The Sleeve and Pregnancy

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There is no doubt that obesity among women is on the rise world wide. According to World Health Organization (WHO) estimates, Kuwait is ranked amongst the top countries in the world in obesity prevalence. In a study published in 2014 by Weiderpass et al., they have concluded that eight out of 10 Kuwaitis were overweight or obese which is a great health concern [1].

Unfortunately, obesity have affected women in the reproductive age group on different levels. Pre-pregnancy challenges which were described by my colleague in the previous chapter as well as potential complications during pregnancy of which we will discuss in this chapter. We will pay a closer look into how weight management surgeries have affected this challenging group of patients.

1 Pre-pregnancy Weight Management

It's no doubt a crucial point of care to optimize weight prior to conception. This is agreed up on by various international guidelines. Advice on weight and lifestyle should be given during preconception counselling or contraceptive consultations. Weight and BMI should be measured to encourage women to optimise their weight before pregnancy. Women of childbearing age with a BMI 30 kg/m^2 or greater should receive information and advice about the risks of obesity during pregnancy as well as childbirth. They should be supported and encouraged to lose weight prior to conception and between pregnancies in line with National Institute for Health and Care Excellence (NICE) Clinical guideline (CG) 189. Women

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S. Al-Sabah et al. (eds.), *Laparoscopic Sleeve Gastrectomy*,
https://doi.org/10.1007/978-3-030-57373-7_10

should be informed that weight loss between pregnancies reduces the risk of stillbirth, hypertensive complications and fetal macrosomia. Weight loss increases the chances of successful vaginal birth after caesarean (VBAC) section.

2 Pre-pregnancy Supplementation

Women with a BMI 30 kg/m^2 or greater wishing to become pregnant should be advised to take 5 mg folic acid supplementation daily, starting at least 1 month before conception and continuing during the first trimester of pregnancy. (RCOG). Metabolic and nutritional derangements can occur after bariatric surgery, particularly after malabsorptive procedures. Reduced oral intake and alterations in digestive physiology as well as anatomy can result in malabsorption of various micronutrients and minerals, particularly iron, folate, vitamin B12, calcium, and vitamin D. Absorption of iron and folate are reduced due to lower acid content in the gastric pouch and bypass of the duodenum, the main site of absorption. Calcium deficiency can also result from bypass of the duodenum, as well as reduced intake of both calcium and vitamin D. A reduction in the availability of both gastric acid and intrinsic factor may lead to B12 deficiency.

While women with prior malabsorptive procedures are at greatest risk for micronutrient deficiencies, women who undergo restrictive procedures may also develop iron, folate, and fat soluble vitamin deficiencies [2].

A number of adverse pregnancy outcomes have been linked to inadequate supplementation and resultant micronutrient deficiencies. Iron and B12 deficiencies have resulted in maternal anemia.

Specific supplementation regimens need to be tailored to the individual patient and the type of bariatric procedure performed [3]. Guidelines for optimum micronutrient supplementation during pregnancy have been extrapolated from data from the bariatric and obstetric literature. In general, during pregnancy, it is reasonable to continue the regimen recommended by the bariatric surgeon, but the multivitamin is generally advised and is replaced with a prenatal vitamin.

It is generally advised that the following tests are to be performed pre conception or at booking antenatal visit [4]:

- Complete blood count
- Ferritin
- Iron
- Vitamin B12
- Thiamine
- Folate
- Calcium
- Vitamin D

The previous tests will aid in identifying those who will require additional supplementation as well as ensure followup during the course of the pregnancy. Monthly

repeat labs are also suggested to those with demonstrable deficiencies. At every trimester, the tests should be repeated to those with no documented deficiency.

Supplementation and screening should continue following delivery in women who breastfeed.

