Association of Long-term Anastomotic Ulceration After Roux-en-Y Gastric Bypass With Tobacco Smoking

Bariatric surgery is the most effective treatment for obesity, leading to long-term weight loss, improvements in quality of life, and reduction of obesity-associated comorbidities.1 However, long-term complications are reported. Importantly, concerns about such complications represent a considerable barrier for eligible patients considering surgery.2 A common long-term postoperative complication for the Roux-en-Y gastric bypass (RYGB) procedure is anastomotic ulceration (AU). Although AU after RYGB is a well-recognized adverse event, its documented incidence varies widely.3 Additionally, tobacco-smoking has been implicated in the pathogenesis of AU.4 The aim of this study was to describe the epidemiology of AU after RYGB and measure the association of tobacco smoking with long-term AU incidence.

Methods | The Statewide Planning and Research Cooperative System database of the Department of Health of New York State was used to identify adult patients who underwent laparoscopic or open RYGB for obesity in the state of New York in 2005 through 2010. Patients were followed up for a subsequent hospital-based diagnosis of AU, using International Classification of Diseases, Ninth Revision classification codes for gastrojejunal ulcer.

This study was approved by the Stony Brook University institutional review board. Informed consent was not obtained because of the unidentified nature of the data.

Patients who developed AU were compared with patients without AU on measures of demographics and comorbidities present at the time of the initial RYGB procedure. Possible prognostic factors were selected according to the variable importance ranking from 5 cross-validation processes that were repeated 10-fold using logistic regression models to prospectively identify odds of AU. The cumulative incidence is reported with corresponding 95% CIs. The association of tobacco smoking and AU diagnosis was examined through a multivariable Cox proportional hazard model after adjusting for age, sex, and the remaining associated factors (Table). Analysis was performed using SAS, version 9.4 (SAS Institute Inc). We regarded a P < .05 as indicating statistical significance.

Results | There were 35 075 patients who underwent an RYGB procedure. Their mean (SD) age at the time of surgery was 42.5 (10.9) years; 28 439 (81.1%) were women. The overall cumulative incidence of AU was 3.2% (95% CI, 3.0%-3.4%) after 1 year, 4.7% (95% CI, 4.5%-5.0%) after 2 years, 7.9% (95% CI, 7.6%-8.3%) after 5 years, and 11.4% (95% CI, 10.9%-11.9%) at 8 years after RYGB. Risk factors that were independently associated with AU development were identified (Table); these included history of tobacco use. The observed 5-year incidence ranged from 5.2% (95% CI, 4.4%-5.9%) for patients with 0 or 1 risk factors to 15.9% (95% CI, 13.5%-18.4%) for patients with 5 or more risk factors.

History of tobacco use was significantly associated with the development of AU (adjusted hazard ratio, 1.56; 95% CI, 1.41-1.73; P < .001), with significantly higher cumulative incidence at all points examined (Figure). Notably, the estimated 8-year cumulative incidence of AU in patients who used tobacco at the time of surgery was 17.8% (95% CI, 15.9%-19.7%).

Discussion | This study illustrates the significant long-term risk of AU after an RYGB procedure. Although there is a wide
variation in the previously reported rate of AU, the present study suggests that this complication is commonly identified on longer follow-up. Importantly, longitudinal assessment demonstrates a progressive increase in the cumulative incidence of AU throughout the period examined. This dose-response effect of time on AU incidence is in accordance with previous studies that show lower rate of AU with prolonged preventive therapy.

The effect of tobacco use on AU has been suggested by previous studies, although the exact impact size has been unclear. In this study, 17.8% of patients with a history of tobacco use at the time of RYGB surgery developed AU within 8 years. Given the postbariatric surgery recidivism of substance use, including tobacco, despite perioperative cessation, these findings emphasize the need for proper patient and bariatric procedure selection.

The findings of this study underline that the incidence of AU after RYGB is more common than previously reported and that it progressively increases over time. Despite the limitations of the retrospective design, the lack of bariatric-specific granular data, and the possibility of missing patients with AU who were diagnosed and managed exclusively outside the hospital setting, the long-term effect of tobacco use on this complication is profound. Such information can potentially aid in procedure selection at the time of initial bariatric surgery or guide patient selection for targeted AU preventive and surveillance strategies.

Figure. Estimated Cumulative Incidence of Anastomotic Ulceration After Roux-en-Y Gastric Bypass

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