# Endothelial function measurement with peripheral arterial tonometry: tool for risk stratification applicable in a large ambulatory setting

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**Objective:** Endothelial dysfunction is a precursor of atherosclerosis and its consequences. Measurement of endothelial function with digital Peripheral arterial tonometry (PAT) has been proposed as a method for screening cardiovascular disease (CVD) risk. The method evaluates vasomotor reactivity via the reactive hyperemia index (RHI). Digital PAT testing environments and subject pre-conditions are generally highly controlled. In order to use digital PAT for primary prevention it must be generally applicable to large population groups in less controlled settings. Therefore, we investigated the use of digital PAT in a high-throughput, ambulatory setting.

**Methods:** During the EADS/Augsburg cohort 2007 follow-up study, 710 workers (mean age 45±10 years, 88.4% men) underwent digital PAT testing over 18 days. This represented an 80% participation rate in the test. Review of the test results by the digital PAT equipment manufacturer (Itamar Medical Ltd., Caesarea, Israel) indicated data quality was very high. We explored the relationship between various known CVD risk factors and RHI.

**Results:** Subsequently, a significant relationship was found between measured RHI values and Waist to hip ratio (WHR) ($\beta$=-1.04; p<0.001), male gender ($\beta$=0.128, p=0.021), Low-density lipoprotein (LDL) cholesterol levels ($\beta$=-0.001, p=0.024) and systolic blood pressure ($\beta$=0.007, p<0.001). Other known cardiovascular risk factors (CRF), however, such as age, hypertension, diabetes mellitus, smoking and physical inactivity did not show a significant effect on RHI. Possible confounding factors arising from our setting were also included in the analysis. Time of day the test was performed ($\beta$=-.011, p=0.043) and time between last meal and the test ($\beta$=0.013, p=0.001) were also found to be significantly related to RHI.

**Conclusion:** Although the participation rate and our data quality suggest successful implementation of digital PAT in our high throughput ambulatory setting, its use as a screening tool for cardiovascular risk remains unclear. Against our expectations based on prior work on endothelial function and CRFs, we only found WHR to be a statistically relevant predictor of RHI. The fact that other known CRFs did not have any effect on RHI creates doubt as to whether digital PAT as used in our study accurately assessed CVD risk among our study population. The question of whether an RHI algorithm adjusted to the characteristics of the study sample would improve the predictive accuracy of digital PAT requires further study. Thus, further independent studies exploring the predictive value of digital PAT using hard endpoints such as cardiovascular events are needed to clarify the utility of digital PAT as a screening-tool in primary prevention of CVD.