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P5.17: CAROTID PULSE PRESSURE ASSESSMENT BY MEANS OF AN ACCELEROMETRIC SENSOR

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characteristic impedance, pulse wave velocity, and steady afterload were kept constant. In one set of experiments, the magnitude of C(P) was decreased while retaining its pressure-dependence, thus preserving compliance variations within any given cycle. In a second set, both the magnitude and pressure-dependence were progressively decreased, such that compliance became increasingly constant; mean compliance and reflection magnitude were pairwise matched to each case of the first set of experiments.

Results: When stiffening was accompanied by retained pressure-dependence, there was marked delaying of wave reflections compared to more constant compliance cases. Pressures and myocardial wall stress at end-systole were elevated, while stroke volume and ejection period were decreased.

Conclusion: The dynamic loading effects of pressure-dependent compliance can have complex effects on LV-AS coupling. Characterization of the complex changes of C(P) with age and disease deserves further investigation.

P5.13

ESTIMATION OF CENTRAL SYSTOLIC PRESSURE: ARE PERIPHERAL WAVEFORMS AND TRANSFER FUNCTION NECESSARY?

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Background and aim: The degree of systolic pressure amplification (SPamp) from aorta to brachial artery depends on a number of variables including age, gender, heart rate and arterial stiffness. It is admitted that central systolic blood pressure (cSBP) cannot be predicted with sufficient accuracy from brachial blood pressure and thus needs to be estimated using peripheral waveform analysis and transfer functions. We have developed a proprietary method for direct central blood pressure (DCBP) estimation, which challenges this paradigm. In the present preliminary study, our DCBP method was applied to a meta-analysis of published studies with invasive, high-fidelity pressure tip data of both aortic and brachial artery pressures.

Methods and results: Five studies were found fulfilling our criteria. There were 282 subjects (77.3% male), with known or suspected coronary artery diseases. Mean age was 63.3±13.2 years and heart rate was 67.1±11.3 bpm. Invasive brachial systolic, diastolic and mean BP were 137.9±19.9 mmHg, 70.9±10.2 mmHg and 97.1±11.7 mmHg, respectively. The measured invasive cSBP was 131.1±19.9 mmHg and the mean SPamp was 6.8 mmHg. The cSBP estimated with DCBP method was 132.9 mmHg and the mean difference with invasive measures was 1.8 mmHg.

Conclusion: The meta-analysis of studies documenting invasive high-fidelity pressure at aortic and brachial artery level indicates that our DCBP method can predict cSBP from brachial blood pressures with good accuracy in relatively old subjects with established or suspected coronary diseases. Further studies are needed to document the precision of the DCBP method in healthier and younger subjects as well as its sensibility to peripheral BP measuring method.

P5.14

THIGH-CUFF BASED MEASUREMENT OF AORTIC PULSE WAVE VELOCITY: INITIAL TESTING OF A NOVEL VASERA PROTOTYPE DEVICE

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Introduction: Fully automated cuff-based devices have been developed for the assessment of arterial stiffness via pulse wave velocity (PWV) measurement, such as the VaSera device (Fukuda Denshi). To date, measurements were confined to the heart-to-ankle segment, yielding PWV and stiffness indices that are not easily linked to carotid-femoral PWV (cf-PWV), the presumed reference for measurement of aortic PWV.

Methods: We performed initial tests (N=14, 9 males, mean age 27.4±3.3, BMI 23.8±3.4) using a novel thigh-cuff prototype that can be used as a substitute for the ankle cuffs in the VaSera device. Extracted data included heart-thigh (ht-PWV) and heart-ankle (ha-PWV). cf-PWV was obtained using ultrasound (GE Vivid 7) on the right side.

Results: Measurements were successfully obtained for all subjects. cf-PWV was 5.32 ± 0.43 m/s. ha-PWV was 6.35±0.49 m/s, and was significantly

higher than cf-PWV (paired t-test; P<0.001). ht-PWV, on the other hand, was 5.51±0.50 m/s and was not significantly different from cf-PWV. Bland-Altman analysis demonstrated a non-significant bias of 0.19±0.54 m/s of ht-PWV with respect to cf-PWV.

Conclusion: We conclude that, in this small-sized young and healthy population, fully automated measurement of heart-thigh PWV is straightforward and easy. Measured values were not different from carotid-femoral PWV. Further research is warranted to confirm these findings in a larger population spanning a large age range and cardiovascular risk profiles.

P5.15

EVALUATION OF AORTIC ¹⁸F-NAF TRACER UPTAKE DETECTED USING PET/CT IN PREDICTING AORTIC CALCIFICATION OVER A 4-YEAR FOLLOW-UP PERIOD

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Background: Uptake of ¹⁸F-sodium fluoride (¹⁸F-NaF) in the aortic wall may reflect metabolically active areas of calcification, an important predictor of cardiovascular morbidity and mortality when detected by computed tomography (CT). The aim of this project was to determine if ¹⁸F-NaF uptake in the aorta can predict development of calcification as detected by CT.

