Minimally Invasive Surgical Treatment of Morbid Obesity in Patients with Specific Comorbidities. A Case Report

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Abstract

The mortality of patients with morbid obesity is 2 to 12 times higher according to age, comorbidities and the degree of obesity. Surgical treatment has proved to be the only type of treatment that has led to favorable long-term results. We present the therapeutic strategy used in a 39 year old obese patient with BMI=39.8 kg/m², type 2 diabetes mellitus, arterial hypertension, severe hypercholesterolemia, nonalcoholic steatohepatitis and metabolic syndrome. The patient underwent laparoscopic gastric banding with adjustable silicon band.

Key words

Morbid obesity - diabetes mellitus type 2 – laparoscopy - gastric banding

Introduction

Obesity represents a major health issue that has reached epidemic proportions globally. Currently it accounts for 2-7.8% of total health care costs in developed countries. Morbid obesity is characterized by a body mass index (BMI) of 40kg/m² or higher. The following contribute to the severity of this disease: the growing number of patients with morbid obesity, the occurrence of this pathology at increasingly younger ages and especially the severity of specific comorbidities which severely influence the life expectancy of patients.

Diet, physical exercise or medical therapy has not proved to be efficient in treating morbid obesity in the long term. Therefore, once laparoscopic surgical procedures were introduced, the number of patients with morbid obesity who received surgical treatment increased exponentially. The Roux -en-Y gastric bypass (RYGB) and gastric banding (GB) with adjustable silicon band are currently the most frequently used techniques (1).

Recent metaanalyses on bariatric surgery outcomes revealed that in the long term, patients who underwent RYGB or GB lost 61.6% and 47.5%, respectively of excess body weight, while the complete resolution or improvement of comorbidities were registered in most patients with type 2 diabetes mellitus, hyperlipemia, hypertension, nonalcoholic steatohepatitis (NASH) and sleep apnea (1,2).

Case report

A 39 year-old female patient was admitted to our clinic on the 25th of June 2007. She had already been registered at the Clinical Center for Diabetes, Nutrition and Metabolic Diseases, where she had been last admitted in March 2006 and diagnosed with: insulin-dependent type 2 diabetes mellitus, arterial hypertension, severe hypercholesterolemia, NASH, metabolic syndrome and class II obesity.

The patient had had several hospital admissions to the 3rd Medical Clinic Cluj, where she was first diagnosed in February 2004 with NASH based on laboratory, imaging and histopathologic investigations after liver biopsy.

She had had a history of insulin-dependent type 2 diabetes mellitus for 15 years. The patient received insulin, hypotensive medication, silymarin and a hypocaloric diet. Her evolution was unfavorable, she gained weight, the insulin doses had to be increased, glycemia was difficult to control, she had elevated blood pressure, altered hepatic function and the metabolic syndrome became more severe. The investigations carried out at that time revealed poor glycemic balance (HbA1c 10.2%).

Given this evolution, the patient was referred to the 5th Surgical Clinic for laparoscopic surgical treatment of obesity.

On admission the patient had good general condition and BMI 39.8 kg/m². She was being treated with Novorapid 30 u and Lantus 70 u, plus hypotensive agents.

The physical examination indicated lower body obesity with predominantly abdominal obesity, blood pressure 150/100 mmHg. Laboratory investigations: hyperglycemia 289 mg/dl, hepatocytolysis AST 133 U/l, ALT 69 U/l, GGT 103
UI/l, hypercholesterolemia 345 mg/dl, hypertriglyceridemia 190 mg/dl, ESR 42 mm at 1 hour, hs–CRP 3.6 mg/dl. The other laboratory investigations, including thyroid hormones FT4 and TSH, were within normal limits.

The respiratory functional tests and the examination of the cardiac function indicated normal values. The chest X-ray revealed bilateral hilar interstitial lung design. The patient had been smoking 10-15 cigarettes a day for the last 10 years.

The abdominal ultrasonography indicated hepatomegaly (right lobe diameter 23 cm), hyperechogenic echostructure with posterior attenuation.

