and procedural characteristics of study patients, but not important post-operative risk factors. If surgery is successful, CABG should improve postoperative cardiac function, physical health status, and quality of life in most of patients. It has been shown that established preoperative risk factors are not good predictors of adverse outcomes and long-term survival after CABG (4). Actually, late mortality is mainly attributable to many causes, not necessarily related to patients' cardiovascular and general health before CABG. The available literature provides compelling evidence that postoperative complications and persistent vital organ dysfunctions at hospital discharge are important predictors of late mortality after cardiac surgery (5). For example, deep sternal wound infection or mediastinitis, acute myocardial and kidney injuries, pulmonary complications, dysfunction or loss of bypass grafts, new-onset atrial fibrillation, and deterioration of regional wall motion after CABG have been associated independently with increased MACE and long-term mortality. Furthermore, hemoglobin A_{1c} is a marker of glycemic control over the previous 3 months before measurement. Can preoperative hemoglobin A_{1c} levels exactly represent the postoperative long-term glycemic control of patients? Thus, we argue that no inclusion of important postoperative risk factors in the multivariable model for adjusted hazard ratios would have biased the true effect of preoperative glycemic control on long-term outcomes after CABG in this study.

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REPLY: Association of Glycemic Control in Type 1 Diabetes With Long-Term Risk After CABG

We thank Dr. Xue and colleagues for their interest and comments regarding our paper (1). Dr. Xue and colleagues were concerned that the lack of information regarding pre- and post-operative hemoglobin levels and perioperative transfusions in our study would have biased the results. We did not have this information, and we agree that information regarding pre-operative hemoglobin levels would have been interesting because hemoglobin level has been shown to be associated with HbA_{1c} in patients with type 2 diabetes (2). However, because the association between hemoglobin level and HbA_{1c} in previous studies was very weak (2), we find it unlikely that the lack of information regarding preoperative hemoglobin levels influenced our main findings that poor glycemic control was associated with increased long-term risk of death or a major adverse cardiovascular event.

Dr. Xue and colleagues also expressed concern regarding the variables included in the multivariable models used to estimate adjusted hazard ratios for the association between HbA_{1c} categories and a combination of death or a major adverse cardiovascular event. They argued that we should have included post-operative complications in the multivariable models. We disagree because control for intermediates (i.e., factors that are on the causal pathway between the exposure and the outcome, such as post-operative complications) will generally bias estimates of the effect toward no effect (3).

Last, Dr. Xue and colleagues stated that it has been shown that "established preoperative risk factors are not good predictors of adverse outcomes and long-term survival after CABG." We wish to emphasize that well-known cardiac surgery risk prediction models, although developed for assessment of

operative risk, have been demonstrated to perform well for the prediction of long-term survival (4,5).

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