Commentary: Optimize preoperative glycemic control or carry on as usual?

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Diabetes mellitus is a common problem in patients undergoing cardiac surgery. Both type 1 and type 2 diabetes are significantly associated with poor prognosis following surgical intervention.¹ Maintaining optimal glycemic control is fundamental for all surgical patients regardless of diabetes status to improve their outcome, yet this goal is not always met.² Surgery requiring cardiopulmonary bypass causes greater dysregulation in glycemic control, making off-pump procedures the preferred method for the patient with diabetes to improve their surgical outcome.³ Still, little is known regarding the impact of perioperative glycemic control and variability for patients with diabetes undergoing coronary artery bypass without the need for cardiopulmonary bypass.

In this issue of the *Journal*, Kim and colleagues⁴ determined whether perioperative glycemic control was associated with short-term morbidity and mortality among 703 patients with diabetes undergoing off-pump coronary artery bypass graft (CABG) surgery. Preoperatively, they separated patients into those having unstable glycemic control, defined as a hemoglobin A1c (HbA1c) level of $\geq 7\%$ ($n = 416$; 59.2%), or stable glycemic control (HbA1c $< 7\%$; $n = 287$; 40.8%). Their investigation identified that HbA1c levels of at least 7% independently increased the odds of the composite outcome of postoperative stroke, prolonged ventilation, deep sternal wound infection, renal failure, and 30-day mortality (odds ratio, 1.60; 95% confidence interval, 1.03-2.50) independent of age, sex, comorbidities, and perioperative glycemic control. In contrast, glycemic variability before and shortly after CABG, measured as the coefficient of variation and by the time-weighted average glucose concentration, were not associated with short-term adverse outcomes. This finding contributes to the broader literature that preoperative glycemic control is associated with postoperative morbidity and mortality following CABG.⁵

Stable long-term glycemic control among patients with diabetes is needed to mitigate the risk of adverse

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Central Message

Stable glycemic control may improve short-term outcomes following off-pump CABG in diabetic patients. An understanding of whether preoperative therapy to optimize glycemic control improves prognosis is needed.

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cardiovascular outcomes.⁶ Still, it is unclear what clinical benefit could be achieved from stabilizing glycemic control before off-pump CABG in patients with diabetes. In the investigation by Kim and colleagues, the odds of patients with diabetes experiencing an adverse outcome perioperatively was statistically significant, although somewhat low.⁴ Furthermore, the discriminative ability of HbA1c was as good as flipping a coin to predict short-term outcomes (area under the receiving operative curve: 0.55 for an HbA1c of 7.85%). We can then ask whether surgery should be delayed or carry on as usual despite poor management of glycemic control.

Alternatively, managing overall risk before CABG may be useful. Despite poor glycemic control over others, there were similarities in preoperative comorbid conditions. This may reflect other unmeasured issues, such as inadequate medical or behavioral management in some patients over others. Notably, greater presurgical physical activity levels may be associated with favorable short- and long-term prognosis,^{7,8} with preoperative exercise clinical trials showing significant benefits to hospital and patient-oriented outcomes and a larger ongoing trial to determine its efficacy in frail older adults.^{9,10} Whether the manifold health benefits of physical activity extend to glycemic control before CABG for the provision of risk factor

management would be informative, specifically for those placed on a surgical wait list.

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