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14.10: INCREASED CENTRAL PRESSURE AUGMENTATION IS ASSOCIATED WITH REDUCED SLEEP DURATION IN INDIVIDUALS EXPOSED TO AIRCRAFT NOISE POLLUTION: THE SERA-CV STUDY

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powerful predictors of outcomes in patients after myocardial infarction (MI) continue now. Increased pulse wave velocity (PWV), a non-invasive index of arterial stiffness, predicts cardiovascular event in different clinical conditions, but no study on the relationship between PWV and improvement of LV ejection function (EF) in patients with acute MI.

Methods: 97 patients with acute MI and primary percutaneous coronary intervention (PCI) (67% male, age 61.5 ± 9.8 years ($M \pm SD$), 57 (58.7%) with ST-elevation myocardial infarction (STEMI), smokers 29%, arterial hypertension 80%, blood pressure $129 \pm 8/79 \pm 8$ mmHg, left ventricular ejection fraction (LVEF) $50.6 \pm 3.4\%$. Arterial stiffness was assessed using applanation tonometry. Global longitudinal peak strain (GLPS) by STE was calculated in a 16-segment LV model as the average segmental value on the basis of three apical imaging planes. Mann-Whitney and Spearman tests were considered significant if $p < 0.05$.

Results: Baseline GLPS $>18\%$ was not detected in any patient. GLPS increased from 14.3 ± 2.3 to $15.6 \pm 2.4\%$, $p < 0.04$ in 4 weeks after PCI. GLPS normalized ($>18\%$) in 24 (25%) patients. Achieved GLPS differed significantly in patients without vs with normalization (14.5 ± 1.8 vs $18.6 \pm 0.3\%$, $p < 0.02$). Mean carotid-femoral pulse wave velocity (PWV) decreased from 11.5 ± 1.9 to $10.1 \pm 2.3\%$, $p < 0.05$. Patients without vs with GLPS normalization were older (63.2 ± 9.1 vs 56.6 ± 11.4 years, $p < 0.04$), more frequent male (71 vs 33%, $\chi^2 = 7.8$; $p < 0.01$), smokers (83 vs 50%, $\chi^2 = 6.5$; $p < 0.05$), STEMI (60 vs 67%, $\chi^2 = 4.6$; $p < 0.03$), had higher diastolic BP (84 ± 7 vs 80 ± 8 mmHg, $p < 0.02$), higher baseline PWV (12.9 ± 6.9 vs 9.9 ± 2.1 m/s, $p < 0.03$). EF increased non-significant between groups. A significant correlation was found between decreased Δ speckle tracking and higher PWV ($r = -0.21$, $p < 0.05$).

Conclusions: Arterial stiffening may result in a less effective recovery of LV function after acute MI. Measuring PWV values after acute MI important information could be obtained about LV function recovery.

14.10

INCREASED CENTRAL PRESSURE AUGMENTATION IS ASSOCIATED WITH REDUCED SLEEP DURATION IN INDIVIDUALS EXPOSED TO AIRCRAFT NOISE POLLUTION: THE SERA-CV STUDY

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Background: Exposure to environmental noise might exert negative effects on cardiovascular function (1). Aim of the study is to explore whether sleep loss associated with exposure to aircraft noise has a detrimental effect on vascular function.

Methods: 22 individuals, heavily exposed (E) to aircraft noise (>50 DbA) were recruited and matched with a group of non-exposed individuals (NE). Pulse wave velocity (PWV), central blood pressure (BP), augmented pressure (AP) and augmentation index (Aix) were performed. 7-day actigraphy was performed for the assessment of total sleep time (TST) and wake after sleep onset (WASO).

Results: E showed similar TST (7.2 ± 1.8 vs 7.1 ± 1.3 h, $p = 0.77$) and WASO (50 ± 46 vs 47 ± 30 min, $p = 0.49$) compared to NE. E showed higher Aix (26 ± 12 vs 14 ± 16 , $p = 0.006$) and AP (11 ± 7 vs 7 ± 8 , $p = 0.03$) than NE, in the presence of similar PWV, mean BP and heart rate (HR).

