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Conference Abstract

P.19 Intradialytic Changes in Cerebral Blood Flow and Regional Changes in Arterial Stiffness

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Keywords

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ABSTRACT

Purpose/Background/Objective: Cognitive decline is highly prevalent amongst end-stage renal disease (ESRD) patients and is accelerated upon initiation of hemodialysis (HD) [1]. ESRD increases aortic stiffness and blood flow pulsatility, which may damage small vessels of target organs like the brain [2]. In this pilot study, we aimed to evaluate the acute effect of HD on cerebral blood flow and its relation to arterial stiffness.

Methods: Before, every hour during and after HD (T0–T4), we measured cerebral flow velocity (FV) using transcranial Doppler, blood pressure (BP) via digital finger cuff (Nexfin), cardiac activity using ECG and aortic pulse wave velocity (PWV) with Mobile-O-Graph. FV pulsatility index (PI) and transit times between ECG peak and the foot of both FV and BP waveforms (cerebral dT; digital dT) were computed using in house MATLAB-based analysis. Changes during HD were evaluated with Generalized Estimating Equation models adjusting for multiple comparisons in SPSS 26.0.

Results: In eight participants aged 63 ± 17 y. old (4 diabetics, 3 women), peak FV decreased from baseline at T1 and T2 (−11.2 cm/s, $p = 0.007$; −12.2 cm/s, $p < 0.001$), PI decreased at T1 (0.81 to 0.77, $p = 0.005$), whilst minimum FV, mean BP and partial pressure of CO_2 remained unchanged. Digital dT increased at T3 (0.19 to 0.22, $p < 0.001$) and cerebral dT increased throughout HD (T1–T4, $p < 0.005$), whereas aortic PWV did not change.

Conclusions: During hemodialysis, cerebral and digital transit times increased, suggesting decreased stiffness of small peripheral vessels, without significant changes in aortic stiffness. Reduced stiffness of cerebral arteries may partially explain decreased cerebral flow pulsatility.

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