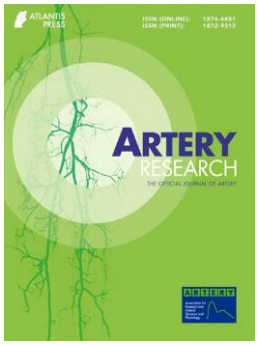

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P2.11: ASSESSMENT OF CAROTID DISTENTION WAVEFORM AND LOCAL PULSE WAVE VELOCITY DETERMINATION BY A NOVEL OPTICAL SYSTEM

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Methods: 135 Patients were enrolled in a longitudinal, prospective study of arterial stiffness and cardiovascular risk in a cohort suffering from chronic kidney disease stages 2 to 4. Office measurements of bSBP and aSBP were assessed by a validated oscillometric device. Prognostic factors of survival were identified by use of Cox proportional hazards regression models.
Results: After a mean follow up duration of 42 months (range: 30 to 50 months) 13 patients died. In univariate Cox analysis, bSBP did not significantly predict mortality, only aSBP assessed using measured mean and diastolic pressure calibration was significantly associated with mortality (HR=1.027, p=0.008). This remained significant in multivariate analysis after adjustment for age, sex and anthropometric measures. More important, adding bSBP to the multivariate model (HR=0.91, p=0.003), lead to a significantly increased prognostic and statistical power of aortic systolic pressure (HR=1.097, p<0.001) and indicated that differences between bSBP and aSBP are of potential interest.
Conclusion: Within our cohort, only aSBP assessed with measured mean and diastolic pressure predicted mortality and provided highly significant prognostic value.

P2.10
ASSESSMENT OF CAROTID PULSE WAVE VELOCITY BY ULTRASOUND: A WAVE INTENSITY ANALYSIS-BASED APPROACH

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Local carotid pulse wave velocity (cPWV) is a parameter increasingly investigated. The diameter-velocity loop (lnD-V loop) could represent a valid approach for cPWV evaluation, since it requires the use of the ultrasound (US) equipment only. Aim of this study was to develop a fully-automatic system for assessing cPWV which is based on the lnD-V loop and the use of the Wave Intensity Analysis (WIA).
US scans were obtained from 27 healthy subjects (44.1±17.8 years, 44.4% males, BMI 25.5±3.9 kg/m^2). Diameter and flow velocity instantaneous values were achieved from B-mode and PW-Doppler images using edge-detection and contour-tracking techniques. Single-beat mean diameter and velocity were calculated, time-aligned using an automatic technique and plotted together providing the lnD-V loop. The WIA, as introduced by Parker in 2009, was performed: the two local maxima (W1 and W2) were used to locate the two reflection-free linear parts of the loop. From the corresponding slopes, early-systolic (PWVes) and late-systolic PWV (PWVls) were calculated; moreover, a carotid stiffness (CS) value was obtained for each subject using Bramwell-Hill equation.
PWVes values (5.16±1.57 m/s) were lower than CS (5.86±1.50 m/s) and PWVls (6.65±3.28 m/s) assessments: the difference was significant for PWVes-PWVls comparison (p<0.05) but not for PWVes-CS and PWVls-CS comparisons. Both PWVes and PWVls values were significantly correlated with CS ones (R=0.90, p<0.001 and R=0.76, p<0.001, respectively).
The proposed approach, based on US images only and the WIA, allows an evaluation of the stiffness in two different phases of the cardiac cycle, reflecting the pressure-dependent changes in cPWV.

