



Artery Research

ISSN (Online): 1876-4401

ISSN (Print): 1872-9312

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

P5.14: IMPACT OF KIDNEY DONATION ON AORTIC STIFFNESS: A FEASIBILITY STUDY

J. Smith, C. McEniery, A. Bradley, I. Wilkinson, L. Tomlinson

To cite this article: J. Smith, C. McEniery, A. Bradley, I. Wilkinson, L. Tomlinson (2014) P5.14: IMPACT OF KIDNEY DONATION ON AORTIC STIFFNESS: A FEASIBILITY STUDY, Artery Research 8:4, 145–146, DOI: <https://doi.org/10.1016/j.artres.2014.09.151>

To link to this article: <https://doi.org/10.1016/j.artres.2014.09.151>

Published online: 7 December 2019

P5.10 INFLUENCE OF OBESITY IN THE RELATIONSHIP BETWEEN CAROTID ARTERY FUNCTION AND CENTRAL BLOOD PRESSURE

A. Casanova, G. Pichler, O. Juan, E. Solaz, J. Mas, F. Martinez
Hospital Clinico Univrsitario, Valencia, Spain

Background: Obesity blunts the association of cfPWV with BP, at least in youth. We assessed the impact of BMI in the relationship between carotid artery function (CAF) and central BP.

Methods: Stiffness index (β), Elastic modulus (Ep), Arterial Compliance (AC) and local PWV (PWV β) were measured at the common carotid arteries by echo-tracking (Aloka prosound alpha 10), and central BP was assessed with the SphygmoCor device. Patients were classified into 3 groups according to BMI (<25 normal weight; \geq 25-30 overweight; \geq 30 obesity). Linear regression models, Pearson's correlation coefficient and ANCOVA models (age, gender, heart rate and central PP as covariates) were performed.

Results: 222 patients (mean age 42.8 ± 14.2 years; 93 (42%) women; mean BMI 26.6 ± 4.4 ; 139 (62.6%) hypertensives, 104 (74.8%) under treatment). BMI categories: 85 (38.3%) normal weight, 88 (39.6%) overweight, 49 (22.1%) obesity. Age, HR, central PP showed significant positive association with CAF parameters. BMI categories and gender were not significantly associated with CAF parameters, except for overweight with PWV β (p-value 0.02). There was no significant difference in β , Ep, AC and PWV β between BMI groups after adjusting by covariates. Pearson's correlation coefficient between central SBP and CAF parameters was significantly lower if BMI \geq 25 ($\hat{\alpha}$: 0.46, 0.19, 0.13; Ep: 0.69, 0.43, 0.3; AC: -0.48, -0.37, -0.31; PWV $\hat{\alpha}$: 0.66, 0.48, 0.36 for normal weight, overweight and obesity, respectively; p-value for overweight <0.001, p-value for obesity <0.05).

Conclusions: BMI categories are not closely related to CAF. BMI might blunt the increment of CAF parameters with rising central BP.

P5.11 PROXIMAL AORTIC REMODELING IS ASSOCIATED WITH LEFT VENTRICULAR MASS AND PULSE WAVE VELOCITY IN ESSENTIAL HYPERTENSION

F. Tosello, D. Leone, G. Bruno, A. Ravera, L. Sabia, F. Veglio, A. Milan
University of Turin, Turin, Italy

Background: Hypertension accelerates vascular ageing, leading to aortic stiffening and dilatation. We have few data about ascending aorta diameter (AoAsc) remodeling in hypertension. Recently published reference values for AoAsc enable us to evaluate the remodeling process.

Aim of our study was to evaluate in a cohort of essential hypertensives the association between the AscAo remodeling and markers of hypertension related organ damage as left ventricular mass (LVM) and aortic stiffening (cfPWV).

