



Artery Research

ISSN (Online): 1876-4401

ISSN (Print): 1872-9312

Journal Home Page: <https://www.atlantis-press.com/journals/artres>

P11.29: THE COMPARISON OF ENOS MUTATION T786C AND ITS RELATIONSHIP WITH ARTERIAL STIFFNESS

O.H. Orasan, A. Cozma, A.V. Sitar taut, L.M. Procopciuc, D. Sampelean, D. Pop, D.T. Zdrenghea

To cite this article: O.H. Orasan, A. Cozma, A.V. Sitar taut, L.M. Procopciuc, D. Sampelean, D. Pop, D.T. Zdrenghea (2011) P11.29: THE COMPARISON OF ENOS MUTATION T786C AND ITS RELATIONSHIP WITH ARTERIAL STIFFNESS, Artery Research 5:4, 199–200, DOI: <https://doi.org/10.1016/j.artres.2011.10.183>

To link to this article: <https://doi.org/10.1016/j.artres.2011.10.183>

Published online: 14 December 2019

with history of cardiovascular events had higher: number of swollen and tender joints, disease activity score (DAS28), body mass index (BMI), level of ESR, CRP, total cholesterol, triglyceride, augmentation index, aortic pulse pressure. Cases with cardiovascular event were also more likely to have taken higher doses of corticosteroids compared to controls. In statistical analysis, only triglyceride level and aortic pulse pressure were significant risk factor for the development of cardiovascular events ($p < 0.05$). The other mentioned factors have drawn near but haven't crossed the level of statistical significance.

This research was funded by a grant (No. MIP – 83/2010) from the Research Council of Lithuania.

P11.25

DETERMINANTS OF ARTERIAL STIFFNESS IN YOUNG INDIVIDUALS AT LOW CARDIOVASCULAR RISK: THE ROLE OF AUTONOMIC NERVOUS SYSTEM

O. V. Drokina, A. A. Semenkin, G. I. Nechaeva, Y. U. V. Tereschenko, A. B. Zhenatov, E. A. Lalyukova
Omsk Medical Academy, Omsk, Russian Federation

Our aim was to study the influence of autonomic nervous system and other factors on arterial stiffness in young individuals at low cardiovascular risk. The study involved 136 healthy individuals (mean age 23.5 ± 6.7 years, 89 men and 47 women). The examination included: cardiovascular risk factors screening, heart rate variability (HRV), vascular stiffness, and endothelial function evaluation. Stiffness index was measured at baseline (SI_{bl}) and after 500 mcg of sublingual trinitroglycerin (SI_{tng}). Endothelial function was determined as the change of resistance index after inhalation of 400 mcg of salbutamol (EF). Vascular responses were calculated from digital pulse waves (DPW) registered using photoplethysmography. Vascular parameters did not differ between men and women. On multivariate analysis age and diastolic blood pressure were the only determinants of SI_{bl} among the conventional risk factors ($R = 0.37$, $R^2 = 0.14$, $p < 0.001$). Age, systolic blood pressure, and EF were independent predictors of SI_{tng} ($R = 0.57$, $R^2 = 0.33$, $p < 0.001$). Among HRV parameters added to the above models low parasympathetic activity and elevated sympathetic activity evaluated by pNN50 and low frequency waves spectrum (LF), respectively, were independent predictors of higher levels of SI_{bl} ($p < 0.00001$ for each parameter). The model explained nearly 40% of SI_{bl} variability ($R = 0.62$, $R^2 = 0.38$, $p < 0.00001$). Only pNN50 was independently related to SI_{tng} in multivariate model ($p < 0.01$) marginally increasing its predictive value ($R = 0.64$, $R^2 = 0.41$, $p < 0.00001$). Thus, autonomic nervous system significantly affected baseline arterial stiffness evaluated by DPW analysis in young individuals. Whereas SI_{tng} is minimally influenced only by parasympathetic tone and more precisely reflects cardiovascular risk factors effects on arterial wall.