P2.11
ASSESSMENT OF CAROTID DISTENTION WAVEFORM AND LOCAL PULSE WAVE VELOCITY DETERMINATION BY A NOVEL OPTICAL SYSTEM

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Measurement of structural and functional properties of the arterial tree produce important clinical indexes for the assessment of cardiovascular risk, vascular adaptation, and therapeutic efficacy. An optical system for non-contact measurement of skin surface vibrations with the distension in the carotid artery, that allows the determination the pulse wave velocity (PWV) and pulse waveform analysis (PWA), is promising nowadays.
A comparison between optical system and an invasive intra-arterial catheter were performed. The waveforms acquired by both systems show a strong correlation (mean value of 0.95805), the small differences emphasize the effect of the energy dissipation during the heart cycle that occurs due to the viscous properties of the arterial wall.
A comparative test between the optical system and a gold-standard method in PWV assessment (Complior®) was carried out. Lower values were expected for PWV in the carotid site than the PWV in a carotid-femoral measurement and the results proved that there are systematic lower values but with strong correlation (r = 0.819, p<0.001).
Trial tests were developed in a large group of healthy subjects for study the correlations between the population characteristics and their hemodynamic parameters measured by the optical system. The results confirmed an increase of PWV with age; the negative correlation between the Augmentation Index and the heart rate and lower values for the dP/dtmax.in female subjects.
The optical system proved to be able to measure the arterial pulse waveform in a reliable way and demonstrated a good consistency in the determination of clinical parameters using dedicated algorithms.

P2.12
ARTERIAL STIFFNESS MEASURED WITH POPMÈTRE® IN PRIMARY ANTI-PHOSPHOLIPIDS SYNDROME

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Arterial stiffness (AS) is an independent predictor of cardiovascular events. It can be estimated easily by a new technique: pOpmètre® (Axelife-SAS-France). Some data suggests an increase in AS in anti-phospholipids syndrome (APS) patients.
To study the relationship between AS indices, and blood anti-phospholipids antibody levels in patients with primary APS vs controls with an history of thrombosis.
Aortic impedance (Physioflow® Esaote-Italy) , Intima-media thickness (IMT) ultrasound, and foot to toe PWV, blood pressure, ABPI and the aPL antibody titers were measured in 20 APS patients and 20 controls with a distal deep vein thrombosis history.
The two groups were comparable for brachial blood pressure and ABPI (1.15 ± 0.04 vs 1.12 ± 0.03, ns), as well as the age. The APS group had a greater IMT (0.59 ± 0.02 versus 0.53 ± 0.01 mm, p <0.004). AS impedance (10.3 ± 0.6 versus 8.1 ± 0.6 m / s, p <0.02) and pOpmètre® ftPWV (13.2 ± 0.9 vs 10.5 ± 0.6 m/s; p <0.004) was increased in the APS group. Age correlated with systolic blood pressure (SBP) (r2 = 0.1; p = 0.002), AS (r2 = 0.11, p = 0.002), pOpmètre ® ftPWV (r2 = 0.23; p <10^{-4}), IMT (r2 = 0.16; p = 0.0003), not with the BAPI (r2 = 0.03; p = 0.06). No correlation was found between with age and aPL.
Conclusion: In the APS patients, arterial stiffness measured by pOpmètre® is increased compared to controls and correlated with AS indices and IMT.

P2.13
FOOT TO TOE PULSE WAVE VELOCITY WITH POPMETRE® INDEPENDENTLY CORRELATES WITH GLOMERULAR FILTRATION RATE IN RENAL TRANSPLANT PATIENTS

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Aim: To evaluate the relationship between glomerular filtration rate and arterial stiffness using Pulse Wave Velocity (PWV) as an independent cardiovascular risk factor in renal transplanted patients.
Patients and methods: We studied transplanted patients followed in our outpatient clinic. After a medical examination, we measured blood pressure (Comfort Cuff- Skil-Care, USA), PWV (pOpmètre® - Axelife sas - France) after 10 min supine resting. pOpmetre® measures the finger to toe transit time, and according to a height chart, calculates the PWV. Three measurements were performed to study the repeatability. Estimated glomerular filtration rate (eGFR) was calculated using MDRD equation.
Results: Forty-four (30 men, 14 women) renal transplant recipients were included. No significant difference between men and women were found in age (M±SEM: 53.2±2.2 years), systolic blood pressure (SBP: 138±2 mmHg), diastolic blood pressure (DBP: 81±2 mmHg), eGFR (45.9±2.4 ml/min/1.73 m2) and PWV (10.4±1 m/s) [range: 6.0-15.7]. Repeatability expressed as the SD/mean of 3 measurements was very good: 5.4%.
PWV correlated positively with age (r^2=0.16, p<0.009) and negatively with eGFR (r^2=0.15, p<0.009). Using a stepwise regression model (including gender, age, SBP, DBP, height, weight), only age and pOpmetre PWV remained significantly associated with eGFR.