Thirty patients with suspected obstructive sleep apnea (OSA), underwent WatchPAT and assisted nocturnal polysomnography concomitantly.

**RESULTS:** The apnea/hypopnea index (AHI) values of both sleep studies were significantly correlated (r = 0.762). There was a high correlation between minimum oxygen saturation (r = 0.842, p < 0.001), oxygen saturation < 90% (r = 0.799, p < 0.001), and mean heart rate (r = 0.951, p < 0.001). Using a threshold value of ≥5 events/h, sensitivity and specificity were 60% and 96.2% respectively, (AUC: 0.727, p = 0.113), and at a threshold ≥30 events/h sensitivity and specificity were 77.8% and 86.4% respectively (AUC: 0.846, p = 0.003). Mean WatchPAT AHI was significantly higher than that by polysomnography (p < 0.001).

**CONCLUSION:** Periperal arterial tonometry is a useful portable device for the diagnosis of obstructive sleep apnea, and its accuracy is higher in moderate and severe cases.


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**Latest PAT® Publications**

**Accuracy of peripheral arterial tonometry in the diagnosis of obstructive sleep apnea.**

**Pinto JA, Mello de Godoy LB, Ribeiro RC, Mizoguchi EI, Medeiros Hirsch LA, Gomes LM**  

**Home-based diagnosis of obstructive sleep apnea in an urban population.**

**Garg N, Rolle AJ, Lee TA, Prasad B.**  

**Shorter sleep duration is associated with poorer glycemic control in type 2 diabetes patients with untreated sleep-disordered breathing.**

**Siwasaranond N, Nimithpong H, Saetung S, Chirakalwasan N, Ongphiphadhanakul B, Reutrakul S.**  

**Chronic moderate sleep restriction in older long sleepers and older average duration sleepers: a randomized controlled trial.**

**Youngstedt SD, Jean-Louis G, Bootzin RR, Kripke DF, Cooper J, Dean LR, Catao F, James S, Vining C, Williams NJ, Irwin MR.**  

**Accuracy of peripheral arterial tonometry in the diagnosis of obstructive sleep apnea.**

**Evaluated the impact of sleep duration on glycemic control in 90 type 2 diabetes (T2DM) patients with untreated sleep-disordered breathing (SDB), with apnea-hypopnea index (AHI) ≥ 5 as diagnosed using WatchPAT200.**

Sleep duration was recorded by wrist actigraphy for 7 days. Medical records were reviewed for hemoglobin A1c (HbA1c) values.

**RESULTS:** In 71 patients (78.8 %), diagnosed with SDB, there was no significant relationship between AHI and glycemic control. Oxygen desaturation index (SaO2), minimum SaO2, and time spent below SaO2 90 % were not significantly correlated with glycemic control. Sleep duration was inversely correlated with HbAlc (p = 0.026). By multiple regression analysis adjusting for age, sex, body mass index, insulin use, diabetes duration, and AHI, sleep duration was significantly associated with HbAlc (p = 0.005). Each hour reduction in sleep duration was associated with a 4.8 % increase in HbA1c of its original value (95 % CI 1.5-8.0).

**CONCLUSION:** In T2DM with untreated SDB, shorter sleep duration was independently associated with poorer glycemic control.


**Tested the feasibility of WatchPAT200 by comparison with in-laboratory simultaneous polysomnography (PSG) studies, and an at home WatchPAT only study in 75 (57 females, age 45 ± 11 years), urban African Americans with high pre-test probability of obstructive sleep apnea (OSA) as identified with the Berlin questionnaire.**

**RESULTS:** Technical failure rate was 5.3% for home vs. 3.1% for in-laboratory portable monitoring (PM). Good agreement between PSG and PM apnea hypopnea indices (AHI), was found, with areas under the receiver-operator characteristic curves for home PM being 0.90 for AHI(PSG) ≥ 5, 0.95 for AHI(PSG) ≥ 10, and 0.92 for AHI(PSG) ≥ 15. Eighty-two percent (67/72), of participants preferred home over in-laboratory testing.

**CONCLUSION:** Home PM for diagnosis of OSA in a high risk urban population is feasible, accurate, and preferred by patients. As home PM may improve access to care, the cost-effectiveness of this diagnostic strategy for OSA should be examined in underserved urban and rural populations.

The Impact of Obstructive Sleep Apnea and Tobacco Smoking on Endothelial Function.

Lui MM, Mak JC, Lai AY, Hui CK, Lam JC, Lam DC, Ip MS.

Investigated whether concurrent obstructive sleep apnea (OSA) and smoking poses an additive detriment to endothelial function in 114 Chinese men without chronic illness in whom smoking pack-years, polysomnography and EndoPAT-RHI, serum 8-isoprostanate, advanced oxidation protein products (AOPP) and monocyte chemo-attractant protein-1 (MCP-1), were measured.

RESULTS: RHI adjusted for age and BMI, was inversely correlated with apnea-hypopnea index (AHI), (p = 0.092); oxygen desaturation index, (p = 0.024); duration of saturation <90%, (p = 0.020); and minimum saturation, (p = 0.008). RHI decreased with increasing pack-years (p = 0.018), and was lower with concurrent smoking and moderate-severe OSA (AHI ≥15/h) versus either or neither factor. (p = 0.011). Serum 8-isoprostane and AOPP were positively related to OSA severity, while MCP-1 correlated with smoking quantity. Severity of intermittent hypoxia, MCP-1 and pack-years were independent predictors of RHI.

