

Does Gender Make a Differences in Procedure Selection and Outcome in Bariatric Surgery?

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BACKGROUND

- Obesity rates continuing to rise in the United States (1)
- Bariatric surgery has become an increasingly common, well-established and effective treatment for morbid obesity and its comorbid conditions (1)
- Laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic sleeve gastrectomy (SG) are two of the more common types of bariatric procedures (1, 2)
- This study analyzes gender disparities and the role that it plays in differing outcomes, following LRYGB and SG

METHODS

Using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database for years 2015-2017, demographics, postoperative complications, and readmission rates were assessed.

Chi-square analysis, Student t-test, and propensity analyses were performed where appropriate.

RESULTS

- Significantly more men than women underwent SG (68.5% vs 63.0%, $P < 0.0001$) and significantly more women than men underwent LRYGB (37.0% vs 31.5%, $P < 0.0001$)
- Men experience more severe complications after LRYGB such as cardiac arrest (0.2% vs 0.1%, $P = 0.02$) and prolonged intubation (0.4% vs 0.2%, $P = 0.02$)
- Men experience more symptoms after SG such as myocardial infarction (0.2% vs 0.1%, $P = 0.006$)
- Unplanned readmissions higher in women (3.5% vs 2.8%, $P = 0.0012$)

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RESULTS

	Total (n=21602)	Men (n=10788)	Women (n=10814)	p-value
BMI 35-39	2963 (13.72)	1481 (13.73)	1482 (13.7)	0.96
BMI 40-49	10063 (46.58)	5023 (46.56)	5040 (46.61)	0.95
BMI >=50	5942 (27.51)	2973 (27.56)	2969 (27.46)	0.87
Elderly (age > 65 years)	1682 (7.79)	833 (7.72)	849 (7.85)	0.72
Black	2480 (11.48)	1244 (11.53)	1236 (11.43)	0.81
Native American	69 (0.32)	36 (0.33)	33 (0.31)	0.71
White	15801 (73.15)	7870 (72.95)	7931 (73.34)	0.52
Hispanic	2234 (10.34)	1114 (10.33)	1120 (10.36)	0.94
Asian	182 (0.84)	95 (0.88)	87 (0.8)	0.54
Pacific-Islander	81 (0.37)	38 (0.35)	43 (0.4)	0.58
Smoker	2310 (10.69)	1138 (10.55)	1172 (10.84)	0.49
Dyspnea	2821 (13.06)	1411 (13.08)	1410 (13.04)	0.93
HTN	12937 (59.89)	6446 (59.75)	6491 (60.02)	0.68
Diabetic	6665 (30.85)	3304 (30.63)	3361 (31.08)	0.47
COPD	443 (2.05)	229 (2.12)	214 (1.98)	0.46
Ventilator Dependent	2 (0.01)	2 (0.02)	0	0.15
Ascites	2 (0.01)	2 (0.02)	0	0.15
CHF	151 (0.7)	63 (0.77)	68 (0.63)	0.215
Acute Renal failure	23 (0.11)	13 (0.12)	10 (0.09)	0.53
ESRD	176 (0.81)	96 (0.89)	80 (0.74)	0.22
Disseminated Cancer	4 (0.02)	1 (0.01)	3 (0.03)	0.32
Open wound infection	92 (0.43)	52 (0.48)	40 (0.37)	0.21
Steroids	397 (1.84)	202 (1.87)	195 (1.8)	0.7
>10% body wt loss	12 (0.06)	7 (0.06)	5 (0.05)	0.56
Bleeding disorder	324 (1.5)	173 (1.6)	151 (1.4)	0.21
Preoperative Blood Transfusion	2 (0.01)	1 (0.01)	1 (0.01)	0.9986

BMI = body mass index in kg/m², Smoker = current smoker within one year, HTN = hypertension requiring medication, Diabetic = diabetes mellitus requiring therapy with non-insulin agents or insulin, COPD = chronic obstructive pulmonary disease, Ascites = ascites within 30 days prior to surgery, CHF = history of congestive heart failure within 30 days prior surgery, ESRD = dialysis dependent, >10% body wt loss = greater than 10% loss in body weight in last 6 months, Preoperative Blood Transfusion = preoperative transfusion of greater than or equal to 1 unit of whole/packed red blood cells in 72 hours prior to surgery