P11.26

CARDIOVASCULAR RISK IN THE VIEW OF INDIVIDUAL RISK FACTORS IN PATIENTS WITH MORE THAN 1 RISK FACTOR PRESENT

R. Navickas¹, L. Rimsevicius², L. Ryliskyte², Z. Visockienė², M. Ozary-Flato³, A. Laucevicius², M. Kovaite², J. Badariene²

¹Vilnius University, Vilnius, Lithuania

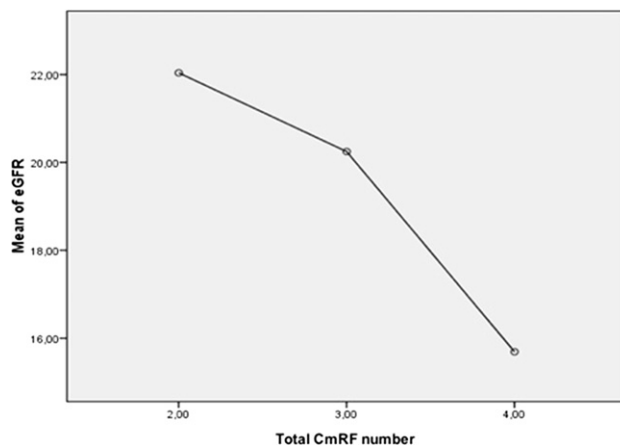
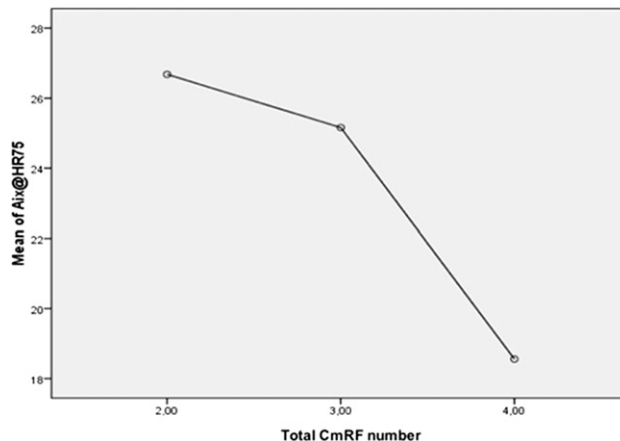
²State Research Institute, Centre for Innovative Medicine at Vilnius University, Vilnius, Lithuania

³Haifa Research Lab, Haifa, Israel

Context and objective: It is known that patients, with a diagnosis of metabolic syndrome (MetS) having three or more cardiometabolic risk factors (CmRF) are associated with an increased cardiovascular risk. The study aimed at evaluating the increase of the risk depending on a number of individual CmRF while evaluating early subclinical atherosclerosis indicators measuring arterial markers, such as PWV and Aix, as well as eGFR.

Results: A total of 530 patients with at least two CmRF according to the NCEP ATP III metabolic syndrome definition were screened for the assessment of subclinical atherosclerosis (measuring PWVradial, PWVfemoral, Aix@HR75), as well as eGFR (using the MDRD formula). A correlation between Aix@HR75 and eGFR (Pearson Correlation Coef. 0.435, $p < 0.01$) was found. Between the groups with two, three or four CmRF, increasing PWVradial (ANOVA, $p = 0.032$) (Figure 1), decreasing Aix@HR75 ($p < 0.01$) and deteriorating eGFR ($p < 0.01$) (Figure 2) with an increasing number of CmRF were noted. The difference in PWVfemoral between the groups was not statistically significant. **Conclusion:** For CVD risk prediction, every individual trait and a number of traits of CmRF must be considered. While Aix increases, eGFR decreases with an increasing number of CmRF. Affected arterial markers were detected in patients with just two CmRF and further worsening was observed with each

additional factor, suggesting that individual CmRF is important when defining the CVD risk for patients with or without MetS.