3 Acceptable Weight Changes in Pregnancy

There is a lack of consensus on optimal gestational weight gain in the obese population or post weight management surgery group. Until further evidence is achieved, the main advice by treating obstetrician is focus on a healthy diet that is more applicable than prescribed weight gain targets. None the less, a referral to a nutritionist could aid in managing both obese and post weight management surgery patients. Caloric restriction during pregnancy is not recommended, even if patients continue to be overweight after bariatric surgery, due to concerns that caloric restriction might impair fetal growth [5]. Anti-obesity medications are not recommended during pregnancy.

Optimal weight gain during pregnancy in women who have undergone bariatric surgery has not been studied. We suggest that women who are not achieving the minimum weight gain standards suggested by the IOM (0.5 lb [0.23 kg]/week for obese women in the second and third trimester) undergo ultrasound evaluation of fetal growth and dietary consultation. If adequate caloric intake is confirmed, we do not recommend encouraging the woman to consume significantly more calories.

4 Care During Pregnancy

Routine care and management for post weight management surgery patients is generally advise. Unless the starting (booking visit) BMI is elevated (>30 kg/m^2), then patient is to be followed up according to international guidelines for obese patients.

Once again, the main issue with post weight management surgery patients is attaining adequate nutrition. Nausea, vomiting might be more profound as the gestation advances. It is most importantly to ensure adequate supplementations in those patients. Needless to say, if symptoms persists, exclusion of acute causes is mandatory.

It is well known that obesity in pregnancy carries risks to both the mother as well as the fetus. Those risks can develop from early pregnancy till the post partum period. This includes early pregnancy loss, diabetes, hypertension, fetal macrosomia, failed induction of labor and ultimately undergoing a C-section. One potential issue during pregnancy is obstructive sleep apnea. Once again no solid evidence is found on the effect of wight management surgery specifically post sleeve gastrectomy is found. We will review some of the potential risks of wight management surgeries in the pregnant patient group.

Fetal growth—Given the plausible increased risk of intrauterine growth restriction and small for gestational age infants in post-bariatric surgery pregnancies, its been suggested to perform serial ultrasound examinations every four weeks to evaluate fetal growth in the third trimester, especially in women with poor weight gain and those who conceive within two years of surgery.

5 Gestational Diabetes

5.1 Screening

The glucose challenge test used to screen for gestational diabetes is typically not well tolerated in women with prior history of bariatric surgery due to dumping syndrome which is experienced in about 50% of patients following RYGB. It's been suggested that following fasting and postbreakfast blood sugars for one week as an alternative [6, 7]. Patients who regularly drink and tolerate sugared soft drinks are an exception; these women probably can tolerate a standard glucose challenge test. A third option is to measure glycated hemoglobin (A1C) and assume overt diabetes is present if it is elevated ($\geq$6.5%); women with a normal A1C should undergo screening as described.

Dumping syndrome typically does not occur in women who have undergone restrictive-type bariatric procedures such as gastric banding and those women can undergo standard testing for GDM.

5.2 Treatment

GDM conventional treatment involves nutritional therapy and insulin, some clinicians use oral anti-hyperglycemic agents, such as glyburide or metformin.

Monitoring for complications of bariatric surgery—The most common late sequelae of bariatric surgery are mild nutritional deficiencies, which are readily treated with replacement therapy.

5.3 Mode of Delivery

Cesarean delivery is performed for standard obstetric indications. Consultation with a bariatric surgeon is advisable if the patient had a complicated bariatric surgery [5]. Patients who have undergone uncomplicated bariatric surgery generally do not require changes in surgical technique. Some obstetricians may favor blunt entry into the peritoneum to minimize risk of iviscus injury that could be adherent to anterior abdominal wall.

5.4 Postpartum

Bariatric surgery should not adversely affect breast feeding and it should be encouraged.

As previously disclosed, micronutrient supplementation and screening should continue following delivery in women who breastfeed. Breastfed infants of women who have had gastric bypass procedures may develop nutritional deficiencies, especially those that are exclusively breastfed [7, 8].

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