Re. DynaPulse Clinical Studies – Update (Jan. 15, 2010)

(15 papers to add to Pulse Dynamics Booklet/2007, with links and abstracts provided below.)

Paper #1: http://www.iop.org/EJ/abstract/0967-3334/31/1/R01

TOPICAL REVIEW

Arterial blood pressure measurement and pulse wave analysis—their role in enhancing cardiovascular assessment

Alberto P Avolio *et al* 2010 *Physiol. Meas.* **31** R1-R47 doi: 10.1088/0967-3334/31/1/R01

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Abstract. The most common method of clinical measurement of arterial blood pressure is by means of the cuff sphygmomanometer. This instrument has provided fundamental quantitative information on arterial pressure in individual subjects and in populations and facilitated estimation of cardiovascular risk related to levels of blood pressure obtained from the brachial cuff. Although the measurement is taken in a peripheral limb, the values are generally assumed to reflect the pressure throughout the arterial tree in large conduit arteries. Since the arterial pressure pulse becomes modified as it travels away from the heart towards the periphery, this is generally true for mean and diastolic pressure, but not for systolic pressure, and so pulse pressure. The relationship between central and peripheral pulse pressure depends on propagation characteristics of arteries. Hence, while the sphygmomanometer gives values of two single points on the pressure wave (systolic and diastolic pressure), there is additional information that can be obtained from the time-varying pulse waveform that enables an improved quantification of the systolic load on the heart and other central organs. This topical review will assess techniques of pressure measurement that relate to the use of the cuff sphygmomanometer and to the non-invasive registration and analysis of the peripheral and central arterial pressure waveform. Improved assessment of cardiovascular function in relation to treatment and management of high blood pressure will result from future developments in the indirect measurement of arterial blood pressure that involve the conventional cuff sphygmomanometer with the addition of information derived from the peripheral arterial pulse.

Keywords: arterial pressure, sphygmomanometer, hypertension, ageing, cardiovascular risk, pulse pressure, heart rate, pulse waveform, pulse wave analysis, transfer function, radial pulse, carotid pulse, central aortic pressure, arterial impedance, pulse wave velocity, arterial stiffness, pulse amplification, vascular haemodynamics

Print publication: Issue 1 (January 2010)
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Published 26 November 2009

Paper #2: http://www.nature.com/ijo/journal/v33/n10/abs/ijo2009164a.html

International Journal of Obesity (2009) **33,** 1118–1125; doi:10.1038/ijo.2009.164; published online 25 August 2009

Gender differences in the relationships among obesity, adiponectin and brachial artery distensibility in adolescents and young adults

E M Urbina, P Khoury, L J Martin, D D'Alessio and L M Dolan

Abstract

Background: Obesity-related cardiovascular diseases (CVDs) are a major cause of cardiovascular (CV) mortality. Obesity-related reduction in vascular protective adipose-derived proteins, such as adiponectin (APN), has an important role.

Methods: We compared brachial artery distensibility (BrachD) with APN, the level of adiposity and other CV risk factors (CVRFs) in 431 post-pubertal subjects (mean 17.9 years). Gender differences in average values were examined by *t*-tests. Correlations among BrachD, obesity and other CVRFs were examined. Regression analysis was performed to determine whether APN provided an independent contribution to BrachD, while controlling for obesity and other CVRFs.

Results: Male subjects had lower BrachD (5.72±1.37 vs 6.45±1.60% change per mm Hg, $P<0.0001$) and lower APN (10.50±4.65 vs 13.20±6.53; all $P<0.04$) than female subjects. BrachD correlated with APN ($r=0.25$, $P< 0.0001$). Both BrachD and APN correlated with measures of body size, including height, weight and body mass index (BMI). Both correlated with higher systolic blood pressure, glucose, insulin and lower high-density lipoprotein cholesterol (all $P<0.01$). In multivariate analysis, APN, gender, APN*gender and BMI *z*-score predicted BrachD ($r^2=0.305$). On the basis of gender difference, only BMI *z*-score was significant for male subjects ($r^2=0.080$), whereas APN and BMI *z*-score contributed for female subjects ($r^2=0.242$, all $P<0.0001$).

