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Same-Day Discharge After Laparoscopic Roux-en-Y Gastric Bypass: An Analysis of the MBSAQIP Database

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INTRODUCTION

Laparoscopic Roux-en-Y gastric bypass (LRYGB) is a bariatric procedure with a typical length of stay of two days. (1, 2) With the promotion of fast-track and Enhanced Recovery After Surgery (ERAS) protocols, there have been increasing reports of successful patient discharge on postoperative day 1 (POD1) after LRYGB. (1–14)

In some institutional series, the successful rate of POD1 discharge in select patients after LRYGB is >80%, with rates of 30-day complications and readmission around 2%. (8) On a national level, Morton et al (1) used the Bariatric Outcomes Longitudinal Database to compare 9,513 patients discharged POD1 with 30,592 patients discharged postoperative day 2 after LRYGB and found no difference in risk-adjusted 30-day mortality, serious complications, or readmissions. Khorgami et al (14) used the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database to compare outcomes between 2,960 patients who were discharged on POD1 versus 13,523 patients who were discharged on postoperative day 2–3 after LRYGB, and found that patients discharged on POD1 had fewer complications than patients discharged later (2.6% versus 4.1%, respectively; $P < 0.001$). These studies further support that POD1 discharge after LRYGB is well tolerated.

Given the apparent trend toward shorter hospitalization and the increasing evidence for successful POD1 discharge after LRYGB, the next step is to examine the feasibility of same-day discharge after LRYGB. However, there are currently no studies that compare outcomes between same-day and POD1 discharge after LRYGB, likely because the novel practice of same-day discharge after LRYGB is currently limited to ≤1.0% of cases. (1, 2) Therefore, the aim of the current study was to evaluate the outcomes of patients with same-day versus

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MEETING PRESENTATION

This research was presented at the Annual Meeting of the Western Surgical Association in Scottsdale, AZ, November 2017.

DISCLOSURES

The American College of Surgeons Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program and the centers participating in the ACS MBSAQIP are the source 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.

POD1 discharge after LRYGB using the American College of Surgeons Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database.

METHODS

Database

The MBSAQIP database is the largest bariatric-specific registry in the United States. The 2015 participant user file is the first MBSAQIP database available for analysis, and contains Health Insurance Portability and Accountability Act (HIPAA)-compliant patient-level data on over 150,000 metabolic and bariatric cases performed between January 1-December 31, 2015 across 742 centers in the United States and Canada.

Patient Population

The 2015 MBSAQIP database was analyzed for patients aged 18 years or older who underwent elective LRYGB on the day of admission with either same-day or POD1 discharge. To reduce possible confounding variables, only conventional laparoscopic procedures were included. Laparoscopic-assisted, hand-assisted, single-incision, natural-orifice, robotic-assisted, and open procedures were excluded. Patients with American Society of Anesthesiologists (ASA) class V or higher were excluded. Patients were also excluded if they had a history of prior bariatric or foregut surgery or were undergoing revisional surgery.

Outcome Measures

Primary outcome measures included 30-day mortality and overall morbidity. Only mortality events that were identified in the database as being related to the index operation were included in the analysis. Secondary outcome measures included 30-day readmission and reoperation. Only cases of readmission and reoperation that were identified in the database as being both unplanned and related to the index operation were included in the analysis.

Statistical Analysis

The statistical program SAS version 9.4 (SAS Institute, Cary, NC) was used for analysis. For continuous variables, t-tests were used to compare the means of between the two groups. For categorical variables, Fisher exact tests (due to small numbers in some categories) were used to compare the proportions between the two groups. Multivariate logistic regression was used to determine risk-adjusted outcomes for same-day versus POD1 discharge. Risk adjustments included patient demographic and clinical characteristics with $P < 0.1$ based on univariate analysis. Patients with missing preoperative variables were excluded from the regression analysis. Two-sided tests with $P < 0.05$ were considered statistically significant. Bonferroni correction was used to adjust the P values for multiple comparisons.

RESULTS

There were 39,515 conventional LRYGB cases in the database, including 354 (0.9%) same-day discharges, 10,324 (26.1%) POD1 discharges, and 20,875 (52.8%) POD2 discharges.

After application of inclusion and exclusion criteria, a total of 9,721 cases were analyzed, including 319 same-day and 9,402 POD1 discharges.

