Increased Morbidity in Elective Bariatric Surgery for Patients with Preoperative Obstructive Sleep Apnea

Stephen Stopenski MD, Sahil Gambhir MD, Brian Smith MD, Farideh Dehkordi-Vakil PhD, Jeffry Nahmias MD MHPE, Ninh T Nguyen MD

Department of Surgery, University of California Irvine School of Medicine, Orange, California



BACKGROUND

- Obstructive sleep apnea (OSA) is associated with increased perioperative morbidity following elective surgery
- Bariatric surgery, with either laparoscopic Roux-en-Y gastric bypass (LRYGB) or laparoscopic sleeve gastrectomy (LSG), is an effective treatment modality for both obesity and OSA
- However, the impact of OSA on perioperative outcomes after bariatric surgery is less well studied
- This study aims to compare post-operative outcomes for patients with and without OSA undergoing elective laparoscopic bariatric surgery

METHODS

- Retrospective analysis using the 2015-2018 Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MSBAQIP) evaluating LRYGB and LSG procedures
- Primary end points analyzed: 30-day mortality, reoperation, readmission, and overall morbidity
- We excluded emergent and conversions to open
- Multivariate logistic regression was used to compare patients with OSA versus without OSA

RESULTS

Demographics and Medical Comorbidities

		LRYGB No OSA n = 80,270 (56.2%)	LRYGB with OSA n = 62,565 (43.8%)	LSG No OSA n = 242,894 (63.8%)	LSG with OSA n = 138,034 (36.2%)
Age, years, mean (SD)		42.7 (11.7)	48.2 (11.2)*	42.2 (11.8)	47.9 (11.4)*
Sex, male, n (%)		9,855 (12.3)	18,264 (29.2)*	33,820 (13.9)	45,287 (32.8)*
Race, n (%)	White	58,921 (73.4)	48,020 (76.7)*	170,683 (70.3)	101,974 (73.9)*
	Black	11,821 (14.7)	8,026 (12.8)	48,814 (20.1)	24,369 (17.6)
	Other	1,151 (1.4)	978 (1.6)	2,587 (1.1)	1,648 (1.2)
	Not reported	8,377 (10.4)	5,541 (8.9)	20,810 (8.6)	10,043 (2.3)
ASA Classification, n (%)	1	252 (0.3)	47 (0.08)*	1,157 (0.5)	170 (1)*
	2	16,621 (20.7)	7,129 (11.4)	70,467 (29.2)	21,478 (15.7)
	3	60,777 (75.8)	51,522 (82.4)	164,577 (68.2)	108,682 (79.2)
	4	2,501 (3.1)	3,811 (6.1)	5,236 (2.2)	6,835 (5)
Pre-op BMI, mean (SD)		45.39 (7.5)	47 (8.45)*	44.35 (7.2)	46.3 (8.6)*

* p-value <0.05, comparing no OSA to those with OSA

	LRYGB No OSA n = 80,270 (56.2%)	LRYGB with OSA n = 62,565 (43.8%)	LSG No OSA n = 242,894 (63.8%)	LSG with OSA n = 138,034 (36.2%)
Hypertension	35,175 (43.8)	39,502 (63.1)*	95,286 (39.2)	81,531 (59.1)*
Diabetes	14,976 (18.7)	15,407 (24.6)*	34,410 (14.2)	28,235 (20.5)*
COPD	742 (0.9)	1,879 (3)*	1,979 (0.8)	3,917 (2.8)*
COPD on oxygen	292 (0.4)	976 (1.6)*	532 (0.2)	1,786 (1.3)*
GERD	26,764 (33.3)	27,550 (44)*	58,101 (23.9)	46,595 (33.8)*
Prior MI	711 (0.9)	1,441 (2.3)*	1,718 (0.7)	2,757 (2)*
Renal insufficiency	328 (0.41)	568 (0.9)*	1,018 (0.4)	1,350 (1)*
Renal Failure	122 (0.15)	122 (0.19)*	627 (0.3)	694 (0.5)*
Chronic steroids	928 (1.2)	1,289 (2.1)*	3,811 (1.6)	3,056 (2.2)*
Current smoker	6,742 (8.4)	5,070 (8.1)	20,951 (8.6)	12,201 (8.8)*

