Possible mechanisms of rapid improvement of glucose tolerance and insulin secretion after laparoscopic sleeve gastrectomy (LSG)

Hiroshi Yamamoto
Departments of Surgery, Shiga University of Medical Science

【Objective】 LSG has been designed as the first of a two-stage procedure for the high-risk, super-obese patient. Recently LSG has been applied as a single-stage procedure because of excellent weight loss and low incidence of complications. More recently, the accumulating data suggested that LSG produces remission or cure of type 2 diabetes mellitus (DM). To investigate the mechanism which LSG improves glucose tolerance, oral glucose tolerance test (OGTT) was performed at preoperative and 3 months after surgery.
【Methods】 We performed LSG on two diabetic patients, one patient with impaired glucose tolerance (IGT) and two non-diabetic patients. Plasma glucose, insulin and Glucagon-like peptide-1 (GLP-1) levels during OGTT were measured. Fasting ghrelin levels were also measured. To assess gastro-intestinal motility during OGTT, we used cine MRI.
【Results】 Diabetic patients discontinued oral hypoglycemic agent or insulin immediately after surgery. HbA1c was improved in diabetic patients. OGTT showed that great improvement of glucose tolerance with enhancement of insulin and GLP-1 secretion in diabetic patients. Area under the curves (AUC) for insulin and GLP-1 were increased after LSG. Fasting ghrelin levels were decreased in all patients. Cine MRI during OGTT revealed that gastro-intestinal motility was remarkably induced after LSG.
【Conclusion】 These results suggest that LSG can lead to rapid improvement of glucose tolerance and insulin secretion. Increased GLP-1 secretion and decreased fasting ghrelin levels may play a role of improvement of glucose tolerance and insulin secretion after LSG. Induced gastro-intestinal motility during OGTT may lead to increased GLP-1 secretion after LSG.