Short-term safety and efficacy of robot-assisted metabolic and bariatric surgery in adolescents: an analysis of the MBSAQIP database

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INTRODUCTION

- The usage of robotic systems in metabolic and bariatric surgery (MBS) is increasing rapidly
- Despite the recent rapid increase in MBS in adolescent patients, analyses of outcomes of robot-assisted MBS in the adolescent population are lacking

METHODS

- We conducted a retrospective cohort study using the 2020-2023 Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database
- We compared **robot-assisted** versus **laparoscopic** MBS procedures in patients ≤19 years of age
- Our primary outcome was 30-day incidence of major complications, defined as Clavien-Dindo Grade >2
- Additional outcomes included:
  - Anastomotic or staple line leak
  - Reoperation, readmission, or re-intervention
  - Operative length and length of stay
  - Change in BMI at 30 days

RESULTS

DATA SUMMARY

- From a **total of 5521** minimally invasive adolescent MBS procedures, **1326 (24.0%)** were robot-assisted
- The **most common procedure** performed was **sleeve gastrectomy** (n=4836, 87.6%, 1166/4836 [24.1%] robot-assisted), followed by **RYGB** (n=590, 10.7%, 147/590 [24.9%] robot-assisted), **BPD/DS** (n=66, 1.2%), and **gastric banding** (n=29, 0.5%)
- Patients who underwent robot-assisted surgery had greater rates of hyperlipidemia and GERD (Table 1)

Table 1: Baseline patient characteristics

	Laparoscopic	Robot-assisted	P-value
N (%)	4195 (76.0%)	1326 (24.0%)	N/A
Age, mean (SD)	17.82 (1.41)	18.04 (1.16)	<0.001*
BMI, mean (SD)	47.04 (7.98)	48.03 (8.09)	<0.001*
Female, n (%)	3027 (72.2%)	1006 (75.9%)	0.024*
Smoker, n (%)	94 (2.2%)	23 (1.7%)	0.314
Diabetes, n (%) Insulin No Insulin	 77 (1.8%) 516 (12.3%)	 24 (1.8%) 179 (13.5%)	 0.782
OSA, n (%)	829 (19.8%)	272 (20.5%)	0.577
GERD, n (%)	382 (9.1%)	182 (13.7%)	<0.001*
Hypertension, n (%)	325 (7.7%)	99 (7.5%)	0.782
Hyperlipidemia, n (%)	133 (3.2%)	59 (4.4%)	0.033*

OUTCOMES

Table 2: Univariate outcomes between groups

	Laparo-scopic	Robot-assisted	Overall	P-value
Major complications, n (%)	71 (1.7%)	23 (1.7%)	94 (1.7%)	1.0
Anastomotic or staple line leak, n (%)	7 (0.2%)	2 (0.2%)	9 (0.2%)	1.0
Reoperation, n (%)	17 (0.4%)	12 (0.9%)	29 (0.5%)	0.048*
Readmission, n (%)	108 (2.6%)	28 (2.1%)	136 (2.5%)	0.397
Reintervention, n (%)	26 (0.6%)	5 (0.4%)	31 (0.6%)	0.412
Operative length (min), mean (SD)	71.49 (39.44)	90.30 (38.97)	76.02 (40.13)	<0.001*
Length of stay (days), mean (SD)	1.33 (0.80)	1.27 (0.70)	1.32 (0.78)	0.006*
BMI change, mean (SD)	-2.94 (2.49)	-3.01 (2.57)	-2.96 (2.51)	0.405

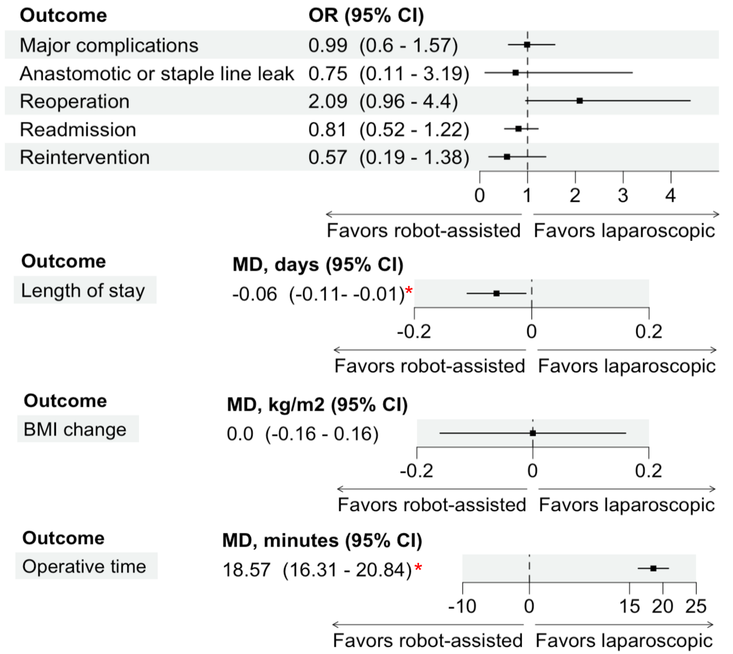

Figure 1: Forest plots showing results of multivariable regression analysis for each outcome. Laparoscopic approach was used as the reference for all comparisons. Red asterisk indicates statistically significant result.

KEY POINTS

- **Based on MBSAQIP data with 30-day follow-up, robot-assisted MBS appears safe in the adolescent population with post-operative efficacy and safety outcomes comparable to laparoscopic MBS**
- **These findings warrant further large-scale studies evaluating the longer-term safety and efficacy of robotic surgery in adolescent patients**