* p-value <0.05, comparing no OSA to those with OSA

Post Operative Outcomes

	LRYGB No OSA n = 80,270 (56.2%)	LRYGB with OSA n = 62,565 (43.8%)	LSG No OSA n = 242,894 (63.8%)	LSG with OSA n = 138,034 (36.2%)
All cause 30-day mortality, n (%)	81 (0.1)	125 (.2)*	120 (0.05)	142 (0.1)*
Overall Morbidity, n (%)	2611 (3.3)	2771 (4.4)*	3541 (1.5)	2977 (2.2)*
Surgical Site infection, n (%)	944 (1.2)	985 (1.6)*	802 (0.3)	668 (0.5)*
Wound Disruption, n (%)	55(0.07)	45(0.07)	71 (0.03)	54 (0.04)
Myocardial Infarction, n (%)	28 (0.03)	38 (0.06)*	47 (0.02)	47 (0.03)*
Cardiac Event, n (%)	29 (0.04)	53 (0.08)*	49 (0.02)	69 (0.05)*
Cerebrovascular accident, n (%)	2 (0.0)	10 (0.02)*	19 (0.01)	32 (0.02)*
Unplanned Intubation, n (%)	125 (0.16)	196 (0.3)*	154 (0.06)	222 (0.16)*
Deep vein thrombosis, n (%)	118 (0.15)	127 (0.2)*	432 (0.18)	267 (0.19)
Pulmonary Embolism, n (%)	101 (0.13)	128 (0.2)*	179 (0.07)	146 (0.11)*
Need transfusion, n (%)	803 (1.0)	785 (1.25)*	1032 (0.4)	888 (0.6)*
Renal Insufficiency, n (%)	47 (0.06)	93 (0.15)*	84 (0.03)	96 (0.07)*
Renal Failure, n (%)	59 (0.07)	104 (0.17)*	80 (0.03)	105 (0.08)*
Urinary Tract Infection, n (%)	319 (0.40)	332 (0.53)*	594 (0.24)	471 (0.34)*
Pneumonia, n (%)	208 (0.26)	292 (0.47)*	221 (0.09)	229 (0.17)*
30-day readmission, n (%)	4430 (5.5)	3772 (6.0)*	6801 (2.8)	4311 (3.1)*
30-day re-operation, n (%)	1663 (2.1)	1389 (2.2)	1840 (0.8)	1262 (0.9)*

* p-value <0.05, comparing no OSA to those with OSA

Risk-adjusted Outcomes

	Adjusted OR	95% CI	p-value
	Laparoscopic Roux-en-y Gastric Bypass		
Overall Mortality	1.024	0.766 - 1.369	0.87
Unplanned Readmission	1.059	1.010 - 1.112	0.018
Reoperation	1.001	0.926 - 1.081	0.986
Overall Morbidity	1.19	1.123 - 1.262	< 0.0001
	Laparoscopic Sleeve Gastrectomy		
Overall Mortality	0.969	0.750 - 1.253	0.811
Unplanned Readmission	1.025	0.983 - 1.069	0.25
Reoperation	1.035	0.957 - 1.119	0.386
Overall Morbidity	1.201	1.139 - 1.267	< 0.0001

Adjusted for age, sex, race, ASA class, BMI, HTN, smoking, history of renal failure, diabetes, COPD, GERD, and history of myocardial infarction

SUMMARY

- 523,763 cases were analyzed, and the incidence of OSA was just under 40%
- OSA was associated with increased overall morbidity after both LRYGB and LSG – including surgical site infections, cardiopulmonary complications, and unplanned intubation
- OSA was associated with increased risk of readmission after LRYGB

CONCLUSION

- Despite multiple comorbidities in the bariatric surgery population, the overall 30-day mortality (0.1%) and rate of adverse events (2.3%) were low
- OSA was associated with 1.2 fold increase in perioperative adverse outcomes following a LSG or LRGGB compared to those without OSA
- Patients with OSA should be identified pre-operatively and treated to mitigate the risks of unplanned intubation, pneumonia, cardiopulmonary complications, and surgical infections

REFERENCES

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