

Ambulatory Blood Pressure and Habitual Physical Activity in Chronic Kidney Disease

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CVD is the leading cause of death in Chronic Kidney Disease (CKD) and hypertension is an important risk factor for adverse cardiovascular outcomes in CKD patients. Despite pharmaceutical advancements in hypertension, high blood pressure (BP) persists in CKD patients. Physical activity levels are reduced in CKD patients and could contribute to elevated BP however the association between ambulatory BP and physical activity in CKD is unknown. **PURPOSE:** To assess indices of ambulatory BP and determine whether habitual physical activity contributes to 24-hour BP indices in stage 3-4 CKD patients. **METHODS:** 24 hour ambulatory BP and habitual physical activity were assessed in 18 treated stage 3-5 CKD patients (Mean \pm SD; Age 60 ± 10 yrs; eGFR 45 ± 13 ml/min/1.73m²) and 13 healthy controls (Age 56 ± 6 yrs; eGFR >90 ml/min/1.73m²). Subjects were given an ambulatory BP monitor to wear for 24 hours. Blood pressure was taken every 20 minutes when the subject was awake and every 30 minutes when the subject was asleep. Outcome measures included overall, wake, and sleep BP, morning surge BP, dipping and reading-to-reading average real variability (ARV). Patients were also given an accelerometer to wear at the hip continuously for 7 days. An average of the 7 day period was calculated to represent the average daily activity levels. **RESULTS:** Overall (132 ± 16 vs. 116 ± 9 mmHg, $p < 0.01$), wake (135 ± 15 vs. 121 ± 9 mmHg, $p < 0.01$), and sleep (127 ± 19 vs. 104 ± 10 mmHg, $p < 0.01$) systolic pressures were higher in CKD patients as were overall (55 ± 13 vs. 43 ± 6 mmHg, $p < 0.01$), wake (55 ± 13 vs. 44 ± 6 mmHg, $p < 0.01$) and sleep (55 ± 16 vs. 40 ± 6 mmHg, $p < 0.01$) pulse pressures. Systolic dipping was lower in CKD patients (6 ± 8 vs. 14 ± 6 %, $p < 0.01$). ARV was higher in CKD patients (9 ± 2 vs. 8 ± 1 mmHg, $p = 0.02$). Vector magnitude (417312 ± 260806 vs. 577860 ± 112021 AU, $p = 0.04$), daily step counts (5339 ± 3076 vs. 8869 ± 2265 AU, $p < 0.01$) and time spent in moderate activity (30 ± 28 vs. 56 ± 29 min, $p = 0.01$) were significantly lower in CKD patients. In CKD patients, time spent in sedentary activity was moderately correlated with ARV ($r = 0.56$; $p = 0.01$). **CONCLUSION:** Stage 3-5 CKD patients report high blood pressures, low dipping and increased BP variability despite hypertensive treatment. Physical inactivity contributes to blood pressure variability in CKD patients.

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