CONCLUSION: OSA and smoking were independent risk factors, and their concurrence was associated with the most severe impairment in endothelial function.


Physical activity below the minimum international recommendations improves oxidative stress, ADMA levels, resting heart rate and small artery endothelial function.


Studied the impact of a lower than moderate level of physical activity (PA) level on cardiovascular health in 64 overweight/obese men and women enrolled in a community program of 4 months of 1h, low-intensity PA two days per week. Before and after intervention, PA level (METs/h/wk), endogenous antioxidant status (SOD and GPX concentration and activity and oxidised LDL), ADMA concentrations, endothelial function (EndoPAT - RHI), and resting heart rate (RHR) were assessed.

RESULTS: Following intervention, significant increases occurred in RHI (P<0.031), SOD and GPX activities, and decreases in ADMA plasma concentrations, and RHR (P<0.001 for all). Increases in PA were positively associated with increases in RHI (r=0.341, P=0.022), GPx (r=0.303, P=0.047) and decreases in RHR (r=-0.302, P=0.047). Independent predictors of RHI improvement were an increase in PA, decrease in RHR, and an increase in GPx.

CONCLUSION: In obese and overweight men and women, an increase in PA, even below the minimal international recommendations, improves antioxidant capacity, RHR and RHI.


Endothelial Function Predicts New Hospitalization due to Heart Failure Following Cardiac Resynchronization Therapy.


EndoPAT-RHI was determined in 34 consecutive patients immediately before implantation with Cardiac resynchronization therapy (CRT) for the treatment of advanced HF (baseline), and at 6-8 months after CRT. In 24 patients CRT was determined by transthoracic echocardiography. Depressed RHI was defined as ≤1.5. Follow-up during 343±120 days was obtained in 20 patients with preserved RHI (age 66±1.8 years) and in 14 with depressed RHI (71±2.2 years).

RESULTS: Kaplan-Meier survival analysis demonstrated higher prevalence of new hospitalization due to HF progression (log-rank 5.40) in the depressed RHI group. Baseline log B-type Natriuretic Peptide (BNP) and baseline RHI were independently associated with the incidence of new hospitalization due to HF progression. Baseline RHI values were positively correlated with 6-8 month CFR change (R = 0.434, p = 0.0343).

CONCLUSION: Baseline RHI could predict the long-term outcome of CRT, and improvement of coronary microcirculation might be associated with better baseline RHI.


The development of depressive symptoms during medical internship stress predicts worsening vascular function.

Fiedorowicz JG, Ellingrod VL, Kaplan MJ, Sen S.
J Psychosom Res. 2015 Sep;79(3):243-5

Explored potential mechanisms linking stress and depression to vascular disease in a prospective cohort of 37 participants exposed to medical internship stress, an established precipitant of depressive symptomatology.

RESULTS: Change in depressive symptom score was inversely correlated with change in the EndoPAT-RHI over one year of internship stress (r=0.41, p=0.01) and in the first six months (r=0.38, p=0.02). While the development of depressive symptoms did not significantly impact changes in endothelial progenitor cells (EPCs), EPCs significantly decrease with the year of internship stress (11.9 to 3.4 cells/ml blood; p=0.01).

CONCLUSION: Endothelial function may be a critical link between stress, depression, and cardiovascular disease and a feasible surrogate outcome for prospective studies.

CONCLUSION: There is a relationship between depression and endothelial dysfunction in outpatients, and improvement of depression is associated with RHI improvement.

RESULTS: Mean RHI was 1.93, 2.19, and 2.34, in depression, remission and control groups respectively, with a significant difference among the 3 groups (p=0.0004). RHI was markedly lower in depressed vs. control groups (p=0.0270), but not between remission and control groups (p=0.0003), and between depressed and remission groups (p=0.0002). RHI did not differ between remission and control groups.

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CONCLUSION: There is a relationship between depression and endothelial dysfunction in outpatients, and improvement of depression is associated with RHI improvement.
Jean-Louis Pépin is currently Professor of Clinical Physiology at Joseph Fourier University Grenoble, France, and Medical Director of the regional home care system for chronic respiratory failure; and Director of the HP2 Laboratory (Inserm U1042; Hypoxia Pathophysiology: cardiovascular consequences of intermittent hypoxia). He is Head of the Clinic of Physiology, Sleep and Exercise department, Scientific Director of Clinical Research Administration and presides over the Research Division at Grenoble University Hospital. He runs the French registry of sleep apnea (> 90,000 individuals) and is involved in the European sleep apnea database (ESADA), and is involved in several European and American Thoracic Society task forces.

The focus of Prof. Pépin’s research has been on clinical and translational research on the cardiovascular consequences associated with chronic and intermittent hypoxia, sleep apnea, chronic obstructive pulmonary disease, chronic respiratory failure, and non-invasive ventilation. Jean-Louis Pépin has published prolifically and is the co-author of over 270 scientific publications, and recently was joint Editor with Ferran Barbe of the European respiratory society monography dedicated to sleep apnea. He is the former President of the French Sleep Research and Medicine Society, a member of the European Respiratory Society and American Thoracic Society, and Associate Editor of THORAX.

Prof. Pépin and colleagues, are making significant contributions to the scientific base and clinical acceptance of the EndoPAT, particularly in relation to sleep disordered breathing conditions, as evidenced by the following publications:


