Commentary: The personalized medicine of cardiothoracic surgery: Delving into subpopulations identifies the right therapy for the right patients

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Central Message

Identifying specific patient populations who may benefit from therapies will help improve overall patient outcomes and avoid ineffectual treatment in those who may not.

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As we strive to improve the quality of care overall for our patients, we seek to tailor our medical therapies to the appropriate and specific patient populations—this is personalized medicine. In this edition of the *Journal*, van Diepen and colleagues¹ report on a prespecified analysis of the Levosimendan in Patients with Left Ventricular Systolic Dysfunction Undergoing Cardiac Surgery Requiring Cardiopulmonary Bypass trial.^{2,3} In this analysis, the investigators look to unpack the prior equivalent levosimendan to placebo findings on the outcomes in patients with reduced left ventricular ejection fraction (LVEF) undergoing cardiac surgery with cardiopulmonary bypass support. The current study attempts to identify if there is a subpopulation of patients undergoing cardiac surgery with reduced LVEF who benefitted from levosimendan administration in the perioperative period.

Levosimendan is a calcium-sensitizing inodilator that has been proposed for treatment of patients with heart failure,^{4,5} with sepsis,⁶⁻⁸ and after bypass.⁹ In the Levosimendan in Patients with Left Ventricular Systolic Dysfunction Undergoing Cardiac Surgery Requiring Cardiopulmonary Bypass trial population who was included, overall, they were a heterogeneous group of patients with various physiologies, most specifically in those types of surgical procedures being undertaken. In the subgroup analysis of the current population, there were lower 90-day mortality outcomes and fewer low cardiac output syndrome occurrences in patients undergoing isolated coronary artery bypass grafting (CABG). The CABG cohort consisted of 66.4% of the overall population, and this is significantly larger than other similar evaluations in which CABG was represented in a smaller proportion (21%-24% in Landoni and colleagues¹⁰).

van Diepen and colleagues¹ accounted for multiple confounders and the economic impact of these therapies,

and were able to identify a specific patient population in whom the use of levosimendan has benefit: patients with reduced LVEF undergoing CABG.

The authors are to be commended for the forethought to identify a predetermined analysis in a study of this nature in which attention to specific patient details and meticulous attention to study design are of paramount importance.

van Diepen and colleagues¹ have provided us specific patient populations with specific disease indications for whom a specific therapy has benefit. It is not surprising that with the heterogeneity of our patients and the inherent complexity of the disease entities that our long-held notions of one treatment plan for all patients need to become more targeted and nuanced. The current study helps provide that clarity.

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