Artery Research (2026) 32(Suppl 1):8
https://doi.org/10.1007/s44200-026-00103-4

Artery Research

MEETING ABSTRACTS Open Access

Abstract Book from Artery 2025

1.01

MICROVASC Study—Assessing Early Vascular Aging and Feasibility of Measuring Arterial Stiffness Via Pulse Wave Velocity During a Parabolic Flight Campaign

Karen Barchetti[1,2], Audrey Derobertmasure[1,2,3], Serena Zanelli[4], Smriti Badhwar[1], Stéphanie Chhun[5], Marie Beauvalet[1], Raphael Couronné[1], Rosa-Maria Bruno[1,2,3], Louise-Laure Mariani[6], Pierre Boutouyrie[1,2,3]
[1]INSERM UMRS 970, Paris Cardiovascular Research Centre—PARCC, Paris, France, [2]Université Paris Cité, Faculté de Médecine, Paris, France, [3]Assistance Publique Des Hôpitaux De Paris, Hôpital Européen Georges Pompidou, Clinical Pharmacology Unit and DMU CARTE, Université Paris Cité, Paris France, [4]Axelife, Paris, France, [5]Laboratory of Immunology and DMU BIOPHYGEN, Georges Pompidou European Hospital and Necker-Enfants Malades Hospital, AP-HP, Paris, France; Université Paris-Cité, INEM, Inserm U1151, Paris, France, [6]Départements de neurologie et de pharmacologie médicale, CIC Neurosciences, Hôpital Pitié-Salpêtrière, AP-HP, Institut du Cerveau ICM, Sorbonne Université, INSERM, Paris, France

Background: Pulse wave velocity (PWV) could be accelerated by spaceflight, mimicking 10–20 years of cardiovascular aging on Earth. The main objective of the MICROVASC study was to assess the feasibility of measuring PWV in microgravity conditions during a parabolic flight, using the pOpmètre® device (Axelife, France). The secondary objectives were to investigate how microgravity affects PWV, BP, and HR.
Methods: Three men and four women (42 ± 13 years) were included. PWV was measured using two photoplethysmography sensors attached to the right finger and toe, and the finger-to-toe pulse wave arrival time was computed. BP was recorded at the left calf using an Omron sphygmomanometer. Data were collected pre-, post- and in-flight at 1G, 0G, and 1.8G. More than 20 measurements per volunteer were done. Repeated measure ANOVA was performed.
Results: PWV measurements in microgravity were feasible, with 93.65% of valid measurements in 0G, 85.05% in 1G, and 68.42% in 1.8G. When compared to baseline (5.92 ± 0.9 m/s), PWV increased in-flight 1G (6.22 ± 1.38 m/s, p = 0.00927) and 1.8G (6.66 ± 1.71 m/s, p = 0.00012). Systolic BP decreased between 1 and 0G (from 136 ± 14.6 to 134 ± 16.9 mmHg, p = 0.0276), while both systolic and diastolic BP were significantly decreased post-flight vs. baseline (138 ± 14.9 to 130 ± 15.4 mmHg, p = 0.022, 65 ± 7.24 to 59 ± 6.44 mmHg, p = 0.0015, respectively). HR showed no significant changes across in-flight conditions.
Conclusion: PWV measurements using pOpmètre® are feasible in microgravity, measurement failures were mainly due to excessive body motion artifacts during the dynamic phases of the parabolic flight. Observed PWV changes were pressure independent, and likely stress dependent.

1.02

A Comparison Between Constitutive and Non-constitutive Wall Models in Capturing Pressure–Diameter Relationships Along the Aortic Length

Mobina Izadpanah[1], Lydia Aslanidou[2], Cindy van Loo[1], Jordi Alastruey[3], Ramin Shahbad[4], Majid Jadidi[4], Tammo Delhaas[1], Bart Spronck[1,5], Alessandro Guidici[1,6]
[1]Department of Biomedical Engineering, Cardiovascular Research Institute Maastricht (CARIM), Maastricht University, Maastricht, The Netherlands, [2]Laboratory of Hemodynamics and Cardiovascular Technology (LHTC), École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, [3]School of Biomedical Engineering and Imaging Sciences, Department of Digital Twins for Healthcare, King's College London, London, United Kingdom, [4]Department of Biomechanics, University of Nebraska Omaha, Omaha, NE, United States, [5]Macquarie Medical School, Faculty of Medicine, Health and Human Sciences, Macquarie University, Sydney, NSW, Australia, [6]GROW Institute for Oncology and Reproduction, Maastricht University, Maastricht, The Netherlands

Background: The arterial wall is an anisotropic, hyperelastic fibrous tissue subjected to biaxial loading. While constitutive models accurately capture its mechanical behaviour by accounting for individual wall constituents, simplified non-constitutive formulations are often preferred in one-dimensional haemodynamic simulations for computational efficiency. We aim to 1) evaluate non-constitutive arterial wall models' capability to capture human aortic mechanical behaviours and 2) quantify parameter changes across aortic regions.
Methods: We used the four-fibre family model to generate pressure–diameter curves of the descending thoracic, supraceliac, infrarenal, and distal abdominal aorta of $N = 10$ donors (age 62 ± 11 years, 30% females) [1] by simulating pressurisation at fixed in vivo-like axial stretch [2]. We then fitted the parameters of linear [3] and Langewouters pressure–diameter models [4] to these synthetic data.
Results: The Langewouters model more accurately captured the simulated aortic pressure–diameter relationships than the linear model ($R2 = 0.999 \pm 0.001$ vs. 0.863 ± 0.101, Figure A). The linear model's stiffness parameter E did not vary significantly with location. Conversely, two out of three Langewouters parameters ($P0$: maximum compliance pressure, Am: area-like parameter) dropped significantly along the aorta while $P1$ (half-width pressure) did not vary significantly (Figure B–E).
Conclusion: The Langewouters model offers a better fit to the constitutive-based pressure–diameter curves, and its parameters show enhanced location sensitivity compared to the linear model, which is likely due to its ability of accurately recapitulating the complex non-linear behaviour of the human aorta.

Mean arterial pressure (MAP) and cutaneous vascular conductance values for both skin sites (CVCp, CVCf) were calculated. The measured parameters were log-transformed for normalisation. Two-way repeated measures ANOVA was used for statistical analysis.
Results: For LDFp, a statistically significant main effect of time ($F(1, 14) = 17.22$, $p < 0.001$, $\eta^2 = 0.15$) and group ($F(1, 14) = 7.72$, $p = 0.01$, $\eta^2 = 0.32$), but no significant interaction was found. In contrast, no statistically significant effects of time, group or their interaction were found for LDFf. CVCp showed a significant effect of both time ($F(1, 14) = 14.41$, $p = 0.004$, $\eta^2 = 0.31$) and group ($F(1, 14) = 12.16$, $p = 0.006$, $\eta^2 = 0.46$) with no interaction, while for CVCf only the main effect of time was significant ($F(1, 14) = 9.47$, $p = 0.01$, $\eta^2 = 0.21$). There were no differences between groups for lnLDFp, lnCVCp and MAP.
Conclusion: Children with T1D have compromised skin blood flow in fingers compared to healthy peers. In contrast, the forearm skin blood flow was not affected in T1D according to our results.

P.96

A Low-Cost Wearable for Reliable Blood Pressure Measurement: Reducing the White-Coat Effect and Improving Hypertension Diagnosis

Valentina Vassilenko[1,6], Juan F. Muñoz-Torrero[2,6], Sergio Rico[3,6], Enrique Rodilla[4,6], Pedro Cunha[5,6]
[1]Laboratory for Instrumentation, Biomedical Engineering and Radiation Physics (LIBPhys-UNL), NOVA School of Science and Technology, Nova University of Lisbon, Caparica, Portugal, [2]Medicine Department, Hospital San Pedro de Alcantara, Caceres, Spain, [3]Internal Nursing Department, Universidad de Extremadura, Caceres, Spain, [4]Internal Medicine Department, Sagunto Hospital Internal Medicine, Valencia, Spain, [5]Hypertension Unit, Hospital da Senhora da Oliveira, Guimarães, Portugal, [6]Iberian Network on Arterial Structure, Central Hemodynamics and Neurocognition

Background: Elevated blood pressure (BP) is the most relevant modifiable cardiovascular risk factor. Accurate BP measurement is essential for hypertension management, especially given the lower targets recommended by current international guidelines.
Objective: To present and validate QMon-20**,** a novel, precise, versatile, and low-cost wearable device designed to automatically record BP during a 20-min waiting period before medical consultation. The device aims to provide realistic systolic and diastolic values, minimize the "white-coat effect," and eliminate the need for a dedicated room required by unattended automated office BP measurement (AOBPM).
Methods: QMon-20, a Bluetooth-enabled wearable device controlled via a mobile application, was clinically validated in a cohort of 548 patients (285 men, 263 women; mean age 61 ± 14 years). Its measurements were compared with unattended-AOBPM, standard office BP measurement (OBPM), and daytime ambulatory BP monitoring (ABPM; reference standard). Sensitivity, specificity, and diagnostic accuracy for hypertension diagnosis were assessed.
Results: QMon-20 demonstrated diagnostic accuracy comparable to unattended-AOBPM in distinguishing normotension from hypertension (73% vs. 76%), with both methods significantly outperforming standard-OBPM (56%, $p < 0.001$).
Conclusion: QMon-20 provides reliable BP measurement without the logistical limitations of unattended-AOBPM. Its performance closely approximates ABPM and may represent a practical, cost-effective solution for routine hypertension screening and management.

P.97

Contactless Blood Pressure Estimation from Radar Signals Through Pulse Waveform Analysis and Machine Learning

Laura Miro[1,2,3], Ruochen Wu[4], Albert Aguasca[4], Antoni Broquetas[4], Cosme Garcia[5], Oriol Estrada[2,3], Montse Najar[1]
[1]Signal Processing and Communications Group, Department of Signal Theory and Communications, Universitat Politècnica de Catalunya—BarcelonaTech (UPC), Barcelona, Spain. The group is recognized as a consolidated research group by the Generalitat de Catalunya through 2021 SGR 01033, [2]INEDIT Research Group on Innovation, Health Economics and Digital Transformation, Institut de Recerca Germans Trias i Pujol, Badalona, Barcelona, Spain, [3]Healthcare Strategy and Innovation Department, Hospital Universitari Germans Trias i Pujol, Badalona, Barcelona, Spain, [4]CommSensLab-UPC, Department of Signal Theory and Communications, Universitat Politècnica de Catalunya—BarcelonaTech (UPC), Barcelona, Spain. The group is recognized as a consolidated research group by the Generalitat de Catalunya GRC-01415, [5]Cardiology Department, Hospital Universitari Germans Trias i Pujol, Badalona, Barcelona, Spain

Background: Continuous blood pressure monitoring is critical for early detection and management of cardiovascular disease. Current techniques are either intermittent or invasive, which motivates the search for contactless solutions [1]. Radar-based systems offer a promising alternative, but their feasibility for accurate systolic (SBP) and diastolic (DBP) estimation remains underexplored.
Methods: Single-pulse waveforms were acquired with a 122.5 GHz frequency-modulated continuous wave radar [2] and compared with reference BP from a sphygmomanometer (Mindray ePM10, Shenzhen, China). Morphological features, such as systolic peak, dicrotic notch, reflection index, and time intervals, were extracted and combined with anthropometric data. These inputs were used to train linear regression, random forest, and a one-dimensional convolutional neural network (1D-CNN). Performance was evaluated using mean absolute error (MAE), root mean square error (RMSE), and coefficient of determination (R^2).
Results: The dataset included 39 pulse captures from 24 healthy subjects. For SBP, random forest achieved the best performance (MAE 3.84 mmHg, RMSE 4.21 mmHg, $R^2 = 0.62$). For DBP, linear regression performed best (MAE 3.28 mmHg, RMSE 4.26 mmHg, $R^2 = 0.62$). 1D-CNN underperformed, with MAE > 5 mmHg for both SBP and DBP. Results are within or close to the Association for the Advancement of Medical Instrumentation limits (mean error ≤ ± 5 mmHg, SD ≤ 8 mmHg).
Conclusion: This preliminary study, based on limited data, shows that radar-derived pulse waveforms can estimate SBP and DBP with errors near accepted standards. These findings also validate the accuracy of the extracted pulse waveform. Future work will expand the dataset and test the method in more diverse populations.
References:

[1] Mukkamala R, Shroff SG, Kyriakoulis KG, Avolio AP, Stergiou GS. Cuffless blood pressure measurement: where do we actually stand? Hypertension. 2025;82(6):957-70.
[2] Miro L, Wu R, Broquetas A, Garcia C, Najar M. Evaluation of radar-based cardiorespiratory monitoring under different physiological conditions. In: Proc 47th Annu Int Conf IEEE Eng Med Biol Soc (EMBC). IEEE; 2025.

