



Comparative Outcomes of Robotic Versus Laparoscopic Bariatric Surgery in High-Risk Subgroups: An Analysis from the MBSAQIP Database

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BACKGROUND

- Robotic-assisted bariatric surgery has become increasingly popular due to potential ergonomic and technical benefits
- The outcomes in high-risk patient subgroups compared to laparoscopic approaches remain unclear
- This study aims to compare robotic-assisted and laparoscopic bariatric surgery in terms of major complications and readmission in high-risk subgroups

METHODS

- Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) 2020-2023
- Random Forest and XGBoost machine learning models identified factors associated with major complications in robotic and laparoscopic cohorts
- Subgroup analyses and multivariate regression were used to compare approaches for 30-day reoperation, reintervention, and readmission

RESULTS

- Total of 819,083 patients
 - 227,386 robotic; 591,697 laparoscopic
- Robotic approach:
 - Higher odds of 30-day reoperation or reintervention for sleeve gastrectomy
 - Higher odds of 30-day readmission across all groups except those with concurrent ventral hernia repair, cholecystectomy, adhesiolysis, and those with a high frailty score
 - No significant difference in reoperation or reintervention for RYGB, BPD-DS, revisional surgery, or those with a high frailty score

Table 1: Multivariate analysis of robotic versus laparoscopic approaches in terms of reoperation/reintervention

Subgroup	OR (95% CI)	p-value
RYGB	1.03 (0.98-1.08)	0.268
SG	1.09 (1.03-1.16)	0.004
BPD-DS	1.06 (0.86-1.33)	0.565
Frailty score: low	1.05 (1.01-1.09)	0.010
Frailty score: high	0.98 (0.74-1.31)	0.914
Primary surgery	1.08 (1.04-1.13)	< 0.001
Revisional surgery	1.05 (0.97-1.14)	0.204
BMI > 50 kg/m ²	1.05 (0.97-1.14)	0.232
Previous foregut surgery	1.11 (1.02-1.20)	0.019
Hiatal hernia	1.05 (0.98-1.13)	0.162
Ventral hernia	1.41 (0.90-2.23)	0.137
Cholecystectomy	0.95 (0.76-1.18)	0.645
Adhesiolysis	1.01 (0.89-1.16)	0.820
Concurrent procedures	1.05 (0.99-1.12)	0.102
Without concurrent procedures	1.05 (1.002-1.10)	0.043

CONCLUSION

- Robotic bariatric surgery is non-inferior in patients who undergo RYGB or duodenal switch or revisional surgery, and in those with a high frailty score
- These findings suggest caution in adopting robotic techniques for certain patient profiles, such as those who undergo sleeve gastrectomy, and with no high-risk features

Table 2: Multivariate analysis of robotic versus laparoscopic approaches in terms of readmission

Subgroup	OR (95% CI)	p-value
RYGB	1.16 (1.12-1.21)	< 0.001
SG	1.09 (1.05-1.14)	< 0.001
BPD-DS	1.30 (1.09-1.56)	0.003
OAGB	1.86 (1.12-3.09)	0.016
Frailty score: low	1.14 (1.10-1.17)	< 0.001
Frailty score: high	1.11 (0.91-1.34)	0.30
Primary surgery	1.13 (1.10-1.17)	< 0.001
Revisional surgery	1.14 (1.07-1.22)	< 0.001
BMI > 50 kg/m ²	1.09 (1.03-1.16)	0.003
Previous foregut surgery	1.16 (1.08-1.24)	< 0.001
Concurrent hiatal hernia	1.19 (1.12-1.25)	< 0.001
Concurrent ventral hernia	1.20 (0.84-1.70)	0.307
Concurrent cholecystectomy	1.17 (0.99-1.38)	0.068
Concurrent adhesiolysis	1.07 (0.96-1.19)	0.194
Without concurrent procedures	1.13 (1.09-1.16)	< 0.001