Summary

Stroke is the most common cause of disability in adults and the second leading cause of death worldwide. Despite its sudden onset, the occurrence of stroke is mainly determined by the aging process and long-term exposure (sometimes from birth) to risk factors. Traditional risk factors are not fully responsible for the pathogenesis of stroke, which is why unconventional predictors, such as vascular markers, are being sought. The cfPWV is considered to be the gold standard for assessing vascular stiffness. If it is more than 10 m/s, it becomes a reliable indicator of high risk HMOD according to the 2023 ESH guidelines.

The aim of this study was to measure indirect indicators of arterial stiffness (cfPWV and acute hypertensive reaction) and analyze their relationship to stroke risk factors. The relationship between cfPWV, AHR, EF, laboratory parameters with respect to the severity of symptoms and the functional prognosis in the case of ischemic stroke were also examined.

The study was conducted in the period from May 31, 2018 to June 30, 2021 in a group of 41 women and 40 men aged 28 to 84 years with their first ischemic stroke and without concomitant neurological disorders. In the entire study group, the average results were: NIHSS (stroke severity) 6.1 points, mRS (functional status after 3 mths) 1.3 ± 1.2, BMI 27.0 ± 3.7 kg/m2. Laboratory tests included: a lipidogram, fasting and casual glucose levels at admission, glycosylated hemoglobin, CRP, creatinine and urea; performed using standard measurement methods. The *eGFR* was calculated *using* the *MDRD study equation.* Non-invasive measurements were performed by applanation tonometry using the SphygmoCor XCEL device from AtCor Medical Pty Ltd (Australia) for *acquisition of the carotid and femoral blood pressure waveforms*, according to literature guidelines. The average cfPWV value was 9.7 m/s for the entire group. Etiological subtypes of stroke were determined based on the TOAST classification.

Results and conclusions: In patients with their first ischemic stroke, a higher cfPWV > 10 m/s was associated with a more severe initial stroke severity (NIHSS 1) and a worse prognosis, both early (NIHSS 2 after 7 days) and long-term (mRS after 3 mths) within the entire study group. In turn, in patients undergoing reperfusion therapy, a higher cfPWV > 10 m/s predicted a worse treatment outcome (a lower percentage improvement in NIHSS 1-2 score between days 1 and 7). The correlation analysis in the entire study group showed a positive relationship between cfPWV, age and BMI; as well as with laboratory parameters (fasting and admission glucose levels, triglycerides and renal function parameters) and hemodynamic

parameters (MAP, PP, cMAP, cPP, HR, EF). A relationship between cfPWV, early prognosis (NIHSS 2 after 7 days) and long-term prognosis (mRS after 3 mths) was demonstrated within the entire study group, while in the SVD subgroup there was the initial stroke severity (NIHSS 1). There was no correlation between AHR and the assessment results. In the group of patients with an NIHSS score > 6 points at admission, EF showed a negative relationship with early neurological improvement (NIHSS 2 after 7 days) for all strokes, and in the CE subtype there was the initial stroke severity (NIHSS 1). A positive relationship was found between CRP concentration, the initial severity of stroke (NIHSS 1) and its long-term functional prognosis (mRS after 3 mths) within the entire study group. However, in the LVD subgroup there was a positive relationship between CRP concentration, the initial severity of stroke (NIHSS 1) and early neurological improvement within 7 days (NIHSS difference 1-2).