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Pregnancy after weight loss surgery: A commentary

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The obesity epidemic poses increasing challenges to maternity services across the UK and the world; almost one fifth of women of childbearing age in the UK are classified obese (BMI ≥ 30) [1]. Optimisation of pre-pregnancy weight can improve maternal and perinatal outcomes and greater numbers are resorting to bariatric surgery pre-pregnancy to aid weight loss. Whilst the negative impact of obesity on maternal and perinatal health is well-established [2], there is a dearth of evidence evaluating the effect of previous bariatric surgery on pregnancy. Given the likelihood of rising rates of pregnancies following bariatric surgery, it is essential that both patients and clinicians have evidence-based information to inform care. However, as yet, there are very few robust clinical trials that have directly assessed pregnancy outcomes following bariatric surgery. Consequently, the majority of our understanding comes from case reports and observational studies (Table 1). This commentary reviews recent and emerging evidence for the management of women who are pregnant after bariatric surgery.

'Bariatric surgery' is an umbrella term that encompasses several different types of weight loss procedures. In the UK, the most commonly performed procedures are Laparoscopic Adjustable Gastric Banding (LAGB), Roux-en-Y gastric bypass, and sleeve gastrectomy [3] (Table 2). Broadly, bariatric procedures can be categorised as malabsorptive, restrictive or a combination of both. Malabsorptive procedures bypass an absorptive part of the gastrointestinal tract, whereas restrictive procedures reduce food intake by limiting gastric volume. Each type of bariatric surgery has specific procedure related metabolic effects and complications. Nutritional deficiencies are more likely after malabsorptive surgery [4]. It is axiomatic that each method will have specific effects on pregnancy, maternal outcomes and perinatal health.

Therefore it is unhelpful that most published studies group all bariatric procedures together as a single intervention. There are other problems with the existing data too:

understandably for a previously uncommon intervention many studies to date have necessarily small sample sizes. To improve statistical power a great deal of the research has taken place over a protracted number of years, which makes firm conclusions difficult as there are likely to have been temporal changes in clinical practice and policy. Moreover, many studies have not accounted for important confounders. Finally, there is often a lack of adjustment for socio-demographics factors such as smoking, parity, and age. Other studies have compared outcomes in the same woman in pregnancies before and after bariatric surgery. This approach does not completely disentangle the impact of weight loss per se, from the complex effects of bariatric surgery and is also prone to confounding.

However, some broad conclusions can be drawn from the available data: after bariatric surgery [4-6] there is reduction in obesity-related maternal complications such as gestational diabetes and hypertension. However, the risk remains higher than for non-obese women[7].

Improvements in some maternal outcomes notwithstanding, there have been concerns raised regarding the negative impact of bariatric surgery on perinatal outcomes, including small for gestational age infants and pre-term birth [4,8]. There has also been a suggestion of an increased risk of perinatal mortality [6]. Moreover, very few studies have exclusively explored the impact of gastric banding on pregnancy, and there has been no randomized controlled trial comparing the management (deflation versus inflation) of the gastric band in pregnancy [9].

In addition to general risks, there are other specific complications including maternal intestinal hernias and nutritional deficiencies, as well as a greater risk of birth defects amongst pregnancies following gastric bypass surgery [4].

We recently completed a national cohort study of Laparoscopic Adjustable Gastric Banding (LAGB) in pregnancy [10, 11] to understand the procedure related impact of LAGB on pregnancy outcomes. This study is currently awaiting publication. Data were collected on all pregnancies following LAGB in the UK over a discrete time period using an established surveillance system (UK Obstetric Surveillance System – UKOSS). Uniquely, the study compared outcomes according to index band management (maintenance of band inflation during pregnancy versus band deflation for some or all of pregnancy) and adjusted for important confounding or modifying factors. Outcomes were compared with controls without a gastric band, and national data, allowing comparison with the background population.

The study [10, 11] identified significant variation in band management across the UK, possibly related to the current paucity of evidence to inform decision-making for these women during pregnancy. In this cohort study, inflation of the gastric band was related to a reduction in gestational weight gain, and an associated improvement of some maternal outcomes.

However, our findings suggest that these maternal benefits may be at the expense of perinatal health. Moreover, some maternal outcomes such as gestational diabetes and caesarean birth were consistently worse in those with a gastric band compared to normal BMI controls, regardless of band management.

