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Acute Declines in Estimated GFR in Blood Pressure Target Trials and Risk of Adverse Outcomes

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Rationale & Objective

Acute decreases in glomerular filtration rate (GFR) occur commonly during intensive blood pressure (BP) lowering. Our objective was to determine the relationship between acute decreases in estimated GFR and patient outcomes.

Study Design

Retrospective observational study.

ıg & Participants

Participants from 4 randomized controlled trials of intensive BP lowering in chronic kidney disease (Modification of Diet in Renal Disease study, African American Study of Kidney Disease and Hypertension, Systolic Blood Pressure Intervention Trial, and Action to Control Cardiovascular Risk in Diabetes trial).

Exposure

A 4-category exposure defined by the level of acute decrease in estimated GFR (defined as >15% vs ≤15% between baseline and month 4) and the randomization to intensive versus usual BP control.

Outcomes

Risk of kidney replacement therapy (primary outcome), defined as the need for dialysis or transplant except in the Action to Control Cardiovascular Risk in Diabetes trial, which defined its kidney outcome as a composite occurrence of serum creatinine concentration >3.3 mg/dL, kidney failure, or kidney replacement therapy.

Analytical Approach

Multivariable Cox models.

Results

We included 4,473 individuals randomly assigned to intensive versus usual BP control who had a total of 351 kidney outcomes and 304 deaths during median follow-up durations of 22 and 24 months, respectively. Approximately 14% of participants exhibited an acute decrease in eGFR, 11.0% in the usual BP treatment arm and 17.8% in the intensive BP treatment arm. In adjusted models, compared with a ≤15% eGFR decrease in the usual BP arm, a ≤15% eGFR decrease in the intensive BP control arm was associated with lower risk of the kidney outcome (HR, 0.75; 95% CI, 0.57-0.98). In contrast, a >15% decrease in eGFR was associated with a higher risk of the kidney outcome in the usual (HR, 2.47; 95% CI, 1.80-3.38) and intensive BP treatment arms (HR, 1.99; 95% CI, 1.45-2.73) compared with a ≤15% decrease in the usual BP arm.

Limitations

Observational study, residual confounding.

Conclusions

Decreases in eGFR of >15% in the usual and intensive BP treatment arms were associated with a higher risk of kidney outcomes compared with a ≤15% decrease in the usual BP arm and may be a harbinger of adverse outcomes.

Index Words

hypertension • chronic kidney disease • end-stage kidney disease

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