ELSEVIER

Surgery for Obesity and Related Diseases ▮ (2015) 00–00

SURGERY FOR OBESITY AND RELATED DISEASES

Original article

Does pregnancy influence long-term results of bariatric surgery?

Thu Quyên Pham, M.D.[a,b], Marie Pigeyre, M.D.[a,b,c], Robert Caiazzo, M.D.[a,b], Hélène Verkindt, M.D.[a,b], Philippe Deruelle, M.D., Ph.D.[a,b,d], François Pattou, M.D., Ph.D.[a,b,*]

[a]General Surgery and Endocrine, Huriez Hospital, Lille, France
[b]Lille University Hospital, Lille, France
[c]Department of Nutrition – Obesity Unit, Huriez Hospital, Lille, France
[d]Department of Gynecology – Obstetrics, Jeanne de Flandres Hospital, Lille, France

Received December 12, 2013; accepted March 25, 2015

Abstract

Background: Bariatric surgery is performed mostly on obese women of reproductive age. Many authors have studied pregnancy outcomes after bariatric surgery. Only a small number of studies have analyzed the impact of maternity on the results of bariatric surgery.

Objectives: To study the effect of pregnancy on long-term outcomes of bariatric surgery.

Setting: Lille University Hospital.

Methods: A retrospective study was conducted on 591 women aged 18 to 42 years who had undergone laparoscopic adjustable gastric band (LAGB) surgery or laparoscopic Roux-en-Y gastric bypass (LRYGB) surgery between 1996 and 2012. A comparison of the results after a 5-year follow-up was performed between patients who became pregnant after their bariatric surgery (pregnant group, n = 84) and postoperative nonpregnant women (nonpregnant group, n = 507).

Results: At the 5-year visit, 84.8% patients were seen. The preoperative body mass index (BMI) was the same in the 2 groups (pregnant group: 47.8 ± 6.9 kg/m^2; nonpregnant group: 47.5 ± 7.2 kg/m^2; $P = .755$). The percentage of excess weight loss (%EWL) was lower in the pregnant group at 2 years (pregnant group = 45.9 ± 24.6%; nonpregnant group = 56.9 ± 28.6%, $P = .002$) but was similar at 5 years (47.7 ± 27.7% versus 49.9 ± 28.9%, $P = .644$). The decrease in co-morbidities was similar after 5 years. The gestational weight gain (GWG) was higher when the band was deflated during pregnancy (GWG = +12.7 ± 10.5 kg) compared to the band without fluid removal (GWG = +4.9 ± 7 kg) or laparoscopic Roux-en-Y gastric bypass (GWG = +4.4 ± 1.1 kg) ($P < .05$).

Conclusions: Pregnancy after bariatric surgery slows down postoperative weight loss but does not affect weight results at 5-year follow-up. (Surg Obes Relat Dis 2015;▮:00–00.)

Keywords: Pregnancy; Bariatric surgery; Weight loss; Outcomes

Obesity is defined as a body mass index (BMI) of 30 or greater, calculated as weight in kilograms divided by the square of the height in meters. Obesity has become a serious public health problem in Western countries. In 2008, the World Health Organization (WHO) estimated that the adult obese population was more than 300 million women. In France, the prevalence of obesity may be as high as 15% and involves more than 32.6% women of childbearing age (18–45 yr) [1].

Obese women who become pregnant have an increased risk of developing gestational diabetes mellitus (GDM), gestational hypertensive disorders, preeclampsia, and fetal macrosomia [2–4]. To reduce maternal and fetal

*Correspondence: François Pattou, M.D., Ph.D., Department of General and Endocrine Surgery at the Lille University Hospital, 2 Oscar Lambret Avenue, 59000 Lille, France.
E-mail: fpattou@univ-lille2.fr

http://dx.doi.org/10.1016/j.soard.2015.03.015
1550-7289/

complications, the most effective strategy is weight loss before conception [3,5]. Bariatric surgery has been recognized to be the only effective long-term treatment for weight loss in the morbidly obese [6,7]. The most common performed surgical interventions are laparoscopic adjustable gastric band (LAGB) and laparoscopic Roux-en-Y gastric bypass (LRYGB). The French ObEpi Survey 2012 reported that more than 78% of patients undergoing bariatric procedures are women and more than 40% are of reproductive age [1].

