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ORIGINAL ARTICLE

Laparoscopic bariatric surgery for the treatment of severe hypertriglyceridemia

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Summary *Background:* It is well established that severe hypertriglyceridemia can lead to pancreatitis. At present, medical treatment for patients with severe hypertriglyceridemia and repeat pancreatitis attacks is not adequate. The aim of this study was to assess the effectiveness of laparoscopic bariatric surgery in these patients.
Methods: A review of 20 morbidly obese patients with severe hypertriglyceridemia (a triglyceride level of >1000 mg/dL) who received laparoscopic bariatric surgery was performed. The study population comprised 14 males and six females, with an average age of 35.0 years (range 24–52 years), and the mean body mass index was 38.2 kg/m^2 (range 25–53 kg/m^2). The preoperative mean plasma triglyceride level was 1782.7 mg/dL (range 1043–3884 mg/dL). Four patients had a history of hypertriglyceridemic pancreatitis and 13 patients had associated diabetes.
Results: Of the 20 patients, 17 (85%) received gastric bypass, whereas three (15%) received restrictive-type surgery. Laparoscopic access was used in all of the patients. Hypertriglyceridemia in morbidly obese patients was more commonly associated with male sex and a poorly controlled diabetic state. The mean weight reduction was 25.5% 1 year after surgery, with a marked improvement in diabetes management. As early as 1 month following surgery, the plasma mean triglyceride levels had decreased to 254 mg/dL (range 153–519 mg/dL), and this was further reduced to mean levels of 192 mg/dL (range 73–385 mg/dL) 1 year after surgery. One patient developed acute pancreatitis during the perioperative period, but none of the patients suffered an episode of pancreatitis in the follow-up period (from 6 months to 13 years).
Conclusion: Bariatric surgery can be successfully used as a metabolic surgery in severe hypertriglyceridemia patients at risk of acute pancreatitis. However, control of triglyceride levels prior to bariatric surgery is indicated.

Conflicts of interest: All contributing authors declare no conflicts of interest.

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1. Introduction

Hypertriglyceridemia (HTG) is an independent risk factor for atherosclerotic heart disease.[1,2] Moreover, patients with serum triglyceride (TG) levels >1000 mg/dL are at high risk of acute pancreatitis.[3,4] Diet control, statins, nicotinic acid, and fibric acid derivatives may be used in the treatment of HTG. It has been reported that in patients with severe HTG-associated pancreatitis, which had been previously unresponsive to treatment, plasmapheresis had proved useful, particularly in pregnant individuals.[5–8] However, none of these treatments can provide a cure for patients with severe HTG accompanied by repeated attacks of pancreatitis.

Metabolic surgery, defined as surgery aimed at anatomical and functional change to treat a metabolic disorder, has been proposed to overcome this problem.[9] Partial ileal bypass has been reported as an effective treatment for resolving HTG, and providing a cure for patients with severe HTG and repeated pancreatitis attacks.[10,11] In this study, the effectiveness of bariatric surgery was evaluated in morbidly obese patients with severe HTG.

2. Materials and methods

2.1. Patient selection and data sources

The Min-Sheng General Hospital institutional review board approved the present study (MSIRB2011003). We identified 20 patients with severe HTG (serum TG levels >1000 mg/dL), who had undergone laparoscopic bariatric surgery during the period 1997 to 2011, by retrospective review of our prospectively collected bariatric database. The distribution of the plasma TG levels is shown in Table 1, and patients with severe HTG comprised only 0.6% of all the bariatric patients. The study group consisted of 14 males and six females, with a mean age of 35.0 years (range 24–52 years) and a mean body mass index of 38.2 kg/m^2 (range 25–53 kg/m^2). The mean body weight was 109.8 kg (range 67–144 kg). Four patients had a history of recurrent hypertriglyceridemic pancreatitis, and 13 (65%) patients had associated type 2 diabetes. The clinical characteristics and follow-up data were collected and compared with those of other bariatric patients. Insulin resistance was measured using the Homeostatic Model Assessment (HOMA) index, which can be calculated as follows: plasma glucose (mmol/L) × insulin (μU/mL)/22.5.[12]

Table 1 Distribution of plasma triglyceride levels in a database of all bariatric surgeries (from 1997 to 2011).

Triglycerides (mg/dL)	No. of patients	%
<500	3042	96.9
500–1000	80	2.5
≥1000 (severely high)	20	0.6
Total	3142	100.0

2.2. Operative techniques

Three patients received restrictive-type surgery (two had vertical banded gastroplasty and one had adjustable gastric banding), and 17 patients received gastric bypass surgery (13 underwent a minigastric bypass and 4 had Roux-en-Y gastric bypass). All procedures were performed using laparoscopic techniques and have been described elsewhere.[13–15] The minigastric bypass is a modification of Mason's loop gastric bypass with a long lesser-curvature tube from the antrum to the Angle of His (outer diameter 1–2 cm, volume 60–80 mL). The jejunum is measured 200 cm from the ligament of Treitz and is brought up to the distal end of the gastric tube in an antecolic position (Fig. 1).[16] The bypass limb in the minigastric bypass measured 200 cm (biliopancreatic limb), and in the Roux-en-Y bypass it measured 100 cm in the biliopancreatic limb and 150 cm in the alimentary limb.

2.3. Statistical analysis

All statistical analyses were performed using SPSS version 12.01 (SPSS Inc., Chicago, IL, USA), with baseline comparison made using Chi-square tests and a two-sample *t* test. Continuous variables were expressed as the mean (standard deviation), with differences expressed as the mean (95%

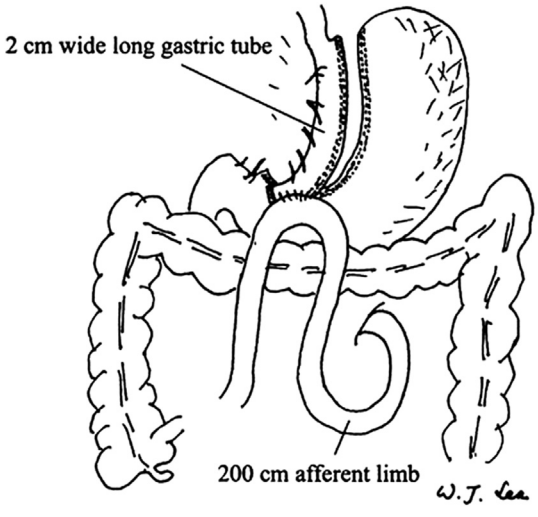

Figure 1 Laparoscopic minigastric bypass (LMGB).