	Total (n=9896)	Men (n=4961)	Women (n=4935)	p-value
SSI	136 (1.37)	56 (1.13)	80 (1.62)	0.035
DSI	13 (0.13)	3 (0.06)	10 (0.2)	0.05
Organ space infection	84 (0.85)	39 (0.79)	45 (0.91)	0.5
Wound dehiscence	21 (0.21)	10 (0.2)	11 (0.22)	0.81
Pneumonia	59 (0.6)	35 (0.71)	24 (0.49)	0.16
Prolonged intubation	25 (0.25)	15 (0.3)	10 (0.2)	0.32
Pulmonary embolism	29 (0.29)	16 (0.32)	13 (0.26)	0.59
Ventilation	29 (0.29)	21 (0.42)	8 (0.16)	0.016
Acute renal failure	13 (0.13)	10 (0.2)	3 (0.06)	0.05
Urinary tract infection	65 (0.66)	15 (0.3)	50 (1.01)	<0.01
Cerebrovascular accident	2 (0.02)	0	2 (0.04)	0.16
Cardiac arrest	15 (0.15)	12 (0.24)	3 (0.06)	0.02
Blood loss requiring transfusion	135 (1.36)	71 (1.43)	64 (1.3)	0.56
Deep vein thrombosis	35 (0.35)	21 (0.42)	14 (0.28)	0.24
Sepsis	46 (0.46)	26 (0.52)	20 (0.41)	0.38
Reoperation	245 (2.48)	127 (2.56)	118 (2.39)	0.59
Unplanned readmission	490 (4.95)	218 (4.39)	272 (5.51)	0.01
30-day mortality	17 (0.17)	12 (0.24)	5 (0.1)	0.09

SSI = superficial surgical site infection, DSI = deep incisional surgical site infection

Table 1 Demographics and comorbidities of the propensity matched cohort after laparoscopic sleeve gastrectomy

	Total (n=8856)	Men (n=4361)	Women (n=4495)	p-value
BMI 35-39	1157 (11.69)	578 (11.65)	579 (11.73)	0.89
BMI 40-49	4445 (44.92)	2232 (44.99)	2213 (44.84)	0.88
BMI >=50	3056 (30.88)	1525 (30.74)	1531 (31.02)	0.76
Elderly (age > 65 years)	712 (7.19)	360 (8.64)	352 (7.13)	0.81
Black	991 (10.01)	500 (10.08)	491 (9.95)	0.83
Native American	15 (0.15)	7 (0.14)	8 (0.16)	0.79
White	7102 (71.77)	3552 (71.6)	3550 (71.94)	0.71
Hispanic	1005 (10.16)	514 (10.36)	491 (9.95)	0.5
Asian	76 (0.77)	46 (0.93)	30 (0.61)	0.068
Smoker	824 (8.33)	413 (8.32)	411 (8.33)	0.995
Pacific Islander	112 (1.13)	59 (1.19)	53 (1.07)	0.59
Dyspnea	1330 (13.44)	671 (13.53)	659 (13.35)	0.8
HTN	6629 (66.99)	3322 (66.96)	3307 (67.01)	0.96
Diabetic	4467 (45.14)	2243 (45.21)	2224 (45.07)	0.88
COPD	249 (2.52)	131 (2.64)	118 (2.39)	0.43
Ascites	2 (0.02)	1 (0.02)	1 (0.02)	0.997
CHF	60 (0.61)	33 (0.67)	27 (0.55)	0.45
Acute Renal failure	2 (0.02)	1 (0.02)	1 (0.02)	0.997
ESRD	26 (0.26)	15 (0.3)	11 (0.22)	0.44
Disseminated Cancer	10 (0.1)	7 (0.14)	3 (0.06)	0.21
Open wound infection	61 (0.62)	36 (0.73)	25 (0.51)	0.16
Steroids	108 (1.09)	58 (1.17)	50 (1.01)	0.46
>10% body wt loss	19 (0.19)	12 (0.24)	7 (0.14)	0.26
Bleeding disorder	124 (1.25)	69 (1.39)	55 (1.11)	0.22
Preoperative Blood Transfusion	4 (0.04)	3 (0.06)	1 (0.02)	0.32