Conclusions: BrachD is independently influenced by obesity in both male and female subjects. In female subjects, APN exerts an additional independent effect even after adjusting for blood pressure (BP), lipid levels and insulin. Differences in the effect of the APN–adiposity relationship on obesity-related vascular disease may be one reason for gender differences in the development and progression of atherosclerosis.

Keywords: elasticity, pediatrics, sex, risk factors, brachial artery

Paper #3:
http://hyper.ahajournals.org/cgi/content/abstract/54/5/919?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=EM+Urbina%2C+2009&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT

Hypertension. 2009; 54:919-950

Noninvasive Assessment of Subclinical Atherosclerosis in Children and Adolescents - Recommendations for Standard Assessment for Clinical Research: A Scientific Statement From the American Heart Association

Elaine M. **Urbina**, MD, FAHA, Chair; Richard V. Williams, MD; Bruce S. Alpert, MD, FAHA; Ronnie T. Collins, MD; Stephen R. Daniels, MD, PhD, FAHA; Laura Hayman, PhD, RN, FAHA; Marc Jacobson, MD, FAHA; Larry Mahoney, MD, FAHA; Michele Mietus-Snyder, MD; Albert Rocchini, MD, FAHA; Julia Steinberger, MD, MS; Brian McCrindle, MD, MPH, FAHA on behalf of the American Heart Association Atherosclerosis, Hypertension, and Obesity in Youth Committee of the Council on Cardiovascular Disease in the Young

Deterioration in endothelial function and arterial stiffness are early events in the development of cardiovascular diseases. In adults, noninvasive measures of atherosclerosis have become established as valid and reliable tools for refining cardiovascular risk to target individuals who need early intervention. With limited pediatric data, the use of these techniques in children and adolescents largely has been reserved for research purposes. Therefore, this scientific stat**em**ent was written to (1) review the current literature on the noninvasive assessment of atherosclerosis in children and adolescents, (2) make recommendations for the standardization of these tools for research, and (3) stimulate further research with a goal of developing valid and reliable techniques with normative data for noninvasive clinical evaluation of atherosclerosis in pediatric patients. Precise and reliable noninvasive tests for atherosclerosis in youth will improve our ability to estimate future risk for heart attack and stroke. Currently, large longitudinal studies of cardiovascular risk factors in youth, such as the Bogalusa and Muscatine studies, lack sufficient adult subjects experiencing hard outcomes, such as heart attack and stroke, to produce meaningful risk scores like those developed from Framingham data.

Key Words: AHA Scientific Stat**em**ents • pediatrics • elasticity imaging technique • brachial artery • risk factors • vasculature • carotid arteries

Paper #4:
http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6WDS-4WM052N-2&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&_docanchor=&view=c&_searchStrId=1140895210&_rerunOrigin=google&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=2f20017c29921dcb2a99c3a127e27210

Environmental Research Volume 109, Issue 7, October 2009, Pages 900-905

Effects of environmental noise exposure on ambulatory blood pressure in young adults

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Abstract

Epidemiological studies have demonstrated that environmental noise exposure is associated with hypertension in middle-aged and older populations, but the relationship in the young subpopulation and between the genders is still unclear. This panel study investigated effects of environmental noise exposure on 24-h ambulatory blood pressure in 60 adults aged 18–32 years. Individual noise exposure and personal blood pressure were measured simultaneously for 30 males and 30 females. Linear mixed-effects regression models were applied to estimate effects. Total subjects (56.6±16.5 A-weighted decibels (dBA)) had transient elevations of 1.15 (95% CI=0.86–1.43) mmHg SBP and 1.16 (0.93–1.38) mmHg DBP at daytime, as well as 0.74 (0.21–1.26) mmHg SBP and 0.77 (0.34–1.20) mmHg DBP at nighttime, significantly associated with a 5-dBA increase in noise exposure. Such effects on SBP and DBP still persisted at the 30- and 60-min time-lagged noise exposure. Per 5-dBA increase in 24-h average noise exposure was significantly associated with sustained increments of 1.15 (0.76–1.54) mmHg SBP and 1.27 (0.96–1.58) mmHg DBP in males (57.4±16.0 dBA), as well as the higher levels of 1.65 (1.36–1.94) mmHg SBP and 1.51 (1.27–1.75) mmHg DBP in females (55.9±17.0 dBA). We found that environmental noise exposure may have elevated effects on adults' blood pressure. Young females are more susceptible to noise exposure than males.

