



## Artery Research

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### **P4.42: DIFFUSE CORONARY CALCIFICATION AND ATHEROSCLEROSIS IN SOUTH ASIAN PATIENTS WITH ANGINA COMPARED TO CAUCASIANS WITH SIMILAR RISK FACTORS**

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## P4.38

## Lipoprotein-Associated Phospholipase A2 Predicts Coronary Artery Calcification Assessed by Multislice Computed Tomography

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**Background:** Lipoprotein-Associated Phospholipase A2 (Lp-PLA<sub>2</sub>) has been shown to be a highly specific biomarker for artery inflammation and for cardiovascular risk assessment. Coronary artery calcification defined as coronary artery calcium score (CAC score) is a marker of increased risk of coronary artery disease (CAD).

**Aim:** This study evaluates the association between Lp-PLA<sub>2</sub> and presence of coronary artery calcification among patients with low and intermediate probability of CAD.

**Methods:** The analysis included 305 consecutive patients (61.3±10.59 yrs; 41.3% males) with intermediate probability of CAD. All patients were routinely assessed for traditional risk factors of CAD. Serum Lp-PLA<sub>2</sub> mass was measured by ELISA-based method. CAC score was obtained by multi-detector computed tomography and calculated by Agatston method. Coronary artery calcification was defined as CAC score > 0.

**Results:** Clinical characteristic of study population is summarized in the table. Coronary artery calcification was found in 187 (61.3%) patients (63.76±9.94 yrs; 48.7% males). In univariate analysis the predictors of coronary artery calcification were age (OR 1.07, 95%CI 1.04-1.09, *p*<0.0001), male gender (OR 2.42, 95%CI 1.38-3.66, *p*=0.0011), hypertension (OR 4.76, 95%CI 1.26-18.06, *p*=0.0217), diabetes (OR 4.28, 95%CI 1.37-13.36, *p*=0.0123), Lp-PLA<sub>2</sub> (OR 1.008, 95%CI 1.0006-1.014, *p*=0.0325), eGFR (OR 0.97, 95%CI 0.955-0.99, *p*=0.0042), triglycerides (OR 1.55, 95%CI 1.03-2.32, *p*=0.0362). In multivariate analysis age (OR 1.08, 95%CI 1.02-1.12, *p*=0.0055) and Lp-PLA<sub>2</sub> (OR 1.02, 95%CI 1.004-1.03, *p*=0.01) were the only independent predictors of coronary artery calcification.

**Conclusions:** Plasma Lp-PLA<sub>2</sub> is independently related to coronary artery calcification which supports its potential clinical utility in identification of individuals at increased risk of CAD.

Hypertension, (%)	41.9
Hyperlipidemia, (%)	40.6
Diabetes (%)	7.5
Smoking history (%)	24.6
Family history of CAD (%)	23.6
CAC score (mean±SD)	193±413.2
Lp-PLA <sub>2</sub> (ng/ml, mean±SD)	179.7±36.8
C-reactive protein (mg/dl, mean±SD)	0.23±0.34
eGFR (ml/min/1.73m <sup>2</sup> , mean±SD)	75.72±13.21
HDL (mmol/l, mean±SD)	1.66±1.87
Triglycerides (mmol/l, mean±SD)	1.27±0.68
LDL (mmol/l, mean±SD)	3.00±1.67

## P4.39

## Determinants of Intensive Care Unit Length of Stay After Coronary Artery Bypass Surgery

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Withdrawn by the author.

## P4.40

## Cardiovascular Disease After Pediatric Renal Transplantation

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**Background:** Chronic kidney disease is associated with an increased arterial stiffness (AsT) and left ventricular (LVM) mass. Increased AsT results in an

elevated pulse wave velocity (PWV). Few data are available on the evolution of PWV and LVM following renal transplantation (RTx) in children.

