**Maternal Sleep Disordered Breathing and Neonatal Outcome**

**Bassan H, Uliel-Sibony S, Katsav S, Farber M, Tauman R.**


Examined the effect of maternal sleep disordered breathing (SDB) on neonatal neurological examination and perinatal complications, in 44 pregnant women of singleton uncomplicated pregnancies who completed a sleep questionnaire in the second trimester, and underwent a WatchPAT study, and were categorized as SDB (apnea hypopnea index > 5), or non-SDB.

Maternal and newborn records were reviewed and a neonatal neurologic examination was conducted during the first 48 hours.

**RESULTS:** All women had full-term infants, 11 (25%) had SDB. Mean maternal age of the SDB and non-SDB women were similar, mean BMI before pregnancy in SDB and non-SDB groups were 25.8 ± 4.7 and 22.0 ± 2.5, respectively (P = 0.028). No differences in birth weight, 5 minute Apgar scores, gestational age or infant neurologic examination scores were found between SDB and non-SDB groups.

**CONCLUSION:** Preliminary results suggest that maternal mild SDB during pregnancy has no adverse effect on neonatal neurologic examination or on perinatal complications.


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**Portable Monitoring for the Diagnosis of Obstructive Sleep Apnea**

**Cooksey JA, Balachandran JS.**

*Chest. 2016 Apr;149(4):1074-81.*

**AUTHORS’ ABSTRACT.** In-lab, attended polysomnography has long been the gold standard for the diagnosis of sleep disordered breathing. In recent years, economic pressures and long wait times have driven interest in home sleep testing, which has in turn led to the development of algorithms that bypass the sleep lab in favor of portable monitoring studies and in-home initiation of positive airway pressure therapy. For appropriately selected outpatients, evidence is accumulating that portable monitors are a reasonable substitute for in-lab polysomnography. In the inpatient setting, where sleep disordered breathing is both highly prevalent and associated with adverse outcomes in certain populations, there is evolving literature on the use of portable monitors to expedite diagnosis and treatment of sleep disordered breathing in the inpatient setting. This review will discuss society guidelines and recent research in the growing field of portable monitoring.

**Editor’s note:** This review points out that WatchPAT is noteworthy for its ability to estimate total sleep times and to calculate a respiratory disturbance index, and cites a 2013 meta-analysis examining the agreement between sleep indexes calculated by in-laboratory PSG and WatchPAT as yielding a correlation coefficient of r = 0.889.


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**Endothelial Function in Youth: A Biomarker Modulated by Adiposity-Related Insulin Resistance**

**Tomsa A, Klinepeter Bartz S, Krishnamurthy R, Krishnamurthy R, Bacha F.**


Investigated the physical and metabolic determinants of EndoPAT-RHI, and augmentation index [Aix] at heart rate 75 bpm, in 81 adolescents: 21 normal weight, 25 overweight with normal glucose tolerance, 19 overweight with impaired glucose regulation, and 16 with type 2 diabetes mellitus; who underwent oral glucose tolerance test, lipid profile, insulin sensitivity, and percentage of body fat and abdominal fat partitioning.

**RESULTS:** Participants across tertiles of RHI had similar age, sex, race, lipid profile, and blood pressure. Body mass index z-score, percentage body fat, abdominal fat, and hemoglobin A1c decreased, and insulin sensitivity increased from the first to third tertile. RHI was inversely related to percentage body fat (P = .008), total [P = .004], subcutaneous [P = .003], and visceral [P = .04] abdominal fat. Aix@75bpm was higher in the lower RHI tertiles [P = .04], positively related to percentage body fat [P = .021], and inversely related to age, insulin sensitivity, and inflammatory markers (tumor necrosis factor-α and plasminogen activator inhibition -1).

**CONCLUSION:** Childhood obesity, particularly abdominal adiposity, is associated with worse RHI and Aix. Insulin resistance appears to mediate this relationship.


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**The Role of the Myocardial Microvasculature in Mental Stress-Induced Myocardial Ischemia**

**Ma H, Guo L, Huang D, Wang L, Guo L, Geng Q4, Zhang M.**


**AUTHORS’ ABSTRACT.** There is increasing evidence that mental stress can manifest as physical diseases. One such condition is mental stress-induced myocardial ischemia (MSIMI); a silent, transient, myocardial ischemic response to stressful conditions. We propose that the cardiac microvasculature may be an important site for the interplay between mental stress and MSIMI. This study is a review of the literature discussing the prevalence and emerging mechanisms underlying MSIMI. We identified several aspects underlying MSIMI, including psychological, genetic, and physiological causes. Several sources suggested that dysfunctional cardiac microvasculature might be a contributing factor in the development of stress-induced myocardial ischemia. The literature also suggested that although MSIMI has distinct features and pathophysiology, its occurrence might indicate an increased future risk of cardiovascular events. We found that dysfunctional cardiac microvasculature may be the key point of interaction between mental stress and transient myocardial ischemia and that the development of MSIMI might be a “silent” indicator for future cardiac events.

