності виникнення неврологічних, нейропсихологічних й клінічних судинних синдромів таламічних інсультів переднього та парамедіанного судинних басейнів. Висвітлюються особливості неврологічної клініки, топичної, клінічної і нейровізуалізаційної діагностики таламічних інсультів передньої та парамедіанної судинних територій. **Мета дослідження:** описати і проаналізувати клініко-нейровізуалізаційні особливості судинних синдромів таламічних інсультів передньої та парамедіанної судинних територій у проспективному клінічному когортному дослідженні. **Матеріали та методи.** Ми провели проспективне клінічне когортне дослідження 319 пацієнтів із гострим інсультом, які надійшли до неврологічного центру Олександрівської клінічної лікарні (м. Київ, Україна) про-

тягом перших 24 годин з моменту розвитку інсульту. Усі пацієнти пройшли комплексне клініко-неврологічне, лабораторне, ультразвукове і нейровізуалізаційне обстеження. **Результати.** Серед 319 обстежених хворих із гострим інсультом нейровізуалізаційно підтверджений таламічний інсульт діагностовано в 34 (10,6 %) пацієнтів. Із них у 22 осіб (середній вік  $61,9 \pm 10,2$  року) виявлено гострий ізолюваний інфаркт таламуса, а в 12 (середній вік  $59,0 \pm 9,6$  року) — гострий таламічний крововилив. **Висновки.** Проаналізовані, порівняні й описані специфічні неврологічні особливості клінічних судинних синдромів гострих таламічних інсультів передньої та парамедіанної судинних територій.

**Ключові слова:** таламус; інсульт; таламічний інсульт; клінічні особливості; синдром; судинна територія; передня судинна територія; парамедіанна судинна територія

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### Клинические сосудистые синдромы таламических инсультов передней и парамедианной сосудистых территорий: проспективное клиническое когортное исследование

**Резюме. Актуальность.** В статье проанализированы и описаны патофизиологические особенности и закономерности возникновения неврологических, нейропсихологических и клинических сосудистых синдромов таламических инсультов переднего и парамедианного сосудистых бассейнов. Освещаются особенности неврологической клиники, топической, клинической и нейровизуализационной диагностики таламических инсультов передней и парамедианной сосудистых территорий. **Цель исследования:** описать и проанализировать клинико-нейровизуализационные особенности сосудистых синдромов таламических инсультов передней и парамедианной сосудистых территорий в проспективном клиническом когортном исследовании. **Материалы и методы.** Мы провели проспективное клиническое когортное исследование 319 пациентов с острым инсультом, поступивших в неврологический центр Александровской клинической больницы (г. Киев, Украина) в течение

первых 24 часов с момента развития инсульта. Все пациенты прошли комплексное клинико-неврологическое, лабораторное, ультразвуковое и нейровизуализационное обследования. **Результаты.** Среди 319 обследованных больных с острым инсультом нейровизуализационно подтвержденный таламический инсульт диагностирован у 34 (10,6 %) пациентов. Из них у 22 человек (средний возраст  $61,9 \pm 10,2$  года) выявлен острый изолированный инфаркт таламуса, а у 12 (средний возраст  $59,0 \pm 9,6$  года) — острое таламическое кровоизлияние. **Выводы.** Проанализированы, сравнены и описаны специфические неврологические особенности клинических сосудистых синдромов острых таламических инсультов передней и парамедианной сосудистых территорий.

**Ключевые слова:** таламус; инсульт; таламический инсульт; клинические особенности; синдром; сосудистая территория; передняя сосудистая территория; парамедианная сосудистая территория

#### Review of the manuscript

#### "Clinical vascular syndromes of thalamic strokes in anterior and paramedian vascular territories: a prospective hospital-based cohort study" submitted to the "International Neurological Journal" (Ukraine)

The article is written on a good English language, is actual, well structured, and the material is presented according to the journal guidelines. The article devoted to the pathophysiological features and patterns of neurological, neuropsychological, and clinical vascular syndromes of the thalamic strokes in anterior and paramedian vascular territories in a prospective hospital-based cohort study. Authors addressed the aim to describe and analyze the clinical and neuroimaging features of vascular syndromes of thalamic strokes in anterior and paramedian vascular territories in a prospective hospital-based cohort study, prospectively recruited 319 acute stroke patients, admitted within 24 hours from the onset of the stroke symptoms to the Oleksandrivska Clinical Hospital, Kyiv, Ukraine. Material and methods are presented in details and include complex neurological, clinical, laboratory, ultrasound, and neuroimaging examinations that were performed to all study patients. Findings, statistical analysis, and conclusion are accurate, reporting that MRI/CT-proven thalamic stroke was diagnosed in 34 (10.6 %) out of 319 patients, forming a study group. Authors highlight that unilateral stroke of the paramedian vascular territory of the thalamus is manifested by posteromedian syndrome; more severe symptoms are observed in a case of a bilateral stroke (paramedian thalamic infarction syndrome). Moreover, the severe dysfunction of the emotional sphere, such as syndromes of anomie and dysthymia, are revealed in patients with stroke of the paramedian vascular territory of the thalamus. Specific neurological features of clinical vascular syndromes of acute thalamic strokes in anterior and paramedian vascular territories were analyzed, compared, and analyzed. Overall, the article is actual, well written, structured, presented good. Some suggestions regarding the stylistic correction of the text are given. Recommend to the publishing.

With kind regards, Colin D. Ferrie (Scotland, UK)