Keywords: Blood pressure; Hypertension; Noise exposure; Panel study; Young adults

Abbreviations: 95% CI, 95% confidence interval; dBA, A-weighted decibel; DBP, diastolic blood pressure; OR, odds ratio; SBP, systolic blood pressure

Paper #5:

http://journals.lww.com/bpmonitoring/Abstract/2008/10000/Reproducibility_of_systemic_hemodynamics_in_stable.8.aspx

Blood Pressure Monitoring: October 2008 - Volume 13 - Issue 5 - pp 291-294
doi: 10.1097/MBP.0b013e3283057ae4 Analytical Methods and Statistical Analyses

Reproducibility of systemic hemodynamics in stable chronic hemodialysis: a pilot study

Vij, Rajiv S.; Motiwala, Shaheen; Peixoto, Aldo J.

Abstract

Objective: Hemodynamic measurements are important in the understanding of hemodialysis (HD) hypertension and intradialytic hypotension. The reproducibility of hemodynamic measurements in HD patients is not known and is the objective of this report.

Methods: We enrolled 13 male patients (mean age 63±13 years) on stable chronic HD. Blood pressure (BP) and hemodynamic variables were obtained with a pulse dynamic technology device. Measurements were taken before and after HD, in the supine and standing positions over a 2-week period.

Results: Ranges for the average intraindividual standard deviation for each hemodynamic variable before and after HD in both supine and standing positions were: 8.3-14.5 mmHg for oscillometric systolic BP; 4.1-10.7 mmHg for oscillometric diastolic BP; 10.7-14.5 mmHg for manual systolic BP; 5.4-8.8 mmHg for manual diastolic BP; 131.4-188.9 mmHg/s for left ventricular dP/dtmax; 0.17-0.27 L/min/m^2 for cardiac index; 142.4-222.6 dynes/s/cm^5 for systemic vascular resistance; 0.59-1.13%/mmHg for brachial artery distensibility; and 0.09-0.15 ml/mmHg for systemic vascular compliance. Repeated measures analysis of variance results showed no significant variability in measures. Intraclass correlation coefficient ranges were 0.58-0.72 for oscillometric systolic BP, 0.46-0.83 for oscillometric diastolic BP, 0.41-0.62 for manual systolic BP, 0.57-0.84 for manual diastolic BP, 0.10-0.78 for left ventricular dP/dtmax, 0.63-0.84 for cardiac index, 0.47-0.80 for systemic vascular resistance, 0.40-0.84 for brachial artery distensibility, and 0.62-0.88 for systemic vascular compliance. No correlation was observed between interdialytic weight gain and hemodynamic variability.

Conclusion: In this pilot study, hemodynamic variables have acceptable reproducibility in chronic stable HD patients. Our results are relevant to the use of hemodynamic monitoring in HD practice and research.

Paper #6: http://www.ncbi.nlm.nih.gov/pubmed/18828435

Nepal Med Coll J. 2008 Jun;10(2):118-22.

Ambulatory blood pressure monitoring: a useful tool to diagnose hypertension and supervise it's treatment.

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Automatic ambulatory blood pressure monitoring (ABPM) for the diagnosis and treatment ofhypertension(HTN) is not common in Nepal. The purpose of this study is to evaluate various characteristics of hypertensive patients undergoing ABPM before starting antihypertensive treatment and evaluate the adequacy of the blood pressure (BP) control during antihypertensive treatment. ABPM was performed in 108 consecutive patients attending the hypertension clinic of Nepal Medical College Teaching Hospital from 1st March 2005 to 30th April 2007 with DynaPulse 5000A (version 3.20q) for approximately 24 hours. Male female ratio was 59:49 and age (mean +/- SD) was 47.8 +/- 16.4 years. The maximum use of ABPM (25.9%) was noted in the age group of 40-49 years. Body mass index was 25.7 +/- 3.8. Diabetes was noted in 13% patients. Maximum use of ABPM was observed in Newar ethnic group (56.5%). ABPM was used for the diagnosis of HTN in 62.0% patients and for follow up in 38.0% patients. Severe HTN was seen in approximately half (47.2%) of the hypertensive patients. Majority of the patients (88.0%) had dipper type of HTN. Beta-blocker (35.6%), ACE inhibitor/Losartan (31.1%) and calcium channel antagonist (26.7%) were the usual antihypertensive agents used. Single antihypertensive agent was used in the majority of patients (64.1%). In a small number of patients (42, 38.9%) undergoing ABPM during antihypertensive therapy, the adequacy of control of HTN was very poor.