**Key Finding From the Paper:** Multivariable analysis showed EndoPAT-RHI to be the only independent predictor of MSIMI (P = 0.009), whereas angiographic severity and extent of CAD were independently predicted by exercise/pharmacological stress-induced myocardial ischemia.

Cardiovascular outcomes were measured during, immediately, and filtered air in 29 healthy adults (30.4 ± 8.2 years). Ambient coarse, (164.2 ± 80.4 μg/m3) particulate matter air pollution (PM), versus Compared the cardiovascular effects of 2-hour exposures to concentrated ambient coarse, (164.2 ± 80.4 μg/m3) particulate matter air pollution (PM), versus filtered air in 29 healthy adults (30.4 ± 8.2 years).

RESULTS: Mean platelet 5-HT increased by 107.0%, 84.5% and 39.8%, in tE2, oCEE and PL groups, respectively. Platelet 5-HT positively correlated with estrone in the oCEE group and with 17ß - estradiol in the tE2 group. Platelet 5-HT showed a positive association with RHI, but not CIMT, in the PL and oCEE groups. Reduction in mood scores for depression-dejection and anger-hostility was associated with elevations in platelet 5-HT only in the oCEE group (p=0.02).

CONCLUSION: Differential effects of hormone therapy on serotonin, vascular function and mood in the KEEPS


Acute increase in blood pressure during inhalation of coarse particulate matter air pollution from an urban location


Compared the cardiovascular effects of 2-hour exposures to concentrated coarse PM (164.2 ± 80.4 μg/m3) particulate matter air pollution (PM), versus filtered air in 29 healthy adults (30.4 ± 8.2 years).

RESULTS: Cardiovascular outcomes were measured during, immediately, and 2 hours after exposures. Both systolic and diastolic BP levels were higher throughout coarse PM compared with filtered air exposures (1.9 mmHg; P < .001 for both). Heart rate variability, EndoPAT-RHI, and arterial compliance were not significantly affected.

CONCLUSION: Brief exposure to coarse PM in an urban environment raises arterial BP. These findings add mechanistic support to the contention that coarse PM may be capable of promoting cardiovascular events.


Exercise training improves cardiopulmonary and endothelial function in women with breast cancer: findings from the Diana-5 dietary intervention study


Examined the effect of oral conjugated equine estrogens (oCEE), transdermal 17ß-estradiol (tE2) or placebo (PL) treatments on the platelet content of Serotonin (5-hydroxytryptamine, 5-HT), the carotid intima-media thickness (CIMT) by ultrasound, EndoPAT-RHI, and self-reported symptoms of affective mood states by the Profile of Mood States (POMS) questionnaire in 79 women.

RESULTS: At baseline and at 1-year follow-up, patients underwent cardiopulmonary exercise stress test (CPET), and EndoPAT-RHI testing.

RESULTS: At baseline there were no significant differences between groups in anthropometrical, BC characteristics, metabolic profile, CPET or RHI parameters.

CONCLUSION: In BC survivors, ET improves cardiopulmonary functional capacity and vascular endothelial function, (RHI), after 12 months.


Cardiovascular Risk Factors and Markers of Atherosclerosis in Stable Kidney Transplant Recipients


Evaluated the role of traditional and novel or potential nontraditional risk factors in vascular and endothelial dysfunction in a cohort of 42 stable kidney transplant recipients at 8.4 ± 1.8 years after transplantation. Carotid intima-media thickness (IMT), pulse wave velocity (PWV), and EndoPAT-RHI were assessed, and inflammatory markers, oxidative stress and endothelial function surrogate markers, adhesion molecules, and parathormone and osteoprotegerin levels were measured.

RESULTS: Age, pre-transplantation diabetes, left ventricular hypertrophy (LVH) and cardiovascular disease (CVD) were related to increased IMT and PWV, whereas RHI values were significantly decreased in diabetics and patients with CVD, and were similar in patients with and without LVH. In multivariate regression analysis, IMT was explained by age, previous CVD episodes, and higher high-sensitivity C-reactive protein levels, and PWV by age and pre-transplantation diabetes.

CONCLUSION: In stable kidney transplant recipients, age, pre-transplantation diabetes, previous cardiovascular episode, and systemic microinflammation were predictors of vascular injury. RHI was poorly associated with traditional CV risk factors and did not correspond with levels of biochemical markers of endothelial dysfunction in this cohort.

Effects of exenatide on postprandial vascular endothelial dysfunction in type 2 diabetes mellitus


Examined whether the GLP-1 analog exenatide inhibits postprandial vascular endothelial dysfunction in 17 patients with type 2 diabetes mellitus (T2DM), who underwent a meal tolerance test to examine changes in postprandial natural log EndoPAT-RHI, (LnRHI), and in glucose and lipid metabolism, without exenatide (baseline), and after a single subcutaneous injection of 10 μg exenatide. In both cases changes were compared between baseline and 120 mins after the meal.

RESULTS: LnRHI was significantly lower after the baseline meal, but not in the exenatide test. Exenatide resulted in a significant decrease in triglycerides. Changes in LnRHI correlated with changes in coefficient of variation (CV) of triglycerides and HDL-cholesterol. Multivariate analysis identified changes in triglyceride CV as the only determinant of changes in LnRHI, contributing to 41% of the observed change.