BMI = body mass index in kg/m², Smoker = current smoker within one year, HTN = hypertension requiring medication, Diabetic = diabetes mellitus requiring therapy with non-insulin agents or insulin, COPD = chronic obstructive pulmonary disease, Ascites = ascites within 30 days prior to surgery, CHF = history of congestive heart failure within 30 days prior surgery, ESRD = dialysis dependent, >10% body wt loss = greater than 10% loss in body weight in last 6 months, Preoperative Blood Transfusion = preoperative transfusion of greater than or equal to 1 unit of whole/packed red blood cells in 72 hours prior to surgery

	Total (n=21601)	Men (n=10788)	Women (n=10814)	p-value
SSI	108 (0.5)	55 (0.51)	53 (0.49)	0.83
DSI	7 (0.03)	2 (0.02)	5 (0.02)	0.26
Organ space infection	69 (0.32)	34 (0.32)	35 (0.32)	0.91
Wound dehiscence	7 (0.03)	3 (0.03)	4 (0.04)	0.7
Pneumonia	45 (0.21)	21 (0.19)	24 (0.22)	0.66
Prolonged intubation	42 (0.19)	25 (0.23)	17 (0.16)	0.21
Pulmonary embolism	36 (0.17)	20 (0.19)	16 (0.15)	0.5
Acute renal failure	20 (0.09)	9 (0.08)	11 (0.1)	0.66
Urinary tract infection	85 (0.39)	26 (0.24)	59 (0.55)	0.0003
Cerebrovascular accident	4 (0.02)	2 (0.02)	2 (0.02)	0.99
Cardiac arrest	16 (0.07)	9 (0.08)	7 (0.06)	0.6
Blood loss requiring transfusion	144 (0.67)	79 (0.73)	65 (0.6)	0.24
Deep vein thrombosis	73 (0.34)	41 (0.38)	32 (0.3)	0.29
Sepsis	41 (0.19)	19 (0.18)	22 (0.2)	0.64
Reoperation	216 (1)	111 (1.03)	105 (0.97)	0.66
Unplanned readmission	500 (2.31)	227 (1.05)	273 (2.52)	0.04
30-day mortality	21 (0.1)	16 (0.15)	5 (0.05)	0.02

SSI = superficial surgical site infection, DSI = deep incisional surgical site infection

Table 2 Demographics and comorbidities of the propensity matched cohort after laparoscopic Roux-en-Y gastric bypass

