Outcomes following mesh reinforced and primary sutured cruroplasty during concurrent Roux-en-Y gastric bypass and hiatal hernia repair: a comparative analysis of the MBSAQIP database (2017-2019)

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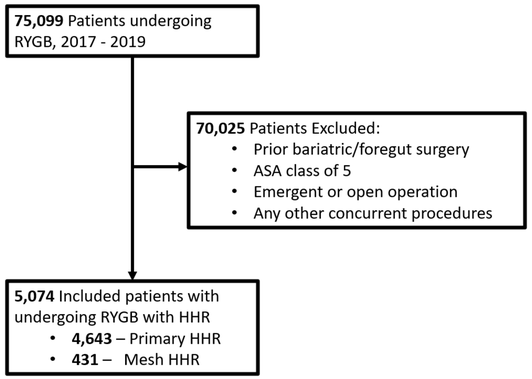
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Introduction

- The recurrence rate of hiatal hernias (HH) repaired concurrently during Roux-en-Y gastric bypass (RYGB) exceeds 30% (Kindel et al., 2015).
- Single institution reviews suggest that mesh reinforced cruroplasty decreases HH recurrence when placed during RYGB (Sutherland et al., 2016)
- We sought to evaluate the frequency of mesh-reinforced cruroplasty during RYGB with concurrent HH repair, patient factors associated with mesh placement, and the safety of its use utilizing MBSQAIP

Methods

- Data: Metabolic and Bariatric Surgery Accreditation and Quality Improvement Project (MBSAQIP) between 2017 to 2019.
- Selection map:



- Modeling: Univariate analysis, multivariable regression analysis, and propensity score-matched comparison of outcomes.
- Treatment cohorts were 1:1 propensity-matched on: age, sex, race, smoking status, ASA class, history of PE, sleep apnea, use of chronic steroid therapy, hypertension, history of venous thrombosis, diabetes, myocardial infarction, and surgical approach.

Results

Table 1 – Patient Characteristics

Characteristic	No Mesh	Mesh	p-value
N	5,074	431	
Age	49 (41, 58)	49 (40, 59)	0.7
Sex			0.6
Female	4422 (87%)	379 (88%)	
Male	652 (13%)	52 (12%)	
Pre-Op BMI	43 (39, 47)	42 (39, 47)	0.2
Current Smoker within 1 year			0.017
Yes	321 (6.3%)	40 (9.3%)	
No	4753 (93.7%)	391 (90.7%)	
ASA			0.11
1	5 (<0.1%)	1 (0.2%)	
2	910 (18%)	65 (15%)	
3	4015 (79%)	347 (81%)	
4	144 (2.8%)	18 (4.2%)	
Pre-Op Obstructive Sleep Apnea			0.007
Yes	2058 (41%)	146 (34%)	
No	3016 (59.4%)	285 (66.1%)	
Pre-Op Hypertension			0.6
Yes	2690 (53%)	234 (54%)	
No	2384 (47.0%)	197 (45.7%)	
Pre-Op Diabetes Mellitus			0.027
Insulin	524 (10%)	38 (8.8%)	
Non-Insulin	868 (17%)	55 (13%)	
No	3682 (73%)	338 (78%)	
History of Myocardial Infarction			0.4
Yes	87 (1.7%)	5 (1.2%)	
No	4987 (98.3%)	426 (98.8%)	
Surgical Approach			0.073
Laparosopic	4442 (88%)	390 (90%)	
Robotic	632 (12%)	41 (9.5%)	