Surgery was performed after brief preoperative preparations. Laparoscopic GB with adjustable silicon band, drainage under the left diaphragm and under the left liver lobe were carried out (Fig. 1).

The postoperative evolution was favorable, intestinal transit was restored, the drains were removed, per oral feeding was initiated and insulin therapy was re-instituted.

The postoperative x-ray of the esophagus, stomach and duodenum with Gastrografin identified a correctly positioned band, proper evacuation through the band, reduced gastric peristalsis and normal transit in the duodenum.

The patient was discharged on the 4th postoperative day. Adequate diet was prescribed at the Center for Diabetes, Nutrition and Metabolic Diseases.

The surgical control performed 2 months postoperatively revealed a 7 kg weight loss, BMI of 37.3 kg/m², decreased cholesterolemia (208 mg/dl) and triglyceridemia (160 mg/dl), lower transaminase levels (AST 90 UI/l, ALT 59 UI/l, GGT 80 UI/l), normal ESR values, hs–CRP 2.1 mg/dl. The insulin dose was also decreased from 30u of Novorapid to 10u, Lantus from 70 to 50u. Normal blood pressure values were registered under the initial treatment.

The patient reported feelings of satiety after quantitatively reduced meals.

The surgical control at 4 months revealed a total body weight loss of 11 kg, BMI of 35.9 kg/m², normal serum lipid levels, lower aminotransferase and GGT levels, hs–CRP 0.3 mg/dl, continuous decrease of insulin doses (Novorapid 5-10u, Lantus 30-35u) and normal blood pressure values under treatment.

Discussion

Previously published studies have demonstrated the reduced efficiency of conservative treatment in the long term with only 5% of patients having a normal weight, 5 years after treatment initiation. Surgical treatment has proved to be the only type of treatment that led to long-term favorable results. The laparoscopic approach and the assimilation of traditional techniques in laparoscopic surgery has strongly advocated the surgical treatment of morbid obesity, due to the obvious advantages of this surgical technique: postoperative comfort, lack of parietal complications, early intestinal transit, reduced dosis of postoperative pain-relieving medication, rapid social and professional reinsertion. These are crucial advantages especially for patients with associated comorbidities and increased anesthetic or surgical risk.

Laparoscopic adjustable gastric banding (LAGB) is currently the most frequently used procedure. This technique has proved to be safe. The available data indicate a perioperative mortality of 0.05% and a complication rate of 2.6%, which is 10 fold lower than that registered in malabsorptive surgery (RYGB) (3).

The long-term favorable evolution of patients who have underwent GB is also related to the possibility of adjusting the gastric passage through the band by filling it with saline

Fig. 1 Position of gastric band during surgery.

Fig. 2 Radiological control with contrast material of band position and gastric passage.
solution or voiding it. The reversibility of the surgical intervention is another advantage since the band can also be removed laparoscopically. The long-term efficiency is reduced when compared with malabsorptive techniques, especially in cases of extreme obesity (BMI > 50 kg/m²). Brown et al demonstrated an 85% body weight loss, two years after LAGB in patients with BMI between 30 and 40 kg/m². Postoperative nutritional deficiencies are less frequent in patients who undergo LAGB if a balanced diet is followed. The long-term disadvantages of this technique include the need for careful monitoring of patient evolution, band adjustment, possible complications, band slippage, gastric wall erosion with intraluminal migration, complications related to implanting and securing the injection port. However, such situations rarely occur when an adequate surgical technique is employed.

Morbid obesity is associated with several specific comorbidities such as type 2 diabetes mellitus and insulin resistance, coronary heart disease, arterial hypertension, NASH, osteoarthritis, respiratory dysfunctions, etc. Morbid obesity significantly decreases the life expectancy of young patients. Constant weight loss favors the remission of diabetes mellitus in two thirds of diabetic morbidly obese patients. This therapeutic effect is obvious especially if surgery is performed 1-2 years after diabetes is diagnosed.