Method and results: Twenty one postmenopausal women (mean age 62±6 years, range 52-74), underwent assessment of aortic ¹⁸F-NaF uptake using positron emission tomography/computer tomography (PET/CT) at baseline and after a mean follow-up of 3.7±1.3 years. Tracer uptake was quantified by calculating the target-to-background ratios (TBR). At baseline, there was a trend to a positive correlation between CT calcium volume score and tracer uptake (r=0.33, P=0.15). Over the follow-up period aortic CT calcium volume increased from 0.45±0.62 to 0.71±0.93 cm³ (P<0.04). However, the change in calcium volume did not significantly correlate with baseline TBR values (r=0.18, P=0.52). TBR at baseline did not differ between participants with (n=16) compared to those without (n=5) progression in calcium volume progression (2.43±0.46 vs. 2.31±0.38, P=0.58). In aortic segments identified to have highest tracer uptake at baseline, calcium volume did not significantly change over the follow-up period (from 0.08±0.15 to 0.12±0.26 cm³, P=0.42). In multivariate regression analysis baseline TBR did not associate with progression in calcium volume.

Conclusion: In a cohort of postmenopausal women ¹⁸F-NaF uptake as measured by TBR was not a predictor of progression of aortic calcification as detected by CT over a 4-year follow-up period.

P5.17

CAROTID PULSE PRESSURE ASSESSMENT BY MEANS OF AN ACCELEROMETRIC SENSOR

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Central pulse pressure (cPP) is increasingly investigated as possible independent predictor of cardiovascular risk and carotid pulse pressure (carPP) can be used as a surrogate marker of cPP. Despite its importance, carPP measurement remains challenging in clinical practice. The aim of this study was to introduce a new easier-to-use method for non-invasive carPP evaluation based on an accelerometric sensor.

Accelerometric signals were recorded in 22 subjects (males: 45.5%, 47.4±17 years, hypertension: 50%; smoking: 18%; diabetes: 23%; hypercholesterolemia: 27%). Under the hypothesis that these signals represent the acceleration linked to the displacement of the carotid near wall, carPP_{acc} values were achieved double integrating the accelerometric waveforms and calibrating the obtained diameter curves with brachial pressure measurements. carPP_{acc} measurements were compared with tonometric assessments (carPP_{ton}). Moreover, accelerometric carotid pressure waveforms (P_{acc}) were contrasted in terms of shape to those obtained by tonometry (P_{ton}), calculating the root mean square error (RMSE_{ton}) and the regression coefficients (r_{ton}).

carPP_{acc} values (46±10.55 mmHg) were significantly correlated with carPP_{ton} (47.5±11.2 mmHg) assessments (R=0.93, p<0.001). The Bland-Altman analysis provided a non-significant bias of -1.54 mmHg. The validity of the accelerometric approach was confirmed by morphological parameters (RMSE_{ton}=5±1.95 mmHg; r_{ton}=0.94±0.04).

In conclusion, carPP values obtained with the accelerometric device are in good correlation with those calculated with standard applanation tonometry. Therefore, the proposed approach, providing an easier and more available measurement, could represent a valid alternative to existing and used technique for carPP assessment.

P5.18

TRANSRADIAL APPROACH FOR VERTEBRAL ARTERY STENTING: SINGLE-CENTER EXPERIENCE

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Objectives: Transradial vertebral artery (VA) angioplasty might be a viable alternative to the transfemoral approach in cases of peripheral artery disease or anatomical variations of the aortic arch. The purpose of our study was to evaluate the safety and efficacy of transradial stenting of symptomatic VA stenosis.

Material and methods: Seventeen patients [67±8,4 years, 76% men, with >80% stenosis, 13 right-side, all symptomatic from posterior circulation (history of stroke, TIA or chronic ischemic symptoms)] with peripheral artery disease (PAD) or unsuccessful attempt via femoral access were scheduled for VA angioplasty by radial approach. Clinical and duplex ultrasound (DUS) follow-up were performed before discharge and 6, 12 and 24 months after VA stenting.

Results: The technical success rate was 100%. In all cases VA angioplasty was performed with the use of single balloon-mounted stent (11 bare metal stents, 6 drug eluting stents). The mean NASCET VA stenosis was reduced from 87,5% to 5,9% (p<0.001). No periprocedural death, stroke, myocardial infarction or transient ischemic attack occurred. During 24-months follow-up in 14 of 17 patients chronic ischemia symptoms release was observed, no new acute ischemic neurological symptoms were diagnosed in all patients. One patient died 20 months after intervention from unknown cause. There was one, symptomatic border-line VA in-stent stenosis 12 months after angioplasty.

Conclusion: Transradial VA stenting may be effective and safe procedure and it may constitute an alternative to femoral approach in patients with symptomatic vertebral artery stenosis.

