Nocturnal Systolic Blood Pressure Dipping and Progression of Chronic Kidney Disease

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Objectives: The relationship between declining nocturnal blood pressure (BP) and adverse cardiovascular outcomes is well-recognized. However, the relationship between diurnal BP profile and the risk of chronic kidney disease (CKD) progression is unclear.

Methods: We analyzed 1,061 participants from Cardiovascular and Metabolic Disease Etiology Research Center-High Risk (CMERC-HI). The main exposure was diurnal systolic BP (SBP) profile and diurnal SBP difference ([nighttime SBP-daytime SBP]×100/daytime SBP). The primary outcome was CKD progression, defined as a composite of ≥ a 50% decline in the estimated glomerular filtration rate from baseline or the initiation of kidney replacement therapy.

Results: During 4,749 person-years of follow-up (median, 4.8 years), the composite outcome occurred in 380 (35.8%) participants. Compared to dippers, the hazard ratios (HRs) for the risk of adverse kidney outcomes were 1.02 (95% confidence interval [CI], 0.64–1.62), 1.30 (95% CI, 1.02–1.66), and 1.40 (95% CI, 1.03–1.90) for extreme dipper, non-dipper, and reverse dipper, respectively. In a continuous modeling, a 10% increase in diurnal SBP difference was associated with a 1.21-fold (95% CI, 1.07–1.37) higher risk of CKD progression.

Conclusions: Decreased nocturnal SBP decline was associated with adverse kidney outcomes in patients with CKD. Particularly, patients with non-dipping and reverse dipping patterns were at higher risk for CKD progression than those with a dipping pattern.

Graphical abstract

Cohort

👥 N=1,061

🫘 Median eGFR
50.8ml/min/1.73m²

📅 Median follow-up
4.9 years

Exposure

Diurnal SBP
profile

1) Extreme dipper
2) Dipper
3) Non-dipper
4) Reverse dipper

Endpoint

Composite kidney
outcome

Result

Diurnal SBP profile	Adjusted hazard ratio (95% confidence interval)
Extreme dipper	1.02 (0.64-1.62)
Dipper	Reference
Non-dipper	1.30 (1.02-1.66)
Reverse dipper	1.40 (1.03-1.90)