

**DESCRIPTION OF COURSE UNIT FOR DOCTORAL STUDIES
AT VILNIUS UNIVERSITY**

Scientific Area/eas, Field/ds of Science (codes)	Medical and Health Sciences (M 000): Medicine (M 001)			
Faculty, Institute, Department/Clinic	Faculty of Medicine Institute of Clinical Medicine Clinic of Neurology and Neurosurgery			
Course unit title (ECTS credits, hours)	Cerebrovascular Disorders 7 credits (189 hours)			
Study method	Lectures	Seminars	Consultations	Self-study
Number of ECTS credits	-	-	1	6
Method of the assessment (in 10 point system)	Examination. Oral form. Five questions are provided.			
PURPOSE OF THE COURSE UNIT				
<p>To provide the doctoral student with knowledge about the physiology of cerebral circulation and autoregulation of cerebral circulation, the spectrum of cerebrovascular diseases, typical clinical manifestations, methods and indications for the diagnosis of cerebrovascular diseases, national and international recommendations for disease prevention, diagnosis and treatment, methods of reperfusion treatment of ischemic stroke and patient selection criteria, stroke diagnosis and treatment situation in Lithuania and the world, peculiarities of stroke diagnosis and treatment in young people, inflammatory, hereditary and rare cerebrovascular diseases.</p>				
THE MAIN TOPICS OF COURSE UNIT				
<p><i>1. Peculiarities of cerebral circulation.</i> Anatomical features of the arterial and venous systems of the brain. Physiology, pathophysiology, autoregulation of cerebral circulation.</p> <p><i>2. Classifications of acute cerebrovascular disorders.</i></p> <p><i>3. Primary and secondary prevention of stroke.</i> Causes of stroke and risk factors. Primary stroke prevention. Secondary stroke prevention. Prophylactic drug treatment. Methods and indications for prophylactic surgical and endovascular treatment. European Stroke Organization Recommendations for stroke prevention. Methodological recommendations for diagnosis, treatment, prevention and rehabilitation of stroke of the Lithuanian Stroke Association. New results from clinical trials.</p> <p><i>4. Diagnosis of cerebrovascular diseases.</i> Examination of a patient after a transient ischemic attack. Vascular ultrasound examinations for the diagnosis of cerebrovascular diseases. Neuroimaging studies: indications, clinical significance, interpretation, perspectives. Early neuroimaging signs of ischemic stroke. Angiographic methods. Compulsory laboratory tests. Diagnostic algorithm for a patient with an acute stroke.</p> <p><i>5. Patent foramen ovale and paradoxical embolization.</i> Prevalence and diagnosis of patent foramen ovale (PFO). The role of paradoxical embolization in the etiopathogenesis of stroke. The role of PFO in the etiopathogenesis of other diseases. Transcranial dopplerography and echocardiography for the detection of "right-to-left" shunting. PFO treatment methods and indications.</p> <p><i>6. Hypercoagulation.</i></p>				

Causes of hypercoagulation. Etiopathogenesis, clinic, diagnosis, treatment of cerebral venous sinus and venous thrombosis. Venous infarction of the brain. Clinical features, diagnosis, prophylactic treatment of antiphospholipid antibody syndrome. Significance of laboratory and genetic tests, indications.

7. Dissection of cerebral arteries.

Prevalence, pathogenesis and risk factors of extracranial artery dissections. Intracranial dissections. Importance of ultrasound and angiographic methods in diagnostics. Clinical symptoms and complications of dissections. Treatment tactics.

8. Urgent treatment of stroke.

Pre-hospital care for stroke. Inpatient basic treatment. Specialized reperfusion treatment of ischemic stroke: intravenous thrombolysis (IVT) and mechanical thrombectomy (MTE). Selection of patients for reperfusion therapy. Protocols and procedures of IVT and MTE. Basic treatment of stroke. Late outcomes of IVT. National and international guidelines for urgent stroke treatment. Organization of acute stroke diagnosis and treatment in Lithuania. Monitoring of quantitative and qualitative indicators of stroke treatment. Urgent treatment of hemorrhagic stroke.

9. Vascular cognitive impairment.

Mild cognitive impairment. Criteria and diagnosis of dementia syndrome. Types of dementias, causes, risk factors. Vascular and mixed dementia. Binswanger's disease. Clinical features of vascular dementia. Plan of patient examination. Principles of treatment.

10. Neurosurgical treatment of stroke.

Methods of surgical treatment of cerebral infarction. Decompression craniotomy. Surgical treatment of intracranial hemorrhage. Diagnosis and surgical treatment of arterial aneurysms, arteriovenous malformations. Principles and algorithms for patient selection for neurosurgical treatment.

