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Original article

Routine contrast imaging after bariatric surgery and the effect on hospital length of stay

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Abstract

Background: Although multiple studies demonstrate that routine postoperative contrast studies have a low yield in diagnosing patients with early gastrointestinal (GI) leak after bariatric surgery, the practice pattern is unknown. Additionally, routine imaging may hinder procedural pathways that lead to accelerated postoperative discharge.

Objectives: To report on the nationwide use of routine upper GI studies (UGI) and evaluate the effect on hospital resource utilization.

Setting: Nationwide analysis of accredited centers.

Methods: The Metabolic and Bariatric Surgery Accreditation Quality and Improvement Program public use file for 2015 was used to identify patients who underwent routine UGI after nonrevisional Roux-en-Y gastric bypass or sleeve gastrectomy. Multivariable logistic regression models were developed to identify risk factors for early hospital discharge.

Results: Bariatric surgery was performed on 130,686 patients. Routine UGI was performed in 30.9% of Roux-en-Y gastric bypass and 43% of sleeve gastrectomy patients ($P < .0001$). Patients undergoing routine UGI were less likely to be discharged by postoperative day 1 (odds ratio .7, 95%; confidence interval .69–0.72). There was no difference in postoperative leak rate between the routine UGI versus nonroutine UGI group (.7% versus .8%, $P = .208$). Among patients who developed a GI leak, there was no significant difference in the rate of reoperation, readmission, and reintervention between the 2 groups. The time interval between index operation and any further management for the leak was longer in the routine UGI group.

Conclusions: Routine UGI evaluation after bariatric surgery remains a common practice in accredited centers. This practice is associated with prolonged hospital length of stay, with no effect on the diagnosis of leak rate. (Surg Obes Relat Dis 2018;▮:00–00.)

Keywords: bariatric; MBSAQIP; routine imaging; UGI; length of stay; sleeve; bypass

The number of bariatric surgeries performed in the United States has increased significantly in the past decade [1]. Although the incidence of gastrointestinal (GI) leak after bariatric surgeries has decreased overtime, GI leaks remain an important cause of overall morbidity and mortality after bariatric surgery. Thus, it is primarily this risk that fuels the practice of postoperative radiographic images, such as upper GI (UGI) series, as means to detect anastomotic leaks early.

The routine use of UGI in the early postoperative period has been challenged in the literature. Because most

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anastomotic leaks occur after discharge [2], UGI series has limited sensitivity in detecting a leak within 2 days of surgery [3]. Moreover, results of imaging can vary with patient body habitus, extent of the leak, and the contrast material used [4]. As such, multiple studies have undermined the benefits of routine UGI series particularly in asymptomatic patients [5,6].

The value of enhanced recovery pathways in surgery is multifaceted and although it primarily involves the earlier return to physiologic norm and functional recovery, it further extends to a tangible reduction in hospital length of stay (LOS). Progressively more published reports describe a target hospital discharge the day after surgery [7–9]. According to a meta-analysis on enhanced recovery after bariatric surgery, a reduction in the LOS translates to reduced costs without any influence on morbidity [10]. The implementation of procedural pathways has led to accelerated postoperative hospital stay, which may be impaired by the use of routine imaging. Regarding the effect of routine imaging on enhanced recovery, in addition to the direct cost of routine imaging, a possible delay in discharge related to such practice may further negatively affect the accelerated patient recovery and value index of bariatric surgery.

Despite national society guidelines, the decision to obtain routine imaging after bariatric surgery depends on the surgeon and the system of care at each institution. As a result, the current practice pattern for routine postoperative contrast studies is unknown. Through this study we aimed to assess the nationwide use of routine UGI and evaluate the effect on hospital resource utilization and patient outcomes.

Methods

The Metabolic and Bariatric Surgery Accreditation Quality and Improvement Program public use file for 2015 was used to identify patients who underwent routine UGI after nonrevisional laparoscopic Roux-en-Y gastric bypass (LRYGB) or sleeve gastrectomy (SG) procedures. This de-identified database includes demographic characteristics, patient characteristics including body mass index, procedural details, and 30-day postoperative complications from all centers that participate in the Metabolic and Bariatric Surgery Accreditation Quality and Improvement Program. At each center, trained clinical abstractors collect and enter data. Centers with an integrity disagreement audit rate $>5\%$, a 30-day follow rate $<80\%$, or noncompliance with the data collection guidelines did not contribute cases to the public use file.

The use of UGI imaging at the patient level is captured in the database as routine, selective, or none. Patients who underwent routine UGI testing were compared with the rest. The primary outcome was early hospital discharge, defined as hospital discharge on postoperative day (POD) 1. This is progressively being used as the anticipated day of discharge for enhanced recovery programs in bariatric surgery [10,11]. GI leak was defined as the presence of organ space infection or reoperation, reintervention, and readmission for anastomotic or staple line leakage.

The Stony Brook University institutional review board deemed this study exempt. The American College of Surgeons Metabolic and Bariatric Surgery Accreditation Quality and Improvement Program and the participating centers are the sources of the data used herein; they have not verified and are not responsible for the statistical validity of the data analysis or the conclusions derived by the authors. Categoric variables were compared using $\chi 2$ or Fisher's exact test and are reported as number (percentage). Continuous variables were compared using the Mann-Whitney U test, and reported as median (interquartile range). Multivariable logistic regression was used to identify risk factors for early hospital discharge and to control for confounders for variables with $P < .1$ on univariable analysis. Odds ratios (ORs) with 95% confidence intervals (CIs) are reported as appropriate. Statistical analysis was performed using SPSS Statistics version 25 for Windows (IBM Corp, Armonk, NY, USA).

Results

We identified 130,686 patients who underwent bariatric surgery; 50,622 (30.3% of LRYGB and 42.4% of SG patients, $P < .0001$) underwent routine UGI. The majority of patients were female (78.8%) with a median age of 44 (36–53) and body mass index of 44 (40–50). SG was performed in 90,819 (69.5%). Hospital LOS, based on procedure and practice type (routine UGI or no), is listed in Fig. 1. Patients undergoing routine UGI were significantly less likely to be discharged by POD1 compared with no routine imaging, after SG (43.2% versus 51.6%, $P < .0001$) or LRYGB (19.2% versus 31%, $P < .0001$). There was no difference in postoperative GI leak rate in the routine versus nonroutine UGI groups (0.4% versus .4%, $P = .975$). After adjusting for confounders, patients undergoing routine UGI were significantly less likely to be discharged from the hospital by POD1 for both LRYGB (OR .53, 95% CI .51–.56) and SG (OR .72, 95% CI .7–.74). This effect remained unchanged even after excluding 9004 patients (6.9%) who developed a postoperative event (for LRYGB: OR .51, 95% CI .48–.54, for SG: OR .69, 95% CI .67–.71).

Of the 542 patients who were diagnosed with a GI leak (57.9% had undergone SG), 206 (38%) had a routine UGI performed; 344 (63.5%) patients underwent reoperation; 418 (77.1%) hospital readmission; and 310 (57.2%) reintervention (by endoscopy or image guided). Subsequent mortality was noted in 11 (2%) patients. Patients who developed a GI leak were compared depending on the previous routine or no use of UGI imaging (Table 1). There was no significant difference in the rate of reoperation,