P5.19

TRANSRADIAL APPROACH FOR CAROTID ARTERY STENTING: SINGLE-CENTER EXPERIENCE

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Objectives: The transfemoral approach is commonly used for carotid artery stenting (CAS) however in cases of severe peripheral vascular disease or unfavorable aortic arch anatomy, the transradial access remains a viable alternative. We report a series of patients with aorto-iliac disease or unsuccessful attempt via femoral access in whom transradial carotid artery stenting was performed.

Material and methods: Sixteen patients (69±10,7 years, 75%men, with >70% stenosis, 10 left-side, 5 contralateral carotid occlusion, 9 with history of stroke or TIA) with peripheral artery disease (PAD) or unsuccessful attempt via femoral access were scheduled for carotid artery angioplasty by radial approach. Clinical and duplex ultrasound (DUS) follow-up were performed before discharge and 1, 12 and 24 months after carotid artery stenting.

Results: The technical success rate was 87,5%. In two cases attempt via femoral and radial access were unsuccessful and the patients were treated by endarterectomy. In other cases CAS was performed with self-expanding bare metal stents. The mean NASCET carotid artery stenosis was reduced

from 85% to 9,6% (p<0.001). No periprocedural death, stroke, myocardial infarction or transient ischemic attack occurred. During 24-months follow-up no new acute ischemic neurological symptoms were diagnosed in all patients. One patient died 2 months after intervention due to deterioration of chronic obstructive pulmonary disease.

Conclusion: Transradial carotid artery stenting may be safe and useful alternative when femoral approach is difficult or impossible.

P5.20

MEASURE OF CHANGE IN CAROTID-RADIAL PULSE WAVE VELOCITY AFTER REACTIVE HYPERAEMIA

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The recognized reference method for endothelial function assessment is brachial artery diameter echo-tracking during flow mediated dilation (FMD) induced by reactive hyperaemia (RH). From the Mons-Korteweg equation, FMD should also reduce upper limb pulse wave velocity (PWV). The aim of our study was to compare echo-tracking FMD with PWV changes after RH. Brachial diameter was assessed by echo-tracking (MyLab 70, Easote, Italy) before and after 7 min of ischemia induced by inflating a cuff on the right wrist 50mmHg above subject's systolic blood pressure. Carotid-left radial and carotid-right radial PWVs were also simultaneously measured with Complior Analyse (Alam Medical, France) at baseline (in triplicate), 30sec, 1, 3 and 5 min end of ischemia.

Measurements were performed in 15 healthy subjects (10M/5F, 31±11 yrs). Maximum PWV changes happened 1min after cuff deflation in the ischemic arm (Δ PWV=2,1±1,4m/s, p<0,001) while changes in the control arm were non-significant.

Time after deflation Δ PWV ischemic arm Δ PWV control arm

30sec -0,6 ± 0,6 -0,2 ± 1,0

1min -2,1 ± 1,4 * -0,1 ± 1,1

3min -1,9 ± 1,4 * -0,1 ± 1,2

5min -1,7 ± 1,3 -0,7 ± 2,5

*p<0,001

The maximal change in arterial diameter post-RH was 5,1±4,7%. There was no correlation between diameter change and Δ PWV (R=0,03, p=0,91).

While the use carotid-radial PWV seems promising to track changes post RH, further studies are needed to better understand this phenomena which is not related to diameter change.

P5.21

PERCUTANEOUS CORONARY INTERVENTIONS OF CHRONIC TOTAL OCCLUSIONS: GENDER DIFFERENCES – SINGLE CENTER EXPERIENCE

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Background: Little is known about gender differences among patients undergoing percutaneous coronary intervention (PCI) for chronic total occlusion (CTO).

Methods: A total of 242 patients underwent 255 procedures PCI of CTO in our center between January 2011 and January 2015. Demographic data, procedural differences and success rate between genders was compared.

Result: Among 242 treated patients 16,9% (n=41) were women. Women were older than men (67.8±8.4 vs. 61.3±9.0, p<0.005, respectively). There were no differences in diagnosis of hypertension (92.7% vs. 85.6%), dyslipidaemia (100% vs. 99%) or diabetes (34.2% vs. 28.4%)(p=NS). Less women were current smoker (7.3% vs. 23.4%, p<0.005). 46.1% of women and 50.8% of men suffered from myocardial infarction before procedure (p=NS). The most frequently opened artery in both groups were right coronary artery (45.2% vs. 49.8%), then left anterior descending artery (40.5% vs. 31.5%) (p=NS). Occlusion's characteristic did not differ in both groups in estimated duration (10.9±19.5 vs. 16.6±33.1 months) and length (27.0±14.0 vs. 26.9±11.8 mm), (p=NS). Retrograde technique was used in 10 women (23.8%) and in 46 men (21.6%) (p=NS). Time of procedure (minutes) (71.4±27.9 vs. 69.3±33.4), fluoroscopic time (minutes) (25.7± 15.2