CONCLUSION: Exenatide inhibited postprandial LnRHI reduction after the meal loading test, suggesting that exenatide has a multiphasic anti-atherogenic action involving not only glucose but also lipid metabolism.


Rosuvastatin treatment in stable chronic obstructive pulmonary disease (RODEO): a randomized controlled trial


Evaluated the effect of treatment with rosvastatin 10 mg once daily for 12 weeks in 49 patients with stable COPD (n=49), compared to matched controls receiving placebo (n = 50), on EndoPAT-RHI, pulmonary function, and markers of systemic inflammation, interleukin-6 (IL6) and high-sensitivity C-reactive protein (hsCRP).

RESULTS: In the overall study population, no significant between-group difference in change in RHI or pulmonary function was observed. Rosuvastatin treatment was associated with a reduction in hsCRP (−20% vs. 11%, P = 0.017) and an attenuation of the rise in IL6 concentration (8% vs. 30%, P = 0.028) compared with placebo. In a prespecified subgroup analysis of patients with a supra-median circulating hsCRP concentration, rosvastatin was associated with improved RHI (P = 0.026).

CONCLUSION: In stable COPD patients without the standard indications for statin therapy, rosvastatin treatment is associated with a significant attenuation of systemic inflammation and improvement in endothelial-dependent vascular function, (RHI), in patients with evidence of systemic inflammation.


Low testosterone in men predicts impaired arterial elasticity and microvascular function


Examined whether low testosterone level is associated with arterial stiffness and endothelial and microvascular dysfunction in 237 healthy men aged 50 years (SD 12y). Endothelial and microvascular function were assessed as brachial artery flow-mediated dilation (FMD) and EndoPAT-RHI, respectively. Arterial stiffness was evaluated by tonometry-derived pulse wave velocity (PWV) and central augmentation index (AIX).

RESULTS: Mean total testosterone level was 16.3nmol/L (SD 6.11) and 25% of subjects had low levels (<12.0nmol/L). Testosterone level correlated positively with RHI (r=0.24, p < 0.001) and inversely with AIX (r=-0.14, p=0.033) but not with FMD or PWV, indicating impaired microvascular hyperemia and arterial elasticity with lower testosterone levels. After multivariate adjustment for the Framingham Risk Score and weight, testosterone level remained an independent predictor of RHI and AIX (β=0.23, -0.13; p < 0.001, 0.04, respectively).

CONCLUSION: In men with few co-morbidities, lower serum testosterone level is associated with lower RHI and increased pulse wave reflections. Whether normalization of low testosterone level improves vascular function needs further investigation.


Differential impact of peripheral endothelial dysfunction on subsequent cardiovascular events following percutaneous coronary intervention between chronic kidney disease (CKD) and non-CKD patients


Examined the differential effect of EndoPAT-LnRHI on clinical outcome after percutaneous coronary intervention (PCI) between chronic kidney disease (CKD), and non-CKD in 435 patients following PCI. Patients were divided into low and high LnRHI groups. The endpoint was a composite of cardiovascular death, nonfatal myocardial infarction, ischemic stroke, hospitalization due to unstable angina pectoris, and coronary revascularization.

RESULTS: A cardiovascular event occurred in 56 patients. Patients who suffered a cardiovascular event had significantly lower LnRHI than other patients in the non-CKD group (0.46 ± 0.18 versus 0.60 ± 0.25; P = 0.002). Kaplan-Meier analysis demonstrated a significantly higher probability of cardiovascular events in low LnRHI patients in the non-CKD group (P = 0.003). LnRHI was an independent and significant predictor of future cardiovascular events in the non-CKD group (P = 0.004) but not in the CKD group.

CONCLUSION: There was a differential effect of LnRHI on clinical outcome after PCI between CKD and non-CKD patients, and LnRHI significantly correlated with subsequent cardiovascular events after PCI in non-CKD patients.

FDA clearance for the new WatchPAT Central Plus!
The new device will enable specific identification & reporting of Central Sleep Apnea (CSA)

Amir Lerman, MD., is a professor of medicine and a consultant in the cardiovascular division at the Mayo Clinic graduate school of medicine, and serves as associate chair and director for research for the cardiovascular division, director of the Mayo cardiovascular research center, and as director of the chest pain and coronary physiology center at the Mayo Clinic.
Prof. Lerman’s research is focused on coronary physiology and imaging, and the role of the endothelium in cardiovascular disease and in regenerative medicine. He is a pioneer in the integration of intra-coronary endothelial function assessment, as well as non-invasive endothelial function assessment into clinical practice for over the past 20 years and has published over 500 manuscripts, book chapters and reviews. Prof. Lerman has been engaged in PAT research since 1999 at the Mayo Clinic where he mentored and made essential contributions to the evolution of the EndoPAT and its scientific basis and clinical acceptance. Prof. Lerman and his group have published over 25 peer reviewed papers with EndoPAT among which are the following cornerstone manuscripts:


