

PRISMA HEALTHSM

Metabolic/Bariatric Surgery (MBS) in BMI>60 Operation – Strategy & Perioperative Risk



Shanu N. Kothari, MD, FACS, FASMBS
Professor – University of South Carolina – Greenville
Jean and H. Harlan Stone Chair of Surgery
Senior Past President - ASMBS



UNIVERSITY OF
SOUTH CAROLINA
School of Medicine

Disclosures

- Medtronic – speaker/travel
- Ethicon – speaker
- Gore – speaker
- Intuitive – consultant/travel
- Twenty30 Health – investor/advisor
- Boston Scientific - meal
- Reprise Medical – meal

Original article

2022 American Society for Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO): Indications for Metabolic and Bariatric Surgery

Dan Eisenberg, M.D.^{a,*}, Scott A. Shikora, M.D.^b, Edo Aarts, M.D., Ph.D.^c,
Ali Aminian, M.D.^d, Luigi Angrisani, M.D.^e, Ricardo V. Cohen, M.D., Ph.D.^f,
Maurizio De Luca, M.D.^g, Silvia L. Faria, Ph.D.^h, Kasey P. S. Goodpaster, Ph.D.^d,
Ashraf Haddad, M.D.ⁱ, Jacques M. Himpens, M.D., Ph.D.^j, Lilian Kow, B.M.B.S., Ph.D.^k,
Marina Kurian, M.D.^l, Ken Loi, M.B.B.S., B.Sc. (Med)^m,
Kamal Mahawar, M.B.B.S., M.Sc.ⁿ, Abdelrahman Nimeri, M.D., M.B.B.Ch.^o,
Mary O' Kane, M.Sc., R.D.^p, Pavlos K. Papasavas, M.D.^q, Jaime Ponce, M.D.^r,
Janey S. A. Pratt, M.D.^{u,s}, Ann M. Rogers, M.D.^t, Kimberley E. Steele, M.D., Ph.D.^u,
Michel Suter, M.D.^{v,w}, Shanu N. Kothari, M.D.^x

^aDepartment of Surgery, Stanford School of Medicine and VA Palo Alto HCS, Palo Alto, California

^bDepartment of Surgery, Center for Metabolic and Bariatric Surgery, Brigham and Women's Hospital, and Harvard Medical School, Boston, Massachusetts

^cWeightWorks Clinics and Allurion Clinics, Amerfoort, The Netherlands

^dBariatric and Metabolic Institute, Cleveland Clinic, Cleveland, Ohio

^eDepartment of Public Health, University of Naples Federico II, Naples, Italy

^fCenter for the Treatment of Obesity and Diabetes, Hospital Alemão Oswaldo Cruz, Sao Paulo, Brazil

^gDepartment of Surgery, Rovigo Hospital, Rovigo, Italy

^hGastrocirurgia de Brasília, University of Brasília, Brasília, Brazil

ⁱGastrointestinal Bariatric and Metabolic Center, Jordan Hospital, Amman, Jordan

^jDepartment of Surgery, Delixi CHIREC Hospital, Brussels, Belgium

^kAdelaide Bariatric Centre, Flinders University of South Australia, Adelaide, Australia

^lDepartment of Surgery, New York University Grossman School of Medicine, New York, New York

^mSt. George Hospital and Sutherland Hospital, Kogarah, New South Wales, Australia

ⁿDepartment of General Surgery, Sunderland Royal Hospital, Sunderland, United Kingdom

^oDepartment of Surgery, Carolinas Medical Center, University of North Carolina, Charlotte, North Carolina

^pDepartment of Nutrition and Dietetics, Leeds Teaching Hospitals NHS Trust, Leeds, United Kingdom

^qDivision of Metabolic and Bariatric Surgery, Hartford Hospital, Hartford, Connecticut

^rBariatric Surgery Program, CHI Memorial Hospital, Chattanooga, Tennessee

^sDivision of Pediatric Surgery, Lucille Packard Children's Hospital, Palo Alto, California

^tDepartment of Surgery, Penn State Health Milton S. Eisenhower Medical Center, Hershey, Pennsylvania

^uNIDDK Metabolic and Obesity Research Unit, National Institutes of Health, Bethesda, Maryland

^vDepartment of Surgery, Riviera-Clublaus Hospital, Renens, Switzerland

^wDepartment of Visceral Surgery, University Hospital, Lausanne, Switzerland

^xPrisma Health, Department of Surgery, University of South Carolina School of Medicine, Greenville, South Carolina

