

## 7.1. Summary

Brain stroke is a complex, clinical set of symptoms which results from pathologies mutually overlapping each other. Correlation between ischaemic stroke and atherosclerotic lesions in the extracranial section of the carotid arteries started to be noticed in the second half of the previous century. Atherosclerosis is considered to be one of the main reasons for carotid artery obstruction or carotid artery stenosis. In most patients carotid artery stenosis is asymptomatic and the most frequently it is detected randomly while diagnosing a different disease entity, e.g. in the ultrasound examination of thyroid or in the angiography conducted due to suspected vascular lesions in the brain (lymphoblastoma, aneurysm or carotid-cavernous fistula). Nowadays, it is beyond doubt that the treatment of carotid artery stenosis by surgical method – endarterectomy or endovascular method is seen to be an optimal prophylaxis of ischaemic stroke the cause of which is among others internal carotid artery obstruction, which protects a patient from permanent health detriment, and even from death.

Essential chemical elements and heavy metals are the source of numerous research conducted to understand the role they play in a lot of processes in the body. The aim of the thesis was to assess concentration of the chosen chemical elements (Se, Zn, Cu, Cd, Pb) in blood and total antioxidant status (TAS) in patients with carotid artery stenosis. Material to the research was collected in Department of Neurosurgery University Clinical Hospital in Bialystok and Department of Bromatology Medical University of Bialystok in 2015 -2017. The research included 100 adults (50 people diagnosed with carotid artery stenosis, 50 people chosen as a control group), which was appropriately matched by gender and age.

Venous blood and nutritional survey were used as research material. Venous blood was drawn directly before the procedure of transvascular stent implantation into the cerebral artery with neuroprotection conducted in Department Neurosurgery University Clinical Hospital in Bialystok in 2015 – 2017. Blood was analysed in Department of Bromatology Faculty of Pharmacy of the Medical University in Bialystok. Questionnaire assessing eating habits was devised in accordance with the recommendations of the Committee of Human Nutrition Science of the Polish Academy of Sciences. Concentration of chemical elements was determined by atomic absorption spectrometry (AAS), flameless technique with electrothermal atomization in a graphite cuvette (Se, Cu, Cd, Pb) and atomization in air – acetylene flame (Zn) with Zeeman background correction using Hitachi Z-2000, Japan.

Persons with internal carotid artery stenosis had a decreased level of total antioxidant status in blood serum with a simultaneously increased BMI index compared to the group of healthy persons. More frequently, they were active or passive smokers and they consumed alcohol on a daily basis. Concentration of selenium and zinc in blood serum in people with internal carotid artery stenosis was lowered and decreased significantly with age. It was observed considerably higher concentration of cadmium and lead in blood of men with internal carotid artery stenosis and in smokers. Concentration of copper in patients with internal carotid artery stenosis increased with the higher level of BMI index. Eating habits of patients with carotid artery stenosis is improper and requires modification. It means cutting down on products rich in carbohydrates and fats, and also increasing the supply of products rich in antioxidants (vegetables, fruit). Additionally, it involves reducing the supply of salt and monosaccharides.

Appropriately balanced diet rich in nutrients and antioxidants may decrease the risk and inhibit the progression of internal carotid artery stenosis.