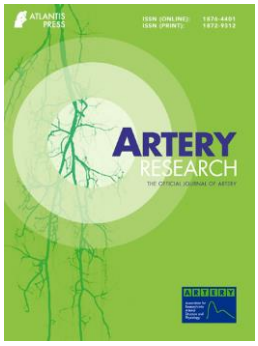

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11.6: THE AORTIC-TO-BRACHIAL STIFFNESS GRADIENT AND AORTIC RESERVOIR-EXCESS PRESSURE IN A DIALYSIS POPULATION

Catherine Fortier, Marie-Pier Desjardins, Aboubacar Sidibe, Mathieu Allard, Martin G. Schultz, James E. Sharman, Mohsen Agharazii

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11.4
RELATIONSHIP BETWEEN INFLAMMATORY CYTOKINES AND AORTIC STIFFNESS IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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Introduction: Cardiovascular diseases are the primary cause of morbidity and mortality in patients with chronic kidney disease (CKD). Aortic stiffness is a non-traditional risk factor in these patients. Using an animal model of CKD with vascular calcification, we reported that inflammation is involved in the development of aortic calcification and stiffness. Hence, increased vascular production of IL-1β, IL-6 and TNFα was associated with aortic calcification. Therefore, we investigated the impact of the latter cytokines on aortic stiffness and determined the profile of inflammatory cytokines in a cohort of CKD patients.
Methods: This is a transversal study involving 196 CKD patients on dialysis, in which aortic stiffness was determined non-invasively by the assessment of carotid-femoral pulse wave velocity (cf-PWV) using Complior SP (Artech Medical, Pantin, France). The profile of inflammatory cytokines (IFNv, IL-1α, IL-1β, IL-2, IL-4, IL-6, IL-8, IL-10, IL-12 and TNF α) was determined in plasma by ELISA using a Multiplex (Aushon, Maine, USA).
Results: Mean cf-PWV of the cohort was 12.8±3.9 m/s. Median plasma levels of IL-1β, IL-6 and TNFα were 1.01 pg/ml, 4.26 pg/ml and 3.33 pg/ml, respectively. IL-6 levels positively correlated with cf-PWV ($\beta = 0.218$, $P = 0.006$, $R = 0.129$), suggesting a role in aortic stiffness. In contrast, no correlation between PWV and plasma levels of IL-1β or TNFα was established.
Conclusion: This study reveals a relationship between an inflammatory cytokine, Il-6, and aortic stiffness in patients with CKD. Our results, together with our previous findings in an experimental animal model, indicate that IL-6 may represent a novel therapeutic target of cardiovascular diseases in CKD.

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11.5
DIFFERENCES OF HEART RATE VARIABILITY AND AUGMENTATION INDEX BETWEEN DIALYSIS AND POST-DIALYSIS PERIODS IN PATIENTS WITH END-STAGE RENAL DISEASE

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Introduction: Heart rate variability (HRV) analysis is a non-invasive tool for assessing the cardiac health. There is evidence that the cardiac autonomic system and central hemodynamics respond to hemodialysis. The aim of this work is to compare HRV parameters and augmentation index (AIx) between intra- and interdialytic periods in patients with end-stage renal disease.
Methods: All 24-h electrocardiogram data were obtained using the Lifecard CF digital Holter recorder (Delmar Reynolds/Spacelabs, Germany) and 24-h pulse wave analysis (PWA) measurements were taken with the Mobil-O-Graph 24h PWA (I.E.M. GmbH, Germany) within the ISAR hemodialysis study. Two-hundred patients (132 men / 68 women: 61+-16 years) were included. HRV was analyzed in the time- and frequency-domain in 5-min segments. AIx values and HRV parameters were averaged for intra- and interdialytic periods.
Results: The low to high frequency ratio (LF/HF) as a representative of sympathovagal balance (2.85 vs 3.36, $p<0.01$) and the augmentation index (AIx) (26.9 vs 28.5 %, $p<0.01$) were significantly decreased during dialysis. Whereas, the root mean square of successive differences (RMSSD) reflecting the parasympathetic cardiovascular modulation was significantly increased during hemodialysis session (13.9 vs 13.7 ms, $p<0.05$) (see Table).
Conclusions: The present work confirms previous findings of changes in HRV and AIx between intra- and interdialytic periods in a larger cohort [1,2]. The data suggests a reduced arterial stiffness in the context of a reduced sympathetic and increased parasympathetic activity during dialysis. Further studies should investigate the prognostic value of HRV changes in dependency of ultrafiltration volume in patients on dialysis.

	In	Out	p-value
AVNN (ms) **	836 [750,939]	819 [759,902]	<0.01
SDNN (ms) **	27.8 [21.4,39.2]	31.2 [24.2,42.3]	<0.01
RMSSD (ms) *	13.9 [9.35,22.9]	13.7 [10,20.3]	<0.05
pNN50 (%)	0.81 [0.19,4.87]	0.91 [0.25,3.97]	0.476
HRVIdx	6.88 [5.45,9.22]	7.03 [5.84,8.92]	0.920
TINN (ms)	102 [79,137]	104 [83.5,132]	0.713
LF (nu) **	68.8 [49.5,80.6]	70.6 [55.4,81.4]	<0.01
HF (nu) **	31.2 [19.4,50.5]	29.4 [18.6,44.6]	<0.01
LF/HF **	2.84 [1.31,5.63]	3.38 [2,6.58]	<0.01
Aix (%) **	26.9 [20.4,34.2]	28.5 [21.6,36.4]	<0.01
AIx75 (%) **	25.4 [20.3,31.6]	28.8 [22.9,33.6]	<0.01

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11.6
THE AORTIC-TO-BRACHIAL STIFFNESS GRADIENT AND AORTIC RESERVOIR-EXCESS PRESSURE IN A DIALYSIS POPULATION

Catherine Fortier [1], Marie-Pier Desjardins [1], Aboubacar Sidibe [1], Mathieu Allard [1], Martin G. Schultz [2], James E. Sharman [2], Mohsen Agharazii [1]
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Background: Aortic reservoir function is associated with increased cardiovascular events. Patients with chronic kidney disease in need of dialysis have increased aortic stiffness and reversal of the aortic-to-brachial stiffness gradient, which could impair aortic reservoir function. The aim of this study was to determine the relationship between the aortic-to-brachial stiffness gradient and aortic reservoir function.
Methods: Among 310 patients with chronic kidney disease on dialysis, aortic and brachial stiffness were measured by pulse wave velocity (PWV), with the aortic-to-brachial stiffness gradient calculated by the ratio of aortic and brachial PWV (PWV ratio). Aortic reservoir function was measured by radial tonometry-derived reservoir pressure (RP) and excess pressure (XSP) integrals.
Results: RP was significantly and positively associated with PWV ratio (Standardized $\beta=0.168$ $p<0.001$) independent from age, sex, height, mean blood pressure, heart rate, treatment by hemodialysis and diabetes status (Model adjusted $R^2=0.68$ $p<0.001$). On the other hand, XSP, which was significantly correlated to PWV ratio (Standardized $\beta=0.20$ $p<0.001$), lost its relation in multivariable adjusted model, and instead was predicted by age, heart rate, mean blood pressure and diabetes status, but this was only a weak model (Adjusted $R^2=0.15$ $p<0.001$).
Conclusion: Among patients with chronic kidney disease on dialysis, the aortic-to-brachial stiffness gradient is an independent predictor of adverse aortic reservoir function.