

Ischemic preconditioning may reduce hyperglycemia associated with intermittent Pringle maneuver in hepatic resection

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We read with considerable interest the article “Ischemic preconditioning prior to intermittent Pringle maneuver in liver resections” by Winbladh et al. [1] in the *Journal of Hepatobiliary Pancreatic Science*. In a study of 32 hepatectomized patients, ischemic preconditioning (IP) before intermittent vascular occlusion using the Pringle maneuver seemed to improve aerobic glucose metabolism, as evidenced by reductions in liver glucose, pyruvate, and lactate levels, compared with the control group without IP. Of particular interest, postoperative hyperglycemia in the IP group was significantly lower than that in the control group. Herein, we share our opinions and provide support for this new finding from our own studies [2–4].

In both experimental [2] and clinical [3] studies using the Pringle maneuver, we found that hyperglycemia was caused by hepatic ischemia–reperfusion injury (IRI). During hepatic resection, blood glucose concentrations decreased marginally during clamping using the intermittent Pringle maneuver, but increased rapidly after unclamping [3]. Specifically, a rapid and profound transition to hyperglycemia was observed after unclamping when the intermittent Pringle maneuver was used during hepatectomy, and this transition may have involved glycogen breakdown within the hepatocytes due to hypoxia [3].

Okabayashi et al. [4] reported that not only was perioperative tight glycemic control (TGC) using an artificial pancreas (AP) to prevent hyperglycemia in hepatectomized

patients more effective in reducing surgical site infection (SSI) than conventional glycemic control, but that it also had cost benefits by reducing the duration of the hospital stay. In the study of Winbladh et al. [1], IP significantly decreased postoperative hyperglycemia on postoperative day (POD) 2 in patients who either had two to three or more than three segments resected compared with the respective control groups. IP protects against hepatic IRI because it reduces endothelial cell apoptosis and ATP degradation in the immediate postischemic period [1]. On the basis of these results, it seems that IP may reduce the hyperglycemia caused by disturbance of the hepatic glucose metabolism in association with IRI. Combination therapy of IP plus TGC, using an AP, may be a novel method to achieve glycemic control in patients who have undergone hepatectomy in which an intermittent Pringle maneuver was used, with less postoperative hyperglycemia resulting in reductions in SSI and a shorter hospital stay. Further studies in a larger series of patients are warranted to address this issue.

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