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15.4: MEASURING ARTERIAL STIFFNESS WITH POPMÈTRE[®] IN CARDIAC REHABILITATION PROGRAM

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Additional studies are needed to confirm the statistical differences observed using this method and to predict the severity of carotid atherosclerosis.

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15.2

ESTIMATES OF ARTERIAL STIFFNESS AND CENTRAL BLOOD PRESSURE IN PATIENTS WITH TYPE 2 DIABETES: A COMPARISON OF SPHYGMOCOR AND ARTERIOGRAPH

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Background: The Arteriograph is a cuff-based oscillometric device for non-invasive assessment of central systolic blood pressure (cSBP), aortic augmentation index (Aix) and aortic pulse wave velocity (PWV). The reproducibility of Arteriograph measurements and the agreement with SphygmoCor measurements in diabetic patients has never been assessed.

Methods: We compared Arteriograph reproducibility and agreement with SphygmoCor with data from two study populations: Study 1 (n=17/mean age 64 years/diabetes duration 9 years) was conducted in a research laboratory and Study 2 (n=19/mean age 67 years/diabetes duration 9 years) in a catheter lab. SphygmoCor PWV data was only available in study 1.

Results: Reproducibility: Mean differences (Standard deviation of the difference (SDD)) between duplicate cSBP, Aix and PWV Arteriograph measurements were -0.6 ± 6.6 mmHg (cSBP), $-1.1 \pm 3.3\%$ (Aix) and 0.1 ± 0.5 m/s (PWV) in study 1 and -0.01 ± 4.3 mmHg (cSBP), $1.5 \pm 3.2\%$ (Aix) and -0.2 ± 0.6 m/s (PWV) in study 2, all differences non-significant.

Agreement: Mean differences between SphygmoCor and Arteriograph were -14 ± 10 mmHg (cSBP), $-8 \pm 7\%$ (Aix) and 2.4 ± 1.8 m/s (PWV), ($p < 0.001$ for all) in Study 1 and -5 ± 10 mmHg, $p = 0.04$ (cSBP) and $-10 \pm 8\%$, $p < 0.001$ (Aix) in Study 2. In study 1, a significant correlation was observed between the mean and the (SphygmoCor – Arteriograph) difference for cSBP, $r = -0.75$, $p < 0.001$ and for Aix, $r = -0.67$, $p < 0.001$.

Conclusion: In patients with type 2 diabetes, Arteriograph data were reproducible yet the device systematically overestimated cSBP, Aix and PWV compared with the SphygmoCor. Hence, the two devices cannot be used interchangeably in patients with type 2 diabetes.

15.3

ARTERIAL STIFFNESS RECORDINGS WITH POPMÈTRE® IN A GENERAL PRIMARY CARE POPULATION: THE IPC COHORT

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Objectives: Aortic stiffness, best approached by pulse wave velocity (PWV), is a determinant of health. Among the devices measuring PWV, gold standard are pulse transit time recordings. pOpmètre® (P®) measures pulse at finger and toe levels using oximetry clips and adequate algorithm in less than 5 minutes. It showed good agreement against reference techniques, but P® feasibility and relevance were never tested in a large general population.

Population and methods: From September 2015, 527 Normotensives (43.8±13.6 years) had a standard health check-up at the IPC Center (Paris, France) including finger to toe pulse wave velocity recording with pOpmètre®, performed by nurses after 10 minutes supine rest permitting ECG and blood pressure measurements (three values averaged). Data were compared to aortic PWV reference values (Eur Heart J, 2010 31, 2338-2350).

Results: Pre-specified factors for measurement failure were variation coefficient within one record > 30%, and PWV extreme outliers: 13 were excluded. BP and PWV were respectively: $121 \pm 10 / 73 \pm 7$ mmHg 7.64 ± 2.7 m/sec. 231 had optimal BP, 202 normal and 81 high normal BP. PWV

increased with age classes from <30 to >70 years. The P® values fell exactly within the aortic reference ranges for age classes: 6.2 ± 1.2 , 7.1 ± 2.1 , 7.4 ± 2.2 , 8.2 ± 2.8 , 10.2 ± 3.6 , 9.6 ± 2.6 m/sec.

Conclusion: The simple and quick measurement with pOpmètre® device can be performed by nurses during a tight time schedule. It provides values within aortic Reference value ranges in normal population. It is a promising substitute to reference techniques for assessing PWV during standard health check-up.

15.4

MEASURING ARTERIAL STIFFNESS WITH POPMÈTRE® IN CARDIAC REHABILITATION PROGRAM

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Background and Objectives: Pulse Wave Velocity (PWV) is a good surrogate of the arterial aging. This is an independent biomarker of cardiovascular events (ESH-ESC Guidelines 2013). PWV seems to be reduced with regular exercise. The effect of cardiac rehabilitation (CR) is less known on this biomarker. The aim of this study was to evaluate the impact of a CR program on arterial stiffness measured by pulse wave velocity (PWV).

Patients and Methods: Data from 100 consecutive patients recruited in a French CR centre were analyzed after exclusion for High variability $cv > 30\%$ and aberrant values $PWV > 30$ m/s. The finger-toe PWV was measured with a new validated device (pOpmètre®-Axelif SAS-France) at the beginning and the end of CR (mean duration = 18.3 ± 4 days). They were measured at the same time and under the same recommended conditions.

Results: Patients (Mean age 64 ± 11 years, 84% males), were coronary artery disease (51%), valvular (38%), heart failure (3%) and other (8%). The classical cardiovascular risk factors were the following: 1- current smoking (n=3), 2- Diabetes (n=26), 3- high blood pressure (n=58), 4- high blood cholesterol (n=48), There were also obesity (n=15) coronary heredity (n=19) sedentary lifestyle (n=20). They took part in 155 physical training sessions (mean duration 120 min/day) The maximal workload (MWL) increased from 94.9 ± 35 to 116 ± 37 Watts and the 6min walking test (6MWT) from 430 ± 113 to 505 ± 106 m ($p < 0.0001$). PWV decreased from 9.16 ± 3.0 to 8.39 ± 2.5 m/s ($p < 0.008$). We found a positive correlation with age ($r = 0.38$ $p < 0.0003$) and inverse correlation with maximal workload ($r = -0.34$ $p < 0.001$) and 6MWT ($r = -0.22$ $p < 0.003$).

Conclusion: Maximal physical capacity and 6MWT correlated with PWV measured with pOpmètre®, and a current CR program seems to improve the arterial stiffness in a cardiac population.

References

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15.5

ASSOCIATION OF A NEW SURROGATE OF TOTAL ARTERIAL COMPLIANCE WITH LEFT VENTRICULAR MASS: THE SAFAR STUDY

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We investigated the association of total arterial compliance (C_T) with left ventricular mass (LVM) and hypertrophy (LVH). The study hypothesis was