Turkish Journal of Pediatric Disease

Letter to the Editor

Comment on "Interpreting mortality-associated factors after pediatric cardiac surgery: The importance of risk adjustment and clinical context"

Ahmet Saki Oğuz, Erkut Öztürk

Department of Pediatric Cardiology, Başakşehir Çam and Sakura City Hospital, University of Health Sciences, İstanbul, Türkiye

Corresponding Author: **Ahmet Saki Oğuz** e-mail: ahmetsaki@gmail.com

Received : 26.09.2026, Accepted : 30.10.2026 DOI: 10.12956/TJPD.2026.1455

Introduction

We read with great interest the study by Talay et al. (1) entitled "Factors affecting mortality in patients during postoperative follow-up after cardiac surgery in a pediatric intensive care unit." The authors should be congratulated for addressing an important and clinically relevant issue in pediatric cardiac intensive care. Their retrospective cohort of 124 children provides valuable real-world information regarding postoperative complications and mortality following congenital cardiac surgery. Overall mortality was 8.8% (11/124), and preoperative pulmonary hypertension, lower postoperative albumin levels, higher C-reactive protein (CRP)/albumin ratios, nitric oxide administration, infection, and cardiopulmonary bypass (CPB) use were reported to be associated with mortality. We would nevertheless like to highlight several points that may further strengthen the interpretation of these findings.

First, the study population represents a considerably heterogeneous spectrum of congenital heart disease and surgical procedures, ranging from ventricular septal defect closure to bidirectional cavopulmonary anastomosis and complex neonatal procedures. The authors appropriately attempted to account for surgical complexity using the Risk Adjustment for Congenital Heart Surgery (RACHS-1) classification. However, RACHS-1 was dichotomized into low-risk (categories 1–2) and high-risk (≥3) groups. Although high-risk surgery was associated with approximately threefold higher odds of mortality, this did not reach statistical significance (OR 3.07, 95% CI 0.85–11.13; p=0.087), and the reported AUC of 0.626 indicated limited discrimination. In this context, procedure-specific analyses or complementary risk adjustment may provide additional information, particularly because the prognostic significance of postoperative variables may differ substantially between biventricular repair, staged single-ventricle palliation, and neonatal surgery. Our previous pediatric cardiac intensive care cohort, for example, used both RACHS-1 and Aristotle-based complexity classifications to characterize the postoperative surgical population (4).

Second, the relatively small number of mortality events (n=11) appropriately limited the possibility of multivariable modeling, as acknowledged by the authors. This limitation warrants caution when interpreting associations between individual perioperative variables and mortality. Interventions such as inhaled nitric oxide and advanced extracorporeal support are generally initiated in response to clinical deterioration and may therefore represent markers of disease severity rather than independent determinants of outcome. Indeed, the authors appropriately acknowledge this possibility in their discussion. A conceptual framework integrating preoperative condition, surgical complexity, and the postoperative hemodynamic trajectory may therefore be more informative than interpreting individual postoperative interventions in isolation.

Several numerical inconsistencies may also merit clarification. The Results state that 29 patients (23.4%) developed postoperative complications, whereas Table IV reports complications in 35 survivors and six non-survivors, implying a total of 41 affected patients. Similarly, Table IV reports CPB use in 39/113 (34.5%) survivors and 3/11 (27.3%) non-survivors, despite the Results and Discussion describing CPB use as being associated with mortality and more frequently observed among non-survivors. In addition, the maximum vasoactive-inotropic score (VIS) within the first 24 hours among non-survivors is reported as 22 in the Results, whereas Table IV reports a median value of 19.5; both sections report a value of 12 among survivors and p=0.076. Clarification of these discrepancies would improve the interpretability and reproducibility of the findings.

The findings regarding vasoactive-inotropic support are also noteworthy. Although the maximum VIS within the first 24 hours was higher among non-survivors, the difference did not reach statistical significance (p=0.076). Previous studies have demonstrated associations between VIS and clinically important outcomes after pediatric cardiac surgery, including prospective validation in neonates and infants (2,3). Importantly, postoperative hemodynamic instability is dynamic, and its prognostic significance may not be fully captured by a single maximum value. Serial

© 2026 Author(s). Published by Ankara Bilkent City Hospital, Children's Hospital. This is an open-access article distributed under the Creative Commons Attribution License (CC BY), which permits unrestricted use, distribution, and reproduction in any medium or format, provided the original work is properly cited.

measurements or assessment of VIS trajectory at predefined postoperative intervals could potentially distinguish transient early vasoactive requirements from persistent circulatory instability.

The discussion of extracorporeal support also warrants clarification. The authors cite our previously published pediatric cardiac intensive care experience as reporting ECMO use in 26 patients (2.9%) with transposition of the great arteries as the primary diagnosis and state that ECMO was initiated mainly for hypoxemia secondary to PARDS. However, in the original cohort of 895 patients, ECMO was used in 26 patients (2.9%) for failure to separate from cardiopulmonary bypass (n=11), low cardiac output syndrome (n=8), E-CPR (n=5), and hypoxemia (n=2); only five of the ECMO-supported patients had transposition of the great arteries (4). Nineteen patients (73%) were successfully weaned from ECMO and 12 (46%) survived to discharge. Therefore, correction of this citation would more accurately reflect the original data and further emphasizes that ECMO after congenital cardiac surgery represents a heterogeneous intervention whose prognostic implications depend strongly on the underlying indication and physiology.

In conclusion, Talay et al. (1) provide valuable real-world data regarding postoperative outcomes following pediatric cardiac surgery. Their findings also underscore the challenges of interpreting individual postoperative variables in a heterogeneous congenital heart disease population with a limited number of mortality events. Clarification of the numerical discrepancies and cited ECMO data noted above, together with incorporation of surgical complexity and dynamic postoperative hemodynamics in future studies, may further improve risk stratification and help identify potentially modifiable factors associated with adverse outcomes.

References

1. Talay MN, Orhan Ö, Kılıç Y, et al. Factors affecting mortality in patients during postoperative follow-up after cardiac surgery in a pediatric intensive care unit. Turk J Pediatr Dis. 2026;20(5):318-24. https://doi.org/10.12956/TJPD.2026.1295
2. Davidson J, Tong S, Hancock H, Hauck A, da Cruz E, Kaufman J. Prospective validation of the vasoactive-inotropic score and correlation to short-term outcomes in neonates and infants after cardiothoracic surgery. Intensive Care Med. 2012;38(7):1184-90. https://doi.org/10.1007/s00134-012-2544-x
3. Gaies MG, Jeffries HE, Niebler RA, et al. Vasoactive-inotropic score is associated with outcome after infant cardiac surgery: an analysis from the Pediatric Cardiac Critical Care Consortium and Virtual PICU System Registries. Pediatr Crit Care Med. 2014;15(6):529-37. https://doi.org/10.1097/PCC.0000000000000153
4. Öztürk E, Kasar T, Yıldız O, Güzeltaş A, Haydin S. The retrospective evaluation of the patients in pediatric cardiac intensive care unit of cardiac surgery center. J Pediatr Emerg Intensive Care Med. 2019;6(1):18-23. https://doi.org/10.4274/cayd.galenos.2018.60783