P11.29

THE COMPARISON OF ENOS MUTATION T786C AND ITS RELATIONSHIP WITH ARTERIAL STIFFNESS

O. H. Orasan¹, A. Cozma¹, Sitar taut A.V.², L. M. Procopciuc¹, D. Sampelean¹, D. Pop¹, D. T. Zdrenghea¹

¹"Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj Napoca, Romania

²"Babes Bolyai" University, Cluj Napoca, Romania

Acknowledgement Grant ID_2246/2009.

Background: Arterial stiffness represents a strong predictor of the cardiovascular events and mortality, but seems to be influenced by eNOS mutations (responsible for alteration of NO release).

Purpose: to investigate the relationship between T786C mutation and arterial rigidity. **Material and method** 70 patients were investigated (63.4% females), mean age 59.81 ± 11.01 years, without significant differences between genders. Genetic polymorphism of T786C (using PCR method), and arterial rigidity (using a TensioMed™ Arteriograph) were determined.

Results: The distribution according to the presence of genotypes was: 49.3% were negative (TT), 33.8% heterozygous (CT) and 16.9% homozygous (CC). Globally, there was significant difference of the PWVAo values between homozygous and heterozygous or negative patients: 11.65 ± 1.87 m/sec in CC patients vs 9.86 ± 1.56 m/sec in CT patients vs 9.75 ± 1.75 m/sec in TT patients ($p = 0.005$). Even though statistical significance was not reached for the rest of the parameters, an ascending trend can still be noticed, CC (in comparison with CT, respectively TT) patients showing higher levels of AixAo ($42.71 \pm 15.24\%$ vs $37.97 \pm 17.24\%$ vs $34.46 \pm 18.11\%$, $p = NS$), Aixb ($15.68 \pm 31.33\%$ vs $1.3 \pm 26.85\%$ vs $-2.07 \pm 31.96\%$, $p = NS$). In the same time, the relationship was also present in women (for PWVAo, CC genotype women

presented greater values 12.18 ± 2.51 vs 9.84 ± 1.75 in CT vs 9.71 ± 1.9 m/sec in TT genotype $p=0.04$, with ascending trend for the rest of the parameters ($p=NS$), but only ascending trends (without statistical significance) were registered in men.

Conclusion: In the present study, the presence of the CC homozygote status was associated with the increase of arterial rigidity.

P11.30

HERITABILITY OF CENTRAL BLOOD PRESSURE AND PULSE PRESSURE – A TWIN STUDY

A. D. Tarnoki¹, D. L. Tarnoki¹, M. A. Stazi², E. Medda², R. Cotichini², L. Nistico², P. Lucatelli³, E. Boatta³, C. Zini³, F. Fanelli³, C. Baracchini⁴, G. Meneghetti⁴, G. Schillaci⁵, G. Jermendy⁶, J. Osztovis⁶, A. Lannert⁷, A. A. Molnar⁸, L. Littvay⁹, Z. Garami¹⁰, V. Berczi¹

¹Department of Radiology and Oncotherapy, Semmelweis University, Budapest, Hungary

²Genetic Epidemiology Unit, National Centre of Epidemiology, Istituto Superiore di Sanità, Rome, Italy

³Vascular and Interventional Radiology Unit, Department of Radiological Sciences, La Sapienza University of Rome, Rome, Italy

⁴Department of Neurosciences, University of Padua School of Medicine, Padua, Italy

⁵Unit of Internal Medicine, Angiology & Arteriosclerosis Disease, Dept. of Clinical and Experimental Medicine, Univ. of Perugia, Perugia, Italy

⁶Bajcsy Zsilinszky Hospital, 3rd Department of Internal Medicine, Semmelweis University, Budapest, Hungary

⁷Research Group for Inflammation Biology and Immunogenomics of Hungarian Academy of Sciences and Semmelweis University, Budapest, Hungary

⁸Faculty of Pharmacy, Semmelweis University, Budapest, Hungary

⁹Central European University, Budapest, Hungary

¹⁰The Methodist Hospital DeBakey Heart and Vascular Center, Houston, TX, United States of America

Objective: Central blood pressure (SBP_{ao}), peripheral and aortic pulse pressure (PP, PP_{ao}) are powerful predictor of cardiovascular events. No comprehensive twin study has investigated their heritabilities.