Paper #7: http://cjasn.asnjournals.org/cgi/content/full/3/1/184

Clin J Am Soc Nephrol 3: 184-192, 2008

doi: 10.2215/CJN.03340807

Mini-Reviews

Vascular Stiffness: Its Measurement and Significance for Epidemiologic and Outcome Studies

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Arterial stiffness is recognized increasingly as an important component in the determination of cardiovascular risk, particularly in chronic kidney disease and ESRD populations. Although the technique has been around for nearly 100 yr, in the past 20 to 25 yr, pragmatic noninvasive approaches have allowed the incorporation of arterial stiffness measurements, usually in the form of aortic pulse wave velocity (PWV), into clinical assessment of patients. In populations with high cardiovascular risk, especially those with ESRD, aortic PWV measurements provide predictive utility independent of the standard brachial arterial BP measurements. This review briefly discusses the history of vascular dynamics, the determinants of PWV, and some of the available technologies in current use and concludes with a section on the relevance of arterial stiffness measurements in populations of particular interest to nephrologists.

Paper #8:

http://journals.lww.com/ccmjournal/Abstract/2007/02000/Nurse_physician_perspectives_on_the_care_of_dying.13.aspx

Critical Care Medicine: February 2007 - Volume 35 - Issue 2 - pp 422-429
doi: 10.1097/01.CCM.0000254722.50608.2D
Clinical Investigations

Nurse-physician perspectives on the care of dying patients in intensive care units: Collaboration, moral distress, and ethical climate *

Hamric, Ann B. PhD, RN, FAAN; Blackhall, Leslie J. MD, MTS

Abstract

Objective: To explore registered nurses' and attending physicians' perspectives on caring for dying patients in intensive care units (ICUs), with particular attention to the relationships among moral distress, ethical climate, physician/nurse collaboration, and satisfaction with quality of care.
Design: Descriptive pilot study using a survey design.
Setting: Fourteen ICUs in two institutions in different regions of Virginia.
Subjects: Twenty-nine attending physicians who admitted patients to the ICUs and 196 registered nurses engaged in direct patient care.
Interventions: Survey questionnaire.
Measurements and Main Results: At the first site, registered nurses reported lower collaboration ($p < .001$), higher moral distress ($p < .001$), a more negative ethical environment ($p < .001$), and less satisfaction with quality of care ($p = .005$) than did attending physicians. The highest moral distress situations for both registered nurses and physicians involved those situations in which caregivers felt pressured to continue unwarranted aggressive treatment. Nurses perceived distressing situations occurring more frequently than did physicians. At the second site, 45% of the registered nurses surveyed reported having left or considered leaving a position because of moral distress. For physicians, collaboration related to satisfaction with quality of care ($p < .001$) and ethical environment ($p = .004$); for nurses, collaboration was related to satisfaction ($p < .001$) and ethical climate ($p < .001$) at both sites and negatively related to moral distress at site 2 ($p = .05$). Overall, registered nurses with higher moral distress scores had lower satisfaction with quality of care ($p < .001$), lower perception of ethical environment ($p < .001$), and lower perception of collaboration ($p < .001$).
Conclusions: Registered nurses experienced more moral distress and lower collaboration than physicians, they perceived their ethical environment as more negative, and they were less satisfied with the quality of care provided on their units than were physicians. Provider assessments of quality of care were strongly related to perception of collaboration. Improving the ethical climate in ICUs through explicit discussions of moral distress, recognition of differences in nurse/physician values, and improving collaboration may mitigate frustration arising from differences in perspective.