Methods: 629 essential hypertensives were included (age 53.2 ± 13.4 yo; 73,6% men; Systo-diastolic blood pressure: $139/82 \pm 16.9/11.4$ mmHg). All subjects underwent a transthoracic echocardiography for the evaluation of LVM and AoAsc; we also measured aortic stiffening as carotid-femoral PWV (cfPWV) with validated tonometric device (SphygmoCor). Remodeling of AoAsc was defined as the difference between measured and expected aortic diameters in relation to age, BSA and sex.

Results: In this cohort mean AoAsc diameter was 35.6 ± 5.38 mm, with a mean AoAsc remodeling of 3.26 ± 4.28 mm. AoAsc remodeling was related to systolic, diastolic and mean blood pressure (MBP) (for MBP $r=0.11$; $p=0.024$). LVM ($r=0.26$; $p<0.001$) and cfPWV ($r=0.14$; $p<0.001$) were related to aortic remodeling: in multivariate analysis these associations were confirmed, independently from MBP (LVM: β 0.23; cfPWV β 0.18; $p<0.05$). AoAsc remodeling progressively increased from subjects with normal LVM and geometry to patients with concentric remodeling, eccentric and concentric hypertrophy (ANOVA $p<0.001$).

Conclusions: Essential hypertension leads to AoAsc remodeling (3 mm), related to both cardiac and vascular (cfPWV) damage: AoAsc remodeling could be a marker of early vascular ageing, carrying a potential prognostic value

P5.12 CAROTID-FEMORAL AND BRACHIAL PULSE WAVE VELOCITY IN PERIPHERAL ARTERIAL DISEASE

M. Frick^a, V. Jacomella^a, S. Roth^a, I. Wilkinson^{b,a}, B. Amann-Vesti^a, M. Husmann^a

^aUniversity Hospital Zurich, Zurich, Switzerland

^bUniversity of Cambridge, Cambridge, UK

Introduction: Peripheral arterial disease (PAD) is associated through its extensive atherosclerotic burden with both increased arterial stiffness and

cardiovascular events. Recently, different non-invasive assessment devices that measure carotid-femoral or brachial pulse wave velocity (PWV) have become commercially available.

Aim: To compare PWV derived from carotid-femoral (cfPWV) or brachial (bPWV) assessments in patients with PAD.

Material and methods: Measurements of PWV with the two different non-invasive methods were performed as part of standard-of-care assessment in outpatients with PAD. Pulse wave velocities were assessed as bPWV by Mobil-O-Graph (ABPM by IEM; Stolberg, Germany), which is a brachial cuff-based method and as cfPWV by Vicorder (SMT Medical, Würzburg, Germany) an oscillometric technique for carotid and femoral pulse wave assessment. Differences between the two methods were compared by Mann Whitney U test and Bland Altman plot. Spearman rank correlation was performed to test for age dependency.

Results: In 67 Patients (35.8% female, mean age 69, range 39-91 years) bPWV (mean 10.5 ± 2.4 m/s) was significantly higher than cfPWV (mean 9.2 ± 2.1 m/s; $p=0.0013$). Brachial PWV was related to age ($r=0.935$, $p<0.0001$) whereas cfPWV did not ($r=0.311$, $p=0.116$). Bland Altman plot for bPWV and cfPWV resulted in a mean difference of -10.4 (+2 SD (4.31), -2 SD (-6.38)).

Conclusion: In patients with peripheral arterial disease, the gold standard assessment (cfPWV) differs from brachial PWV and lacks correlation with age. Aorto-femoral atherosclerotic burden may in part explain this finding since these arterial segments impact the difference in transit time in the femoral segment.

P5.13 THE RELATIONSHIP BETWEEN APOLIPOPROTEIN B/ APOLIPOPROTEIN A1 RATIO, HIGH SENSITIVITY C - REACTIVE PROTEIN AND SOME COMPONENTS OF METABOLIC SYNDROME IN BULGARIAN POPULATION

G. Atanasova^a, M. Marinov^b, M. Atanasov^b

^aMedical University, Pleven, Bulgaria

^bNational Military University, Dolna Mitropolia, Bulgaria

The purpose of this study is to investigate the relations between apolipoprotein B (Apo B), apolipoprotein A1 (Apo A1), high sensitivity C-reactive protein (hsCRP) and the metabolic syndrome (MetS).