11. Inflammatory, hereditary and rare cerebrovascular diseases.

Takayasu arteritis. Fibromuscular dysplasia. Cerebral vasculitis. Moyamoya syndrome. CADASIL. CARASIL. Stroke genetics.

12. Peculiarities of strokes in young people.

The most common causes of stroke at a young age. Clinical features and diagnostic algorithm.

RECOMMENDED LITERATURE SOURCES

1. Kobayashi A, Czlonkowska A, Ford GA, et al. European Academy of Neurology and European Stroke Organization consensus statement and practical guidance for pre-hospital management of stroke. *European Journal of Neurology* 2018; 25: 425-33.
2. Powers WJ, Rabinstein AA, Ackerson T, et al. 2018 guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke* 2018; 49: e46-e110.
3. Powers WJ, Rabinstein AA, Ackerson T, et al. 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals from the American Heart Association/American Stroke Association. *Stroke* 2019; 50: e344-e418.
4. Pristipino Ch, Sievert H, D'Ascenzo F, et al. European position paper on the management of patients with patent foramen ovale. General approach and left circulation thromboembolism. *E Heart J* 2019; 40: 3182-95.
5. Sacks D, Baxter B, Campbell BCV, et al. From the American Association of Neurological Surgeons (AANS), American Society of Neuroradiology (ASNR), Cardiovascular and Interventional Radiology Society of Europe (CIRSE), Canadian Interventional Radiology Association (CIRA), Congress of Neurological Surgeons (CNS), European Society of Minimally Invasive Neurological Therapy (ESMINT),

European Society of Neuroradiology (ESNR), European Stroke Organization (ESO), Society for Cardiovascular Angiography and Interventions (SCAI), Society of Interventional Radiology (SIR), Society of NeuroInterventional Surgery (SNIS), and World Stroke Organization (WSO), Multisociety consensus quality improvement revised consensus statement for endovascular therapy of acute ischemic stroke. *AJNR Am J Neuroradiol* 2018; 39: E61-E76.

6. Berge E, Whiteley W, Audebert H, et al. European Stroke Organisation (ESO) guidelines on intravenous thrombolysis for acute ischaemic stroke. *European Stroke Journal* 2021; 6(1): I-LXII.
7. Rost NS, Brodtmann A, Pase MP, et al. Post-stroke cognitive impairment and dementia. *Circ Res* 2022; 130(8): 1252-1271.
8. Dobbie S, Markus HS. Stroke genetics: discovery, insight into mechanisms, and clinical perspectives. *Circ Res* 2022; 130(8): 1095-1111.
9. Klijn CJM, Paciaroni M, Berge E, et al. Antithrombotic treatment for secondary prevention of stroke and other thromboembolic events in patients with stroke or transient ischemic attack and non-valvular atrial fibrillation: A European Stroke Organisation guideline. *European Stroke Journal* 2019; 4(3): 198-223.
10. D. Jatužis, D. Rastenytė, A. Vilionskis, V. Matijošaitis, K. Ryliškienė. Galvos smegenų insulto diagnostikos, gydymo ir profilaktikos metodika. Metodinė mokymo priemonė. Trečioji pataisyta ir papildyta laida. Vilnius: Vilniaus universiteto leidykla, 2021.
11. Grotta JC, Albers GW, Broderick JP, et al. *Stroke: pathophysiology, diagnosis, and management*, 6th edition. Elsevier, 2016.
12. K. Ryliškienė, D. Jatužis. Smegenų veninių ančių ir venų trombozės diagnostika ir gydymas. Metodinė mokymo priemonė. Vilnius: Vilniaus universiteto leidykla, 2016.
13. Carroll BJ, Piazza G. Hypercoagulable states in arterial and venous thrombosis: when, how, and who to test? *Vasc Med* 2018; 23: 388-99.
14. Ferro JM, Boussier MG, Canhao P, et al. European Stroke Organization guideline for the diagnosis and treatment of cerebral venous thrombosis - endorsed by the European Academy of Neurology. *Eur J Neurol* 2017; 24: 1203-13.
15. Steiner T, Al-Shahi Salman R, Beer R, et al; European Stroke Organisation. European Stroke Organisation (ESO) guidelines for the management of spontaneous intracerebral hemorrhage. *Int J Stroke* 2014; 9(7): 840-55.

CONSULTING LECTURERS

1. Coordinating lecturer: Dalius Jatužis (Prof. Dr.).

2. Aleksandras Vilionskis (Assoc. Prof. Dr.).

3. Kristina Ryliškienė (Assoc. Prof. Dr.).

4. Jurgita Valaikienė (Assoc. Prof. Dr.).

APPROVED:

By Council of Doctoral School of Medicine and Health Sciences at Vilnius University:
29th of September 2022

Chairperson of the Board: Prof. Janina Tutkuvienė