Paper #9:

http://journals.lww.com/jhypertension/Abstract/2007/02000/C_reactive_protein,_an__intermediate_phenotype_.13.aspx

Journal of Hypertension: February 2007 - Volume 25 - Issue 2 - p 329-343

C-reactive protein, an 'intermediate phenotype' for inflammation: human twin studies reveal heritability, association with blood pressure and the metabolic syndrome, and the influence of common polymorphism at catecholaminergic/[beta]-adrenergic pathway loci

Wessel, Jennifer; Moratorio, Guillermo; Rao, Fangwen; Mahata, Manjula; Zhang, Lian; Greene, William; Rana, Brinda K; Kennedy, Brian P; Khandrika, Srikrishna; Huang, Pauline; Lillie, Elizabeth O; Shih, Pei-An Betty; Smith, Douglas W; Wen, Gen; Hamilton, Bruce A; Ziegler, Michael G; Witztum, Joseph L; Schork, Nicholas J; Schmid-Schönbein, Geert W; O'Connor, Daniel T

Abstract

Background: C-reactive protein (CRP) both reflects and participates in inflammation, and its circulating concentration marks cardiovascular risk. Here we sought to understand the role of heredity in determining CRP secretion.
Methods: CRP, as well as multiple facets of the metabolic syndrome, were measured in a series of 229 twins, both monozygotic (MZ) and dizygotic (DZ), to estimate trait heritability (h^2). Single nucleotide polymorphism (SNP) genotyping was done at adrenergic pathway loci. Haplotypes were inferred from genotypes by likelihood methods. Association of CRP with hypertension and the metabolic syndrome was studied in a larger series of 732 individuals, including 79 with hypertension.
Results: MZ and DZ twin variance components indicated substantial h^2 for CRP, at ~56 ± 7% ($P < 0.001$). CRP was significantly associated ($P < 0.05$) with multiple features of the metabolic syndrome in twins, including body mass index (BMI), blood pressure (BP), leptin and lipids. In established hypertension, elevated CRP was associated with increased BP, BMI, insulin, HOMA (index of insulin resistance), leptin, triglycerides and norepinephrine. Twin correlations

indicated pleiotropy (shared genetic determination) for CRP with BMI (P = 0.0002), leptin (P < 0.001), triglycerides (P = 0.002) and systolic blood pressure (SBP) (P = 0.042). Approximately 9800 genotypes (43 genetic variants at 17 loci) were scored within catecholaminergic pathways: biosynthetic, receptor and signal transduction. Plasma CRP concentration in twins was predicted by polymorphisms at three loci in physiological series within the catecholamine biosynthetic/β-adrenergic pathway: *TH* (tyrosine hydroxylase), *ADRB1* (β_1-adrenergic receptor) and *ADRB2* (β_2-adrenergic receptor). In the *TH* promoter, common allelic variation accounted for up to ~6.6% of CRP inter-individual variance. At *ADRB1*, variation at Gly389Arg predicted ~2.8% of CRP, while *ADRB2* promoter variants T-47C and T-20C also contributed. Particular haplotypes and diplotypes at *TH* and *ADRB1* also predicted CRP, though typically no better than single SNPs alone. Epistasis (gene-by-gene interaction) was demonstrated for particular combinations of *TH* and *ADRB2* alleles, consistent with their actions in a pathway in series. In an illustration of pleiotropy, not only CRP but also plasma triglycerides were predicted by polymorphisms at *TH* (P = 0.0053) and *ADRB2* (P = 0.027).

Conclusions: CRP secretion is substantially heritable in humans, demonstrating pleiotropy (shared genetic determination) with other features of the metabolic syndrome, such as BMI, triglycerides or BP. Multiple, common genetic variants in the catecholaminergic/β-adrenergic pathway contribute to CRP, and these variants (especially at *TH* and *ADRB2*) seem to interact (epistasis) to influence the trait. The results uncover novel pathophysiological links between the adrenergic system and inflammation, and suggest new strategies to probe the role and actions of inflammation within this setting.