This study includes 500 clinically healthy people from Bulgaria - 201 (40,2%) men and 299 (59,8%) women. The following biomarkers are tested: apo B, apo A1, hsCRP, blood glucose, HDL-cholesterol, serum triglycerides (TG), LDL-cholesterol. One way ANOVA test, multiple comparison test of means and multiple logistic regression analyses are used.

The analysis shows that the odds of MetS for women increase by 1.08% for an increase of Apo B level with 1 mg/dl. When the level of hsCRP rises with 0.05 mg/l the odds of MetS for women increase with 1.9%. The odds of MetS for men increase by 4.75% for an increase of Apo B level with 1 mg/dl.

The odds of MetS for women increase by 1.77% for an increase of Apo B/Apo A1 ratio level with 0.01. When the hsCRP level rises with 0.05 mg/l the odds of MetS for women increase with 1.91%.

The hsCRP appears as the strongest indicator of MetS and it is more significant for women. The results for the first model indicate that the odds of MetS increase with rising of Apo B and hsCRP and decrease when Apo A1 increase. The results for the second model show that the odds of MetS increase with rising of Apo B/APO A ratio and hsCRP.

P5.14 IMPACT OF KIDNEY DONATION ON AORTIC STIFFNESS: A FEASIBILITY STUDY

J. Smith, C. McEniery, A. Bradley, I. Wilkinson, L. Tomlinson
University of Cambridge, Cambridge, UK

Background: Aortic pulse wave velocity (aPWV) is an important determinant of cardiovascular risk and predicts survival in patients on dialysis and other patient populations. Aortic stiffening is associated with a progressive decline in renal function whilst renal impairment results in accelerated aortic stiffening. However, existing studies are confounded by co-morbid illness. The aim of the current study was to better understand the impact of a reduction in renal function on aortic stiffness by examining blood pressure (BP) and aPWV in people undergoing donor nephrectomy, prior to, and 12 months following, donation.

Methods: 48 living donors (20 male) were recruited over a 3 year period. The average age was 51 ± 13 years and there were 3 current smokers. Glomerular filtration rate (eGFR) was estimated, and aortic stiffness assessed by measuring carotid-femoral (aortic) PWV.

Results: As expected, eGFR fell from 85 ± 18 ml/min at baseline to 59 ± 12 ml/min, 12 months post-donation ($P < 0.001$). Clinic BP was $123 \pm 15 / 79 \pm 9$ mmHg at baseline and $126 \pm 14 / 75 \pm 9$ mmHg, 12 months post-donation ($P = 0.09$ and $P < 0.001$ for systolic and diastolic BP, respectively). There was no change in aPWV from baseline, 12 months following donation (7.33 ± 1.53 m/s versus $7.35 \pm 1.1.58$ m/s, $P = 0.8$).

Conclusion: These data demonstrate that it is feasible to recruit patients undergoing living-donor nephrectomy and to examine the effects on aortic stiffness up to 12 months following donation. Moreover, the results provide important data on which to base larger studies aimed at investigating longer-term effects of kidney donation on aortic stiffness and cardiovascular health.

P6.1

EVALUATION OF ARTERIAL STIFFNESS INDICES AND CENTRAL HEMODYNAMICS IN HEALTHY NORMOTENSIVE VOLUNTEERS AND IN TREATED OR UNTREATED HYPERTENSIVE PATIENTS IN AMBULATORY CONDITIONS

