The Effect of Insulin May Not Be So Simple

To the Editor:

Drenger et al. have demonstrated that sevoflurane postconditioning is cancelled in the rat heart with type 1 diabetes mellitus and that this adverse effect by glucose intolerance cannot be restored by the adjustment of blood glucose using insulin.1 This study appears to have many questions regarding the mechanisms of insulin’s action, whereas we would congratulate their impressive results. In the study by Drenger et al., the treatment with insulin significantly increased the infarct size in rats with diabetes mellitus, and a phosphatidyl-

inositol-3-kinase inhibitor of mitochondrial adenine triphosphate sensitivity failed to restore the sensitivity of the hearts from early-stage (4–5 weeks after streptozotocin injection) diabetic rats to postconditioning. Of interest, the authors demonstrated in their study that in rats with streptozotocin-induced type 1 diabetes, the cardioprotective effects of either ischemic postconditioning or the volatile anesthetic sevoflurane postconditioning were lost and that short duration (48 h) of insulin treatment to “normalize” glucose concentration failed to restore the sensitivity of the hearts from early-stage (4–5 weeks after streptozotocin injection) diabetic rats to postconditioning.

Potential Synergy of Antioxidant N-Acetylcysteine and Insulin in Restoring Sevoflurane Postconditioning Cardioprotection in Diabetes

To the Editor:

We read with great interest the article recently published by Drenger et al.1 The authors demonstrated in their study that in rats with streptozotocin-induced type 1 diabetes, the cardioprotective effects of either ischemic postconditioning or the volatile anesthetic sevoflurane postconditioning were lost and that short duration (48 h) of insulin treatment to “normalize” glucose concentration failed to restore the sensitivity of the hearts from early-stage (4–5 weeks after streptozotocin injection) diabetic rats to postconditioning. Of interest, the author showed that insulin administration before ischemia–reperfusion event in the model of diabetic rats exacerbated postischemic myocardial infarction than without insulin therapy. Accordingly, they suggested that caution should be taken not to add insulin before the planned ischemic period.

However, we cannot completely agree with the authors’ suggestion. Hyperglycemia-induced increase in mitochondrial superoxide anion production has been shown to represent a key mechanism of hyperglycemic damage.2 Results of prospective, randomized clinical trials have shown that aggressive control of blood glucose achieved by intensive insulin therapy (target glucose concentration of 80–110 mg/dl) significantly decreased mortality in critically ill patients3 whereas poor or marginal intraoperative blood glucose control was associated with a worse hospital outcome after cardiac surgery in diabetic patients.4 In the study by Drenger et al.,1 the blood glucose levels of diabetic rats 48 h after streptozotocin injection were not listed, so we do not know the degree of hyperglycemia the authors used in their experiment.

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