OBES SURG (2009) 19:1333–1334
DOI 10.1007/s11695-009-9888-5

CASE REPORT

Successful Medical Management of Status Post-Roux-en-Y-Gastric-Bypass Hyperinsulinemic Hypoglycemia

Elias Spanakis · Claudia Gragnoli

Received: 9 March 2009 / Accepted: 26 May 2009 / Published online: 24 June 2009

Abstract Roux-en-Y gastric bypass (RYGBP) is the most commonly performed type of bariatric surgery, which is used in the treatment of obesity and type 2 diabetes. Recent case reports and case series have described a rare complication of RYGBP, status post-gastric-bypass hyperinsulinemic hypoglycemia, which was mainly managed successfully with pancreatectomy. In this letter, we describe the first successful management of status post-gastric-bypass hyperinsulinemic hypoglycemia with diazoxide.

Keywords Bariatric · T2D · Obesity · Hypoglycemia · Diazoxide · Gastric bypass · Hyperinsulinemic hypoglycemia · RYGBP · Type 2 diabetes

E. Spanakis · C. Gragnoli (✉)
Laboratory of Molecular Genetics of Complex and Monogenic Disorders, Division of Endocrinology, Diabetes and Metabolism, H044, Department of Medicine and Cellular and Molecular Physiology and Public Health Sciences,
Penn State Milton S. Hershey Medical Center,
500 University Drive,
Hershey, PA 17033, USA
e-mail: claudia.gragnoli@gmail.com

E. Spanakis · C. Gragnoli
Penn State University College of Medicine,
Hershey, PA, USA

C. Gragnoli
Sbarro Institute for Cancer Research and Molecular Medicine, Center for Biotechnology and Department of Biology,
Temple University's College of Science and Technology,
Philadelphia, PA, USA

C. Gragnoli
Molecular Biology Laboratory,
Bios Biotech Multi-Diagnostic Health Center,
Rome, Italy

Case Report

Obesity and type 2 diabetes (T2D) represent major health concerns in USA. Bariatric surgery seems to be a very effective tool in management of these conditions [1]. Roux-en-Y gastric bypass (RYGBP) is the most common bariatric procedure performed in the USA, with approximately 140,000 procedures done in 2005 [2]. Several case reports and case series studies have described a rare but extremely interesting complication of RYGBP, status post-gastric-bypass hyperinsulinemic hypoglycemia [3–8]. In almost all of these cases, successful management was achieved with partial or total pancreatic resection.

The patient is a 52-year-old woman with a personal medical history of obesity, T2D, and dyslipidemia, who underwent a gastric bypass surgery 4 years ago. Her preoperative weight was 377 lb with a body mass index of 63. Her T2D was managed with metformin, glipizide, pioglitazone, and acarbose and her blood glucose levels were ranging from 118 to 189 with an HbA1c around 7.6–7.8%. One year after the surgery, her weight had decreased to 229 lb and medications for T2D were discontinued 3 months after surgery, as the patient became normoglycemic without medications. One year ago, the patient reported complaints regarding several episodes of sweating, hunger, nervousness, and discomfort that had been happening in the last 6 months about 2 h after a meal. Her blood glucose levels, examined at these episodes occurring postprandially, were as low as 29, 48, and 55 mg/dl. Her fasting blood glucose and insulin levels were 82 mg/dl and 7 μU/ml, respectively; at 2 h status after the glucose tolerance test, her blood glucose and insulin levels were 55 mg/dl and 35 μU/ml, respectively. Computed tomography of the abdomen with contrast and octreotide scan was negative for the presence of insulinoma, a well-

described cause of hypoglycemia. Dietary modifications (i.e., frequent meals with low percentage of carbohydrates) had failed to improve her symptoms and also caused an unfavorable weight gain of 35 lb. Administration of diazoxide 50 mg twice a day was sufficient to control her symptoms and the patient remains symptom free 16 months after the administration of diazoxide. Attempts to stop diazoxide for at least 2 weeks resulted in the recurrence of hypoglycemia episodes.

Post-gastric-bypass hyperinsulinemic hypoglycemia represents a rare complication of RYGBP and, as very few cases have been reported, the appropriate treatment of this condition is unknown. Successful management of this condition has been reported with dietary modifications [4, 5]. However, there is a growing tendency to treat these patients with pancreatic resection. Partial pancreatic resection (at least 75%) is often unsuccessful, necessitating a further total pancreatic resection [6, 8]. The end result of this approach is to cause iatrogenic diabetes, necessitating lifelong treatment with insulin. Diazoxide has been used in the treatment of this condition; however, the result has been up until today unsatisfactory [6]. Diazoxide (a specific adenosine-triphosphate-dependent potassium channel agonist of β cells) has been used successfully in the treatment of a similar condition in infants and children, the persistent hyperinsulinemic hypoglycemia of infancy [9]. Although this approach may not be always successful in the persistent hyperinsulinemic hypoglycemia of infancy, the recommended treatment is pharmacotherapy first (either with diazoxide, somatostatin analogs, or calcium channel blockers) and, if unsuccessful, the recommended treatment is surgery [9].

Recently, Moreira et al. reported the first successful case of management of post-gastric-bypass hyperinsulinemic hypoglycemia with verapamil and acarbose [10]. Others have reported successful management of post-gastric-bypass hyperinsulinemic hypoglycemia with dietary modifications [4, 5], raising the question of whether pancreatectomy should be the first line of treatment. Our letter may represent the second successful case using pharmacological measures; however, it is the first case which describes a successful outcome after 16 months of medical therapy with diazoxide.

We would like to raise the following questions: is timing of post-gastric-bypass hyperinsulinemic hypoglycemia medical management relevant in order to obtain a positive patient answer to treatment? Is it possible that if the patient with post-gastric-bypass hyperinsulinemic hypoglycemia is treated promptly with diazoxide, she or he will more likely not need to undergo surgery? In other words, could a very prompt medical treatment with diazoxide prevent the need for surgery? And finally should pancreatectomy (either partial or total) be the first treatment option in patients with post-gastric-bypass hyperinsulinemic hypoglycemia?

Acknowledgments This study was made possible by the Penn State University Physician–Scientist Stimulus Award and by the Dean's Pilot and Feasibility Grant, number D1BTH06321-01, from the Office for the Advancement of Telehealth (OAT), Health Resources and Services Administration, DHHS. This project is funded, in part, under a grant from the Pennsylvania Department of Health using Tobacco Settlement Funds. The department specifically disclaims responsibility for any analyses, interpretations, or conclusions.

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