Methods: 389 Italian, Hungarian and American twin pairs (230 monozygotic and 159 dizygotic) underwent oscillometric arterial stiffness investigation (TensioMed Arteriograph, TensioMed Ltd., Budapest) to measure brachial and aortic augmentation index (Aix_{bra}, Aix_{ao}), pulse wave velocity on aorta (PWV_{ao}) and SBP_{ao}. MPLUS Version6 statistical software was used.

Results: Age, sex and country-adjusted heritability of SBP_{ao}, PP and PP_{ao} indicated 45.5% (95% confidence interval /CI/, 10.5 to 60.0%), 46.6% (95% CI, 29.8 to 58.0%), and 39.9% (95% CI, 1.4 to 53.9%). Unshared environmental effects accounted for the largest part of variance, respectively. Model fit was normal. Bivariate saturated model showed high and significant correlations between SBP_{ao}, PP_{ao} and arterial stiffness measures ($r=0.588$, $p<0.001$ between SBP_{ao} and Aix_{bra}; $r=0.587$, $p<0.001$ between SBP_{ao} and Aix_{ao}; $r=0.475$, $p<0.001$ between SBP_{ao} and PWV_{ao}; $r=0.582$, $p<0.001$ between PP_{ao} and Aix_{bra}; $r=0.581$, $p<0.001$ between PP_{ao} and Aix_{ao}; $r=0.456$, $p<0.001$ between PP_{ao} and PWV_{ao}). Non-significant correlations were estimated for PP and Aix ($r=-0.077$, $p=0.057$ between PP and Aix_{bra}; $r=-0.078$, $p=0.055$ between PP and Aix_{ao}; $r=0.083$, $p<0.05$ between PP and PWV_{ao}).

Conclusions: SBP_{ao}, PP and PP_{ao} are moderately heritable. High significant correlations were estimated between SBP_{ao}, PP_{ao} and arterial stiffness, suggesting a genetic background.

(The research was supported by Medexpert Ltd, Twins Days Festival Committee, Balassa Institute Hungarian Scholarship Board Office, Ministry for Foreign Affairs of Republic of Italy.)

P11.31

CLINICAL AND VASCULAR PARAMETERS CORRELATED WITH AUGMENTATION PRESSURE IN A BRAZILIAN HYPERTENSIVE POPULATION

M. F. Neves, A. K. Burlá, M. A. Casanova, J. D'El-Rei, A. R. Cunha, B. Umbelino, M. L. Correia, M. Burlá, W. Oigman
State University of Rio de Janeiro, Rio de Janeiro, Brazil

Background: Augmentation pressure (AP) has been considered an absolute index that represents vascular stiffness.

Objective: To evaluate clinical and vascular parameters in a Brazilian population presenting hypertension and increased augmentation pressure.

Methods: A cross-sectional study was carried out to evaluate hypertensive patients, both genders, aged 30-75 years. Cardiovascular risk was estimated using SCORE by gender, age, systolic blood pressure, total cholesterol and smoking status. Carotid-femoral pulse wave velocity (cfPWV) was measured by Complior SP, aortic pressures and AP were obtained using SphygmoCor device, and intima-media thickness (IMT) was measured by carotid ultrasonography.

