Bariatric Surgery Reduces Incidence of Distal Radius Fractures Among Obese Patients

Daniel Yang[1], Alan H Daniels[2], Bryant W Oliphant, Kevin Chan
[1]Orthopaedic Surgery, University of Michigan, [2]University Orthopedics, Inc.

INTRODUCTION: Bariatric surgery has been associated with weight loss, correction of obesity-related conditions, and improvements in quality of life and longevity. However, there are concerns that bariatric surgery may increase the risks of subsequent fractures through metabolic changes and decreased bone mineral density. We hypothesize that a history of malabsorptive bariatric surgery leads to both an increased risk of distal radius fracture (DRF) and increased risk of malunion following open reduction and internal fixation (ORIF).

METHODS: The PearlDiver Patient Records Database was queried from 2010-2023 using CPT and ICD-9/10 codes to identify four groups of patients age >18: (A) underwent malabsorptive procedures (e.g, Roux-en-Y-Gastric Bypass (RYGB), (B) restrictive procedures (Sleeve Gastrectomy), (C) had obesity eligible for bariatric surgery but did not undergo bariatric surgery, or (D) non-obese controls. Each cohort was constructed via matching by age, sex, and nine comorbidities that qualify a patient for bariatric surgery. Multivariable logistic regression controlling for Elixhauser comorbidity index was performed to compare incidence of DRF across all four cohorts and risk of surgical complications in patients from each cohort who underwent ORIF over a 3-year period. Alpha threshold was set at 0.05.

RESULTS: The study included matched cohorts of 54404 non-obese, 96756 obese, 104026 restrictive surgery patients, and 104026 malabsorptive surgery patients. The incidence of DRF was lowest in nonobese patients (0.92/10,000 person-years) ($p<0.05$) (Figure 1). Patients with history of malabsorptive surgery had significantly lower incidence of DRF (4.71/10,000 person-years) compared to obese patients who did not undergo bariatric surgery (96.0/ 10,000 person-years) (OR=0.07,95%CI=0.05-0.10) and those who underwent restrictive surgery (OR=0.79,95%CI=0.63-0.98). After DRF ORIF, obese compared to non-obese patients were at higher risk of 2-year revision DRF (OR=1.20,95%CI1.02-1.39,p=0.0211), malunion (OR=1.22,95%CI1.05-1.41,p=0.0082), malunion repair (OR=1.44,95%CI1.12-1.84,p=0.0032), and surgical site infection/osteomyelitis (OR=1.25,95%CI1.02-1.52,p=0.0307). History of bariatric surgery, including individually malabsorptive and restrictive surgery, did not increase the risk of surgical complications when compared to obese patients who did not undergo bariatric surgery.

DISCUSSION AND CONCLUSION: Our study highlights obesity as a contributing risk factor for DRF, affecting younger populations. Malabsorptive bariatric surgery significantly decreases this risk by more than 10-fold. Addressing barriers to bariatric surgery among eligible patients may allow reducing the burden of obesity-related conditions, which includes risk for subsequent DRF, particularly reducing the burden of DRF amongst younger adults. DRFs cost Medicare approximately $170 million per year with higher costs associated with surgical management. Furthermore, malabsorptive surgery does not increase risk of malunions, malunion repairs, or revisions despite malabsorptive procedures bypassing the small bowel, which can lead to changes in alimentary-associated hormones and risk for metabolic bone disease. Reducing burden of obesity, including through bariatric surgery, may be a means to reduce DRF-associated costs nationally, without increasing ORIF complications for patients who do require ORIF.