**Aim, subjects, Methods:** Children (aged 13.4 (0.88) years /mean(SD)/) with end stage renal disease followed by successful RTx were identified. 26 patients underwent PWV measurement 2,81 (0.03) years after RTx, with repeat PWV measurement and echocardiography 3,5 (1.08) years after transplantation. The LVM index (LVMI) was calculated. PWV was measured by applanation tonometry. Age and height matched PWV normal values were used, SD score was calculated. Candidate clinical variables for an association with LVMI and PWV were assessed, including age, routine laboratory findings, medications (serum levels and cumulative doses) and co-morbidities (hypertension, diabetes, dyslipidaemia).

**Results:** PWV age SDS (1,18(1,22)) and PWV height SDS (1,47 (1,21)) of RTx were increased compared to healthy pediatric population. Follow up measurement of PWV revealed increased PWV age SDS (1,18 vs 0,19) 3.5 years after RTx. Follow up measurement of PWV age SDS correlated with LVMI (*r*: 0,61, *p*:0,01). There was a bimodal correlation between LVMI and cumulative calcitriol dose before RTx.

**Conclusion:** Controls matched both for age and height should be used to assess PWV in RTx children with growth failure. AsT determined by PWV increased after RTx, and correlated with left ventricular hypertrophy (LVMI). Cumulative dose of calcitriol is among the major determinants of left ventricular hypertrophy after Tx.

## P4.41

## Calcium Score Reproducibility: A Meta-Analysis from St Francis and EBEAT Trials

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**Background and aim:** Coronary artery calcium score (CACs) is an established quantitative tool for assessing subclinical atherosclerosis. The aim of this study was to assess in a meta-analysis model the natural history and reproducibility of CACs measurements obtained from St Francis and EBEAT trials.

**Methods:** We analysed data from: 443 on placebo with 2 year follow up from St Francis trial (Study A) and 209 on 10 mg atorvastatin with 1 year follow up of EBEAT trial (Study B). Total CACs and that in the left coronary artery (LCA) branches, main stem (LMS), anterior descending (LAD), circumflex (Cx) and right coronary artery (RCA) were analysed.

**Results:** The overall agreement between the two measurements was fairly good, showing a small but significant increase in CAC: 68% of the group as a whole presented an increase in CACs, 23 % of the cohort had negligible change in CACs of <10% irrespective of the baseline CACs; and the remaining 10% showed a fall in CACs. Both studies showed similar patterns. The analysis of individual coronary arteries showed significantly higher variability of measurements in the RCA than that of the LCA. Males had higher baseline CAC, irrespective of age, than females but the rate of progression was not different between genders.

**Conclusion:** The higher variability in RCA measurements could be related to the low baseline CACs or exaggerated movement of the right side atrioventricular ring, whereas those for LCA branches are influenced by the branch allocation of the CACs.

## P4.42

## Diffuse Coronary Calcification and Atherosclerosis in South Asian Patients with Angina Compared to Caucasians with Similar Risk Factors

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**Introduction:** Ethnic differences in prevalence and severity of coronary artery disease (CAD) and calcification (CAD) are widely recognized.

**Aim:** To investigate CAC and CAD differences as shown by CT coronary angiography (CTCA), between symptomatic South Asians (SA) and Caucasians (CA).

**Methods:** We identified 101 symptomatic angina patients of S.Asian origin who had undergone CTCA (1/12/2009 to 30/04/2011) with a 640 slice,

320-row CT scanner, and compared them with 101 Caucasians matched for age, gender and coronary risk factors.

**Results:** CAC prevalence was similar in the two groups (56.4% SA, 47.5% CA;  $p=0.25$ ) but mean CAC score (CACS) ( $p<0.0001$ ) and mean number of affected segments ( $p=0.0001$ ) were significantly higher in S.Asians, in whom also 3 vessel disease (VSD) (25.7% SA, 5.9% CA;  $p=0.0004$ ) and obstructive CAD (stenosis  $>50\%$  in any branch) were more common (19.8% SA, 5.76% CA;  $p=0.0041$ ). In patients  $\leq 50$  years old ( $n=37$ ), no significant difference was found between the two groups in mean CAC score ( $p=0.28$ ), affected segments number ( $p=0.12$ ) or CAD severity ( $p=0.684$ ) and extent ( $p=0.514$ ). In individuals  $>50$  years old, the CAC severity was higher in S.Asians (Table 1) as was the number of affected segments ( $p=0.001$ ).

