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Baseline characteristics of the gait of the patients of Chronic Kidney Disease: Report from Gait Analysis using Artificial Intelligence for digital Therapeutics of patients with Chronic Kidney Disease (GAIT-CKD)

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Objectives: Gait is a biomarker that can provide a lot of information to clinicians because it can diversify in various situations such as the subject's underlying disease, medication, emotional state, dementia, blood pressure, and anemia. This study investigated the clinical characteristics of GAIT-CKD, a cohort to identify the characteristics of the pathologic gait of CKD and use it as baseline data for digital therapeutics.

Methods: We performed gait analysis and BIA measurements in 217 normal populations and 276 patients with chronic kidney disease (CKD) from September to December 2022. We collected demographic characteristics, physical measurement, laboratory findings, and the degree of sarcopenia. A CDSS model using RNN distinguishing between pathological and normal gait was constructed. Sarcopenia was defined as appendicular skeletal muscle index <7.0 kg/m2 in men and 5.7 kg/m2 in women and/or hand grip test <20 kg/m2, Time-up-and-go test >= 10 seconds.

Results: The purpose of this study was to distinguish between normal and pathological gait between healthy individuals and patients, so the age and sex of the subjects were not matched. In CKD patients, men's prevalence was higher (40.1% vs. 56.9%), and they were older (mean age, 38 years vs. 65 years) than the normal population. In the normal population, the TUG test score was 10.3+1.8 and the hand grip test score was 31.1+15.3, whereas, in patients, the scores were low at 12.5+5.2 and 25+11.8, respectively. Sarcopenia was observed in 6 patients (2.7%) in the normal group and 22 patients (8%) in the patient group. The CKD stages were as follows: stage 1, 36%; 2, 43%; 3, 22.5%, 4, 8.3%, 5, 17.0%, HD or PD, 23.6%. As a result of classifying the gait of the two groups with an artificial intelligence (AI) model, an F1 score of 80% was obtained.

Conclusions: The performance of the AI model for pathological gait was good.