Predictors of Nutritional Deficiencies After Bariatric Surgery in the United States: Analysis of Real-World Data

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Objectives: Bariatric surgery can lead to postoperative nutritional deficiencies due to restrictive and malabsorptive mechanisms, but there is limited literature quantifying this risk.

Methods: Patients who underwent Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy (SG), and laparoscopic adjustable gastric banding (LAGB) in the IBM® MarketScan® Commercial Database (2006–2016) were identified. Nutritional deficiencies (anemia, protein malnutrition, vitamin B12 deficiency, vitamin D deficiency, other) were assessed at 1 year prior to surgery and at 3 years post-surgery. Multivariable logistic regression models were used to estimate odds ratios (OR) and 95% confidence intervals (CI) across bariatric surgery types after adjusting for potential confounders (demographics, lifestyle, and comorbidities). Interactions of bariatric surgery types with age, sex, and baseline nutritional deficiencies in relation to post-surgery nutritional deficiencies risk were assessed by likelihood ratio tests.

Results: A total of 82,885 patients (mean (SD) age of 44.5 (9.5) years) were identified with 38.8% (n = 32,190) undergoing RYGB, 33% (n = 27,388) undergoing SG, and 28.1% (n = 23,307) undergoing LAGB. The most common 3-year postoperative nutritional deficiencies were anemia (28%), vitamin D (24%), protein malnutrition (9%), and vitamin B12 (9%). Relative to the LAGB group, the adjusted OR of developing any 3-year nutritional deficiency postoperatively was 3.03 (95% CI, 2.92–3.15) for the RYGB group and 2.45 (95% CI, 2.36–2.55) for the SG group. These associations were stronger among patients younger than 45 years, men, and those without baseline nutritional deficiency (P-interaction < 0.05 for all). Baseline nutritional deficiencies were independently associated with higher odds of postoperative nutritional deficiencies. Similar results were observed for anemia, protein malnutrition, and vitamin B12 deficiency.

Conclusions: RYGB and SG were associated with two- to three-fold odds of developing postoperative nutritional deficiencies compared to LAGB, independent of baseline nutritional deficiency status. Pre- and postoperative nutritional assessment are recommended for all bariatric surgery patients to optimize postoperative outcomes.

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