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P240-Progression and determinants of atherosclerosis and other vascular markers in patients with chronic kidney disease compared to healthy volunteers

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Introduction: Atherosclerosis and arteriosclerosis related vascular events is a major cause of morbidity and mortality in patients with CKD, yet the nature of progression and the role of risk factors - particularly non-traditional risk factors - is unknown. The aim of this study was to examine the nature of progression and risk factors for vascular dysfunction in stable CKD patients and compare these with healthy volunteers.

Methods: Fifty-seven CKD patients (22 kidney-transplantation, 21 CKD2-4 and 14 haemodialysis) and 22 healthy volunteers were examined in a temperature-controlled vascular laboratory for brachial artery flow-mediated dilatation (FMD), carotid intima-media thickness (IMT), carotid-femoral pulse wave velocity (PWV), ankle-brachial index (ABI) and blood biomarkers at baseline and 3-6 months later. Most biomarkers were analysed by the clinical laboratory on the same day, and other markers were analysed using the "luminex" technique on saved samples. Statistical analysis was performed using IBM SPSS Version 25.

Results: The CKD patients were older [62.50 years (53.00-67.00) median (25th-75th centile) vs 43.50 (38.00-50.75); p=0.000], had a higher BMI [26.90 kg/m2 (24.35-32.15) vs 24.25 (22.14-26.30);p=0.004], higher Waist-Hip ratio [0.92 (0.84-1.00) vs 0.80 (0.76-0.88);p=0.000], higher systolic blood pressure [141mmHg (125-151) vs 126 (118-132); p=0.001], lower cholesterol [4.60 mmol/L (4.10-5.30) vs 5.00 (4.35-5.95); p=0.031] more males (37/57 vs 6/22, p=0.005) and more diabetics [12/57 vs 0/22, p=0.017] (see table 1).
At baseline, the CKD patients had a higher IMT [6.50 mm (5.62-7.34) vs 5.50(4.94-6.00); (p=0.002)] and PWV [9.47 m/s (7.80-11.10) vs 6.85(5.88-7.76); p=0.000] compared to healthy volunteers, but similar ABI (p=0.560) and FMD (p=0.141) (table 1).
The follow up period was 141 days (128,189). Between baseline and follow up, the FMD [(3.19% (1.62, 4.80) and 2.15 (1.24, 2.96); p=0.000)] and IMT [6.50 mm (5.63, 7.34) and 6.75 (6.00, 7.25) p=0.015)] progressed in CKD patients, but not in healthy volunteers. The PWV and ABI did not change significantly with time in CKD patients or volunteers (see table 1).
Among the several bio markers tested, hsCRP, BNP, Troponin-T, ICAM 1 (intercellular cell adhesion molecule) and matrixmetalloproteinase-2 levels were higher in CKD patients. Levels of other bio markers (RANTES, VCAM 1, FGF 23, GRO-alpha, IFN-gamma, IL1, IL6, IL8, MCP1, PAI1, TNF-alpha, eSelectin) were not different (see table 1).

Discussion: CKD patients suffered from a higher burden of cardiovascular risks, inflammatory markers, atherosclerosis, endothelial dysfunction and arterial stiffness compared to healthy volunteers. Endothelial dysfunction and atherosclerosis worsened over 4-6 months in CKD patients, yet no change was observed in healthy volunteers, despite higher lipid levels. We conclude that vascular structure and function are highly abnormal in patients with CKD and progresses rapidly – which may partially explain the high CV event rates in CKD patients.