Patient demographics and clinical characteristics are summarized in Table 1. On univariate analysis, statistically significant differences between same-day versus POD1 discharge included higher mean body mass index (BMI) (47.3 versus 45.9 kg/m^2, respectively; P = 0.0024), racial distribution, and higher percentage of patients with Hispanic ethnicity (11.9% vs. 12.0%, respectively; P = 0.0079). There were no statistically significant differences between the two groups for other evaluated characteristics or comorbidities.

Perioperative characteristics are listed in Table 2. On univariate analysis, there was no statistically significant difference between the two groups for operative time. Statistically significant differences between same-day versus POD1 discharge included distribution of the first-assistant training level and use of routine or selective postoperative swallow study.

Postoperative outcomes are summarized in Table 3. On univariate analysis, there was a statistically significant higher rate of mortality for same-day versus POD1 discharge (0.94% versus 0.05%, respectively; P = 0.0017). Reasons for mortality in the same-day discharge group included hemorrhage (N = 1), other respiratory failure (N = 1), and unlisted (N = 1). Reasons for mortality in the POD1 discharge group included intestinal obstruction (N = 1), vein thrombosis requiring therapy (N = 2), and unlisted (N = 2). Compared to POD1 discharge, same-day discharge had higher overall morbidity (3.76% versus 1.54%, respectively; P = 0.0055), higher rates of cardiac arrest requiring cardiopulmonary resuscitation (0.63% versus 0.01%, respectively; P = 0.0032), higher rates of unplanned intubation (0.94% versus 0.06%, respectively; P = 0.0025), higher rates of unplanned admission to the intensive care unit (1.25% versus 0.29%, respectively; P = 0.0178), and higher rates of renal insufficiency/failure (0.94% versus 0.09%, respectively; P = 0.0047). There were no statistically significant differences between same-day versus POD1 discharge for rates of readmission (3.45% versus 3.66%, respectively; P = 0.7699) or reoperation (1.88% versus 0.89%, respectively; P = 0.1273).

Table 4 lists results of the multivariate logistic regression analysis comparing outcomes between same-day versus POD1 discharge. Risk-adjusted mortality was not performed because it did not fit into the regression model due to the low number of events. Patients with same-day discharge had higher risk-adjusted odds of overall morbidity compared to patients with POD1 discharge (adjusted odds ratio [AOR] 2.41, P = 0.0216). There were no significant differences between the same-day versus POD1 discharge groups for risk-adjusted readmissions (AOR 0.85; P = 0.9999), or reoperations (AOR 2.33; P = 0.2428). Additional adjustments were made for assistant training level and postoperative swallow study, since these variables were found to be statistically different between the two groups on univariate analysis. The secondary multivariate regression analysis was similar to the original analysis, with higher risk-adjusted overall morbidity in the same-day versus POD1 discharge group (AOR 2.55; P = 0.0126), and no statistically significant difference in risk-adjusted rates of readmission or reoperation.

DISCUSSION

Based on a large, national bariatric surgery database, the current study showed that same-day discharge after LRYGB is limited in practice, occurring in <1% of patients undergoing conventional LRYGB. However, a significant percentage of patients are being discharged on POD1 after surgery (27%). Compared to POD1 discharge, same-day discharge was associated with higher rates of mortality and risk-adjusted overall morbidity. There was no statistically significant difference for risk-adjusted odds of readmission or reoperation between the two groups.

In this study, a risk-adjusted analysis for mortality could not be performed due to the rarity of events, only three deaths occurring in the same-day discharge group and five deaths occurring in the POD1 discharge group. Based on univariate analysis, mortality was significantly higher for same-day versus POD1 discharge (0.94% versus 0.05%; $P = 0.0017$). In a study of 51,788 LRYGB cases using the Bariatric Outcomes Longitudinal Database, Morton et al (1) compared 507 same-day discharge cases with 30,592 cases discharged after a two-day length of stay and similarly found that same-day discharge was associated with higher risk-adjusted odds of 30-day mortality (0.8% versus 0.1%, respectively; AOR 12.97; $P < 0.0001$).