Paper #10: http://www.anesthesia-analgesia.org/cgi/content/full/102/5/1463

Anesth Analg 2006;102:1463-1467

doi: 10.1213/01.ane.0000204303.21165.a4

TECHNOLOGY, COMPUTING, AND SIMULATION

Remote Anesthetic Monitoring Using Satellite Telecommunications and the Internet

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Abstract

Remote collaboration for anesthesia requires considerable sharing of physiologic data, audio, and images on a consistent data platform. A low-bandwidth connection between Ecuador and the United States supported effective joint management of operative plan, airway, intraoperative decisions, and recovery. Transmission with a 64-Kbps InMarSat satellite telephone (Thrane & Thrane, Denmark) connection from hospitals in Macas and Sucúa, Ecuador, to Richmond, Virginia, included preoperative patient evaluations, video of endotracheal intubations, electrocardiogram waveforms, pulse oximetry measurements, arterial blood pressure readings, capnography readings, and auscultation of breath sounds.

Paper #11: http://heart.bmj.com/content/91/6/769.abstract

*Heart 2005;**91:**769-773 doi:10.1136/hrt.2003.032110*

- Cardiovascular medicine

Ventriculo-vascular interactions in patients with β thalassaemia major

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- Accepted 28 July 2004

Abstract

Objectives: To determine potential interactions between the heart and arterial system in patients with β thalassaemia major.
Design and patients: Vascular compliance, systemic vascular resistance, and left ventricular (LV) contractility was determined in 34 asymptomatic thalassaemia patients at 2–4 hours after blood transfusion and also in 34 age and sex matched controls using a non-invasive device. The results were compared between groups and inter-relationships between LV contractility and indices of vascular load were explored.
Setting: Tertiary paediatric cardiac centre.
Results: When compared with controls, patients had greater systemic vascular resistance (1633 (259) *v* 1377 (276) dynes/s/cm^5, $p < 0.001$) and effective arterial elastance (E_a) (1.86 (0.25) *v* 1.65 (0.29) mm Hg/ml, $p = 0.001$), an index of combined pulsatile and static vascular load. On the other hand, their systolic blood pressure (104 (9) *v* 112 (13) mm Hg, $p = 0.006$), pulse pressure (45 (9) *v* 57 (10) mm Hg, $p < 0.001$), adjusted systemic vascular compliance (1.21 (0.09) *v* 1.37 (0.14), $p < 0.001$), adjusted brachial artery distensibility (21 (0.29) *v* 7.95 (0.29)%/mm Hg, $p < 0.001$) and LV+dP/dt (1059 (183) *v* 1239 (237) mm Hg/s, $p = 0.001$) were significantly lower. Significant determinants of LV contractility, as reflected by LV+dP/dt, were age (standardised $\beta = -0.24$, $p = 0.003$), body mass index (standardised $\beta = -0.34$, $p = 0.004$), systolic blood pressure (standardised $\beta = 0.90$, $p < 0.001$), and effective E_a (standardised $\beta = -0.50$, $p < 0.001$) (model $R^2 = 0.69$). No significant correlation existed between serum ferritin concentration and any of the cardiac or vascular indices.
Conclusion: An unfavourable ventriculo-vascular interaction, as characterised by impaired cardiac contractility and increased static and pulsatile vascular load, occurs in patients with β thalassaemia major.

Paper #12: http://heart.bmj.com/content/91/6/773.1.extract

*Heart 2005;**91:**773 doi:10.1136/hrt.2004.044701*

- Miscellanea

Left ventricular pseudoaneurysm in a child

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- Images in cardiology

A 14 year old girl presented with a history of fatigue, atypical chest pain, and breathlessness for one month. Her haemoglobin was 8.3 g/dl and erythrocyte sedimentation rate (ESR) was 48 mm in the first hour. She had …

