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Commentary: Addressing glycemic load in the precardiac surgical period: Does one size fit all?

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Many patients requiring cardiac surgery have a high glycemic load, which is known to increase the risk of adverse postoperative outcomes.¹ Yet, precise estimates associated with a milieu of clinically relevant short- and long-term postoperative outcomes using varying degrees of glycemic thresholds are not available.

In this issue of the *Journal*, Corazzari and colleagues² conducted a systematic review and meta-analysis to estimate the association of glycemic control and prognosis following cardiac surgery. They assembled 30 studies of almost 35,000 patients who primarily underwent isolated coronary artery bypass (mean age 63 years old) with varying rates of diabetes (median ~60%). Meta-analyses were performed on early and late mortality. Postoperative complications using multiple thresholds of HbA1c levels in 0.5% increments were used, ranging from 5.5% to 8.0%. Interestingly, the greatest risk reduction for in-hospital and 30-day mortality occurred with a low HbA1c threshold of <5.5% versus >5.5%. Other thresholds with the greatest risk reduction were identified for sternal wound infection (7.0%-7.5%), and hospital length of stay, stroke/transient ischemic attack, and acute kidney injury (7.0%). These findings demonstrate that HbA1c levels represent a continuous risk, with varying degrees of thresholds associated with postoperative health outcomes.

The findings by Corazzari and colleagues² suggest that preoperative HbA1c levels could be used as a general indicator of glycemic control associated with postoperative glycometabolic complications independent of diabetes status.

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CENTRAL MESSAGE

Glycemic load above critical limits before cardiac surgery is linked to adverse postoperative events. Instituting interventions to produce clinically meaningful change in glycemic load is warranted.

Since most studies included in their meta-analysis (95%) were in patients undergoing isolated coronary artery bypass, it will be useful to understand whether similar glycemic thresholds apply to other cardiac surgical procedures and intervention protocols. Indeed, the effect of dysregulated glycemic status is associated with aortic stenosis, especially in poorly controlled diabetes.³ Off-pump coronary artery bypass may also be preferred when HbA1c levels are above critical thresholds (7.0%) for adverse surgical outcomes.⁴ Many patients included in the meta-analysis had diabetes mellitus; therefore, the extent to which novel antihyperglycemic agents (glucagon-like peptide-1 receptor agonists and sodium glucose cotransporter-2 inhibitors) known to reduce the risk of major adverse cerebrovascular and cardiovascular events impact the HbA1c–postoperative risk relationship warrants further investigation.⁵

Maintenance of long-term glycemic control is needed to improve prognosis regardless of diabetes status, yet this goal is not always met.⁶ Indeed, Corazzari and colleagues² provide data to support the need to institute interventions that optimize preoperative glycemic control. Strict glycemic control targeting glucose levels <140 mg/dL before cardiac surgery with insulin therapy is shown to improve in-hospital morbid outcomes in patients with diabetes. Whether this approach could be implemented in patients without diabetes and poorly controlled glycemic status

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requires investigation.^{7,8} Other strategies for people with a surgical waitlist may benefit from exercise training to improve long-term glycometabolic status. Yet, observational studies and preoperative exercise therapy trials have not demonstrated efficacy to modulate glycemic status in the presurgical period.^{9,10} Regardless, the meta-analysis by Corazzari and colleagues² suggests that studies that reduce glycemic load will require a better understanding of the minimal clinically important change in HbA1c to produce a more favorable postsurgical outcome.

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