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Commentary: Let food be thy medicine?—Hippocrates

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Cardiac surgery patients are at increased risk of perioperative nutritional depletion because of decreased nutritional intake and increased catabolism. In this issue of the *Journal*, a group of investigators from Seoul, Republic of Korea reveal that preoperative malnutrition may increase mortality in these individuals.¹

This group retrospectively assessed 1927 patients undergoing valvular heart surgery over a 5-year period (2013–2018). Preoperative nutritional status was evaluated by 3 indices: the Controlling Nutritional Status score (CONUT), the Prognostic Nutritional Index (PNI), and the Geriatric Nutritional Risk Index (GNRI). The primary outcome was 1-year mortality, and secondary outcomes included analysis of adding these 3 nutritional status indices to the established EuroSCORE II to improve the accuracy of risk stratification.

Overall, the 1-year mortality rate was 3.8% and was associated with compromised preoperative nutritional status via significantly higher CONUT scores and significantly lower PNI/GNRI scores. Kaplan–Meier survival curves revealed that mortality was significantly increased stepwise from normal to severe malnutrition risk for all 3 nutritional indices. Furthermore, of the 3, only the CONUT score was an independent predictor for mortality and able to predict in-hospital mortality, and it was superior to both PNI and GNRI scores in predicting 1-year mortality. Finally, of the 3, only the CONUT score statistically improved the EuroSCORE

CENTRAL MESSAGE

Preoperative nutrition may impact long-term postoperative mortality after cardiac surgery. A screening approach for malnutrition may improve the ability of EuroSCORE II to predict mortality.

II's ability to predict 1-year mortality (although not in-hospital mortality).

Should preoperative malnutrition be managed similarly to other comorbid conditions that increase mortality, such as diabetes and hypertension, with a targeted intervention and objective goals? Although nutritional status has consistently been associated with postoperative outcomes, it is seldom quantified objectively in clinical practice. A lack of sufficient randomized controlled trials investigating nutrition-based intervention in cardiac surgery patients has prevented the jump from academic discussion to clinical care. The results presented by Cho and colleagues reveal the need for proper clinical studies to investigate whether improving preoperative nutritional status improves clinical outcome in patients undergoing cardiac surgery. Notably, the fields of orthopedic and gastrointestinal surgery have made great strides in demonstrating the feasibility of nutritional therapy treatment leading to early recovery and cost reduction.^{2,3} These are valid lessons of medical and financial astuteness that can be adopted in cardiac surgery.

Perhaps the most significant finding from the study presented by Cho and colleagues is the assertion that adding a nutritional score (CONUT) to the commonly used EuroSCORE II improves the risk stratification of postoperative mortality. A practical approach to screening is an easy first step to implement, requiring minimal resources and training. This is equivalent to screening patients for

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diabetes, hypertension, obstructive sleep apnea, and other diseases that have considerable health impact. Although further studies are needed to fully substantiate generalizability of various scores into the preoperative evaluation, this study is compelling in bringing the conversation of nutrition into routine clinical practice. Although the limitations of this clinical study are obvious (eg, retrospective design, low statistical power, single center/unique geographic location), the results indicate that preoperative nutritional status may profoundly influence outcome in patients undergoing cardiac surgery and perhaps

should become part of routine preoperative risk stratification.

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Commentary: Nutritional status before cardiac surgery—at the 11th hour

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CENTRAL MESSAGE

Nutritional status before cardiac surgery significantly influences patient outcomes and survival.

Assessment of numerous preoperative factors, such as a patient's age, comorbidities, and nutritional status, are of high clinical relevance before surgery because they influence his or her mid- and long-term outcomes, especially after cardiac surgery.^{1,2} Malnutrition affects up to 46.4% of cardiac surgery patients³ and their nutritional status will worsen after surgery due to the commonly occurring perioperative inflammatory response and

frequently observed inadequate postoperative nutrition support.⁴ Conceptually, malnutrition can be divided into starvation independent from any disease (starvation-related) and disease-related malnutrition.⁵ Nutritional deficiencies may negatively influence the postoperative systemic inflammatory and catabolic response, further contributing to the development of organ dysfunctions in intensive care units (ICUs).^{1,2} Despite the growing evidence about the detrimental effects of chronic and acute malnutrition in high-risk cardiac surgery patients, no specific nutrition guidelines exist and nutrition screening is seldom implemented in clinical routine practice.⁶ Adequate nutritional risk assessment is crucial to identify patients at nutritional risk and/or with poor nutritional status before surgery to allow tailored initiation of optimization strategies. At the least, these should include early initiation

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