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Things to Consider

- Mortality
- Complications
 - Major
 - Minor
- Co Morbidity outcomes
- Weight loss outcomes
- LOS
- Operative time
- Psychological profiles/outcomes

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Laparoscopic Roux-en-Y Gastric Bypass is Safe and Effective in Patients with a BMI \geq 60

Daniel T. Farkas, MD; Prathiba Vemulapalli, MD; Ali Haider BA; James M. Lopes, MD; Karen E. Gibbs, MD; Julio A. Teixeira, MD, FACS

Montefiore Institute for Minimally Invasive Surgery, Albert Einstein College of Medicine, Bronx, NY, USA

Methods

- **213** consecutive patients underwent LRYGB (n=167 with BMI<60, n=46 with BMI>60)
- **Single surgeon**
- **Outcomes: perioperative complications and postoperative weight loss**

Table 1. Patient characteristics

	BMI <60	BMI ≥60	<i>P</i>
Number of patients (n)	167	46	
BMI (kg/m ²)	48.3 ± 5.2	67.2 ± 7.1	<.001
Range	38 - 59	60 - 96	<.001
Male/Female	18/149	9/37	NS
Age	37.3 ± 9.9	40.2 ± 9.4	NS
Diabetes	31 (19%)	10 (22%)	NS
Hypertension	52 (31%)	22 (48%)	.03
Arthritis /			
Musculoskeletal	116 (69%)	33 (72%)	NS
Sleep apnea	15 (9%)	9 (20%)	.05
Asthma / COPD /			
previous PE	33 (20%)	12 (26%)	NS
Peptic ulcer disease /			
GERD	17 (10%)	6 (13%)	NS
Psychiatric disorders	21 (13%)	11 (24%)	.05

Table 2. Major complications

	BMI <60 n=167	BMI ≥60 n=46	<i>P</i>
Bleeding	1	0	NS
CVA	1	0	NS
Intraabdominal abscess	2	0	NS
Fasciitis	0	1	NS
C. difficile	0	1	NS
Gastric distention	1	2	NS
Small bowel obstruction	2	1	NS
Bowel injury	1	0	NS
DVT/PE	1	0	NS
Anastomotic leak	0	0	NS
Perioperative mortality	0	0	NS
Total number of patients	8* (5%)	3* (7%)	NS

*Several patients had more than one complication.

Table 3. Minor complications

	BMI <60 n=167	BMI ≥60 n=46	<i>P</i>
Stricture	6	4	NS
Gastric distention	1	0	NS
Bleeding	1	0	NS
Ulcer	1	0	NS
Total number of patients	9 (5%)	4 (9%)	NS

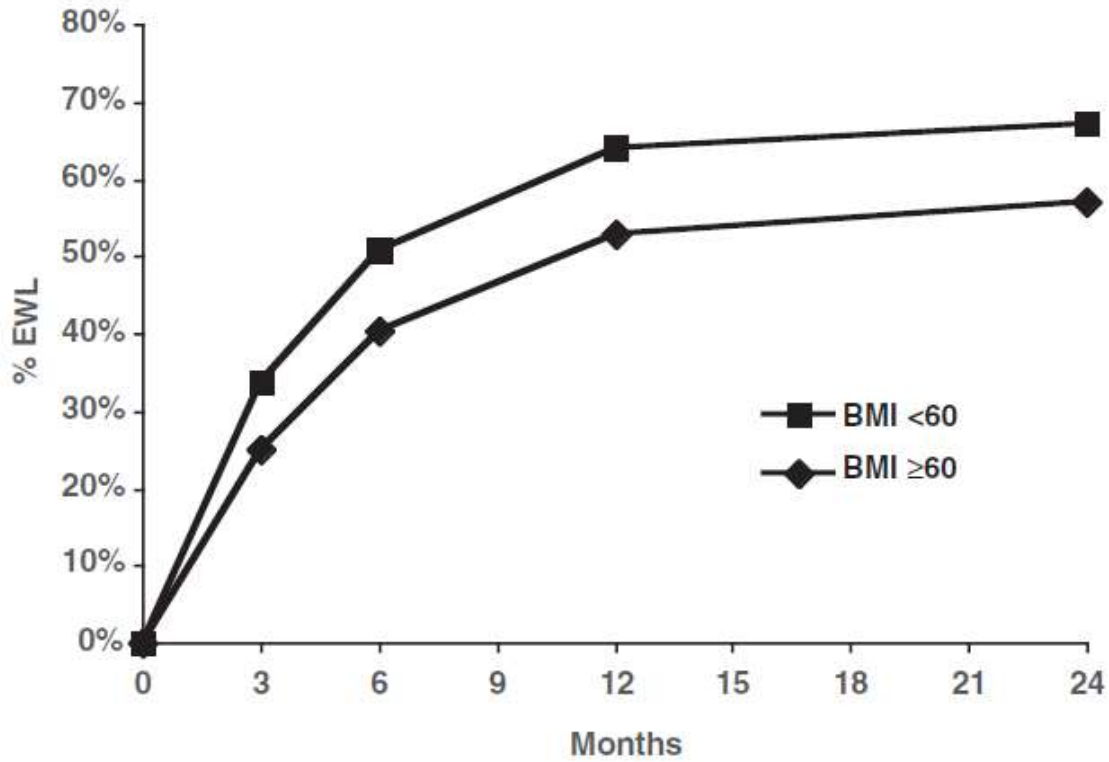


Figure 1. Mean percent of excess weight lost (%EWL) over time (see Table 5 for SD).

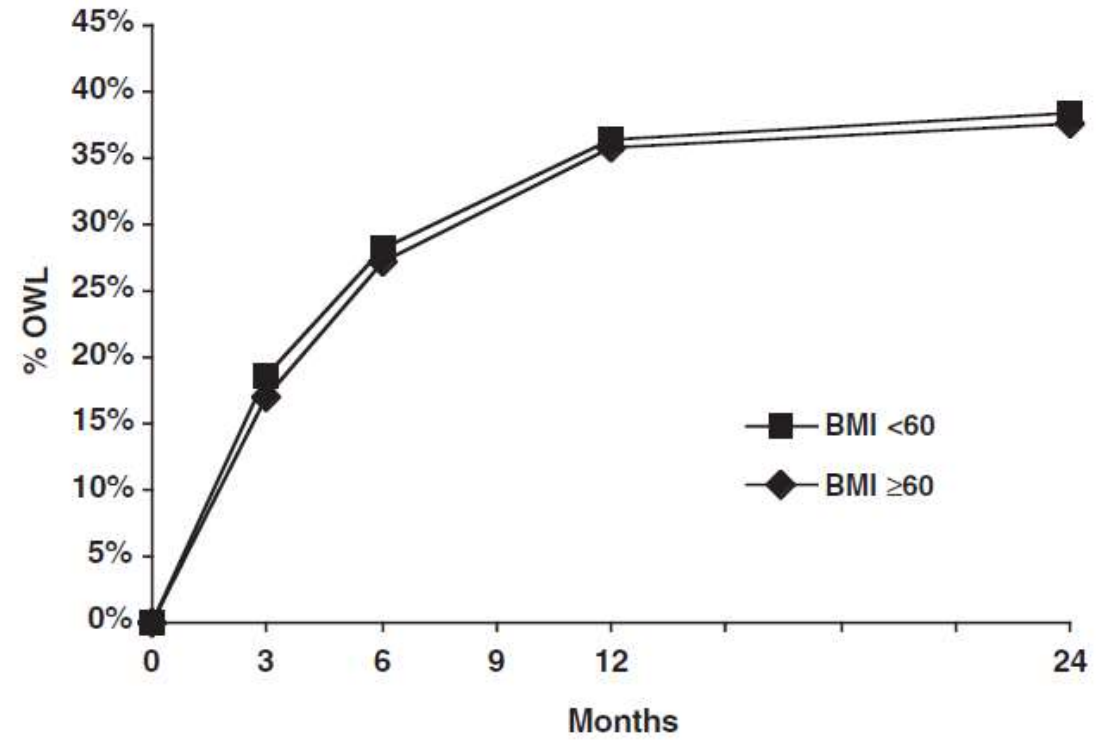


Figure 2. Mean percent of original weight lost (%EWL) over time (see Table 6 for SD).

