

## Enhanced glucagon-like peptide (GLP-1) secretion leads to rapid improvement of glucose tolerance and insulin secretion after laparoscopic sleeve gastrectomy (LSG)

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**【Objective】** Bariatric surgery, especially Roux-en-Y gastric bypass (RYGP), has been shown to resolve T2DM. Although the mechanism by which RYGP improves T2DM have yet to be fully determined, the most possible mechanism of this is assumed to be increment of GLP-1 secretion. LSG has been designed as the first of a two-stage procedure for the high-risk, super-obese patient. Recently LSG has been studied as a single-stage procedure because of excellent weight loss and low incidence of complications. However, little is known about the impact of LSG on glucose homeostasis. We performed LSG in two diabetic patients and both showed rapid and profound improvement of glucose tolerance after LSG.

**【Methods】** We performed glucose tolerance test (GTT) before and twenty days after surgery and analyzed area under the curve of plasma glucose, insulin and GLP-1 ;  $AUC_{\text{glucose}}$  (mg/dl·hr),  $AUC_{\text{insulin}}$  (µU/ml·hr),  $AUC_{\text{GLP-1}}$  (pmol/l·hr), and fasting ghrelin levels.

**【Results】** The first case had received metoformin 750mg/day for three years. HbA1c was 6.3%. Twenty days after surgery, BMI decreased from 38.0 to 36.4 (-4.1kg). Although  $AUC_{\text{glucose}}$  slightly decreased (510 to 457), both  $AUC_{\text{insulin}}$  and  $AUC_{\text{GLP-1}}$  dramatically increased (122 to 216 and 6.4 to 68.5, respectively). Three months after surgery, HbA1c was 5.5% without medication. Second case also showed great improvement of glucose tolerance with enhancement of insulin and GLP-1 secretion. Ghrelin levels were significantly decreased in both cases. Enhanced GLP-1 secretion is specific to bariatric surgery, because weight reduction by diet therapy did not enhance GLP-1 secretion.

**【Conclusion】** These results suggest that LSG can lead to rapid improvement of glucose tolerance and insulin secretion along with GLP-1 secretion. Reduction in ghrelin levels may also contribute to improvement of glucose tolerance. Thus, LSG will be ideal procedure for obesity with T2DM.