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Changes in Renal Hyperfiltration Status and Their Association with Cardiovascular Events, Kidney Disease Progression, and Mortality

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Objectives : Renal hyperfiltration (RHF) is a precursor to serious adverse clinical outcomes, including cardiovascular (CV) events, all-cause mortality, and progression to end-stage kidney disease (ESKD). However, whether changes in RHF status affect patient outcomes remains unclear.
Methods : We analyzed 4,781,876 individuals with an estimated glomerular filtration rate ≥60 mL/min/1.73 m² from the National Health Insurance Service database of Korea between 2012 and 2020. RHF was defined as an eGFR more than the 95th percentile after multiple adjustments. Study participants were classified into four groups based on changes in RHF status: RHF-free, RHF-developed, RHF-disappeared, and RHF-persistent.
Results : Among individuals without RHF, 10.6% developed new-onset RHF, while a considerable proportion (88.7%) of those who initially had hyperfiltration showed resolution of this condition. Compared to the RHF-free group, the RHF-persistent group had the highest risk of CV events (adjusted hazard ratio [HR], 1.17; 95% confidence interval [CI], 1.06–1.28) and all-cause mortality (HR, 1.77; 95% CI, 1.54–2.05). Both the RHF-developed and RHF-disappeared groups were associated with an increased risk of CV events (HR, 1.05; 95% CI, 1.02–1.08, and HR, 1.04; 95% CI, 1.01–1.08, respectively) and all-cause mortality (HR, 1.30; 95% CI, 1.23–1.37, and HR, 1.22; 95% CI, 1.16–1.29, respectively), although their risk levels were lower than those of the RHF-persistent group. The risk of ESKD progression was highest in the RHF-disappeared group (HR, 1.38; 95% CI, 1.05–1.83), but it was not significant in the RHF-free, RHF-developed, and RHF-persistent groups.
Conclusions : Renal hyperfiltration is a dynamic condition, and changes in its status significantly influence clinical outcomes. Persistent RHF was associated with an increased risk of CV events and all-cause mortality, whereas RHF disappearance was linked to an increased risk of progression to ESKD.