**Conclusions:** Symptomatic S.Asians have more diffused coronary artery calcification, age plays an important role in this difference.

#### P4.43

##### ACUTE, INDUCED INFLAMMATION AFFECTS ARTERIAL LOAD

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Acute, systemic inflammation may contribute to a shift in ventricular-vascular coupling (VVC), quantified by the ratio of arterial load (Ea) to ventricular elastance (Elv). Fitness is associated with reduced systemic inflammation which may affect VVC. We determined the effect of acute systemic inflammation on VVC in young, healthy adults and evaluated the impact of fitness on this outcome. We tested 21 adults ( $m=15$ , mean age=25 yr, mean body surface area = 2.05m<sup>2</sup>) before and at 24 and 48 hr post influenza vaccination (inflammatory stimulus). Ventricular volumes were measured by ultrasound from the 4-chamber apical view. Applanation tonometry was used to measure end-systolic pressure (ESP). Arterial load was calculated as ESP/stroke volume (SV) and Elv was calculated as ESP/end-systolic volume (ESV). Treadmill VO<sub>2</sub> max was used to quantify fitness. A repeated measures (1 x 3) ANOVA was used with VO<sub>2</sub> max as a covariate, and Spearman's correlation used to assess relationships between variables. Ea increased at 48 hr post-vaccination (from 1.19 to 1.13 to 1.32 mmHg/ml),  $p<0.05$ , but Elv did not change at either time point ( $p>0.05$ ), resulting in an increase in VVC from 0.49 to 0.53 to 0.52,  $p<0.05$ , at 24 and 48 hr post vaccination. At 48 hr post-vaccination, the change in Ea was ( $r=0.45$ ,  $p<0.05$ ) related to VO<sub>2</sub> max. There were no significant changes in blood pressure. Thus, acute inflammation increased arterial load but not ventricular elastance, independent of changes in blood pressure. This increased VVC, and higher fitness was associated with greater inflammation induced changes in arterial load.

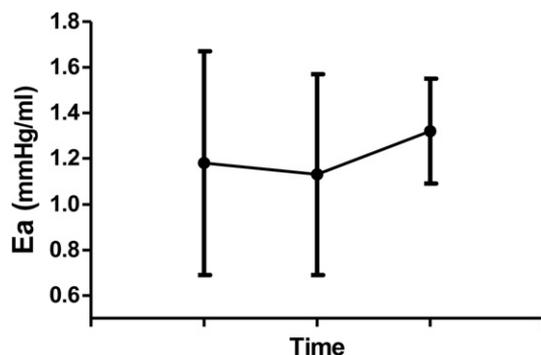


Figure 1 Ea (mmHg/ml) at baseline and at 24 and 48 hr post-inflammation. \* indicates  $p<0.05$  from baseline value

#### P4.44

##### REGIONAL ARTERIAL STIFFNESS ASSESSED BY POPMETRE® IN PATIENTS WITH CAROTID PLAQUES

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**Purpose:** To date, regional arterial stiffness can be easily evaluated using pOpmetre® (Axelife SAS – France), a new device measuring the pulse wave transit time (TT) between the finger (TTf) and the toe (TTt). The aim was to evaluate the relationship between the pOpmetre® indices and the presence of carotid plaques.

**Methods:** In 66 consecutive patients with risk factors (40 men aged  $54 \pm 2$  years; 26 women aged  $49 \pm 3$  years), the difference between TTt and TTf (Dt-f) and the pulse wave velocity (PWVt = Constant\*Height\_Patient / Dt-f in m/s) were measured by pOpmetre®. Doppler ultrasound imaging assessed presence of carotid plaques. The local aortic stiffness (AoStiff) was evaluated by the Physioflow® system.

