Long-term effect of different physical activity levels on subclinical atherosclerosis in middle-aged men: a 25-year prospective study.


Investigated the influence of lifetime physical activity (PA) on selected indices of atherosclerosis in longitudinal observation of 101 middle-aged men aged 59.7±9.0 years, free of cardiovascular symptoms and treatment, followed up in 1985/90-2011/12.

Self-reported PA was assessed by interviewer and PA questionnaire. Subclinical atherosclerosis was assessed by coronary artery calcification (CAC), carotid intima-media thickness (IMT) and EndoPAT-RHI. Participants were divided into three groups of exercise-related energy expenditure (EE) in kcal/week at baseline: low-to-moderate <2050 (LM); n=33, high 2050-3840; n=34 (H), and very high >3840; n=34 (VH).

RESULTS: All groups were comparable in age and atherosclerosis risk factors at baseline. No linear relationship was found between PA and CAC, IMT and RHI. IMT was not significantly different amongst groups, but CAC was higher for LM vs. H (p<0.001), and for LM vs. VH (p=0.050). RHI trended higher amongst LM, H and H groups (p=0.050). Men with high and very high PA had more favorable cardiometabolic profile than men with lower PA.

CONCLUSION: Maintaining regular high PA level through young and middle adulthood may protect against atherosclerosis as measured by CAC, IMT and RHI.

Myocardial ischemia during mental stress: role of coronary artery disease burden and vasomotion.


Tested whether Mental stress-induced myocardial ischemia (MSIMI) is primarily due to vasomotor changes compared to exercise/pharmacological stress-induced myocardial ischemia (PSIMI), which is secondary to atherosclerotic burden of CAD, in 384 patients with angiographically documented CAD, undergoing (99m)Tc-sestamibi myocardial perfusion imaging, and EndoPAT assessed digital microvascular tone changes, at rest and following physical and mental stress testing respectively, on separate days. Measurements were made in a discovery sample (n=225) and verified in a replication sample (n=159).

RESULTS: In the pooled sample, CAD severity and extent scores were not significantly different between those with and without MSIMI, but were greater in those with PSIMI (P<0.04). PAT ratio was lower in MSIMI (0.55±0.36 versus 0.76±0.52, P=0.009), and in multivariable analysis was the only independent predictor of MSIMI (P=0.009), whereas angiographic severity and extent of CAD independently predicted PSIMI.

CONCLUSION: The degree of PAT determined vaso-constriction, and not the angiographic burden of CAD, is associated with MSIMI. Varying causes of MSIMI compared with PSIMI may require different therapeutic interventions requiring further study.

Improvement in endothelial function by lifestyle modification focused on exercise training is associated with insulin resistance in obese patients.


Investigated the effect of lifestyle modification with a focus on exercise training on EndoPAT-RHI, body composition, arterial stiffness, insulin resistance, adipokines and exercise tolerance in 43 obese patients, (BMI 30). Exercise consisted of 30 min on a cycle ergometer or treadmill, 3 times per week for 6 months. Training intensity was adjusted to the anaerobic threshold.

RESULTS: Following exercise training, significant improvements were observed in RHI, reduction in low body fat percentage, and leptin values, and a significant increase in adiponectin levels and exercise tolerance. An abnormal baseline RHI was observed in 24 patients (55.8%); with improvement rates higher in these patients than in those patients with normal RHI values. Stepwise multiple regression analysis revealed that changes in insulin resistance (HOMA-IR) were independently correlated with changes in RHI.

CONCLUSION: Lifestyle modification with a focus on exercise training improved RHI in obese patients, particularly amongst those with an abnormal RHI before the program. Results suggest that insulin resistance was the only independent factor influencing improvement in endothelial function.

Comparison of peripheral arterial tonometry and flow-mediated vasodilation for assessment of the severity and complexity of coronary artery disease.


Renal nerve ablation as a tool for studying the interactions between arterial stiffness, blood pressure and sympathetic drive: weight of the evidence.


Reviewers described the paper as addressing three major questions, whether renal denervation has favorable effects on arterial stiffness, whether these effects are related to the changes in sympathetic neural outflow, and whether modifications in arterial stiffness might participate in the blood pressure-lowering effects of the procedure.

The papers main findings are; significant reductions in blood pressure, in muscle sympathetic nerve firing rate, and a particularly substantial reduction in the augmentation index (EndoPAT-AI), the magnitude of which was unrelated to the degrees of blood pressure decrease, and the extent of sympathetic inhibition. The reviewers see the papers major contributions as the first time evidence that vascular functional alterations of resistant hypertension may be reversed in a short time period following renal nerve ablation, and that the test procedure represents one of the few cases wherein a given intervention is used as a model to investigate issues of pathophysiological relevance, such as the relationships between arterial stiffness, adrenergic drive, and blood pressure load.


