Comparing the Risk of Micronutrient Deficiencies in Roux-en-Y Gastric Bypass and Sleeve Gastrectomy Patients

Bailey Plunket
University of North Alabama

Abstract

Bariatric surgery is the most effective weight loss method for obese patients. A common issue with bariatric surgery is the resultant malabsorption and subsequent nutritional deficiencies. Two of the most effective types of bariatric surgeries are the Roux-en-Y gastric bypass and sleeve gastrectomy. The purpose of this review is to explore which type of bariatric surgery, the Roux-en-Y or the sleeve gastrectomy, leads to a higher level of nutrient deficiencies. Five research articles were evaluated using the Academy of Nutrition and Dietetics Evidence Analysis Process. In response to the PICO question: Among individuals status post bariatric surgery does the Roux-en-Y gastric bypass compared to the sleeve gastrectomy lead to an increased number of nutrient deficiencies? The majority of the evidence reviewed demonstrated no difference between the number of observed nutrient deficiencies between the Roux-en-Y gastric bypass and the sleeve gastrectomy patients. The one exception was vitamin B12. Roux-en-Y gastric bypass patients had a higher risk of developing vitamin B12 deficiency postoperatively then sleeve gastrectomy patients.

Introduction and Purpose

There are several different types of bariatric surgeries available to encourage weight reduction. For obese patients, bariatric surgery is the most effective weight loss method. Two of the most effective surgeries are the Roux-en-Y gastric bypass and the sleeve gastrectomy. Patients are qualified to have bariatric surgery if they have a body mass index (BMI) greater than 40 or a BMI greater than 35 along with a severe weight related complication including but not limited to: diabetes, hypertension, or congestive heart failure. The Roux-en-Y gastric bypass surgery accounts for 60-70% of bariatric surgeries. This surgical procedure involves construction of a small gastric pouch that reduces stomach capacity and meal size. This pouch is then linked directly to the jejunum. The food flow then bypasses a larger portion of the small intestines resulting in significant nutrient malabsorption.

The sleeve gastrectomy procedure involves the removal of about 80% of the patient’s stomach. Post operation, the stomach can only hold about four ounces.

Partial digestion of nutrients begins in the stomach. With both bariatric surgeries altering stomach structure, a reduction of nutrient absorption is a risk. Therefore, the purpose of this review is to explore which type of bariatric surgery, the Roux-en-Y or the sleeve gastrectomy, leads to a higher level of nutrient deficiencies.

PICO Question

Among individuals status post bariatric surgery does the Roux-en-Y gastric bypass compared to the sleeve gastrectomy lead to an increased number of nutrient deficiencies?

<table>
<thead>
<tr>
<th>Author, Design, Class Rating</th>
<th>Purpose</th>
<th>Findings/ Author’s Conclusions</th>
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<tbody>
<tr>
<td>Toh et al. 2008</td>
<td>To determine the prevalence of nutrient deficiencies in patients who have undergone bariatric surgery, assess nutritional status postoperatively and compare with preoperative levels.</td>
<td>In patients who underwent Roux-en-Y gastric bypass surgery, one year post operation they had significant increased deficiencies in iron and folate. The presence of anemia in the patients also increased from 6.2 to 17.2. In patients who underwent the sleeve gastrectomy, one year post operative the mean ferritin level had dropped significantly. Vitamin D deficiency declined from 92% to 43%.</td>
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<td>Moizé et al. 2013</td>
<td>To prospectively compare dietary changes and nutritional deficiencies in grade 3 obese patients 5 years after sleeve gastrectomy and Roux-en-Y gastric bypass.</td>
<td>Data show that sleeve gastrectomy and Roux-en-Y gastric bypass are associated with similar long-term weight loss with no differences in terms of dietary intake.</td>
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<td>Verger et al. 2016</td>
<td>To assess the relationship between food intake, nutrient adequacy of the diet and nutritional biological parameters systematically measured before and at 3 and 12 months after roux-en-Y gastric bypass and sleeve gastrectomy.</td>
<td>The risk of micronutrient and protein deficiencies are comparable in both Roux-en-Y gastric bypass and sleeve gastrectomy. Protein levels should be closely monitored in both surgeries and multivitamin and mineral supplementation are needed at least for a year after surgery.</td>
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<td>Mufaqam et al 2013 Reviewer</td>
<td>To assess post operative bariatric surgery complications such a nutrient deficiencies.</td>
<td>Deficiency of vitamins B12, B9, thiamine, and vitamin D were found in patients who underwent Roux-en-Y gastric bypass as a result of the removal of the duodenum, part of the absorption site, from the body.</td>
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<td>Kwon et al. 2014 Meta-analysis Reviewer</td>
<td>To compare post operative anemia and nutritional deficiencies between two methods of bariatric surgery, the sleeve gastrectomy and the Roux-en-Y gastric bypass.</td>
<td>Fewer vitamin B12 deficiency are seen in sleeve gastrectomy patients than in Roux-en-Y patients postoperatively, however the 2 methods have comparable postoperative risk for anemia and iron deficiency.</td>
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Summary, Conclusions

- The majority of the evidence reviewed did not show a significant difference in nutrient deficiencies between the two surgeries studied.
- In regards to vitamin B12 deficiency, the sleeve gastrectomy patients have less risk of deficiency.
- The sleeve gastrectomy surgery is a more recently developed surgery than the gastric bypass, therefore the research on it is limited.

References


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Contact

Bailey Plunket
University of North Alabama
bplunket@una.edu