The association between pregnancy and bariatric surgery has become stronger. Contraception is routinely recommended for women after their bariatric intervention. Women are advised to delay pregnancy after a postoperative period for 12 to 18 months. Many studies have addressed the maternal and fetal risks after weight loss surgery and have revealed fewer obstetric complications after this period [8]. Very few studies have been conducted on the impact of pregnancy on the results of weight loss.

This study was performed to evaluate the impact of pregnancy on the efficacy of bariatric surgery.

Methods

Study Design

A total of 591 women of reproductive age (18–42 years) who had undergone bariatric surgery (either LAGB or LRYGB) in our bariatric center from January 1996 to December 2012 were included in this study. These patients were followed regularly and were told to inform us of pregnancy or any intention to become pregnant as soon as possible. We identified 88 women who declared to have become pregnant after their bariatric surgery. Four patients were excluded because they had not delivered in time for the study. The pregnant group was composed of 84 women with 95 pregnancies; 507 patients who had never become pregnant after their bariatric procedure represented the nonpregnant group. The 2 groups were compared to evaluate the influence of the pregnancy on the weight and co-morbidity evolution with a 5-year follow-up.

The information was prospectively recorded in an electronic database and retrospectively analyzed. Missing data were completed according to medical charts or telephonic interviews. All patients were included up to their last recorded visit.

Baseline

The database collected the demographic data, surgical procedures, and co-morbidities. Excess weight was defined as a weight in kilograms above the weight at BMI of 25 kg/m^2. Co-morbidities were recorded and included type 2 diabetes mellitus (T2 DM), hypertension, and dyslipidemia. The diagnosis of T2 DM was based on fasting plasma (blood) glucose levels of at least 7 mmol/L or 1.26 g/L confirmed in a subsequent analysis, a hemoglobin A1 c level of at least 6.5%, or the use of antidiabetic medication. Hypertension was defined as a resting blood pressure of at least 140/90 mm Hg or the use of antihypertensive medications. Dyslipidemia was confirmed if the fasting LDL-C was at least 1.6 g/L, fasting HDL-C was less than .4 g/L, or fasting triglycerides was at least 1.5 g/L or if the patients were using lipid-lowering medication.

Surgical procedures

LAGB and LRYGB were the 2 most performed bariatric surgical procedures. Laparoscopic surgery was performed for all of the patients in the same manner by the same team. LAGBs were placed using the "pars flaccida" technique. The LRYGB procedure was executed according to the technique described by Lönroth [9]. It involved the creation of a gastric pouch of 30–50 mL. The length of the Roux-en-Y jejunal limb was 150 cm, whereas the length of the biliopancreatic limb was 60 cm. Mesenteric defects were systematically closed.

Follow-up

Patients were regularly evaluated at 1 month, 3 months, 6 months, 1 year, 2 years, and 5 years postoperatively. At each visit, efficacy was measured using the percentage of excess weight loss (%EWL) calculated with the formula (Initial weight [kg] – Current weight [kg]) / (Initial weight [kg] – Ideal weight [kg]) × 100, where Ideal weight (kg) = 25 × (Height [m])^2. Remission of co-morbidities was defined as normal levels of fasting glucose, hemoglobin A1 c, resting blood pressure, and lipids without medication.

Pregnancy parameters

The following data were analyzed: parity, gravidity, interval between surgery and conception, weight and BMI at conception, gestational weight gain (GWG), weight and BMI after pregnancy, gestational age, miscarriage (defined as a spontaneous end of the pregnancy <12 wk of gestation), gestational hypertension, pre-eclampsia, gestational diabetes, birth weight, and malformation. The management of LAGB during pregnancy and surgical complications were reported.

Statistical analysis

The quantitative data were reported as the mean ± standard deviation. They were tested for normality with a Shapiro-Wilk test. For parametric continuous data, the Student t test for independent samples was performed. For nonparametric variables, a Mann-Whitney U test was used. The quantitative data were denominated in frequencies and compared using χ^2 test or Fisher's exact test for small samples. $P \leq .05$ was considered significant. All data were analyzed using the Statistical Package for Social Sciences