Paper #13: http://ntr.oxfordjournals.org/cgi/content/abstract/7/4/581

Nicotine & Tobacco Research 2005 7(4):581-590; doi:10.1080/14622200500185199

The Influence of Gender, Race, and Menthol Content on Tobacco Exposure Measures

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Abstract

Research has suggested that race, gender, and menthol cigarette use influence tobacco-smoke exposure measures and smoking-related disease risk. For example, a high proportion of Black smokers prefer menthol cigarettes and, despite smoking fewer cigarettes per day (CPD) than do Whites, tend to have higher cotinine levels. Additionally, Black males are more at risk for smoking-related lung cancer. High cotinine levels and smoking menthol cigarettes may lead to higher toxin intake, which contributes to increased disease risk. We explored the relationship between tobacco exposure variables (i.e., cotinine, CPD, carbon monoxide [CO], nicotine content, and nicotine dependence) with respect to race, gender, and menthol content in a sample of 307

smokers recruited from the greater Boston area to participate in a smoking cessation treatment trial. The pattern of correlations between tobacco exposure measures and cotinine showed a consistently positive correlation between cotinine and CO in all smokers and a correlation between cotinine and CPD in those who smoked nonmenthol cigarettes. Cotinine and CPD correlations varied by gender and race among menthol cigarette smokers. Consistently, we found a significant genderxracexmenthol interaction on salivary cotinine level as well as cotinine/CPD ratio. These findings suggest that the relationship between number of cigarettes consumed and salivary cotinine is more complex than previously believed. It is not sufficient to look at race alone; researchers and clinicians need to look at race and gender concurrently, as well as type of cigarette consumed.

Paper #14: http://bingoon.org/Documents/SphygmogramAnalyzer.pdf

Expert Systems with Applications 28 (2005) 693–700

A novel intelligent sphygmogram analyzer for health monitoring of cardiovascular system

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Abstract

A novel sphygmogram analyzer (SGA) with embedded medical advisory system is proposed to conquer the drawbacks of the existing commercial systems such as clumsy volume, awkward user-interface, and weak intelligence, etc. Firstly, benefited from the advanced embedded systems and micro-processing chips, the elementary components of SGA can be condensed into a tiny micro-system, which will greatly contribute to the wearable health monitoring devices. Secondly, the proposed SGA is distinguished due to the embedded medical advisory system, which can provide the comparative medical services while adaptive to the source restricted embedded platforms. In this paper, the hemodynamic analysis of sphygmogram is firstly introduced and then, the implementation of SGA, including data acquiring and analyzing unit (DA2U), embedded medical advisory system (e-MAS) boosted for the application of soft computing, and the distributed information exchanging framework, is addressed in detail.

Keywords: Sphygmogram analyzer; Embedded systems; Medical advisory system; Health monitoring

Paper #15: http://www.nature.com/ajh/journal/v15/n3s/abs/ajh2002368a.html

P-78: Cardiovascular reactivity and diurnal arterial compliance during nebivolol treatment of young obese essential hypertensives

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Abstract

To evaluate changes in systemic and peripheral hemodynamics in resting, under stress tests and daily life conditions during short-term treatment with nebivolol in a special high-risk population twelve randomly selected verified never treated essential hypertensives (aged 38.6±8.4 years, body mass index 31.2±5.2 kg/m2) underwent ambulatory blood pressure monitoring (DynaPulse 5000A; Pulse Metric, Inc., USA), standard mental arithmetic (MT) and cold pressor (CT) tests before and 4 weeks after treatment with nebivolol (5 mg once daily). Systemic and local (brachial artery) vascular hemodynamics parameters were derived blindly from each measurement by previously validated web-based pulse dynamics analysis technology. Ambulatory BP and HR were significantly reduced by nebivolol without excessive nighttime falls and variability affecting. 24-hour, but not resting systemic vascular compliance was significantly improved (1.19±0.11 vs. 1.36±0.16 mL/mm Hg; $p<0.05$) without changes in brachial artery compliance. Nebivolol reduced diastolic BP response to MT (17.0±8.5 vs. 14.0±11.2 mm Hg; $p<0.05$), and enhanced the rise in systemic vascular resistance during CT (1.5±1.6 vs. 4.7±3.3 mm Hg; $p<0.05$).
Thus, in the studied overweight young essential hypertensives, under significant short-term antihypertensive effects of nebivolol during daily life and MT, favorable changes in systemic but not in brachial artery compliance are registered, probably due to main peripheral points of nitric oxide modulating. The last might result in some discrepancies registered in hemodynamics and compliance changes between different stress tests, resting and 24-hour conditions. Daily arterial compliance evaluation is useful for comprehensive judgement about vascular effects of antihypertensive agents.

Keywords:

Nebivolol, Arterial Compliance, Cardiovascular Reactivity