

## Follow-up Retrospective Assessment, Nutritional Status and Obstetric Complications in Pregnant Women after Bariatric Surgery.

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### Summary:

Women of childbearing age are a broad group of candidates for bariatric surgery (CB), which improves the metabolic status and the reproductive health. A descriptive study was presented to assess the nutritional status and follow-up of 19 pregnant women, under control due to endocrinology, who underwent BC between 2008/2017.

The surgical technique, the metabolic and the obstetric situation were analyzed before and after the intervention. During pregnancy, the weight, nutritional status, and adherence to supplementation, as well as the appearance of gestational Diabetes Mellitus (GDM) were assessed in consultation. Average weight before surgery (Qx) 133.87 kg. No DM prior to surgery. 9 gastric bypass and 10 tubular gastrectomies were performed. Average weight one year after surgery 86.97 kg, average time until gestation 31.8 months. During pregnancy, 21% of the patients made three consultations. Adherence to supplementation was multivitamin 85%, vitamin D and iron 20%. GDM was diagnosed in 3 patients. In conclusion, CB is a safe technique in this group, with a low rate of obstetric complications. We consider it necessary to optimize the follow-up and supplementation of these patients in our setting.

### Keywords:

- Bariatric surgery
- Morbid obesity
- Gestation

### Introduction

The Bariatric surgery (CB) is effective in the treatment of uncontrolled obesity with medical treatment, when there are comorbidities secondary to an effective intervention to prevent the consequences of excess weight in the short, medium, and long term. In this context, women of childbearing age represent a scenario where it is necessary to act energetically to contribute to better reproductive health and also to reduce the risk of multiple obstetric and perinatal complications.

The increase in the prevalence of severe obesity, the existence of increasingly safer and less bloody surgical techniques, accompanied by the increasing experience of surgeons in performing them, have contributed to an aggressive growth in the number of interventions in these last decades (1)The obesity and CB guidelines (2) include specific chapters for the management of women of childbearing age who have undergone surgery. The objective is to assess the ideal time to perform the surgery, closely and multidisciplinary control of nutritional status and fertility in the pre and postoperative period, as well as educating patients on their own health to manage pregnancy safer.

In the same way, special emphasis is placed on the need for vitamin and mineral supplementation in a specific way (3) and, at the time of gestation, the metabolic, nutritional, dietary and obstetric monitoring plan is exposed to reduce as much as possible the appearance of complications, or diagnose them early to reduce their impact on maternal-fetal health. In these guides, reference is made to the need for a large team, consisting of gynecologists-obstetricians,

surgeons, endocrinologists, dietitians-nutritionists, psychiatrists, and psychologists. The objective of this study is to review the nutritional and metabolic status in pregnant women, previously submitted to BC in the Bilbao metropolitan area, and adherence to treatment and follow-up in endocrinology consultations during this period in order to create multidisciplinary protocols in charge of offering the best conditions in this group of patients.

### Material and methods

Endocrinology consultations were reviewed retrospectively from 2008 to 2017, in women who underwent CB. Pregnancy development during follow-up in the control consultation in our hospital was used as an inclusion criterion, initially including 28 patients, and finally 9 patients were discarded due to gestational follow-up outside our setting. In the perioperative period, metabolic and nutritional status were analyzed: mean body mass index (BMI), presence of pregnancy and previous comorbidities (DM, dyslipidemia, high blood pressure). The surgical technique used was recorded. The mean time from the intervention to gestation and the evolution in weight loss one year after surgery were measured. During pregnancy, the number of visits to the endocrinology clinic, nutritional status (weight, BMI, analytical parameters) and adherence to recommended supplementation were confirmed, as well as the existence of GDM, its diagnostic method and its management. Lastly, the presence of comorbidities in childbirth and the weight of the newborns were identified.



## Results

Data were collected from a group of 19 women whose mean age was 32.5 years. No case of DM or dyslipidemia was detected prior to surgery. 10.5% of the patients were hypertensive, with complete resolution after CB. 26% reported pregnancy prior to surgery, no abortions were documented. 9 Gastric Bypass (BPG) and 10 tubular gastrectomies (GT) were performed. One year after surgery, the weight evolution was satisfactory in 12 of the cases (7 patients undergoing BPG and 5 under GT) (4). 15 patients delayed gestation for at least 12 months after the intervention (2). The weight evolution during pregnancy and the weights of newborns are shown in Table 1.

