



Research Article

Impact of Pregnancy on Weight after Laparoscopic Sleeve Gastrectomy

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Abstract

Background: Controversy regarding the effect of pregnancy on the outcome of bariatric surgery are present in the literature.

Objective: To evaluate the outcome of weight loss in women who have undergone Laparoscopic Sleeve Gastrectomy (LSG) followed by pregnancy after two years from conception.

Methods: We retrospectively reviewed records for women who matched the inclusion criteria and included them in the analysis. Demographics and anthropometric measurements were collected. Women who conceived after LSG were included in the study.

Results: fifty three women were included in the study. Mean age was 33 ± 5.2 years, and 5 women were ASA 3 \leq . Weight/BMI at LSG were 107.1 ± 5.2 kg and 41.4 ± 5.6 kg/M² respectively. After 2 years from conception, there was a significant weight loss after LSG followed by pregnancy with weight/BMI 74.3 ± 14.6 kg and 28.9 ± 4.9 kg/M² respectively ($p < 0.0001$)

Conclusion: Conception after LSG do not effect the amount of weight loss might hinder the weight loss process in the short term but have no significant effect over five years of follow-up.

Introduction

Obesity is a health condition that increases the risk of morbidity and mortality. Over 20% of Saudi women are overweight or obese, especially those of childbearing age [1,2]. Even before getting pregnant, obesity can make it harder to conceive, as having more body fat can lead to infertility and polycystic ovarian syndrome. This is because women with obesity often have higher levels of insulin, which leads to more androgen production. During pregnancy, obesity increases the risk for developing maternal comorbidities (e.g. gestational diabetes, high blood pressure, infections) and obstetrical comorbidities (birth defects, premature birth, and neonatal low/high birth weight) [3]. To address the connection between obesity and related health issues, guidelines from various organizations agree that weight loss is beneficial for women who are overweight or obese and planning for pregnancy. Weight-loss surgeries are the most effective way to combat obesity compared to non-surgical interventions. However, there

are concerns about the effectiveness of bariatric surgery when it is followed by pregnancy. Weight-loss surgery can also lead to a state of increased energy expenditure and weight loss, which may contradict the recommended weight gain during pregnancy [4-6]. There are controversy about the effectiveness and safety of Laparoscopic Sleeve Gastrectomy (LSG) that is followed by pregnancy. The study aims to evaluate whether pregnancy after (LSG) can effect the weight loss, and to assess the neonatal outcomes.

Method

We reviewed records from a single center from 2014 to 2019. The study focused on women of reproductive age who had undergone primary LSG and subsequently conceived and had a singleton delivery. Women who had revisional or conversional bariatric surgery, multiple birth pregnancy, or abortion/pregnancy termination were excluded. We collected maternal data including

demographics, obesity-related conditions, pre-LSG weight/Body Mass Index (BMI), and number of prior pregnancies. Data were gathered retrospectively during the patients' visits to the relevant clinics. Informed consent was obtained from all individual participants included in the study.

Definitions

- Conception date: defined as the first day of the last menstrual period + 2 weeks or as a due date – 40 + 2 weeks when the first day of the last menstrual period was unknown.
- Gestational weight gain: The adequacy of weight gain during pregnancy was based on the recommendation of the Institute of Medicine and National Research Council Report.
- Gestational age: estimated using ultrasound scan between 8 to 12 weeks or the last menstrual period where early ultrasound scan was unavailable.
- Small for gestational age (SGA): was defined as below the 10th percentile, using birth-weight adjusting for gestational age and ethnicity [7].
- Weight loss was reported as per the standardized reporting recommendation as follows:
 - Percent of total weight loss (%TWL): $\%TWL = [(Initial\ Weight) - (Postop\ Weight)] / [(Initial\ Weight)] \times 100$
 - Percent excess BMI loss (%EBMIL): $\%EBMIL = [\Delta BMI / (Initial\ BMI - 25)] \times 100$

Results

The review yielded 53 women who matched the inclusion criteria during the specified period. One patient was excluded because of missing information. For the whole cohort, the mean age was 33±5.2 years, the mean weight and BMI at the time of LSG were 107.1±5.2 kg, 41.4±5.6 kg/m², respectively (Tables 1,2). During period of two years, women who got pregnant and delivered had a weight of 74.3±14.6 kg, and a BMI of 28.9±4.9 kg/m² which was statistically significant compared to pre LSG weight and BMI (P=0.0001). As for the maternal and neonatal outcome it is depicted in Table 3.

