Hypertension (HT) is a leading cause of global cardiovascular disease burden, causing damage to several organs including the heart (left ventricular hypertrophy, subclinical systolic dysfunction) and ultimately leading to major events of heart attack, stroke and kidney failure.

There are studies that have revealed an opportunity to use exercise blood pressure (BP) as a tool to unmask BP abnormalities and identify high risk people who would otherwise be missed with clinic BP alone.

In healthy individuals, systolic blood pressure (SBP) physiologically rises in a stepwise manner with increasing exercise intensity, whereas diastolic blood pressure (DBP) may change only a little or even drop slightly. Even with normal BP measured at rest, some individuals may experience excessive BP increase with exercise, what has been termed an "exaggerated BP response to exercise" (ExBPR).

There is no consensus about the definition of ExBPR, which is diagnosed most commonly on the basis of SBP ≥210 mm Hg in men and ≥190 mm Hg in women at peak exercise intensity. Evidence exists that SBP ≥150 mm Hg at early (1 or 2) stages of the Bruce treadmill protocol is associated with higher BP values in 24-hour ambulatory blood pressure monitoring (24-ABPM) and can effectively identify hypertension not diagnosed by conventional methods. The use of this threshold as a new definition of ExBPR (ExBPR-MI, *exaggerated blood pressure response to exercise at moderate exercise intensities*) can give the possibility of assessing BP response in a larger group of patients, including those, who would not be able to achieve more advanced stages of the Bruce protocol and, consequently, higher exercise level due to cardiac (chronotropic insufficiency) and non-cardiac (deconditioning, musculoskeletal disorders) limitations that make the achievement of high BP at peak exercise intensity, considered in the previous studies, impossible. Another advantage of the abovementioned ExBPR-MI definition is the fact that moderate exercise intensity better corresponds to routine daily activities than peak exercise intensity that was considered in the earlier studies.

The aim of the study is to explore the role of ExBPR-MI in the development of cardiovascular (CV) disease in patients with and without an established diagnosis of hypertension.

All potentially eligible patients will undergo: anamnesis, clinic BP measurement, resting echocardiography imagining, 24-ABPM and automatic BP measurement with the analysis of hemodynamic parameters, and cardiopulmonary exercise stress test (maximum symptom-limited exercise; maximal effort is justified by the necessity of the assessment of LV systolic and diastolic functional reserve) with immediately post-exercise echocardiographic imagining.

The results of this project may provide further insights into the pathophysiology of cardiovascular disease in HT, with special focus on the mechanisms contributing to exercise intolerance and extend the clinical utility of exercise testing. Each year with many millions exercise stress tests done worldwide, the inclusion of mandatory BP recordings during early stages into the protocol could add major benefit from a test that is already being performed as a part of routine care. The finding of ExBPR-MI could be a relevant diagnostic clue with potential treatment implications and serve as a 'red flag' warning of a previously undetected high risk of unfavorable clinical scenario related to suboptimal BP control. Current evidence does not support the guidance of hypotensive treatment on the basis of exercise BP response, however the exercise BP information may be used to alter (and improve) the way that hypertensive patients are clinically managed.

In a long-term perspective, the modification of medical practice based on the anticipated results of this study might lead to improvement of patient outcomes and reduce the burden of cardiovascular disease in the community.