	Minimum	Maximum	Average %
Age (years)	24,1	43,6	32,5
IMC pre Qx (Kg/m2)	40,2	63,3	49,7
Weight pre Qx (Kg)	102,3	161	133,8
Gestation months	2	107	30,5
Weight 1st. trimester (Kg)	65,4	123	80,3
Weight 2nd. trimester (Kg)	68,4	128,5	87,9
Weight 3rd. trimester (Kg)	73	131	91,2
Weight RN 1 (Grams)	1870	3830	3123
Weight RN 2 (Grams)	2180	2600	2390

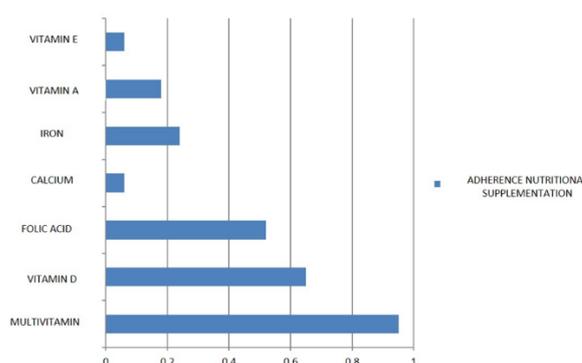
BMI: body mass index; Qx: Surgery; Kg: Kilograms; m2: Square meter; RN: Newborn.

Table 1

During gestation, a 21% absence of consultations was documented, 58% attended on one occasion and 21% attended every trimester. Patients who underwent BPG attended a greater number of consultations than those who underwent GT (1.37 on average compared to 0.8 in GT). In the first trimester of pregnancy, 47% of the patients had a BMI > 26 kg / m2 and 16% a BMI < 26 kg / m2. Following the weight gain recommendations (5), an adequate weight gain was found in the group with BMI > 26 kg / m2 in 13 patients, and an absence of registration in 2 patients. All pregnant women with a BMI < 26 kg / m2 achieved an adequate weight gain. Adherence to multivitamin and mineral supplementation is shown in Figure 1. Screening for DMG (2) was carried out throughout gestation using HbA1c in 13 patients and in 2 oral glucose overload tests were performed. GDM was diagnosed in 3 cases, one of which required insulin. During pregnancy 10 patients performed 1 nutritional analysis and 1 patient performed a quarterly analysis. 6 patients did not perform nutritional analysis. The most prevalent

nutritional deficits were Retinol (<0.30 mg / L), vitamin B12 (<191 pg / mL), vitamin D (<20 ng / mL), Iron (<37 µg / mL) and Ferritin (< 15 ng / mL). As of 2013, 13 patients received were followed up in a dietary consultation, achieving an adequate weight evolution (2). Delivery took place between weeks 37 to 41 in 18 patients, documenting a premature rupture of the membranes. All newborns had a birth weight between the 10th and 90th percentiles, including the two twin pregnancies.

ADHERENCE NUTRITIONAL SUPPLEMENTATION



## Discussion

These findings represent a frequent situation in routine clinical practice, where performing CB in women of childbearing age is increasingly widespread. The adverse effects of obesity on pregnancy are well known. Already in the 90s the American Institute of Medicine and Research wrote a guide on "Weight gain during pregnancy", which was revised in 2009, where the consequences of obesity in pregnancy for both the mother and the fetus are exposed (6). More current reviews such as the one by Busetto et al at the end of 2017 deal extensively with the possible maternal-fetal complications of obesity and the comprehensive management of patients undergoing BC with subsequent gestation. Following the recommendations established in the guide and reviewed in national multicenter studies (7), we found that 79% of the patients in our study meet the minimum 12-month waiting period between the intervention and pregnancy. Endocrinology consultation follow-up is significantly below that established for these patients, where a quarterly clinical and analytical evaluation is recommended in order to monitor weight gain and possible nutritional deficits. Only 21% of the patients were evaluated with this frequency, in addition 21% of patients never came to this consultation. The adherence to supplementation in our sample is conspicuously deficient, similar to that obtained in other studies, obtaining a greater adherence from multivitamin and vitamin D supplementation (8). A prolonged period without follow-up from CB to gestation, non-attendance to consultations and the scarce information about the importance of nutritional supplementation may contribute to the results obtained in this study.

The contribution of the dietitian-nutritionist in dietetic education has contributed in a very positive way in the weight evolution and in the maintenance of healthy dietary habits.

Despite this monitoring and suboptimal nutritional support, we found a low rate of complications and unchanged fetal development in practically all patients. There was only an abortion in the first trimester of pregnancy related to chromosomal abnormalities.

### Conclusion

The management of pregnancy in women previously operated on for CB represents a challenge that we must improve in our usual clinical care to ensure adequate fetal development. Multidisciplinary assistance, as well as nutritional monitoring, is essential for maintaining maternal health in this period. Despite the limitations in attendance at consultations and adherence to supplementation, we found no relevant maternal-fetal complications in our series.

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