EDITORIAL COMMENT

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Coenzyme Q10 in Contrast-induced Nephropathy - A Step Forward in Renal Protection?

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Contrast-induced nephropathy (CIN) remains a significant clinical challenge, particularly among patients with acute coronary syndrome (ACS) undergoing coronary angiography. Despite advances in hydration strategies and the use of iso- or low-osmolar contrast agents, CIN continues to be associated with increased morbidity, mortality, and healthcare costs. Against this backdrop, the prospective randomized clinical trial conducted by El-Sheikh et al.[1] and colleagues offers important insights into the potential renoprotective role of coenzyme Q10 (CoQ10) - a naturally occurring antioxidant - in this high-risk population.

Key Findings and Clinical Significance

This single-center trial enrolled 300 ACS patients randomized to receive either oral CoQ10 supplementation (n=200) or standard care (n=100). The incidence of CIN - defined as a ≥0.5 mg/dL or ≥25% rise in serum creatinine, or a ≥25% decline in estimated glomerular filtration rate (eGFR) within 48 hours - was significantly lower in the CoQ10 group (9%) compared to the control group (21%) (P =0.004), Furthermore, postoperative serum creatinine levels were lower and eGFR were higher in the CoQ10 group on days two and three, suggesting sustained renal protection.

Multivariate logistic regression identified high body mass index, pre-existing CKD, and balloon dilatation during the procedure as independent predictors of CIN. These findings provide valuable stratification parameters for identifying patients who may benefit the most from adjunctive therapies like CoQ10.

Mechanistic Rationale for CoQ10 in CIN

CoQ10 plays a vital role in mitochondrial electron transport and cellular energy metabolism, with robust antioxidant and anti-inflammatory properties. The pathogenesis of CIN involves oxidative stress, tubular ischemia, and endothelial dysfunction - all processes that CoQ10 could theoretically mitigate. Preclinical studies have shown CoQ10's ability to preserve renal function in models of ischemia-reperfusion injury and toxin-induced nephropathy, but this study is among the first to demonstrate that its clinically significant benefits in a well-defined cardiovascular population (Figure 1).

Practical Implications and Future Directions

This study opens an important dialogue about the use of adjunctive antioxidant therapy for CIN prevention. CoQ10 is readily available, inexpensive, and generally well tolerated, making it an appealing option for at-risk patients. However, as a single-center study, its findings should be interpreted with caution. Larger, multi-center, placebo-controlled trials are warranted to confirm these results, evaluate long-term renal outcomes, and explore optimal dosing strategies.

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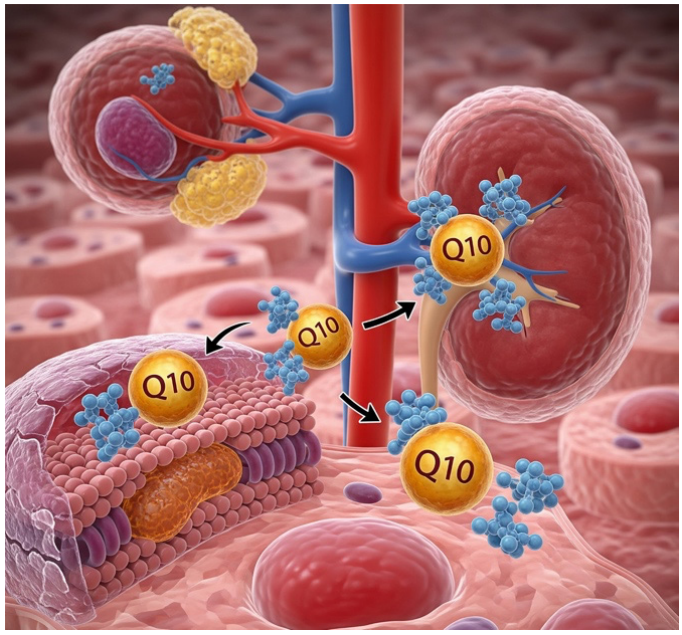

Figure 1: Protecting kidneys in contrast angiography: the role of CoQ10

Moreover, the study raises intriguing questions: How does CoQ10 compare with other antioxidants like N-acetylcysteine or ascorbic acid? Could CoQ10 be part of a broader "renal protection bundle" in high-risk interventions? Should its use be expanded beyond coronary angiography to other contrast-dependent procedures?

Conclusion

The work of El-Sheikh et al.[1] provides compelling preliminary evidence that CoQ10 may reduce the incidence of CIN in ACS patients undergoing coronary angiography. If validated in larger trials, this could represent a paradigm shift in CIN prevention - from reactive management to proactive renal protection using a physiologically grounded and low-risk intervention.

CoQ10 may well become a valuable addition to the armamentarium against CIN - signaling a new era in preventive nephrocardiology.

REFERENCE

1. El-Sheikh R, El Etriby S, Bastawy I, Okasha N. Coenzyme Q10 in prevention of contrast-induced nephropathy in patients with acute coronary syndrome undergoing coronary angiography. Int J Cardiovasc Acad. 2025;11:107-14.