LETTER TO THE EDITOR

The letter to editor regarding “Association of NRF-2 changes in plasma and pericardial fluid with renal injury in patients undergoing cardiac surgery”

Carta al editor sobre el artículo "Asociación entre las alteraciones de NRF-2 en plasma y líquido pericárdico y la lesión renal en pacientes sometidos a cirugía cardíaca"

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Dear Editor,

I read with great interest, the study by Padak et al. investigating changes in nuclear factor erythroid 2-related factor 2 (NRF-2), kidney injury molecule-1 (KIM-1), and heme oxygenase-1 (HO-1) levels in plasma and pericardial fluid (PF) among patients undergoing cardiac surgery with cardiopulmonary bypass (CPB).[1] The authors should be commended for addressing an important and underexplored aspect of cardiorenal interactions, particularly the novel evaluation of oxidative stress-related biomarkers within PF.

Acute kidney injury remains a frequent and clinically significant complication after cardiac surgery, and early detection continues to be challenging. While traditional markers, such as serum creatinine lack sensitivity in the early post-operative period, the exploration of molecular biomarkers reflecting oxidative stress and inflammation is of high clinical relevance. In this context, the simultaneous assessment of NRF-2, HO-1, and KIM-1, provides valuable mechanistic insight into renal stress responses during CPB.

A notable strength of this study lies in the comparison between systemic circulation and PF. The finding that NRF-2 and HO-1 levels were higher in PF than in plasma, while KIM-1 predominated in plasma, supports the concept that PF represents a biologically active compartment rather than a passive ultrafiltrate. This observation reinforces the potential role of PF as both a diagnostic reservoir and a therapeutic target, particularly for localized interventions aimed at modulating oxidative stress.

The demonstrated correlations between NRF-2, oxidative stress indices, and renal function parameters further emphasize the central role of redox imbalance in CPB-associated renal injury. Importantly, the dynamic changes observed during different CPB phases suggest that NRF-2-related pathways may respond rapidly to ischemia-reperfusion injury, highlighting their potential utility for early risk stratification.

Despite limitations related to sample size and the absence of urinary biomarker analysis, this study provides meaningful translational insight. Future investigations incorporating longitudinal outcomes and interventional strategies targeting NRF-2 signaling may further clarify its clinical applicability. Overall, this work represents an important contribution to the evolving understanding of cardiorenal syndrome in cardiac surgery.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Ethical considerations

Protection of human subjects and animals. The authors declare that no experiments on humans or animals were performed for this research.

Confidentiality, informed consent, and ethical approval. This study does not involve personal patient data, medical records, or biological samples, and does not require ethical approval. SAGER guidelines do not apply.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing or creation of the content of this manuscript.

Reference

1. Padak M, Dikme R, Temiz E, Göç Ö, Ersöz E, Hacanlı Y. Association of NRF-2 changes in plasma and pericardial fluid with renal injury in patients undergoing cardiac surgery. Cir Cir. 2025;93:599-607.