territories and the prognostic value in the progression of carotid disease of coronary calcium score at a median follow up.

P729
Differential effects of peripheral and central blood pressures on circulating levels of high-sensitivity cardiac troponin I

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Background: Increased circulating concentrations of cardiac troponins support the diagnosis of small as well as large myocardial damage in the early phase of acute myocardial infarction. However, high-sensitivity cardiac troponins are not only specific markers of ischemic myocardial damage; severe cardiac load also increases high-sensitivity cardiac troponins through non-ischemic mechanisms.
Purpose: The present study was designed to investigate the effect of central blood pressure (BP), which reflects cardiac load rather than peripheral BP, on serum concentrations of high-sensitivity cardiac troponin I (hs-cTnI) in subjects with or without increased arterial stiffness.
Methods: The present study enrolled 1210 participants (58±12 years) taking part in a yearly health checkup program. Laboratory measurements included serum concentrations of hs-cTnI and derivative reactive oxygen metabolites (d-ROM), as well as plasma concentrations of B-type natriuretic peptide (BNP). Central BP and the radial augmentation index (rAI) were evaluated non-invasively using an automated device.
Results: In univariate regression analysis, hs-cTnI concentrations were significantly correlated with BNP (r=0.29, $p<0.0001$), and d-ROM (r=0.06, $p<0.05$), as well as brachial systolic BP (r=0.32, $p<0.0001$) and central systolic BP (r=0.32, $p<0.0001$). Multivariable regression analysis was performed with both brachial and central SBP included in the same model to analyze the effect of each BP on hs-cTnI concentrations because assessment of variance inflation factors did not show significant effects of multicollinearity on the results. The results of multivariable regression analysis indicated that both brachial and central systolic BP were independently associated with hs-cTnI after adjustment for conventional risk factors and other possible factors in three different models. To analyze the effects of brachial and central BP on hs-cTnI concentrations in patients with different arterial properties, subjects were divided into two groups using the mean rAI value as the cut-off point. Subjects with higher rAI had higher hs-cTnI concentrations than those with lower rAI ($p<0.05$). In subgroup analyses, in those with lower rAI, brachial but not central systolic BP was independently associated with hs-cTnI (β=0.16, $p<0.01$), whereas in those with higher rAI, central but not brachial systolic BP was independently associated with hs-cTnI (β=0.13, $p<0.05$). These associations remained significant after further adjustment for BNP and/or d-ROM.
Conclusions: Circulating levels of hs-cTnI increase with increasing brachial and central BP, but the effect of central BP was greater in subjects with higher rAI. This indicates that central BP may have a strong effect on silent myocardial damage, assessed as increased circulating hs-cTnI, particularly in subjects with increased arterial stiffness.

P730
Noninvasive assessment of local carotid pulse pressure by radiofrequency-based wall tracking: comparison with applanation tonometry and relationships with cardiovascular biomarkers

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Background: Central pulse pressure (PP) has been suggested a better predictor of cardiovascular (CV) risk than brachial PP, since it better reflects the impact of hemodynamic load on CV system. A routine measurement of invasive aortic BP is not feasible, and thus a noninvasive carotid artery pressure is often used as a surrogate for aortic pressure, because of the close proximity of the two arterial sites.
Purpose: The present study validated the performance of radiofrequency-based ultrasound wall tracking (WT) system to estimate local carotid PP from calibrated arterial distension waveforms. Values of carotid PP obtained by WT were compared to those obtained by a validated applanation tonometry (AT) system. Furthermore, the associations of local carotid PP and brachial PP with established CV biomarkers were evaluated.
Methods: Carotid PP was measured by WT and AT during the same session in 346 subjects (116 healthy controls, 199 hypertensives, 72 diabetics). Carotid intima-media thickness (IMT) was measured in all subjects and left ventricular mass (LVM) in 225.
Results: Carotid PP values as measured by two different techniques highly correlated (r=0.87; slope 0.90 [0.85–0.95]; $P<0.0001$), though carotid PP was higher when measured by WT, with a mean difference of 3.1±6.8 mmHg. Independent determinants of carotid PP were age, heart rate, triglycerides and BP-lowering therapy, both when measured by AT (cumulative R2=0.29, $P<0.0001$) and WT (cumulative R2=0.27, $P<0.0001$). IMT, LVM and LVM index correlated better with local carotid PP measured by WT (r=0.44, 0.50 and 0.56; $P<0.0001$ for all) than with simultaneously measured brachial PP (r=0.34, 0.43 and 0.49; $P<0.0001$ for all).
Conclusions: Local carotid PP estimated from carotid distension waveforms is comparable to PP obtained by carotid applanation tonometry. Carotid PP provides a better insight on the impact of pressure load on large artery and left ventricle as compared to brachial PP. Therefore, a non-invasive estimation of local carotid PP during routine ultrasound examination of extracranial carotid tree may be helpful for cardiovascular risk assessment.

