COMPARISON OF EARLY POST-OPERATIVE COMPLICATIONS IN PRIMARY AND CONVERSION LAPAROSCOPIC SLEEVE GASTRECTOMY, GASTRIC BYPASS, AND DUODENAL SWITCH: A 5-YEAR MBSAQIP ANALYSIS

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Abstract

Background

- Laparoscopic gastric bypass (GB) is considered the "gold standard" bariatric surgery, however–
- Sleeve gastrectomy (SG) is now the most preformed bariatric surgery;
- Data demonstrate use of duodenal switch (DS) as an index procedure is increasing, too.[1]
- Current comparative literature focuses on long-term outcomes, but little attention has been paid to early post-operative complications of bariatric procedures.[2]
- Re-operation and conversion are common in bariatric surgery;
- Similar early post-operative comparative analyses have not been performed for such cases, either.[3]

Methods

- MBSAQIP query
  - 2015 – 2019
  - Primary: SG, GB, DS cases
  - Conversions: SG, GB, DS
- Gross return: 855,380 cases
- Post-exclusion: n = 755,968
- Multivariable logistic regression for crude and adjusted odds ratio of 30-day complications:[a]
  - SSI
  - Readmission
  - Reoperation
- SG compared to GB and DS

Results (risk of complication)

- Primary cases: GB ≈ DS > SG
  - SSI, readmission, and reoperation
- Conversions: DS > GB = SG
  - Reoperation and readmission

Methods

MBSAQIP was queried for **adult patients who underwent SG, GB, or DS from 1/1/2015 – 12/31/2019**. Initial query returned 855,380 cases from 868 centers. Further inclusion and exclusion criteria were applied as below yielding **755,968 primary/index cases** for primary analysis and **68,716 conversion/revision cases** for secondary analysis.

Crude and adjusted odds ratios for 30-day complications were calculated via multivariable logistic regression as SG vs GB or DS. Models were adjusted for age, BMI, cardiac history, pre-operative hypertension, previous bariatric surgery, smoking status, pre-operative steroid use, diabetes, surgery conversion. In a separate similar analysis, we compared the early post-operative outcomes of conversion/revision SG, GB, and DS.

MBSAQIP Cohort Query

1. SG, GB, DS (2015 – 2019)
2. Adult (age ≥ 18 years)
3. EXCLUDE Open, NOTES
4. No concurrent procedures
5. Valid BMI (not <30, >100)
6. 1° surgery (no revision, conversion)

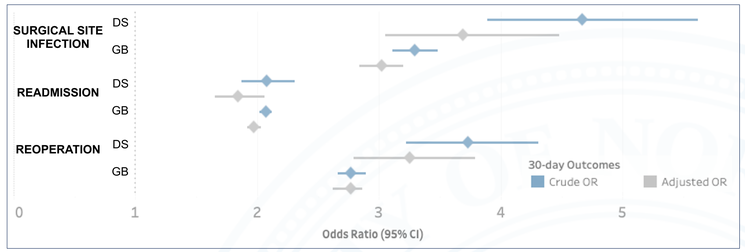


Figure 1. Crude and adjusted risk of 30-day complications in primary laparoscopic DS or GB procedures vs primary SG.

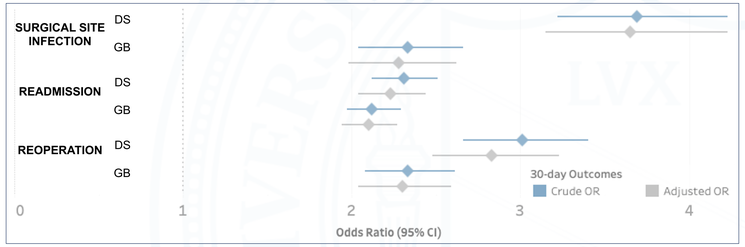


Figure 2. Crude and adjusted risk of 30-day complications in conversion laparoscopic DS or GB vs conversion SG.

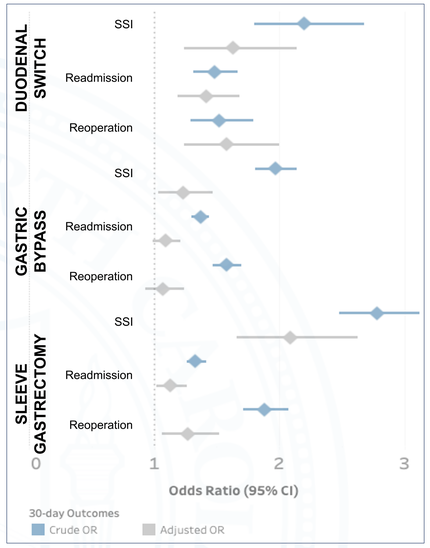


Figure 3. Risk of 30-day complications in conversion procedures vs respective primary procedures

Table 1. 30-day patient outcomes in patients who underwent index or conversion bariatric surgery from 2015- 2019

