Research Week 2023

Effect of prior Roux-en-Y gastric bypass surgery on vitamin and mineral profiles during pregnancy in rhesus macaques

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Keywords

Roux-en-y gastric bypass, bariatric surgery, pregnancy, vitamins, minerals

Abstract

Background

Roux-en-Y gastric bypass (RYGB) alters the stomach and intestine in ways that reduce caloric intake and absorption. These changes can also decrease absorption of nutrients such as iron, vitamin B12, folate, vitamin D and calcium. As a result, human RYGB patients are counseled to take oral supplements after surgery. During pregnancy, adequate nutrient levels are necessary for supporting fetal development and growth, so females who become pregnant after RYGB may be more likely to demonstrate deficiencies in key nutrients that could directly affect their offspring.

Methods

As part of a larger study looking at the impact of maternal RYGB on offspring health, blood samples were taken throughout pregnancy to assess vitamin and mineral levels. 9 obese adult female macaques underwent RYGB surgery and became pregnant 6-14 months later. Pregnancies from lean control females (n=9) and obese control females (n=10) followed the same protocols. RYGB cohort animals and obese control animals were fed a high-fat diet for at least 6 months prior to joining the study. After surgery, all RYGB females received daily calcium and multivitamin supplementation.

Results

Initial results show that Post-RYGB averages were above the base level recommended for human pregnancies for hemoglobin (11 g/dl), B12 (200 pg/ml), folate (2.7 ng/ml), vitamin D (20 ng/ml) and calcium (8.5 mg/dl). Vitamin B12 levels were lower in post-RYGB animals both before and throughout pregnancy compared to lean control animals. Post-RYGB animals and lean control females had lower folate levels than high-fat-diet control

animals. No significant difference between groups was found for vitamin D, calcium, or hemoglobin levels.

Conclusion

While the post-RYGB cohort demonstrated reduced levels in some of the 5 examined vitamins and minerals compared to one or both control groups, post-gastric bypass animals were able to maintain levels within the suggested range for human pregnancies with consistent oral supplementation.