Acute cigarette smoking impairs microvascular function in young moderate smokers: A potential model for studying vasoactive properties of food bioactives


Investigated the effects of acute smoking on blood pressure (BP), heart rate (HR), EndoPAT-RHI, and arterial stiffness (EndoPAT-AI), in 20 young smokers, (average of 15cigs/day), before and after smoking one cigarette.

RESULTS: Acute smoking significantly increased HR, systolic and diastolic BP (p<0.05 respectively), while no effect was observed after 30 min. RHI was reduced at 20 min (2.23 ± 0.28 vs. 1.59 ± 0.27, p<.0001). Arterial stiffness after correction for HR was not significantly affected. A significant, positive correlation was found between total serum cholesterol concentration and post-smoking arterial stiffness values.

CONCLUSION: This study demonstrates that acute cigarette smoking impairs RHI and vital signs in young moderate smokers. A decrease in RHI induced by cigarette smoking may be useful for studying the impact of dietary vasoactive compounds on endothelial function.

http://www.sciencedirect.com/science/journal/22134344/2/1

Light activity following a meal and postprandial cardiometabolic risk in adolescents.


Determined effects of light physical activity (LPA, - walking 1.5 mph for 45 min of each hour) vs. sitting, on cardiometabolic risk factor impairment following a typical meal, (32% fat, 14% protein, 53% carbohydrate), in 18 adolescents, (50% male, 14.8 ± 2.3 yrs), in randomized, order on separate days.

RESULTS: Post meal HDL cholesterol declined during walking at 3 hr by 4.8% but remained higher than sitting (8.4% decline; treatment x time interaction, p<.03). The 3-hr insulin was lower after walking (24.8 μIU/ml ± 33.4) than sitting (37.8 μIU/ml ± 34.7; treatment x time interaction, p<.0001). Triglycerides increased by ~40% above baseline at 1 and 2 hr, with higher values for walking (treatment x time interaction, p<.02), but were not different from baseline by 3 hr. Area under the curve analyses were not significantly different between treatments for any outcomes. Baseline and post 3 hr EndoPAT-RHI between did not differ between treatments.

CONCLUSION: Although minor, LPA appears to mitigate the undesirable postprandial changes in HDL cholesterol and insulin but not triglycerides, following a typical meal in adolescents.


Evaluation of a new simple treatment for positional sleep apnoea patients.


Evaluated the effectiveness of a neck-worn device which influences sleep position by generating a vibration when the patient is supine, without significantly reducing total sleep time, in 30 patients with positional sleep apnoea.

RESULTS: No side effects were reported. The mean WatchPAT AHI dropped from 27.7 ± 2.4 to 12.8 ± 2.2. Seven patients developed an overall AHI < 5 when using the device.

CONCLUSION: Authors expect that positional therapy with the device can be applied as a single treatment in many patients with mild to moderate position-dependent obstructive sleep apnoea, while in patients with a more severe obstructive sleep apnoea the device could be used in combination with other treatment modalities.

Reliability of the Watch-PAT 200 in detecting sleep apnea in highway bus drivers.


Assessed the validity of Watch-PAT in diagnosing sleep disordered breathing (SDB) among 90 highway bus drivers based on simultaneous polysomnography (PSG) and Watch-PAT testing.

**RESULTS:** The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were 89.1%, 76.9%, 82% and 85.7% for RDI > 15, respectively. WatchPAT RDI, ODI, mean SaO2 and SaO2<90% duration results were well correlated with PSG results. In sensitivity and specificity analysis, for cut-off values of RDI of 5, 10 and 15, AUC were 0.84, 0.87 and 0.91, respectively. There were no statistically significant differences between total sleep times, nREM and REM durations, and PSG stages1+2 vs. WatchPAT light sleep, but stage PSG stage 3 was significantly different to WatchPAT Deep.

**CONCLUSION:** Watch-PAT device is helpful in detecting SDB with RDI > 15 in highway bus drivers, especially those older than 45 years, but has limited value in drivers younger than 45 years old who have less risk for OSA. Therefore, WP can be used in the former group when PSG is not easily available.


A comparison of cardiovascular risk indices in patients with polycystic ovary syndrome with and without co-existing non-alcoholic fatty liver disease.


