Arterial stiffness is increased in families with premature coronary artery disease.

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OBJECTIVE: A positive family history of premature coronary artery disease (CAD) is a risk factor for cardiovascular disease (CVD), independent of traditional risk factors. Therefore, currently used risk algorithms poorly predict risk in these individuals. Novel methods are thus needed to assess cardiovascular risk. Pulse-wave velocity (PWV) might be such a method, but it is unknown whether PWV is increased in first-degree relatives of patients with premature CAD.

DESIGN: Observational case-control study.
SETTING: Academic hospital.
PATIENTS: Patients with premature CAD and a positive family history of premature CVD (n=50), their first-degree relatives without CVD (n=50) and unrelated controls (n=50).

INTERVENTIONS: None.

MAIN OUTCOME MEASURES: PWV was measured with using an Arteriograph system. Differences in PWV were assessed by a generalised linear model and multinomial logistic regression.

RESULTS: Patients with premature CAD had a higher PWV compared with first-degree relatives and controls (9.69±2.90 m/s vs 8.15±1.96 m/s and 7.38±1.08 m/s; p<0.05 patients vs all groups). Linear regression showed all groups related to PWV, with patients having the highest PWV and controls the lowest (p<0.0001). Furthermore, PWV was associated with first-degree relatives (OR 1.32, 95% CI 1.02 to 1.72; p<0.05) and premature CAD (OR 1.72, 95% CI 1.32 to 2.24; p<0.05) compared with controls. These findings were independent of blood pressure and other traditional risk factors.

CONCLUSIONS: Patients with premature CAD and their first-degree relatives had higher PWV compared with controls, independent of other risk factors. This holds promise for the future, in which arterial stiffness might play a role in risk prediction within families with premature CAD.

Heart. 2012 Mar;98(6):490-4.

Arterial stiffness in patients with coronary artery disease: relation with in-stent restenosis following percutaneous coronary intervention.

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BACKGROUND: Arterial stiffness parameters in patients who experienced MACE after acute MI have not been studied sufficiently. We investigated arterial stiffness parameters in patients with ST segment elevation (STEMI) and non-ST segment elevation myocardialinfarction (NSTEMI).

METHODS: Ninety-four patients with acute MI (45 STEMI and 49 NSTEMI) were included in the study. Arterial stiffness was assessed noninvasively by using TensioMed Arteriograph.

RESULTS: Arterial stiffness parameters were found to be higher in NSTEMI group but did not achieve statistical significance apart from pulse pressure (P = 0.007). There was no significant difference at MACE rates between two groups. Pulse pressure and heart rate were also significantly higher in MACE observed group. Aortic pulse wave velocity (PWV), aortic augmentation index (AI), systolic area index (SAI), heart rate, and pulse pressure were higher; ejection fraction, the return time (RT), diastolic reflex area (DRA), and diastolic area index (DAI) were significantly lower in patients with major cardiovascular events. However, PWV, heart rate, and ejection fraction were independent indicators at development of MACE.

CONCLUSIONS: Parameters of arterial stiffness and MACE rates were similar in patients with STEMI and NSTEMI in one year followup. The independent prognostic indicator aortic PWV may be an easy and reliable method for determining the risk of future events in patients hospitalized with acute MI.

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Evaluation of arterial stiffness for predicting future cardiovascular events in patients with ST segment elevation and non ST segment elevation myocardial infraction.

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BACKGROUND: Coronary artery disease (CAD) is one of the most important issues in modern medicine due to its high mortality and prevalence. An early detection and prevention can reduce morbidity and mortality. Arterial stiffness is a potent and independent predictor of CAD. We aimed to investigate the arterial stiffness in CAD patients undergoing the coronary angiography. Also, we investigated a possible correlation between arterial stiffness and in-stent restenosis (ISR), an important limitation of percutaneous coronary intervention (PCI).

METHODS: The study included 160 patients undergoing coronary angiography, treated either with PCI or with CABG. The pulse wave velocity (PWV) and augmentation index (AIx) were measured by the Arteriograph.

RESULTS: PWV in the CAD group (12.24 ± 2.78 m/s) was significantly higher compared to the control group (8.27 ± 1.89 m/s). PWV in ISR and left main (LM) stenosis group (14.03 ± 3.15 and 13.89 ± 2.95 m/s) was significantly higher compared to the control and CAD groups. Peripheral and central AIx were significantly higher in CAD group (1.38 ± 30.63 % and 38.35 ± 15.52 %) than in control group (-11.35 ± 26.74 % and 26.91 ± 10.62 %). Patients with LM stenosis have significantly higher values of peripheral and central AIx (23.37 ± 23.77 % and 49.71 ± 12.02 %) than the CAD and ISR group.

CONCLUSIONS: The study confirmed a positive correlation between arterial stiffness measures, PWV and AIx, and CAD. Also, this study showed the correlation between PWV and ISR which can help to select more appropriate stent.

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Comparison of aortic and carotid arterial stiffness parameters in patients with verified coronary artery disease.

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BACKGROUND: Arterial stiffness parameters are commonly used to determine the development of atherosclerotic disease. The independent predictive value of aortic stiffness has been demonstrated for coronary events.

HYPOTHESIS: The aim of our study was to compare regional and local arterial functional parameters measured by 2 different noninvasive methods in patients with verified coronary artery disease (CAD). We also compared and contrasted these stiffness parameters to the coronary SYNTAX score in patients who had undergone coronary angiography.

METHODS: In this study, 125 CAD patients were involved, and similar noninvasive measurements were performed on 125 healthy subjects. The regional velocity of the aortic pulse wave (PWVao) was measured by a novel oscillometric device, and the common carotid artery was studied by a Doppler echo-tracking system to determine the local carotid pulse wave velocity (PWVcar). The augmentation index (AIx), which varies proportionately with the resistance of the small arteries, was recorded simultaneously. **RESULTS:** In the CAD group, the PWVao and aortic augmentation index (AIxao) values increased significantly (10.1 ± 2.3 m/sec and 34.2% ± 14.6%) compared to the control group (9.6 ± 1.5 m/sec and 30.9% ± 12%; $P < 0.05$). We observed similar significant increases in the local stiffness parameters (PWVcar and carotid augmentation index [AIxcar]) in patients with verified CAD. Further, we found a strong correlation for PWV and AIx values that were measured with the Arteriograph and those obtained using the echo-tracking method ($r = 0.57$, $P < 0.001$ for PWV; and $r = 0.65$, $P < 0.001$ for AIx values).

CONCLUSIONS: Our results indicate that local and regional arterial stiffness parameters provide similar information on impaired arterial stiffening in patients with verified CAD.

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