On the basis of our findings, we would not recommend a one-size-fits-all policy during pregnancy, but band adjustments should be made on a case-by-case basis. Irrespective of the band management, pregnancies after bariatric surgery remain high risk and it is essential that women are closely monitored. A multi-professional approach with close involvement of endocrinologists and nutritionists, monitoring of

gestational complications such as diabetes and hypertension, as well as regular fetal growth scans are recommended.

However, clinical judgment alone should not dictate management. It is important for professionals to involve women in decision-making, enabling them to remain in control of their pregnancy and thereby optimising pregnancy and birth experience [12]. A woman's preference regarding band management is likely to be multifactorial. Decision-making may not rest solely on the balance of the maternal and perinatal outcomes, but may have a more complex psychological element. Obesity has been associated with high rates of depression and poor body image, and bariatric surgery can lead to improvements in mental health [13]. However, it is unclear how pregnancy may influence the psychological wellbeing and mood of women with a gastric band, and what psychosocial support, if any, these women may require during pregnancy. The ENGAGE (ENquiry into women with GAstric banding in pregnancy to Guide management and improve Experience) study aims to explore women's experience of pregnancy following LAGB and assess which factors drive a woman's decision regarding management of the band during pregnancy [14]. Most women interviewed thus far had their bands inserted in the private sector. Preliminary analysis suggests limited information, guidance and support in pregnancy, and need for clarity regarding band management during pregnancy.

A national prospective cohort study, using the same UKOSS methodology, is currently ongoing to better understand the effects of gastric bypass surgery on pregnancy [15]. All women who are pregnant following gastric bypass surgery are included. Epidemiology, management and outcomes, will be evaluated to assess current practice. The findings will help to inform obstetricians, endocrinologists, nutritionists, and bariatric surgeons for pre-pregnancy counseling, suitable monitoring and appropriate nutritional supplementation.

Furthermore, there is a paucity of data regarding how long to delay pregnancy following weight loss surgery. American guidelines recommend a surgery to conception interval of at least one year [16] however, there is no firm evidence to support such advice [17]. Data from the UKOSS gastric banding and bypass studies are currently being analysed to investigate the impact of time to conception on maternal and fetal outcomes; the results will be informative.

In conclusion, the rates of bariatric surgery in women are likely to increase further, but there are very few data available to guide clinicians. Much of the evidence is from registry-based studies and case reports. Furthermore, there has been a tendency to group all bariatric procedures together in studies evaluating associated pregnancy outcomes, despite clear mechanistic differences as well as different procedure-related effects on pregnancy. However, there is emerging evidence that will inform both the understanding of different types of bariatric surgery, and the effect of management options on patient outcome and experience.

In the meantime, we would advocate multi-professional care for all women who have undergone bariatric surgery (Table 3). Ideally, these women should receive pre-pregnancy counseling; until further advice is available, we would suggest that women delay pregnancy for one year following surgery. Women should be screened and treated for nutritional deficiencies prior to conception [18] and receive prompt specialist dietary advice during early pregnancy. They should be advised about the associated maternal and fetal risks antenatally. We would recommend low dose aspirin and vitamin supplementation; close blood pressure and urinalysis surveillance; and universal testing of gestational diabetes. Importantly, fetal wellbeing should be carefully monitored with serial growth scans. Clinicians may consider the role of

induction at term to reduce the risk of placental dysfunction and intrauterine fetal death.

Clearly, the findings from ongoing studies will refine these recommendations and provide the clarity clinicians need, and women want, to make appropriate decisions together.

Insert Table 3

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Disclosure of Interests

None

Contribution to Authorship

Katie Cornthwaite conceived the idea, wrote the manuscript, is principal investigator of UKOSS gastric bypass study, and co-investigator of UKOSS gastric banding and ENGAGE studies.

Amanda Jefferys edited the manuscript and is principal investigator of UKOSS gastric banding and ENGAGE studies.

Erik Lenguerrand edited the manuscript and conducted the UKOSS gastric banding analyses.

Anne Haase edited the manuscript and is co-investigator of ENGAGE study.

Mary Lynch edited the manuscript and is co-investigator of ENGAGE study.

Andrew Johnson provided funding for the two UKOSS studies and approved the manuscript.

Tim Draycott edited and approved the manuscript.

Dimitrios Siassakos conceived the idea, co-wrote and edited the manuscript, and supervises the UKOSS gastric bypass, gastric banding and ENGAGE studies.

Ethics Approval

Data for UKOSS gastric banding (NRES 11/SW/0227), UKOSS gastric bypass (NRES 14/LO/0491), and ENGAGE studies (13/SW/0285) were collected with ethics approval

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