**Results:** No statistical difference was found between the group of patients with carotid plaques ( $n=23$ ) and the rest of patients for Ankle-Brachial Index (ABI:  $1.13 \pm 0.02$  vs  $1.17 \pm 0.03$ ), systolic and diastolic blood pressure ( $83.8 \pm 2.1$  vs  $86.2 \pm 2.9$ ;  $131.2 \pm 2.7$  vs  $137.3 \pm 3.7$ ). The first group was older than the second one ( $59 \pm 2$  yrs vs  $49 \pm 2$  yrs,  $p<0.002$ ) with a larger intima media thickness ( $0.70 \pm 0.02$  vs  $0.63 \pm 0.01$ ,  $p=0.003$ ), a higher AoStiff and PWVt ( $10 \pm 1.0$  vs  $8 \pm 1.0$  m/s,  $p<0.03$ ;  $10.97 \pm 0.97$  vs  $8.84 \pm 0.43$  m/s,  $p<0.02$ ) and a shorter Dt-f ( $57.9 \pm 6.2$  vs  $70.4 \pm 3.2$  ms,  $p<0.02$ ). PWVt ( $r=0.49$ ,  $p<0.0001$ ) and Dt-f ( $r=0.54$ ,  $p<0.0001$ ) were correlated with age. **Conclusion:** Although we found no difference in ABI and arterial pressure, the data reveals an increased in local and peripheral arterial stiffness (pOpmetre®) for patients with carotid plaques.

#### P4.45

##### SUBTHERAPEUTIC, LOW-DOSE FLUVASTATIN IMPROVES FUNCTIONAL AND MORPHOLOGICAL ARTERIAL WALL PROPERTIES IN APPARENTLY HEALTHY, MIDDLE-AGED MALES

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**Objective:** Early arterial wall changes are already present in the apparently healthy, middle-aged population and continuously progress with age. The aim of our study was to investigate whether 30 days low-dose fluvastatin treatment could improve and reverse these arterial changes that are primarily associated with ageing, in otherwise healthy middle-aged males.

**Methods:** In a double blind, randomized study, 50 middle-aged males received either placebo or fluvastatin (10mg) for 30 days. Brachial artery flow-mediated dilation (FMD), pulse wave velocity (PWV) and  $\beta$ -stiffness of the common carotid artery were measured on the 1st, 14th and 30th day of the study using an Aloka instrument by integrated eTracking.

**Results:** In 77% of subjects, impaired endothelial function was revealed at inclusion in the study. All the parameters were improved already after 14 days, and after 30 days of treatment FMD improved by  $91.5 \pm 15.6\%$ , while PWV and  $\beta$ -stiffness improved by  $6.2 \pm 1.1\%$  and  $10.7 \pm 1.5\%$ , respectively (all  $P<0.001$ ). After therapy discontinuation, the beneficial effects progressively decreased, but were still detectable after 5 months. During the study the lipid profile remained unchanged, thus the beneficial effects obtained were attributed to the pleiotropic effects of fluvastatin.

**Conclusions:** We found that subtherapeutic low-dose fluvastatin (10mg daily; 30 days) considerably improves and reverses early functional and morphological arterial wall impairments that are present in apparently healthy, middle-aged males. It might be supposed that such a new and original approach could be valuable in cardiovascular prevention.

#### P4.46

##### RELATIONSHIP BETWEEN ARTERIAL STIFFNESS, DIASTOLIC FUNCTION AND GLYCEMIC CONTROL IN HEALTHY SUBJECTS

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Insulin resistance with its associated metabolic derangements is associated with cardiovascular disease. It is unknown if lesser degrees of this metabolic derangement are associated with early vascular functional or structural changes. Our aim is to examine the relationship between glycemic indices and early vascular dysfunction in healthy subjects.