



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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Chronic Kidney Disease and Cognitive Decline across Major Neurological Disorders: A Nationwide Longitudinal Study using the Long-Term Care Insurance Database

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Objectives : Chronic kidney disease (CKD) is common in older adults but is rarely considered in assessing long-term risk of functional cognitive decline, particularly among people with major neurological disorders (MNDs). This study aimed to quantify the longitudinal association between CKD and changes in cognitive function and to examine how this association differs according to co-existing MNDs, including acute stroke, dementia, and Parkinson's disease (PD).

Methods : This was a retrospective, population-based cohort study using linked Korean National Health Insurance Service and Long-Term Care Insurance (LTCI) databases. A total of 359,572 individuals who applied for LTCI and had repeated standardized cognitive assessments were included. Participants were categorized into eight groups based on the presence of CKD at baseline and the timing (pre-existing vs. incident) of MNDs. The main outcome was longitudinal change in cognitive function assessed using the cognitive function equivalent score (CFES). Cognitive change was evaluated as (1) the annual rate of change derived from repeated measures and (2) categorical cognitive change (decline, no change, or improvement) based on the reliable change index.

Results : CKD and MNDs were independently associated with accelerated cognitive decline. The combined presence of CKD and acute stroke showed the strongest association with cognitive decline. While CKD and incident stroke independently increased decline, their co-occurrence resulted in the most rapid deterioration ($\beta = 1.01$, 95% confidence interval [CI], 0.62–1.40; adjusted odds ratio for decline = 1.73, 95% CI, 1.48–2.01). For dementia and PD, the inherent disease impact was dominant, though CKD significantly exacerbated the rate of decline. These patterns were robust across multiple sensitivity analyses.

Conclusions : In this nationwide study, CKD was consistently associated with accelerated cognitive decline, with heterogeneity according to the presence and timing of MNDs. The impact of CKD was significant following acute stroke, whereas in neurodegenerative disorders, cognitive deterioration was largely disease-driven.