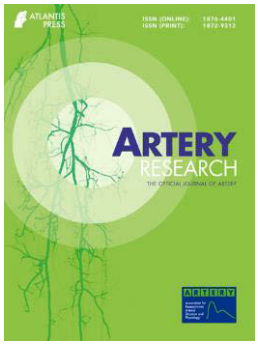

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P75: SIGNS OF ACCELERATED CAROTID ATHEROSCLEROSIS IN EARLY TYPE 2 DIABETES ASSESSED BY MAGNETIC RESONANCE IMAGING

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P75
SIGNS OF ACCELERATED CAROTID ATHEROSCLEROSIS IN EARLY TYPE 2 DIABETES ASSESSED BY MAGNETIC RESONANCE IMAGING

Esben Laugesen [1], Pernille Høyem [1], Samuel Thrysøe [2], Esben Hansen [2], Anders Mikkelsen [2,3], Bill Kerwin [4], L. Poulsen Per [1], K. Hansen Troels [1], Y. Kim Won [2,5]
[1]*Department of Endocrinology and Internal Medicine, Aarhus University Hospital, Aarhus, Denmark*
[2]*The MR Research Centre and Department of Clinical Medicine, Aarhus University Hospital, Aarhus, Denmark*
[3]*Department of Procurement and Clinical Engineering, Central Denmark Region, Denmark*
[4]*University of Washington, Seattle, WA, USA*
[5]*Department of Cardiology, Aarhus University Hospital, Aarhus, Denmark*

Background: Ischemic stroke from carotid plaque embolism remains a major cause of morbidity and mortality in patients with type 2 diabetes (T2DM). However, the effect of T2DM on early carotid plaque burden and composition is sparsely elucidated. We assessed carotid plaque composition by carotid magnetic resonance imaging (MRI) in short duration T2DM patients compared to a sex- and age-matched control group.
Methods: 100 patients with T2DM (duration <5 years) and 100 sex- and age-matched control subjects underwent MRI of the carotid arteries bilaterally in a 1.5 T MRI scanner. Plaque burden was measured as normalized wall index, maximum wall thickness, maximum wall area, and minimum lumen size. Plaque characteristics were quantified by calcified plaque volume, necrotic core volume, and loose matrix volume.
Results: MRI data were available for 149 and 177 carotid arteries from T2DM patients and control subjects, respectively. T2DM was associated with a higher normalized wall index (ratio 1.03 (1.002; 1.06), $p = 0.03$), a lower minimum lumen area (ratio 0.81(0.74; 0.89), $p < 0.001$), and lower maximum wall area (ratio 0.94 (0.88; 1.00), $p = 0.048$) compared to controls. Body mass index (BMI) was associated with maximum wall area and all plaque characteristics independently of diabetes status. BMI $\geq 30\,kg/m^2$ was associated with an 80% increase in total volume of calcified plaque, and a 44% increase in necrotic core volume compared to BMI $< 25\,kg/m^2$.
Conclusions: T2DM patients had increased carotid plaque burden and negative remodeling. Obesity was associated with increased carotid artery necrotic core volume and calcification independently of diabetes status.

P76
PERIPHERAL BLOOD PRESSURE AND STIFFNESS INDEX ESTIMATION USING THE PPG SIGNAL MEASURED WITH THE pOpmètre DEVICE: CALIBRATION WITH THE CUFF BLOOD PRESSURE

Hasan Obeid [1], Hakim Khettab [1], Magid Hallab [2], Stephane Laurent [1], Pierre Boutouyrie [1]
[1]*Hôpital Européen Georges-Pompidou, Inserm U970, Paris, France*
[2]*Axelife and University Hospital Nantes, Nantes, France*

Arterial stiffness may influence the contour of the peripheral pulse, suggesting that contour analysis of the digital volume pulse (DVP) might be used to estimate peripheral blood pressure and a stiffness index (SI).
The objective is to establish a transfer function that estimates the peripheral blood pressure using the PPG pulse, calibrated with a brachial pressure cuff, and then to deduce a stiffness index using the established parameters.
We positioned the photodiode sensor on the finger. Brachial blood pressure measurement was performed with a cuff adapted to the arm circumference and an oscillometric device (Omron M10 -IT). Pulse wave velocity (PWV) measurements were performed with the pOpmètre® system. DVP waveforms were recorded over a 10 s period and ensemble-averaged to obtain a single waveform from which DT (DVP) was determined as the time between the first systolic peak and the early diastolic peak/inflection point in the waveform. The SI is the ratio of the subject's height to the DT (DVP).
69 subjects were included: 24 healthy subjects and 45 patients with essential hypertension. The correlation between the estimated peripheral diastolic pressure and the brachial one was good and significant ($r^2 = 0.51$; $p < 0.001$). A better correlation was found in terms of peripheral systolic pressure ($r^2 = 0.56$; $p < 0.001$). The correlation between the SI and the ft-PWV was significant ($r = 0.5$; $p < 0.001$) classifying the estimation as good agreement.
The estimation of the peripheral blood pressure and a stiffness index with the PPG signal qualifies as good agreement with the reference technique.