In E group, Aix was related with height ($r = -0.56$, $p = 0.009$), TST ($r = -0.65$, $p = 0.002$), while was not related with age, mean BP, PWV and HR. The association remained significant in a multiple regression model ($\beta = -2.92$, $p = 0.01$), with TST accounting for 12.9% of Aix variance (r^2 full model 0.84). In NE Aix was related with age ($r = -0.82$, $p < 0.001$), HR ($r = 0.76$, $p < 0.001$), TST ($r = -0.49$, $p = 0.01$), mean BP ($r = 0.61$, $p = 0.01$), PWV ($r = 0.57$, $p = 0.004$). The only independent determinants of Aix in NE were age ($\beta = 0.64$, $p = 0.02$) and HR ($\beta = -0.37$, $p = 0.03$).

Conclusions: Central pressure augmentation is independently affected by sleep duration in individuals exposed to high levels of environmental aircraft noise.

References

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14.11

TOTAL ARTERIAL COMPLIANCE AS A RISK FACTOR FOR ORGAN DAMAGE IN HYPERTENSION

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Purpose/Background/Objectives: Hypertension is associated with several markers of subclinical target organ damage (TOD). Total arterial compliance (TAC) is a prognostic factor for cardiovascular events. We hypothesized that there is a relationship between TAC and TOD in never-treated hypertensives.

Methods: We enrolled 990 consecutive essential hypertensives (mean age 52.6 ± 12.2 years, 526 males). Markers of subclinical TOD [left ventricular mass index (LVMI), pulse wave velocity (PWV), ankle-brachial index (ABI) and estimated glomerular filtration rate (eGFR)] were evaluated in all patients. LVMI was assessed echocardiographically using the Devereux formula. Carotid-femoral PWV was estimated with the Complior. eGFR was calculated by the Cockcroft-Gault formula. ABI was calculated by dividing the highest ankle systolic blood pressure by the highest brachial systolic blood pressure. The ratio of stroke volume to pulse pressure was measured echocardiographically as a surrogate of TAC.

Results: In multivariable regression analysis, TAC exhibited significant association with LVMI ($p = 0.004$, adjusted R^2 of model = 0.400), PWV ($p < 0.001$, adjusted R^2 of model = 0.298) ABI ($p = 0.002$, adjusted R^2 of model = 0.009) but not with eGFR. In further analysis, TAC was associated with the number of TOD markers ($p < 0.001$) as suggested by the 2013 European Guidelines for Hypertension [left ventricular hypertrophy (LVMI > 115 g/m² in men and > 95 g/m² in women), increased PWV (PWV > 10 m/s), decreased ABI (ABI < 0.9) and decreased renal function (eGFR < 60 ml/min)]. In logistic regression model increasing TAC was associated with a reduction in the likelihood of TOD, similarly to the multivariable regression model. ($P < 0.05$ for all X eGFR).

Conclusions: Our findings support the relationship between TAC and TOD in hypertension.

15.1

ANALYSIS OF THREE STATISTICAL METHODS TO PREDICT THE PRESENCE OF CAROTID ATHEROMATOUS PLAQUES

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Background: At least 15-20% of all ischemic strokes are attributable to atherosclerosis [1]. We analyzed three statistical methods for 12 traditional risk factors (TRF) i.e. age, sex, arterial pressure, Intima Media Thickness (IMT), Pulse Wave Velocity (PWV) in order to predict the presence of carotid atherosclerotic plaques.

Methods: We studied 48 patients (27 men, mean age 52 ± 10.9) after a vascular screening for atherosclerosis from a metabolic syndrome cohort in a retrospective way. Fourteen patients presented carotid atheromatous plaques confirmed by a trained operator using an ultrasound system. The sensitivity and specificity of the combination of the IMT and the PWV indices with other risk factors were considered using: multiple linear regressions (MLR), support vector machines (SVM) [2] and discriminant analysis (DA). The best combinations of variables were kept for each learning machine.

Results: The best sensibility and specificity were obtained using DA. This method reached a sensitivity of $95 \pm 7\%$ and a specificity of $73 \pm 36\%$ with an area under the ROC curve equal to 0.84 ± 0.35 . The other methods showed a sensitivity of $73 \pm 13\%$ for the MLR method and $53 \pm 34\%$ for the SVM method with an area under the ROC curve of 0.72 ± 0.07 and 0.74 ± 0.18 respectively.

Conclusion: This preliminary study shows that carotid atherosclerotic plaques could be reliably predicted using discriminant analysis method.