Results: Subjects ($n=129$) were divided into two groups according to AP median (16mmHg). Individuals with increased AP were older (59 vs 51 years, $p<0.001$) and presented higher SCORE (4,0 vs 2,5%, $p<0.05$), pulse pressure (66 vs 48mmHg, $p<0.001$), time of hypertension (16 vs 8 years, $p<0.001$), total cholesterol (216 vs 193mg/dl, $p<0.01$), cfPWV (10.9 vs 9.8m/s, $p<0.01$), carotid intima-media thickness (0.87 vs 0.67mm, $p<0.05$), and lower estimated glomerular filtration rate (74 vs 84ml/min, $p<0.01$). All these variables were correlated with AP, but in a multiple linear regression, time of hypertension was the only parameter associated with AP.

Conclusion: Many clinical variables may contribute to an increased AP in hypertensive patients, and time of diagnosis seems to be important suggesting that intensive and early antihypertensive treatment could smooth the progress of patient's vascular status.

P12 – Techniques and Mechanisms 2

P12.01

MEASURING AORTIC DISTENSIBILITY WITH CMR USING CENTRAL PRESSURES ESTIMATED IN THE MAGNET: COMPARISON WITH CAROTID AND PERIPHERAL PRESSURES

A. Redheuil^{1,3}, M. Bensalah^{2,3}, N. Kachenoura³, E. Bozec^{1,4}, A. Decesare³, P. Boutouyrie^{1,4}, E. Mousseaux^{1,3}

¹HEGP, University of Paris Descartes, Paris, France

²Hôpital Ambroise Paré, Boulogne, France

³INSERM U678, Paris, France

⁴INSERM U970, Paris, France

Objective: Evaluate the feasibility of local aortic distensibility measurement using central pressure estimation in the magnet, simultaneous to aortic imaging with cardiovascular magnetic resonance (CMR).

Methods: We studied 49 asymptomatic subjects (26 men, age 44 ± 18 years). Ascending aortic strain was determined by CMR using automated segmentation of SSFP cine acquisitions. Central pressures were estimated as: 1) carotid pressures using tonometry measured immediately after CMR; 2) estimated from brachial cuff pressure using Vicorder™ acquired simultaneously with aortic cine imaging in the magnet. Central pressures were used to calculate aortic distensibility defined as aortic strain over central pulse pressure (AAD-carotid using carotid pressure and AAD-vicorder using Vicorder) and the carotid augmentation index (Aix). Carotid-femoral pulse wave velocity (cfPWV) was measured using tonometry.

Results: Average \pm SD systolic brachial, carotid and Vicorder pressures were respectively: 114 ± 13 , 105 ± 13 , 106 ± 14 mmHg. We found a strong linear relationship between AAD-carotid and AAD-vicorder ($\beta=0.89$, $R^2=0.91$, $p<0.001$). The mean distensibility difference between the two methods was: -1.1 ± 12 mmHg and variability 0.9%. Distensibilities measured using brachial pressures were higher than using either central pressures (Table).

The correlations with age, Aix and cfPWV obtained using AAD-vicorder (respectively: $r=-0.82$, $r=-0.62$; $r=0.61$; $p<0.001$) were significantly higher than using AAD-carotid ($r=-0.79$, $r=-0.50$, $r=-0.58$; $p<0.001$).

Conclusions: Aortic distensibility may be measured by CMR using central pressures measured in the magnet, simultaneously with cine acquisitions. Resulting distensibilities are closely related to those using carotid pressures measured by tonometry outside the magnet and achieve higher correlation with age and markers of global aortic stiffness such as Aix and cfPWV.

Table: Average ascending aortic distensibilities according to central pressure measurement technique and age group

Distensibilities, $kPa^{-1} \cdot 10^{-3}$	Age < 50 years n=26	Age \geq 50 years n=23
AD peripheral (Brachial)	65 \pm 29	24 \pm 13
AAD central Carotid	80 \pm 34	31 \pm 17
AAD central Vicorder	83 \pm 37	30 \pm 18