P.98

Carotid Intima-Media Thickness and Type 2 Diabetes as Predictors of Cardiovascular Events and Mortality in Middle Age

Vilma Dženkevičiūtė[1], Tadas Adomavičius[1], Egidija Rinkuniene[2], Jolita Badariene[2]
[1]Clinic of Internal and Family medicine, Faculty of Medicine, Institute of Clinical Medicine, Vilnius University, Vilnius, Lithuania, [2]Clinic of Cardiac and Vascular Diseases, Faculty of Medicine, Institute of Clinical Medicine, Vilnius University, Vilnius, Lithuania

Background: Carotid intima-media thickness (IMT) is widely recognised as a marker of subclinical atherosclerosis. Its prognostic value in cardiovascular (CV) risk stratification, especially in individuals with

type 2 diabetes mellitus (T2DM), remains under investigation. This study assessed the interaction between IMT and T2DM in predicting CV events in a middle-aged population without known cardiovascular disease (CVD).
Methods: A prospective cohort study was conducted at the Preventive Cardiology Department of Vilnius University Hospital Santaros Klinikos between 2012 and 2021. Participants aged 40–60 years, free from overt CVD and enrolled in the Lithuanian High Cardiovascular Risk primary prevention programme, were included. Data on demographics, T2DM status, and carotid ultrasound were collected. IMT was categorised as <900 µm or ≥900 µm. A total of 6,138 individuals (mean age 53 years) were followed for 4–10 years for CV events and all-cause mortality. Cox proportional hazards regression was used to assess associations between IMT, T2DM, and incident CV events, adjusting for conventional risk factors.
Results: Among individuals with IMT <900 µm, the presence of T2DM significantly increased the risk of CV events (HR = 1.222; 95% CI: 1.016–1.471; p = 0.034). Although IMT ≥900 µm was linked to a trend towards increased risk, statistical significance was not consistently observed across subgroups.
Conclusion: T2DM significantly increases cardiovascular risk, even in individuals with low carotid IMT. These findings highlight the importance of comprehensive risk assessment in diabetic patients, extending beyond subclinical imaging markers, and support early preventive measures.

P.99
Intima-media Thickness and Arterial Hypertension: Risk Indicators for Cardiovascular Disease and All-Cause Mortality in Middle-Aged Adults

Tadas Adomavičius[1], Egidija Rinkuniene[2], Jolita Badariene [2],Vilma Dženkevičiūtė[1]
[1]Clinic of Internal and Family medicine, Faculty of Medicine, Institute of Clinical Medicine, Vilnius University, Vilnius, Lithuania, [2]Clinic of Cardiac and Vascular Diseases, Faculty of Medicine, Institute of Clinical Medicine, Vilnius University, Vilnius, Lithuania

Background: Hypertension (HTN) continues to be a major modifiable risk factor for cardiovascular disease (CVD). Carotid intima-media thickness (IMT) is a validated surrogate marker for subclinical atherosclerosis and target organ damage in hypertension. Our aim is to investigate the synergistic effects of hypertension and intima-media thickness on cardiovascular (CV) events and all-cause mortality.
Methods: A follow-up study was carried out between 2012 and 2021 at Vilnius University Hospital Santaros Klinikos, involving 6,138 participants aged 40–60 years who were free of clinically diagnosed CVD at baseline. Carotid ultrasound was used to measure IMT, categorised as < 900 µm or ≥ 900 µm. Hypertension (HTN) status was recorded, and participants were followed for 4–10 years for cardiovascular events and all-cause mortality. Cox proportional hazards regression models were applied to evaluate associations, adjusting for age, sex, lipids, and other common risk factors.
Results: Although the combination of IMT ≥ 900 µm and AH was associated with a numerically elevated risk of CVD events (HR = 1.285; 95% CI: 0.807–2.047; p = 0.291), this was not statistically significant. IMT ≥ 900 µm alone showed a similar non-significant trend (HR = 1.196; p = 0.347). In individuals with IMT < 900 µm and HTN, no increased risk was observed (HR = 1.023; p = 0.874). Mortality risk in the IMT ≥900 µm and no HNT subgroup was high (HR = 3.461), but this did not reach statistical significance (p = 0.221) due to wide confidence intervals.
Conclusion: These findings suggest that although IMT may indicate subclinical vascular changes, its usefulness as a sole predictor for cardiovascular events and mortality in this population remains limited.

