Hepatic phosphoenolpyruvate carboxykinase expression after gastric bypass surgery in rats with type 2 diabetes mellitus

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ABSTRACT. The objective of this study was to investigate the mRNA expression of hepatic phosphoenolpyruvate carboxykinase (PEPCK) after gastric bypass surgery (GBS) in rats with type 2 diabetic mellitus (T2DM). Thirty-six male Goto-Kakizaki rats, aged 12 weeks, were randomly divided into the GBS, sham operation with diet restriction (SO), and sham operation alone (control) groups (N = 12 per group). Liver specimens from all rats were obtained during the operation and 8 weeks after operation. Blood lipid levels were measured before and 8 weeks after operation. Fasting blood glucose (FBG), food intake, and body weight were recorded at weekly time points after operation. The blood glucose area under the curve (AUC) was calculated, and insulin sensitivity indices (ISI) were assessed. The expression PEPCK mRNA and protein were measured by real-time polymerase chain reaction and western blot. Compared with those of the SO and control groups, the blood lipid levels and the FBG in the GBS group was significantly decreased (P < 0.05), as was the AUC (P < 0.05), whereas the ISI was significantly increased (P < 0.05). PEPCK mRNA and protein levels in the GBS group were lower than those in the control group.
group, whereas those in the SO group were significantly higher than those in controls (P < 0.05). In conclusion, GBS can reduce blood glucose in T2DM rats while improving glucose tolerance and hyperglycemia, and the mechanism appears to be associated with a decrease of hepatic PEPCK mRNA and protein expression.

Key words: Gastric bypass surgery; Type 2 diabetes mellitus; Phosphoenolpyruvate carboxykinase; Gluconeogenesis