S. Omboni^a, I. Posokhov^b, A. Rogoza^c

^aItalian Institute of Telemedicine, Varese, Italy

^bHemodynamic Laboratory Ltd, Nizhny Novgorod, Russia

^cCardiology Research Center, Moscow, Russia

Central blood pressure (BP) and various vascular indices estimated non-invasively over a 24-hour period were compared between normotensive volunteers and hypertensive patients by an innovative technology of pulse wave analysis, integrated in a BPLab ambulatory blood pressure monitoring (ABPM) system. Digitalized waveforms obtained during each brachial oscillometric BP measurement were stored in the device memory and then post-processed using software with Vasotens technology running on a personal computer. Averages for the whole 24-hour period and for the awake and asleep subperiods were computed. A total of 142 normotensive healthy subjects and 661 hypertensive patients were analyzed. 24-hour central BP, aortic pulse wave velocity (PWV) and augmentation indices (AI) were significantly higher in the hypertensive than in the healthy subject group (119.3 vs. 105.6 mmHg for systolic BP, 75.6 vs. 72.3 mmHg for diastolic BP, 9.8 vs. 9.2 m/sec for PWV, -9.7 vs. -40.7 for peripheral AI and 24.7 vs. 11.0 for aortic AI), whereas reflected wave transit time (RWTT) was significantly lower in patients with high BP (126.6 vs. 139.0 ms). After adjusting for age, gender, body mass index and 24-hour BP levels, a statistically significant between-group difference was still observed for 24-hour RWTT (127.5 ms hypertensives vs. 134.5 ms normotensives, $p = 0.0001$) and 24-hour peripheral AI (-14.1 vs. -20.0 , $p = 0.005$). All estimates of vascular health displayed a typical circadian rhythm. Thus the estimation of arterial stiffness and central hemodynamics by the BPLab device represents an effective tool for an evaluation of vascular damage in hypertensive patients in dynamic condition.

P6.2

SYSTEMATIC REVIEW OF RESULTS OF KISSING STENTS IN THE TREATMENT OF AORTOILIAC OCCLUSIVE DISEASE

E. Groot-Jebbink^{a,b}, J.-W. Lardenoije^a, S. Holewijn^a, M. Reijnen^a

^aRijnstate Hospital, Arnhem, The Netherlands

^bUniversity of Twente, Enschede, The Netherlands

Introduction: Severe stenosis or occlusion of the aortoiliac bifurcation is typically treated with open surgery. Patency results of aorto-bifemoral bypass are up to 90% at 5 years. However, the number and severity of complications seem to have reached a plateau level. A less invasive technique, the kissing stent (KS) is available nowadays. The goal of this review was to give an overview of the current results and status of the kissing stent technique.

Method: The Scopus® search engine was used to retrieve articles concerning KS, this retrieved 78 abstracts, 60 were rejected and 4 more were rejected after full text screening. One article was included after cross referencing. After a quality check, data was extracted for further analysis.

Results: 810 patients (72.8% Rutherford classification of 1/2/3) were included. The most prevalent risk factor was hypertension (37.5-96%) and 50% of patients were treated for TASC C & D lesions. Overall the technical success rate was 98.2%. Procedural protocols greatly differed on applying protrusion and pre or post dilatation. Clinical improvement at 30 days was achieved in 89.9%. Primary patency at 12, 24, and 36 months was 88.8%, 78.9 and 68.5, respectively. A complication rate of 11% was reported, of which most are minor. No detailed analysis could be performed because individual patient data are lacking.

Conclusion: KS treatment of aortoiliac disease is related with only minor complications and acceptable midterm patency results, this can however not surpass the results seen with open surgery.

P6.3

MODERATE INTENSITY EXERCISE AORTIC RESERVOIR PRESSURE INDEPENDENTLY PREDICTS LEFT-VENTRICULAR MASS INDEX: ONE-YEAR PROSPECTIVE STUDY IN PATIENTS WITH TREATED HYPERTENSION

M. Schultz^a, J. Davies^b, J. Sharman^a

^aUniversity of Tasmania, Hobart, Australia

^bImperial College London, London, UK

Background. Moderate intensity exercise blood pressure (BP) is associated with adverse cardiovascular outcomes. The mechanisms of this association are unknown but may be due to central haemodynamic factors. This study sought to determine the relation between moderate-exercise central haemodynamics (including aortic reservoir characteristics) and end organ disease assessed by left ventricular mass index (LVMI).