P77
NEAR INFRARED SPECTROSCOPY (NIRS) CAN DETECT DIFFERENCES IN MICROVASCULAR REACTIVE HYPERAEMIA IN THE PRESENCE OF HYPERTENSION

Siana Jones, Chloe Park, Nish Chaturvedi, Alun Hughes
University College London, UK

Background: Hypertension has adverse effects on microvascular function but there are limited methods that permit non-invasive assessment of the microcirculation in man in vivo. We used Near Infrared Spectroscopy (NIRS) to assess microvascular reactive hyperaemia in skeletal muscle following a short period of ischemia. We tested if differences between normotensive and hypertensive individuals could be detected.
Methods: Older adults enrolled in a population-based cohort study underwent measurements of oxy-Hb changes during a 30-second arterial occlusion and hyperaemic response using NIRS (Portamon, Artinis). Time-to-peak hyperaemic response was calculated. Hypertension diagnosis was determined by questionnaire and clinic blood pressure (BP) (diastolic BP > 90 mmHg or systolic BP > 140 mmHg). Diabetes diagnosis and information about medication were determined by questionnaire. Data are mean (SD) or adjusted mean ± SEM. Multivariable linear regression was used. Associations with hypertension were adjusted for age, gender, ethnicity and presence of diabetes.
Results: 129 participants (99 = male, 72(6) years old, 74(57%) hypertensive participated). Time-to-peak hyperaemic response was significantly longer in hypertensive than normotensive participants after adjustment for age and gender (12.5 ± 0.49 versus 10.5 ± 0.57seconds, $p = 0.06$). This association persisted after adjustment for ethnicity and the presence of diabetes (12.6 ± 0.50 versus 10.5 ± 0.57, $p = 0.03$).
Conclusion: Hypertension is associated with impairment of post-ischemic reactive hyperaemia in skeletal muscle microvasculature. Differences between hypertensive and normotensive older adults can be detected non-invasively using NIRS.

P78
LONGITUDINAL MICRO-ULTRASOUND ASSESSMENT OF THE ob/ob MOUSE MODEL: EVALUATION OF CARDIOVASCULAR, RENAL AND HEPATIC PARAMETERS

Nicole Di Lascio [1,2], Claudia Kusmic [1], Francesco Stea [3], Francesca Lenzarini [1], Cristina Barsanti [1], Arthur Leloup [4], Francesco Faita [1]
[1]*Institute of Clinical Physiology, CNR, Pisa, Italy*
[2]*Institute of Life Sciences, Scuola Superiore Sant'Anna, Pisa, Italy*
[3]*Department of Clinical and Experimental Medicine, University of Pisa, Pisa, Italy*
[4]*Department of Pharmaceutical Sciences, University of Antwerp, Antwerp, Belgium*

Purpose/Background/Objectives: Obesity is associated with increased risk factors for cardiovascular disease (CVD). Leptin-deficient mice (*ob/ob*) are widely employed to investigate obesity. This study is aimed at providing a micro-ultrasound (mUS) longitudinal evaluation of the *ob/ob* mouse in terms of cardiovascular effects, consequences for renal microcirculation and liver fat accumulation.
Methods: Sixteen wild-type (*wt*) and eleven *ob/ob* male mice were studied at 8 (T_0) and 25 (T_1) weeks of age with a mUS system (Vevo2100). Cardiac output (CO), ejection fraction (EF), stroke volume (SV), fractional shortening (FS) and E/A ratio were measured from cardiac images. Mean diameter (Dm_{abd}, Dm_{car}), relative distension ($relD_{abd}$, $relD_{car}$) and pulse wave velocity (PWV_{abd}, PWV_{car}) were obtained for both abdominal aorta and common carotid. Renal resistivity and pulsatility index (RI, PI) were assessed. The ratio between grey-levels related to liver and kidney (Steato-Score) was used as index of hepatic steatosis.
Results: At T_0, *ob/ob* mice showed reduced SV, EF, CO and $relD_{abd}$ values and increased LVmass, PWV_{abd}, RI, PI and Steato-score. Similar results for SV, EF, CO, RI, PI and Steato-Score were found at T_1; furthermore, obese mice showed reduced Dm_{abd} and Dm_{car} measurements in comparison with lean controls. The longitudinal analysis showed an increase in LVmass and Dm_{abd} and a reduction of FS, EF, CO, $relD_{abd}$ and $relD_{car}$ for *wt* animals and no differences for the *ob/ob* one.