P.100
The Impact of TAVR on Valvular and Ventricular Function and Arterial Stiffness in Patients with Aortic Stenosis

Simina Mariana Moroz[1,2], Silvia Luca[2,4], Mirela Baba[2,3], Maria Alina Lupu[9,10], Horea Feier[4,5,6], Daniel Florin Lighezan[1,7], Ioana Mozos[3,8]
[1]Center for Advanced Research in Cardiovascular Pathology and Hemostaeology, Victor Babeş University of Medicine and Pharmacy, Timişoara, Romania, [2]Doctoral School Medicine-Pharmacy, Victor Babeş" University of Medicine and Pharmacy, Timişoara, Romania. [3]Center for Translational Research and Systems Medicine, "Victor Babeş" University of Medicine and Pharmacy, Timişoara, Romania, [4]Department of Cardiology, "Victor Babes" University of Medicine and Pharmacy Timişoara, Timişoara, Romania, [5]Research Center of the Institute of Cardiovascular and Heart Disease of Timişoara, Timisoara, Romania, [6]Division of Cardiovascular Surgery, Institute for Cardiovascular Diseases, Timişoara, Romania, [7]Department of Internal Medicine I-Medical Semiotics I, Victor Babes University of Medicine and Pharmacy, Timişoara, Romania, [8]Department of Functional Sciences-Pathophysiology, "Victor Babeş" University of Medicine and Pharmacy, Timişoara, Romania. [9]Center for Diagnosis and Study of parasitic Diseases, Departament of Infectious Disease, Victor Babes University of Medicine and Pharmacy Timişoara, Timişoara, Romania, [10]Clinical Laboratory, Institute of Cardiovascular and Heart Disease of Timişoara, Timisoara, Romania

Objective: To assess the impact of TAVR on arterial stiffness, mitral, tricuspid (RT) and aortic regurgitation, transvalvular aortic gradient and ventricular function, and to find the relationship between pulse wave velocity, valvular regurgitations, aortic gradient and ventricular function.
Materials and methods: A total of 100 patients, aged 78±5.84 years, wih aortic stenosis, underwent TAVR. Pulse wave velocity was estimated using mean arterial pressure. Echocardiography was performed before and after TAVR.
Results: TAVR significantly improved arterial stiffness, mitral, tricuspid and aortic regurgitation, the transvalvular aortic gradient (49.94± 15.16 vs.10.29± 5.07, p< 0.0001) as well as ejection fraction and right ventricular function. Significant corrleations were found between estimated pulse wave velocity before TAVR (ePWV_pre) and telediastolic diameter of the left ventricle, ejection fraction, TAPSE_PSAP and parietal relative thickness. Estimated pulse wave velocity calculated after TAVR (ePWV_post) was significantly correlated with F_VD_TAPSE and RT assessed after TAVR (RT_post). In multiple regression analysis, DTDVS and ejection fraction remained significant determinants of ePWV_pre (MR=0.278, p=0.0051, and MR=0.228, p=0.0261, respectively), and F_VD_TAPSE and RT_post were revealed as independent determinants of ePWV_post (MR=0.372, p=0.0008).
Conclusion: TAVR improved arterial stiffness, the transvalvular aortic gradient valvular regurgitation and ventricular function. Estimated pulse wave velocity is a noninvasive marker which can provide valuable information about ventricular function and tricuspid regurgitation in patients with aortic stenosis undergoing TAVR. These findings highlight the importance of integrating PWV measurements into post-TAVR management.

P.101
Integration of Information Systems in the Optimized Management of Arterial Hypertension (EpISIMOH) Using the Concept of Vascular Age in the TOGETHER-Trial

Llanos Cuenca[1], José Manuel Ventura-Cerdá[2], Begoña Martínez-Salvador[3], Enrique Rodilla[4,5]
[1]Universitat Politècnica de València, Valencia, Spain, [2]Conselleria de Sanitat, Hospital Arnau de Vilanova, Valencia, Spain, [3]Universitat Jaume I, Castellón, Spain, [4]Conselleria de Sanitat, Hospital de Sagunto, FISABIO, [5]Universidad Cardenal Herrera-CEU, CEU Universities, Moncada, Valencia, Spain

Background: Hypertension is the leading cause of premature death and disability worldwide. The lack of integration between healthcare levels, particularly between community pharmacies and primary care, hinders the coordinated follow-up of chronic patients and limits medication adherence, which is inversely associated with cardiovascular