



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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PREVENTING ANGIOGRAPHY-RELATED NEPHROTOXICITY AFTER PCI THROUGH ENHANCED HYDRATION STRATEGIES: A META-ANALYSIS

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Objectives : Contrast-associated acute kidney injury (CA-AKI) is a frequent and clinically significant complication following exposure to iodinated contrast during percutaneous coronary interventions (PCI). Patients with pre-existing renal impairment are particularly susceptible. Adequate hydration remains the cornerstone of CA-AKI prevention; however, the optimal volume and intensity of fluid administration remain controversial. This updated meta-analysis evaluates the renal protective effect of aggressive versus standard hydration protocols in patients undergoing coronary angiography.

Methods : A systematic search of PubMed, Scopus, Embase, Cochrane CENTRAL, and Web of Science was performed through November 21, 2025. Eligible studies compared aggressive hydration regimens with standard hydration in adults receiving intra-arterial contrast. Data were pooled using a random-effects model. Risk ratios (RRs) with 95% confidence intervals (CIs) were calculated using STATA 18 software.

Results : Twenty studies including 6,301 participants met inclusion criteria. Aggressive hydration significantly reduced the risk of CA-AKI, defined as an absolute increase in serum creatinine ≥ 0.5 mg/dL (RR = 0.85; 95% CI: 0.79–0.90; $p = 0.04$). The incidence of dialysis requirement was comparable between groups (RR = 0.90; 95% CI: 0.31–2.55; $p = 0.28$). Similarly, no significant differences were observed in the rates of major adverse cardiovascular events (RR = 0.90; 95% CI: 0.72–1.07; $p = 0.38$) or myocardial infarction (RR = 0.75; 95% CI: 0.42–1.34; $p = 0.28$).

Conclusions : Aggressive hydration strategies are associated with a significantly lower risk of contrast-associated kidney injury compared with standard hydration, without increasing cardiovascular complications or dialysis requirements.