

**Title:**

**Arterial stiffness measurements of primary care patients with atherosclerotic disease and subclinical atherosclerosis.**

**Streszczenie w języku angielskim**

Atherosclerotic cardiovascular disease occurs in several clinical variants, including lower extremities arterial disease (LEAD). A common element in all forms of cardiovascular disease based on atherosclerosis is the presence of defined risk factors and the stage of the disease where the patient does not exhibit symptoms that would prompt diagnostic action and subsequent therapeutic interventions. In the diagnosis of LEAD, the ankle-brachial index (ABI) is used, but its limitations include low sensitivity during the subclinical phase, limited reliability in the presence of comorbidities, and the dependency of the result on the examiner's skill. One of the promising early risk parameters for atherosclerotic disease is arterial stiffness, which is described by physical properties such as pulse wave velocity (PWV). To assess the usefulness of arterial stiffness as an early diagnostic parameter for peripheral arterial disease in the subclinical phase, a study was conducted among 290 general practice patients aged  $\geq 50$  years. Classical cardiovascular risk factors and chronic diseases were analyzed, ABI measurements were performed using a Doppler probe, and arterial stiffness was measured using an oscillometric non-invasive method with the Mobil-o-Graph Pulse Wave Analyzer (Mobil-o-Graph PWA). Two cutoff values for pulse wave velocity, considered abnormal, were used in the analysis: a fixed cutoff value  $>10$  m/s, and an individualized value calculated by the Mobil-o-Graph for each patient, taking into account age, gender, and blood pressure.

Among the 259 patients who had both ABI and PWV measurements, the mean ABI result was  $0.99 \pm 0.14$ , while 44/259 (16.9%) of the study participants had an ABI value  $<0.9$ . The mean pulse wave velocity was  $9.99 \pm 1.36$  m/s. Among all participants with arterial stiffness measurements ( $n=266$ ), elevated PWV values  $>10$  m/s were observed in 130/266 (48.8%) individuals, while considering the individualized cutoff for PWV, this applied to 104/266 (39.1%) participants. The study showed that increased arterial stiffness parameters, such as pulse wave velocity, correlated with a lower ankle-brachial index for the individualized

abnormal PWV cutoff ( $r = 0.18$ ,  $p = 0.003$ ), but this correlation was not observed for the fixed abnormal PWV  $>10$  m/s ( $r = 0.12$ ,  $p = 0.057$ ). Furthermore, it was shown that abnormal arterial stiffness parameters occurred twice as often in the studied population as reduced ABI values (37.5% vs 16.9%). Additionally, in 43.2% of patients with abnormal ABI, pulse wave velocity values were normal.

Based on the conducted study, it can be concluded that arterial stiffness parameters allow for additional clinical assessment of patients suspected of atherosclerosis, including subclinical atherosclerosis of the lower limb arteries. Arterial stiffness parameters, such as pulse wave velocity, correlate with the recognized diagnostic parameter for peripheral arterial disease of the lower extremities, the ankle-brachial index. In the studied population, abnormal arterial stiffness parameters were associated with the presence of some classical cardiovascular risk factors, such as hypertension and diabetes. The individualized cutoff for pulse wave velocity appears to be more reliable for assessing arterial stiffness, especially in older patients. The prevalence of abnormalities in arterial stiffness parameters was nearly twice as high as the frequency of reduced ABI, which, along with the limitations of ABI as a diagnostic parameter, may provide a significant suggestion for the broader use of new non-invasive measurements in the diagnosis of subclinical stages of peripheral arterial disease.

These studies seem to suggest the potential for the wider adoption of non-invasive methods for measuring arterial stiffness parameters in the adult population.

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