In our patient, the favorable evolution was proven by the halving of the insulin dose required and stable glycemia levels, 4 months postoperatively.

Nonalcoholic steatohepatitis in morbid obesity is signaled by increased transaminase and gamma-glutamyltransferase levels, insulin resistance, hepatomegaly, hepatic steatosis as revealed by ultrasound examination in patients who were not given hepatotoxic drugs or alcohol and had negative viral and autoimmune markers. It frequently occurs in combination with metabolic syndrome components. Most studies indicate that simple steatosis does not usually turn into NASH or cirrhosis. On the other hand, 30-40% of NASH cases turn into fibrosis over a 4-year period. The risk factors for such an evolution include obesity, type 2 diabetes mellitus, increased transaminase levels (AST/ALT >1) and age over 45 years. The therapy of NASH is usually targeted at the associated disorders: obesity, diabetes, dyslipidemia. A slow reduction in body weight (1.5 kg/week) proved efficient in both reducing transaminase levels, and improving histological liver changes. The liver ultrasonography carried out 2 and 4 months postoperatively did not detect changes as compared with the preoperative investigation.

The metabolic syndrome is frequently associated with chronic inflammatory syndrome and coronary heart disease, demonstrated by the inflammatory biomarkers hs–CRP, IL-6 (8) and the assessment of the cardiac function (9,10). Body weight loss and the implicit decrease in insulin resistance led to a significant reduction of the inflammatory bio-markers, in our patient. Regarding cardiac func-tion, this patient had not ECG or echocardiographic signs of coronary heart disease prior to the surgical intervention.

Conclusions
Surgery is currently the most efficient method of treating morbid obesity. It provides the best results as far as body weight loss and long-term evolution of specific comorbidities are concerned. The surgical laparoscopic techniques for morbid obesity have numerous advantages over traditional surgery. Gastric banding is a restrictive procedure used in laparoscopic surgery. The presence of comorbidities and their favorable evolution, accompanied by an increased life expectancy after surgery represent additional arguments for choosing surgical therapy.

References
QUIZ HQ 41
Is any intrahepatic mass a tumor?

A 56-year-old normoponderal woman with a crural hernia surgically cured 3 years before, was admitted in our unit for complete evaluation of an intrahepatic mass diagnosed at a routine ultrasound (US) performed in another unit and considered a neoplastic lesion. Medical history did not reveal chronic drug consumption or alcohol abuse. At admission, the patient was asymptomatic, with no complaints except moderate asthenia (no abdominal pain, weight loss, or fever). Physical examination was normal, without hepatomegaly or spleen enlargement. Routine laboratory parameters did not show any pathological findings; serological screening for hepatic viruses B and C was negative; plasma cholesterol and triglycerides were in normal range and tumoral markers (alpha-foetoprotein, carcinoembirionic antigen, CA 19-9, CA 125, CA 15-3) were within normal limits as well. US revealed a normal liver size with a hyperechoic, inhomogeneous mass, with irregular margins, involving more than one half of the right hepatic lobe; Doppler examination has shown a normal vascular pattern inside the hyperechoic mass (Figs. 1, 2). The sonoelastographic examination showed a low-medium stiffness of the hyperechoic mass (Fig. 3).

An extensive examination comprising upper and lower gastrointestinal endoscopy, X-Ray chest examination and gynaecological exam was performed. The MRI confirmed the presence of a large intrahepatic mass located in the right hepatic lobe showing hypocaptation of hepatocellular specific contrast agent and a huge amount of intracellular fat accumulation; no vascular abnormalities were detected (Figs. 4, 5). Finally, an US-guided liver biopsy into the suspected area was performed. The histological aspect of the liver mass is depicted in Figs. 6-8.

Question
What is the focal abnormality of the liver?
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Fig. 6 Liver biopsy specimen: micro- and macro-vezicular steatosis; a net demarcation between the fat area and the normal adjacent hepatic parenchyma (HE x40).

Fig. 7 Liver biopsy specimen: grade 3 steatosis in the focal area (HE 400x).

References