P731
Carotid elastic properties impairment in case of Bicuspid aortic valve: myth or reality?

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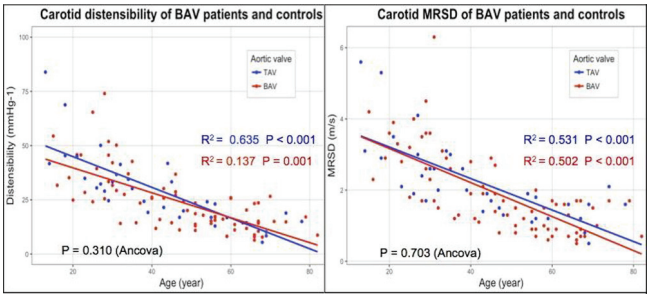
Purpose: Bicuspid aortic valve (BAV) is associated with a well-known aortic impairment. Despite a common embryological origin of the carotids and ascending aorta, carotid involvement associated to BAV remains controversial. We aimed at evaluating parameters of carotid stiffness by ultrafast ultrasound imaging (UF), in a prospective series of BAV patients.
Methods: BAV patients and normal first-degree relatives (controls) were consecutively included in a reference center for BAV. Bilateral evaluation of common carotid arteries by UF was carried out by a 7.5 MHz linear probe (Aixplorer®, SuperSonic Imagine©). The high frame rate (5000 frames/s) was used to measure the PWV at the foot of the waveform (PWV1), generated at the diastolic blood pressure (DBP) and at the dicrotic notch (PWV2), at the systolic blood pressure (SBP). To evaluate the intrinsic properties of the artery, we therefore reported each PWV measured to their corresponding arterial pressure. Distensibility measurement, maximal rate of systolic distension (MRSD) and maximal rate of diastolic recoil (MRDR) were measured by analyzing the carotid diameter change, obtained by tracking the wall by ultrafast Doppler imaging.
Results: 74 BAV patients and 35 controls were prospectively included, with similar age but larger aortic diameters in case of BAV ($p<0.001$) at the Valsalva sinus or tubular aortic levels. Neither the PWVs analysis, nor the distensibility, MRSD, or MRDR analysis, found any difference in term of carotid stiffness between BAV patients and controls (Table). Carotid stiffness, evaluated by distensibilty or MRSD, was linearly correlated with age, with similar slopes in BAV patients and controls, underlining the similar behaviour of carotid stiffening with age (Figure).

Table 1. Characteristics of Bicuspid aortic valve (BAV) patients and controls

	BAV patients	Controls	p-value
Age (year)	47.2±16.9	42.3±18.6	0.175
Tubular aortic diameter (mm)	35.0±7.2	28.8±4.4	<0.001
Sinus of Valsalva diameter (mm)	36.2±8.6	28.3±6.1	<0.001
PWV1/DBP (cm/s/mmHg)	6.97±1.49	6.55±1.22	0.156
PWV2/SBP (cm/s/mmHg)	5.33±1.76	5.43±1.44	0.763
Distensibility ($mmHg^{-1}$)	26.3±22.5	29.1±16.5	0.503
MRSD (no unit)	1.87±1.14	2.23±1.13	0.131
MRDR (no unit)	1.00±0.61	1.02±0.56	0.905



Conclusion: Comparatively to the impairment observed on the ascending aorta, our results clearly indicate that carotid stiffness parameters are not impacted in case of BAV.

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