Table 2 – Factors Associated with Use of Mesh

Characteristic	OR	95% CI	p-value
Age	1	0.99, 1.01	0.8
Sex			
Female	—	—	
Male	1.02	0.74, 1.38	>0.9
Race			
Black	—	—	
Other	0.4	0.06, 1.33	0.2
White	1.13	0.85, 1.53	0.4
Pre-Op BMI	0.99	0.97, 1.00	0.2
Current Smoker within 1 year			
No	—	—	
Yes	1.47	1.02, 2.06	0.03
ASA			
1	—	—	
2	0.38	0.06, 7.30	0.4
3	0.5	0.08, 9.57	0.5
4	0.8	0.12, 16.0	0.8
Pre-Op Obstructive Sleep Apnea			
No	—	—	
Yes	0.75	0.60, 0.93	0.008
Pre-Op Hypertension			
No	—	—	
Yes	1.17	0.94, 1.47	0.2
Pre-Op Diabetes Mellitus			
Insulin	—	—	
No	1.35	0.95, 1.96	0.1
Non-Insulin	0.91	0.59, 1.41	0.7
Surgical Approach			
laparoscopic	—	—	
robotic	0.73	0.52, 1.01	0.07

Table 3 – Factors Associated with Complication

Characteristic	OR	95% CI	p-value
Hiatal Hernia Repair Approach			
No mesh	—	—	
Mesh	0.92	0.49, 1.57	0.8
Age	1	0.98, 1.01	0.6
Sex			
Female	—	—	
Male	1.17	0.75, 1.77	0.5
Current Smoker within 1 year			
No	—	—	
Yes	1.53	0.88, 2.51	0.11
Pre-Op Obstructive Sleep Apnea			
No	—	—	
Yes	1.06	0.77, 1.46	0.7
Pre-Op Steroid			
No	—	—	
Yes	2.51	1.15, 4.85	0.011
Pre-Op Hypertension			
No	—	—	
Yes	1.6	1.13, 2.28	0.008
Pre-Op Vein Thrombosis Therapy			
No	—	—	
Yes	3.12	1.50, 5.98	0.001
Surgical Approach			
Laparoscopic	—	—	
Robotic	0.8	0.47, 1.28	0.4

Table 3 – Matched Comparison of Surgical Outcomes

Characteristic	No Mesh	Mesh	p-value
Operation Length	118 (91, 152)	131 (102, 173)	<0.001
Acute Renal Failure	0 (0%)	1 (0.2%)	>0.9
Number of Post-Op Deep Incisional occurences	0 (0%)	0 (0%)	>0.9
Intra-Op or Post-Op Myocardial Infarction	1 (0.2%)	1 (0.2%)	>0.9
Number of On Ventilator > 48 hours Occurences	2 (0.5%)	2 (0.5%)	>0.9
Number of Post-Op Pneumonia occurrences	1 (0.2%)	2 (0.5%)	>0.9
Progressive Renal Insufficiency	1 (0.2%)	1 (0.2%)	>0.9
Pulmonary Embolism	2 (0.5%)	2 (0.5%)	>0.9
Number of Post-Op Sepsis Occurences	1 (0.2%)	0 (0%)	>0.9
Post-Op Vein Thrombosis Requiring Therapy	1 (0.2%)	0 (0%)	>0.9
Unplanned Admission to ICU within 30 days	8 (1.9%)	8 (1.9%)	>0.9
Patient Received Treatment for Dehydration as an Outpatient	32 (7.4%)	25 (5.8%)	0.3
At Least One Reoperation within 30 days of the Op	14 (3.3%)	13 (3.0%)	0.8
At Least One Readmission within 30 days of the Op	32 (7.4%)	30 (7.0%)	0.8
At Least One Intervention within 30 days of Op	16 (3.7%)	11 (2.6%)	0.3

Conclusions

- Mesh reinforced cruroplasty is performed relatively infrequently in concurrent RYGB and HH repair.
- Mesh reinforced repairs are more common in recent smokers and occur less frequently in robotic repairs and in patients with OSA.
- Mesh placement is associated with longer operative duration but is safe with equivalent perioperative outcomes compared to sutured cruroplasty alone.
- Additional studies are needed to assess the efficacy of mesh in reducing HH recurrence rates in this patient population.

Acknowledgments

METABOLIC AND BARIATRIC SURGERY ACCREDITATION AND QUALITY IMPROVEMENT PROGRAM