		Primary/Index			Conversion/Revision		
		Incidence, n (%)	OR (95% CI)	aOR (95% CI)[a]	Incidence, n (%)	OR (95% CI)	aOR (95% CI)[a]
Surgical Site Infection	DS	122 (1.9)	**4.67 (3.89, 5.62)**	**3.69 (3.05, 4.48)**	539 (4.1)	**3.69 (3.22, 4.23)**	**3.65 (3.15, 4.23)**
	GB	2,681 (1.3)	**3.29 (3.11, 3.48)**	**3.02 (2.84, 3.20)**	674 (2.6)	**2.33 (2.04, 2.66)**	**2.28 (1.98, 2.62)**
	SG	2,271 (0.4)	1.0 (ref)	1.0 (ref)	339 (1.1)	1.0 (ref)	1.0 (ref)
Readmission	DS	378 (5.9)	**2.08 (1.87, 2.31)**	**1.84 (1.65, 2.06)**	1,120 (8.5)	**2.31 (2.12, 2.51)**	**2.23 (2.04, 2.44)**
	GB	11,691 (5.9)	**2.07 (2.02, 2.12)**	**1.97 (1.92, 2.03)**	2,025 (7.9)	**2.12 (1.97, 2.29)**	**2.10 (1.94, 2.27)**
	SG	16,087 (2.9)	1.0 (ref)	1.0 (ref)	1,148 (3.9)	1.0 (ref)	1.0 (ref)
Reoperation	DS	193 (3.0)	**3.73 (3.22, 4.31)**	**3.25 (2.79, 3.79)**	593 (4.5)	**3.01 (2.66, 3.40)**	**2.83 (2.48, 3.23)**
	GB	4,489 (2.3)	**2.77 (2.66, 2.89)**	**2.74 (2.62, 2.86)**	905 (3.5)	**2.33 (2.08, 2.61)**	**2.30 (2.04, 2.59)**
	SG	4,537 (0.8)	1.0 (ref)	1.0 (ref)	458 (1.5)	1.0 (ref)	1.0 (ref)

Table 2. Risk of 30-day patient outcomes in conversion vs primary bariatric surgery modalities from 2015 – 2019, stratified by procedure

		Incidence, n (%)		OR (95% CI)	aOR (95% CI)[a]
		Revision	Primary		
DS	Any SSI	539 (4.1)	122 (1.9)	**2.20 (1.80, 2.68)**	**1.63 (1.24, 2.14)**
	Readmission	1,120 (8.5)	378 (5.9)	**1.48 (1.31, 1.67)**	**1.42 (1.19, 1.68)**
	Reoperation	593 (4.5)	193 (3.0)	**1.52 (1.29, 1.79)**	**1.58 (1.24, 2.00)**
GB	Any SSI	674 (2.6)	2,681 (1.4)	**1.97 (1.81, 2.14)**	**1.23 (1.03, 1.47)**
	Readmission	2,025 (7.9)	11,691 (5.9)	**1.37 (1.30, 1.44)**	1.09 (0.99, 1.21)
	Reoperation	905 (3.5)	4,489 (2.3)	**1.58 (1.47, 1.70)**	1.07 (0.93, 1.24)
SG	Any SSI	339 (1.1)	2,271 (0.4)	**2.78 (2.48, 3.12)**	**2.09 (1.66, 2.63)**
	Readmission	1,148 (3.9)	16,087 (2.9)	**1.33 (1.26, 1.42)**	**1.13 (1.02, 1.26)**
	Reoperation	458 (1.5)	4,537 (0.8)	**1.88 (1.71, 2.07)**	**1.27 (1.06, 1.52)**

Results and Conclusions

Among **primary operations** our data demonstrate a **higher risk of 30-day SSI, readmission, and reoperation following DS or GB compared to SG,** with risks for readmission or reoperation nearly twice as high (Table 1). The elevated risk remained statistically significant even after controlling for confounding comorbidities.

Among conversion/revisional operations, our data demonstrated a **higher risk of all 30-day complications following DS or GB compared to SG**. Again, greater risk remained after controlling for confounding clinical characteristics.

GB demonstrated a higher risk of SSI, but **not a higher risk of re-operation or readmission, among conversion procedures compared to primary procedures** (Table 2). However, when compared to their primary counterparts, **conversion/revisional DS and SG demonstrated a higher risk of SSI, readmission, and reoperation at 30-days.**

Overall, our data demonstrate GS exhibits the lowest risk of complication incidence in the early postoperative period compared to DS and GB, which are roughly equivocal. As our analysis only considered incidence, future investigations considering morbidity and/or mortality could further delineate the safety profiles of these procedures.

Abbreviations: MBSAQIP, Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program; IQR, interquartile range; BMI, body mass index; MI, myocardial infarction; COPD, chronic obstructive pulmonary disease

[a] Adjusted based on age, BMI, cardiac history, pre-operative hypertension, previous bariatric surgery, smoking status, pre-operative steroid use, diabetes, surgery conversion.

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3. Gribben JL, Ilonzo N, Neifert S, Michael Leitman I. Predictors of Reoperation and Failure to Rescue in Bariatric Surgery. JSLS. 2018;22(1):e2017.00074. doi:10.4293/JSLS.2017.00074