Compared the cardiovascular risk profile of 25 oligoanovulatory women, 12 with polycystic ovary syndrome (PCOS) alone and 13 with PCOS and non-alcoholic fatty liver disease (NAFLD). Measured cardiovascular risk factors including the inflammatory marker (CRP), endothelial function (EndoPAT-RHI), serum markers (ICAM-1, VCAM-1, E-selectin and P-selectin) and clot structure and function (maximum absorbance (MA), and lysis (EndoPAT-RHI), intima-media thickness (IMT) of right and left common carotid arteries (RCCA and LCCA), and fasting lipid-profile and C-reactive protein (CRP) in 203 Kawasaki Disease (KD) patients, age 11-29 years, with onset of KD at a median of 11.6y before the study, to 50 healthy controls.

**RESULTS:** The PCOS with NAFLD group were heavier (BMI 43.9±2.2 kg/m²) compared to the PCOS alone group (BMI 37.6±1.4 kg/m² p=0.03). There was no differences in CRP, RHI, ICAM-1, VCAM-1, E-selectin and P-selectin, nor in clot formation or lysis.

**CONCLUSION:** Patients with PCOS and NAFLD were heavier than patients with PCOS alone, however there were no differences in inflammatory markers, endothelial function or clot structure and function, suggesting that severity of steatosis is not the most important determinant of cardiovascular risk in PCOS.


Endothelial function in patients with metabolic syndrome and erectile dysfunction: a question of Angiopoietin imbalance?


Examined relationships between angiopoietin levels and systemic and local endothelial function in 45 men with metabolic syndrome (MetS) and Erectile dysfunction (ED). ED severity was assessed by questionnaire (IIEFS) and penile duplex Doppler ultrasound (PDDU). Endothelial function was assessed by EndoPAT-RHI, and serum asymmetric dimethylarginine (ADMA), Ang1 and Ang2 levels.

**RESULTS:** Obesity and hypertension were the most frequent MetS parameters (91.1 and 88.9% respectively). Severe ED was present in 35.6%, and impaired penile haemodynamics in 77.5%. Pathological RHI values was present in 40.9% of patients. Ang2 levels were significantly higher in men with abdominal obesity. Ang1 was inversely correlated to peak systolic velocity and was significantly higher in penile arterial dysfunction, while Ang2/Ang1 ratio was significantly lower. Neither ADMA nor PAT parameters were correlated with ED severity.

**CONCLUSION:** Angiopoietins are imbalanced in MetS and ED patients, and the lack of correlation with RHI or ADMA levels suggests they may be early markers of endothelial dysfunction in this higher cardiovascular risk population.


Vascular Health in Kawasaki Disease.


Compared EndoPAT-RHI, intima-media thickness (IMT) of right and left common carotid arteries (RCCA and LCCA), and fasting lipid-profile and C-reactive protein (CRP) in 203 Kawasaki Disease (KD) patients, age 11-29 years, with onset of KD at a median of 11.6y before the study, to 50 healthy controls.

KD patients were classified according to their worst-ever coronary artery (CA) status: Group I-always normal CA (67%); Group II (10%); Group III (20%), and Group IV-giant CA aneurysm - (3%).

**RESULTS:** Compared to controls, KD patients had a higher peak velocity in LCCA (p=0.04) and higher pulsatility index of both RCCA (p=0.006), and LCCA (p=0.05). There were no differences in the EndoPAT-RHI, carotid IMT or stiffness. Mean IMT of LCCA tended to differ across the KD subgroups and control group (p=0.05), with a higher mean in Group IV. Otherwise KD and controls had similar vascular health indices.

**CONCLUSION:** KD patients whose maximum CA dimensions were either always normal or mildly ectatic, have normal vascular health indices, providing reassurance regarding peripheral vascular health in this population.
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Dr. Shechter is a leading authority in the field of magnesium in coronary artery disease and has conducted numerous studies of magnesium in acute myocardial infarction and coronary artery disease, endothelial function and platelet function. He received the 2003 Annual Award of the American College of Nutrition, and an honorary life membership of the German Magnesium Society in recognition of his work in this field, and for his contribution to understanding the role of magnesium in human physiology.

Dr. Shechter received the 2010 Annual Meltzer Prize from the Israel Heart Society and the Friends of The Israel Heart Society for his contribution to endothelial function research in Israel. Dr. Schechter and colleagues, have made significant progress in the field of endothelial function, and in the study of the Endo PAT, as may be appreciated from the following publications:

- Shechter M, Beigel R, Freimark D, Matezky S, Feinberg MS. Short-Term Sibutramine Therapy is Associated with Weight Loss and Improved Endothelial Function in Obese Patients with Coronary Artery Disease. Am J Cardiol 2006;97:1650-1653