We hypothesize that the increased mortality after same-day discharge may due to failure to rescue when patients developed respiratory or other complications at home in an unmonitored and unsupervised setting. It is important to note that over 40% of patients in the same-day discharge group had a diagnosis of sleep apnea, particularly given the high risk for postoperative respiratory depression in this group of patients after anesthesia combined with postoperative narcotic usage. While there are a number of studies demonstrating safe POD1 discharge after LRYGB in the context of Enhanced Recovery After Surgery protocols, it is unknown which patient characteristics and comorbidities would allow for safe same-day discharge after LRYGB. (2–14) Studies on successful same-day discharge after laparoscopic sleeve gastrectomy excluded patients with sleep apnea or cardiac disease, suggesting that same-day discharge after bariatric surgery may be safe in select patients. (15–17) However, in the current study, same-day discharge was associated with higher rates of unplanned postoperative intubation compared to the POD1 discharge, as well as statistically higher rates of cardiac arrest and unplanned admission to the intensive care unit. It is likely that poor patient selection for same-day discharge to an unmonitored setting resulted in higher rates of respiratory and cardiac complications, which in turn may have contributed to the higher mortality observed in the same-day discharge group.

There are several limitations to this study. First, this study is subject to the inherent biases of all retrospective database studies, including possible selection bias and bias from inaccurately recorded or missing data. Additionally, since the comparison groups were determined retrospectively based on day of discharge, there may be additional bias from patients who were intended for same-day discharge but were instead discharged at a later date due to the clinical need for continued hospitalization. Furthermore, the MBSAQIP does not include variables on specific centers or surgeons, thus the results could not be adjusted for these factors. This is important to note, as bariatric surgery performed at high-volume

centers or by high-volume surgeons is associated with improved outcomes. (18–20) Finally, the data in this study were collected from Bariatric Centers of Excellence accredited by the MBSAQIP, and results may not be representative of non-accredited institutions.

CONCLUSION

While previous studies have demonstrated that POD1 discharge after LRYGB in carefully selected patients is feasible with good outcomes, particularly in the context of Enhanced Recovery After Surgery (ERAS) protocols, same-day discharge after LRYGB is associated with significantly higher morbidity and mortality compared POD1 discharge. Despite the trend toward shorter postoperative hospital stays, same-day discharge after LRYGB should be considered experimental until further research determines the optimal patient for safe accelerated discharge.

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ABBREVIATIONS

AOR	adjusted odds ratio
ASA	American Society of Anesthesiologists
BMI	body mass index
HIPAA	Health Information Portability and Accountability Act
LRYGB	laparoscopic Roux-en-Y gastric bypass
MBSAQIP	Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program
POD	postoperative day

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Table 1.

Patient Demographics and Clinical Characteristics for Same-Day Versus First-Postoperative-Day (POD1) Discharge After Laparoscopic Roux-en-Y Gastric Bypass

Characteristic	Same-day (n = 319)	POD1 (n = 9,402)	p Value
Age, y, mean (SD)	45.0 (12.0)	44.5 (11.8)	0.5022
Age, y, median (IQR)	44.0 (36–54)	44.0 (36.0–53.0)	
BMI, kg/m^2, mean (SD)	47.3 (7.5)	45.9 (8.0)	0.0024
BMI, kg/m^2, median (IQR)	46.6 (41.8–52.0)	44.6 (40.3–50.0)	
Female, n (%)	256 (80.3)	7,262 (77.2)	0.2212
Race, n (%)			
White	229 (71.8)	7,480 (79.6)	0.0031
Black or African American	63 (19.8)	1,143 (12.2)	
Asian	2 (0.63)	49 (0.52)	
Other	3 (0.94)	95 (1.01)	
Unknown/not reported	22 (6.90)	635 (6.75)	
Hispanic ethnicity, n (%)	38 (11.9)	1,129 (12.0)	0.0079
ASA Class, n (%)			
I	1 (0.31)	14 (0.15)	0.3634
II	45 (14.1)	1,568 (16.7)	
III	257 (80.6)	7,397 (78.7)	
IV	16 (5.02)	423 (4.50)	
Comorbidity, n (%)			
Hypertension	164 (51.4)	4,785 (50.9)	0.8645
Diabetes	110 (34.5)	3,074 (32.7)	0.5050
Hyperlipidemia	103 (32.3)	2,629 (28.0)	0.0995
COPD	7 (2.19)	159 (1.69)	0.5040
Sleep apnea	133 (41.7)	3,604 (38.3)	0.2418
History of myocardial infarction	5 (1.57)	119 (1.27)	0.6063
History of PCI	4 (1.25)	193 (2.05)	0.4194
History of cardiac surgery	3 (0.94)	84 (0.89)	0.7632
Renal insufficiency	1 (0.31)	40 (0.43)	0.9999
Renal failure	0 (0.00)	9 (0.10)	0.9999
Venous stasis	3 (0.94)	122 (1.30)	0.8004
History of DVT	5 (1.57)	141 (1.50)	0.8146
History of PE	3 (0.94)	74 (0.79)	0.7413
Chronic steroid use	2 (0.63)	108 (1.15)	0.5884
Smoker	36 (11.3)	772 (8.21)	0.0624
Functional status, n (%)			
Independent	316 (99.1)	9,327 (99.2)	0.6591
Partially dependent	3 (0.94)	62 (0.66)	
Totally dependent	0 (0.00)	13 (0.14)	

Values are reported as frequencies (%) unless otherwise indicated.

