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Original article

Should we wait for metabolic complications before operating on obese patients? Gastric bypass outcomes in metabolically healthy obese individuals

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Abstract

Background: A subgroup of obese patients without metabolic disorders has been identified and defined as metabolically healthy but morbidly obese (MHMO).

Objectives: To compare Roux-en-Y gastric bypass (RYGB) outcomes between MHMO and metabolically unhealthy morbidly obese (MUMO) patients to assess whether the obesity phenotype could affect the results.

Setting: A university-affiliated tertiary care center.

Methods: One hundred nineteen consecutive patients underwent RYGB; 102 completed the 2-year follow-up and were divided into 2 groups (MHMO and MUMO) according to Wildman criteria, including blood pressure, triglycerides, high-density lipoprotein cholesterol (HDL-C), fasting blood sugar, C-reactive protein (CRP), and homeostasis model assessment of insulin resistance (HOMA-IR). Weight loss and metabolic parameter changes were analyzed.

Results: Twenty-one of 102 (20.6%) patients were identified as MHMO; they were mostly women (90.5%) and were significantly younger than MUMO patients (39.4 ± 9.1 yr versus 47.2 ± 10, $P = .001$); 12.6% were lost to follow-up. MHMO phenotype was significantly associated with a greater percentage of excess body mass index loss ($P = .03$), independent of gender, age, and redo procedures. All metabolic parameters were significantly improved 2 years after surgery in the MUMO group. HOMA-IR, CRP, and triglycerides were significantly lower 2 years after surgery in the MHMO group, whereas fasting blood sugar and HDL-C were unchanged. At 2 years of follow-up, 92.3% of the population was metabolically healthy.

Conclusions: RYGB is an effective procedure to achieve weight loss and had a strong positive metabolic effect in both MHMO and MUMO phenotypes. RYGB led to an increase of the metabolically healthy status and may prevent or delay the onset of metabolic disorders. (Surg Obes Relat Dis 2015;▮:00–00.) © 2015 American Society for Metabolic and Bariatric Surgery. All rights reserved.

Keywords: Morbid obesity; Metabolically healthy; Metabolic disorders; Gastric bypass; Obesity phenotype; Weight loss

The increasing prevalence of obesity worldwide has major socioeconomic consequences. Obesity is often associated with metabolic disorders leading to type 2 diabetes mellitus (T2DM), higher cardiovascular risk, and higher

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mortality rate [1,2]. Bariatric surgery is now considered the best option to achieve significant weight loss and has also been found to be superior as an optimized medical therapy to cure T2DM and other co-morbidities [3,4]. Therefore, indications for bariatric surgery are now evolving from weight loss considerations to metabolic objectives.

Since the 1980s, a subgroup of obese patients without metabolic disorders has been identified and defined as metabolically healthy but morbidly obese (MHMO) patients [5–7]. Currently, there is still no standardized definition of metabolic health, resulting in a wide variation of metabolically healthy obesity prevalence, which is estimated to be between 6% and 40% [6,8]. MHMO characterized by less visceral fat would be at lower cardiovascular risk [8]. Thus, whereas indications for bariatric surgery tend to expand to nonobese T2DM patients with metabolic concerns, the best therapeutic strategy in MHMO patients, who could be at lower risk of morbidity and mortality, remains questionable.

In the present study, we compared gastric bypass outcomes in MHMO versus metabolically unhealthy morbidly obese (MUMO) patients. The aim was to assess whether obesity phenotype influences the results of bariatric surgery and therefore if our surgical management can be based on stratification of obese individuals according to their metabolic health phenotype.

Methods

Definition of MHMO patients and population selection

From April 2009 and May 2011, 119 patients underwent a Roux-en-Y gastric bypass (RYGB) in the Department of Digestive Surgery, Edouard Herriot Hospital, a university-affiliated tertiary care center (Lyon, France). Fifteen patients were excluded from the study because of insufficient collected data (follow-up performed in another center) and were considered as lost to follow-up. Two others were excluded because of type 1 diabetes mellitus. Finally, 102 patients were included in the study. Patients' characteristics are presented in Table 1.

The population was divided into 2 groups, MHMO and MUMO, according to Wildman's definition [9]. Patients were considered as MHMO when having only 1 or no cardiometabolic abnormalities among the following 6:

1. Elevated blood pressure: systolic/diastolic blood pressure ≥130/85 mm Hg or antihypertensive medication use;
2. Elevated triglycerides level: fasting triglycerides level ≥1.70 mmol/L;
3. Decreased high-density lipoprotein cholesterol (HDL-C) level: <1.04 mmol/L in men or <1.30 mmol/L in women or lipid-lowering medication use;
4. Elevated glucose level: fasting blood sugar ≥5.5 mmol/L or antidiabetic medication use;
5. Insulin resistance: homeostasis model assessment of insulin resistance (HOMA-IR) >2.5 (i.e., >90th percentile); and
6. Systemic inflammation: C-reactive protein (CRP) level >5 mg/L (i.e., >90th percentile).

Table 1
Characteristics of the study population

Population	n = 102
Age (yr)	45.6 (± 10)
Male gender (%)	43%
Height (m)	1.66 (± .09)
Weight (kg)	124.2 (± 20)
Waist Circumference (cm)	131 (± 14)
BMI (kg/m²)	45 (± 6.6)
T2DM (%)	51% (n = 54)
Insulin-treated T2DM (%)	21% (n = 21)
Arterial hypertension (%)	41% (n = 45)
Dyslipidemia (%)	46% (n = 47)
Redo surgeries (%)	27.4% (n = 28)

BMI = body mass index; T2DM = type 2 diabetes.
Data are presented as mean ± standard deviation.

Laparoscopic Roux-en-Y gastric bypass procedure

A 5-port technique was used and consisted in a small gastric pouch (30 mL) by stapling the stomach using a linear stapler. The first jejunal loop was moved up into an antecolic position after an epiploic transection. An end-to-side gastrojejunal anastomosis was performed using a linear stapler. Closure of the anterior part of the anastomosis was done using a running suture. The alimentary limb was 150 cm long. A laterolateral jejunojejunal anastomosis was performed with a linear stapler. Closure of the mesenteric defect was systematic, using a nonabsorbable silk suture (2/0).

Data analysis

This is a retrospective study of prospectively collected data from our electronic database dedicated to bariatric surgery. Anthropometric and biological data were recorded preoperatively; at 2, 6, 12, 18, and 24 months; and every year after surgery. Weight loss was expressed in percentage of excess body mass index (BMI) loss (%EBMIL), absolute weight loss in kg (aWL), and BMI loss in kg/m^2. The prevalence and evolution of metabolic co-morbidities in each group were assessed. Type 2 diabetes mellitus was defined using the American Diabetes Association criteria [10], and diabetes was considered in remission when patients stopped their antidiabetic treatments and HbA_{1c} was <6% and/or fasting blood glucose levels were <100 mg/dL. Arterial hypertension was defined as systolic/diastolic blood pressure ≥130/85 mm Hg or use of antihypertensive drugs. Dyslipidemia was defined as low-density lipoprotein cholesterol (LDL-C) ≥4.1 mmol/L or triglycerides ≥1.7 mmol/L.

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