Variable	
Number	53
Age (year)	33 ±5.2
Parity	2.4±2
Comorbidities	
Diabetes mellitus	4
Hypertension	2

Iron deficiency anemia	3
Hyperlipidemia	2
Hypothyroidism	10
ASA 3≤	5

Table 1: Patient’s demographics.

Variable	At LSG	2 years after conception	p-value
Weight kg	107.1±5.2	74.3±14.6	<0.0001
Body mass index (kg/m ²)	41.4±5.6	28.9±4.9	<0.0001
%TWL	NA	45.7±25.3	
%EBML	NA	76.7±27.9	

Table 2: Weight loss after LSG followed by conception.

Variable	
Gestational weight gain (kg)	12.8±13.7
Gestational age (weeks)	37.9±1.2
Mode of delivery	
Normal vaginal delivery	23 (47%)
Cesarean section	28 (52%)
Birth weight (kg)	2.9
Small for gestational age	2 (3.7%)
NICU admission	0

Table 3: Obstetrical and neonatal outcomes.

Discussion

Throughout pregnancy, women are provided with specific instructions to support the birth of a healthy child. These guidelines focus on promoting a nutritious diet and achieving essential nutritional targets. Nevertheless, experiencing Weight Loss Surgery (WRS) followed by pregnancy within a short timeframe can impact both conditions simultaneously. This raises concerns about potential negative effects on both the mother and the newborn. For instance, inadequate weight loss post WRS due to pregnancy or nutritional imbalances resulting from WRS, leading to potential congenital disabilities.

Studies have shown mixed results regarding the effect of Weight Loss Surgery (WRS) on pregnancy. When it comes to Roux-en-Y Gastric Bypass (RYGB), reports have indicated favorable results from a maternal standpoint. This includes lower rates of gestational hypertension (GHTN) and Gestational Diabetes Mellitus (GDM), as well as a reduced likelihood of cesarean section deliveries. These positive outcomes are expected since RYGB lowers the risk

of obesity-related diseases by reducing weight. However, from a neonatal perspective, concerns arise over a higher incidence of small for gestational age (SGA) infants and lower birth weights among women who have undergone RYGB before delivery [8-10].

Several studies have shown the outcome of LSG as a standalone procedure in terms of weight loss sustainability over an extended follow-up period. In 5 years from LSG, Noel and colleagues reported a %EBMIL of 76% and Sieber et al. reached a %EBMIL of 57.4% [11,12]. With its technical ease and how quickly it can be performed, LSG became so popular and became the most common performed bariatric surgery conducted. Since pregnancy can promote physiological weight gain, the addition of this aspect for women planning for conception and weight loss by WRS in their childbearing age can theoretically alter the outcome. Clearly, there are two opposing physiological states: the catabolic state by the LSG against the weight-gaining pregnancy co-occurring, and the net result with regard to weight during this period can not be predicted with certainty. Different factors play an essential role in the outcome of bariatric surgery. Age, level of activity, adherence to follow-up appointments, compliance with dietary recommendations, and a healthy lifestyle are some aspects that impact weight loss. However, after delivery (roughly after 1-2 years from LSG), we see that women kept the positive effect of LSG by maintain the weight and not developing weight regain because the pregnancy's effect on weight is eliminated by delivery and the effectiveness of LSG still ongoing and will continue for an extended period of time.

Safety of bariatric surgery on neonatal outcome has been examined before. Women who have undergone malabsorptive weight loss surgeries (WRS) are more likely to deliver small for gestational age (SGA) neonates due to a higher chance of nutritional deficiencies such as folic acid and calcium. A study by Gascoin et al. found that the rate of delivering SGA neonates was more than 20% in women who had undergone RYGB, and the cord blood analysis showed inferior nutritional parameters compared to neonates of non-obese women [13]. Chevrot et al. concluded that the SGA rate was higher in women who had undergone RYGB than in purely restrictive procedures, and susceptibility was evident following RYGB even after adjusting for other risk factors [14]. When compared to malabsorptive procedures, LSG confers a lower risk for nutritional deficiencies, and thus supposedly a lower chance of SGA. Our data showed only two neonates being SGA, with a rate of 3%, which is far less than the rate of the study mentioned above that included malabsorptive procedures.

Conclusion

Conception following LSG didn't effect the weight loss achieved, and did not lead to detrimental consequence on the birth weight, increasing the chance of SGA or C-section. Women who had

LSG followed by conception should be approached with a multidisciplinary team with clear communication between the members. Special consideration and management plans should be designed for these groups of patients (including close follow-up appointments, vitamin regimens, and dietary recommendations) to ensure the safe delivery of a healthy child and to achieve acceptable weight loss.

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