ASA, American Society of Anesthesiologists; BMI, body mass index; COPD, chronic obstructive pulmonary disorder; DVT, deep vein thrombosis; IQR, interquartile range; PCI, percutaneous coronary intervention; PE, pulmonary embolus; POD, postoperative day

Table 2.

Perioperative Characteristics for Same-Day Versus First-Postoperative-Day Discharge (POD1) After Laparoscopic Roux-en-Y Gastric Bypass

Characteristic	Same-day (n = 319)	POD1 (n = 9,402)	p Value
Operative time, min, mean (SD)	107.4 (52.9)	104.4 (46.2)	0.3253
Operative time, min, median (IQR)	95 (72–127)	96 (73–126)	
First assistant, n (%)			
PA/NP	107 (33.5)	3,649 (38.8)	0.0002
Resident	39 (12.2)	1,410 (15.0)	
Fellow	29 (9.09)	1,252 (13.3)	
Attending	79 (24.8)	1,817 (19.3)	
None	65 (20.4)	1,274 (13.6)	
Swallow study, n (%)			
Routine	82 (25.7)	1,800 (19.1)	0.0145
Selective	2 (0.63)	85 (0.90)	
None	235 (73.7)	7,517 (80.0)	

Values are reported as frequencies (%) unless otherwise indicated

NP, nurse practitioner; NS, not significant; PA, physician assistant; POD, postoperative day; SD, standard deviation

Table 3.

Thirty-Day Outcomes for Same-Day Versus First-Postoperative-Day (POD1) Discharge After Laparoscopic Roux-en-Y Gastric Bypass

Outcome	Same-day (n = 319)		POD1 (n = 9,402)		p Value
	n	%	n	%	
Mortality	3	0.94	5	0.05	0.0017
Overall morbidity	12	3.76	145	1.54	0.0055
Surgical site infection	4	1.25	71	0.76	0.3128
Superficial	3	0.94	56	0.60	0.4445
Deep	0	0.00	4	0.04	0.9999
Organ space	1	0.31	11	0.12	0.3301
Urinary tract infection	1	0.31	21	0.22	0.5204
Cardiac arrest requiring CPR	2	0.63	1	0.01	0.0032
Myocardial infarction	1	0.31	3	0.03	0.1250
Postoperative ventilator	0	0.00	3	0.03	–
Unplanned intubation	3	0.94	6	0.06	0.0025
Unplanned ICU admission	4	1.25	27	0.29	0.0178
Pneumonia	0	0.00	12	0.13	0.9999
Deep vein thrombosis	0	0.00	12	0.13	0.9999
Pulmonary embolism	1	0.31	10	0.11	0.3073
Renal insufficiency/failure	3	0.94	8	0.09	0.0047
Sepsis	1	0.31	4	0.04	0.1537
Septic shock	0	0.00	3	0.03	0.9999
Readmission	11	3.45	344	3.66	0.7699
Reoperation	6	1.88	84	0.89	0.1273

POD, postoperative day.

Values are reported as frequencies (%) unless otherwise indicated.

CPR, cardiopulmonary resuscitation; ICU, intensive care unit; UTI, urinary tract infection

Table 4.

Risk-Adjusted 30-Day Outcomes for Same-Day Versus First-Postoperative-Day (Reference) Discharge After Laparoscopic Roux-en-Y Gastric Bypass

Outcome	AOR* (95% CI)	p Value	AOR† (95% CI)	p Value
Overall morbidity	2.41 (1.32–4.41)	0.0216	2.55 (1.39–4.69)	0.0126
Readmission	0.85 (0.46–1.56)	0.9999	0.86 (0.63–2.15)	0.9999
Reoperation	2.33 (0.01–5.26)	0.2428	2.38 (0.18–0.97)	0.2091

AOR, adjusted odds ratio.

*Adjusted for body mass index, race, Hispanic ethnicity, hyperlipidemia, smoker

†Additional adjustment for the level of first assistant and performance of a swallow study

AOR, adjusted odds ratio; CI, confidence interval