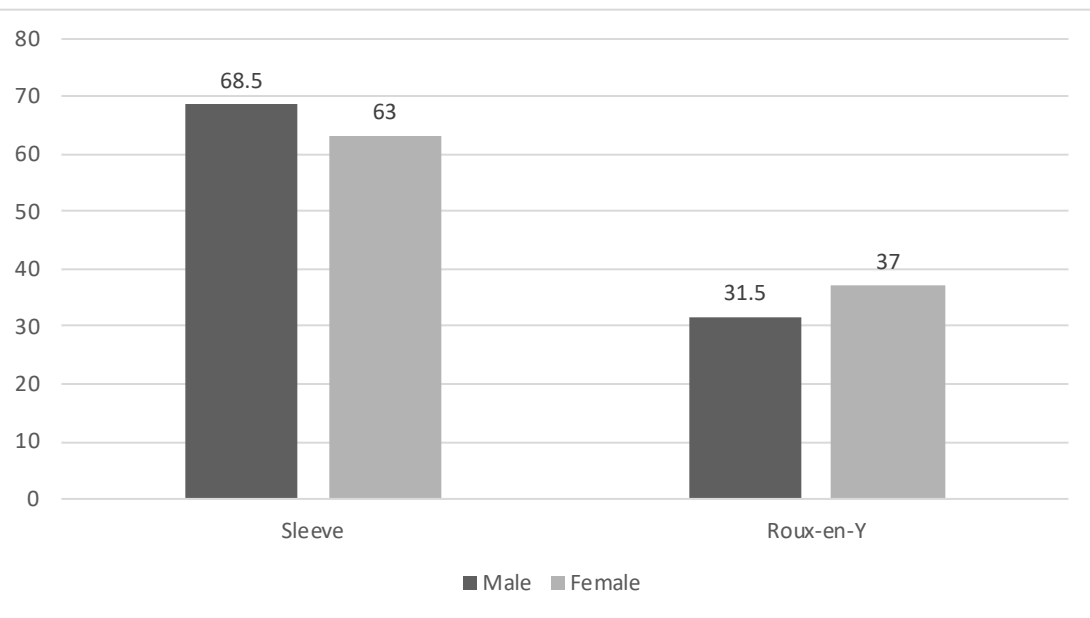


Figure 1 Percentage of patients undergoing Roux-en-Y gastric bypass ($P < 0.0001$) and sleeve gastrectomy ($P < 0.0001$) based upon gender

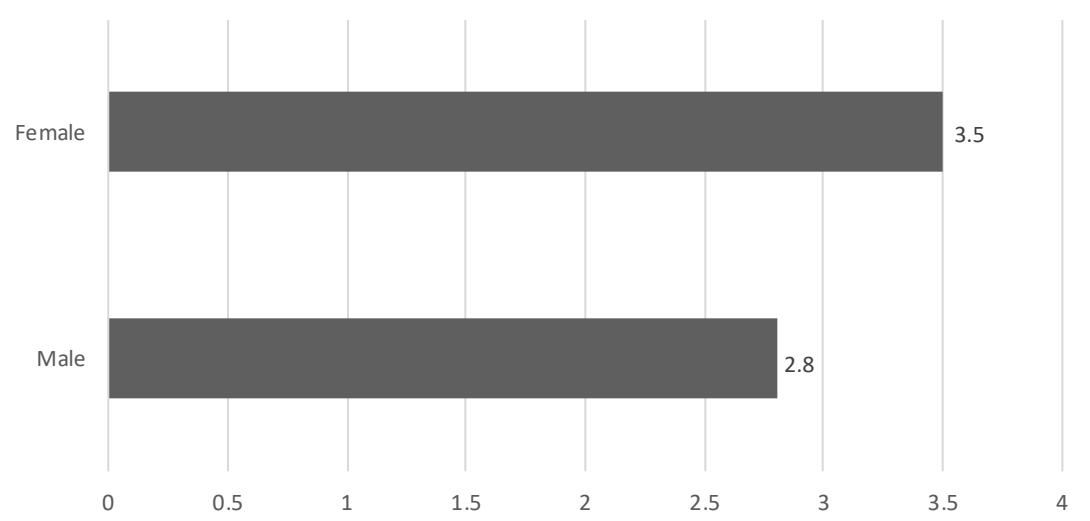


Figure 2 Percentage of patients with unplanned readmission related to initial procedure ($P = 0.0012$) based upon gender

SUMMARY & CONCLUSION

- Men were more likely to undergo SG than LRYGB, which aligns with current literature (3)
- Men presented with more comorbidities and higher BMI
- Current literature recommends SG to male patients who present with more comorbidities (4)
- Male patients undergoing either SG or LRYGB experienced more complications
- LRYGB and female gender identified as risk factors for increased early hospital readmission (5, 6)
- Women had higher rates of hospital readmission compared to male patients when controlled for comorbidities, complications, procedure type
- Male gender identified as independent risk factor for poor 1-year follow-up after bariatric surgery (7)
- Need for additional discharge interventions, including outpatient monitoring protocol, to improve quality of care
- Barriers that male patients may face in follow-up care, despite initially presenting as higher risk population that inherently needs closer postoperative monitoring