Methods. Resting and moderate cycle exercise (60-70% heart rate maximum) haemodynamics were recorded in 119 participants with treated hypertension (mean age 65±7 years, 47% male) at baseline and one-year. Brachial BP was recorded by auscultation and central haemodynamics (aortic reservoir pressure, augmentation index, systolic BP, pulse pressure) via radial tonometry. LVMI mass was recorded using real-time 3-dimensional echocardiography.

Results. Baseline to one-year change in LVMI was not related to change in any resting brachial or central haemodynamic variable, or exercise brachial BP ($P > 0.05$ all). However, change in exercise aortic reservoir pressure (integral) was significantly associated with change in LVMI ($r = 0.244$, $p = 0.006$). This relationship was maintained on multiple regression analysis adjusting for age, sex, body-mass index, aortic stiffness and 24-hour ambulatory systolic BP ($\beta = 0.001$, 95% CI = 0.000-0.001, $p = 0.035$).

Conclusions. Moderate exercise aortic reservoir pressure independently predicts changes in LV mass over time. Technology to measure 24-hour ambulatory central haemodynamics (including aortic reservoir characteristics) is now available and should provide additional prognostic information beyond peripheral BP measures.

P6.4

THE DIFFERENTIAL EFFECTS OF RESISTANCE TRAINING AND ENDURANCE TRAINING ON AUGMENTATION INDEX: A PILOT STUDY

I. Softley^a, E. Kier^b, S. Cooke^b, M. Bowes^b, L. Watkeys^b, N. Gale^a,

J. Cockcroft^a, B. McDonnell^a

^aCardiff University, Cardiff, UK

^bCardiff Metropolitan University, Cardiff, UK

Background: Current literature suggests that increased exercise is associated with decreased cardiovascular risk and improvements in vascular health. However, there is some conflict as to which modality of exercise has the most beneficial effect on vascular health and cardiovascular risk [1-3]. Therefore, the aim of our study was to investigate the influence of two different training modalities on augmentation index (AIx). This was carried out in a group of tightly matched, young, healthy male athletes who were either resistance (RT) or endurance trained (ET).

Methods: 17 male athletes (9 RT + 8 ET) aged 18-25 years were assessed for height, weight, BMI, mean arterial pressure (MAP) and AIx. AIx, which has been shown to be the most sensitive marker of systemic vascular stiffness in young individuals, was determined using the Mobil-o-Graph device (IEM).

Results: No significant differences in height, weight or MAP ($p > 0.05$) were observed between the RT and ET groups. However, both BMI and HR were found to be significantly higher in the RT compared to the ET group ($P < 0.05$). Interestingly, the RT group also had significantly higher AIx at heart rate 75 compared to the ET group ($14.4 \pm 9.6\%$ vs $0.3 \pm 12.3\%$, $P < 0.05$).

Conclusion: These results demonstrate that AIx was significantly higher in the RT compared to the ET group. Therefore, different modalities of exercise may elicit differential effects on vascular health. However, as this is a pilot study, larger and longitudinal studies are needed to support these findings.

P6.5

ANTI-INFECTIVE PERIODONTAL THERAPY IS ASSOCIATED WITH IMPROVEMENT OF ARTERIAL STIFFNESS AND PULSE WAVE REFLECTION

Y. Jockel-Schneider^a, U. Schlagenhauf^a, M. Bechtold^a, S. Fickl^a,

I. Harks^c, J. Baulmann^b

^aUniversity, Wuerzburg, Germany

^bUniversity, Luebeck, Germany

^cUniversity, Muenster, Germany

Aim: This parallel-group double blind prospective placebo-controlled clinical trial evaluated the impact of anti-infective periodontal therapy on the expression of surrogate parameters of cardiovascular health including arterial stiffness, pulse wave reflection, and blood pressure.