Conclusions (Farkas et al 2005)

- LRYGB can be performed safely in patients with BMI > 60
- Patients with BMI > 60 had less excess weight loss
- Similar rates of complications

Original article

Short-term outcomes for super-super obese (BMI ≥ 60 kg/m²) patients undergoing weight loss surgery at a high-volume bariatric surgery center: laparoscopic adjustable gastric banding, laparoscopic gastric bypass, and open tubular gastric bypass

Daniel J. Stephens, M.D., John K. Saunders, M.D., Scott Belsley, M.D., Amit Trivedi, M.D., Douglas R. Ewing, M.D., Vincent Iannace, M.D., Rafael F. Capella, M.D., Annette Wasielewski, R.N., S. Moran, R.N., Hans J. Schmidt, M.D., Garth H. Ballantyne, M.D.*

Bariatric Surgery Center, Hackensack University Medical Center, Hackensack, New Jersey

Received May 13, 2007; Revised September 9, 2007; Accepted October 19, 2007

Methods

- The records for all patients were analyzed as 2 groups (those with a BMI $< 60\text{kg/m}^2$ and those with a BMI $\geq 60\text{kg/m}^2$), as well as by type of operation.
- Step-wise and univariate logistic regression analyses assessed the effect of BMI on the outcome variables, including mortality, length of surgery, length of hospital stay, and disposition at discharge.

Table 1

Type of bariatric operation performed on 3692 patients

Variable	Patients (n)	%
Procedure		
VBG-RYGB	1203	32.6
LRYGB	1472	39.9
LAGB	1017	27.6
BMI <60 kg/m ² (n = 3401)		
VBG-RYGB	1073	31.6
LRYGB	1356	39.9
LAGB	972	28.6
BMI ≥60 kg/m ² (n = 291)		
VBG-RYGB	130	44.7
LRYGB	116	39.9
LAGB	45	15.5

VBG-RYGB = open tubular banded gastric bypass (previously called vertical banded gastroplasty–Roux-en-Y gastric bypass; LRYGB = laparoscopic Roux-en-Y gastric bypass; LABG = laparoscopic adjustable gastric banding; BMI = body mass index.

Table 2
Co-morbid diseases

Co-morbid disease	BMI (kg/m ²)					
	All patients (n = 3692)		<60 (n = 3401)		≥60 (n = 291)	
	n	%	n	%	n	%
Hypertension	1280	34.67	1192	35.05	88	30.24
Asthma	489	13.24	440	12.94	49	16.84
Type 2 diabetes mellitus	675	18.28	623	18.32	52	17.87
Hypercholesterolemia	489	13.24	465*	13.67	24*	8.25
Hypertriglyceridemia	132	3.58	123	3.62	9	3.09
Coronary artery disease	91	2.46	85	2.50	6	2.06
Depression	335	9.07	313	9.20	22	7.56
COPD	57	1.54	50	1.47	7	2.41
Sleep apnea	581*	15.74	500*	14.70	81*	27.84
DVT	12	0.33	11	0.32	1	0.34

BMI = body mass index; COPD = chronic obstructive pulmonary disease; DVT = deep venous thrombosis.

* Significantly different by chi-square test ($P < .05$).

Table 4

Total operating time measured from patient entry to exit for 2595 patients

Variable	n	Total OR time (min)	
		Median	Range
All patients	2595	121	33–493
BMI (kg/m ²)			
<60	2419	120*	33–493
≥60	176	136*	52–425
Procedure			
BMI <60 kg/m ²	2419		
VBG-RYGB	653	115*	33–334
LRYGB	1008	154*	33–493
LAGB	758	92	45–302
BMI ≥60 kg/m ²	176		
VBG-RYGB	67	125*	93–234
LRYGB	75	171*	100–425
LAGB	34	102	52–204

OR = operating room; other abbreviations as in Table 1.

* Significantly different by chi-square test ($P < .05$).

Table 5
Hospital length of stay for 3692 patients

Variable	n	Hospital LOS (d)	
		Median	Range
All patients	3692	3	1–46
BMI (kg/m ²)			
<60	3401	3	1–30
≥60	291	3	1–46
Procedure			
BMI <60 kg/m ²	3401		
VBG-RYGB	1073	3	2–30
LRYGB	1356	2*	1–22
LAGB	972	1	1–23
BMI ≥60 kg/m ²	291		
VBG-RYGB	130	3	2–14
LRYGB	116	3*	1–46
LAGB	45	1	1–9

LOS = length of stay; other abbreviations as in Table 1.

* Significantly different by Kruskal-Wallis analysis of variance; no differences found between BMI groups for individual operations.

Table 6
Discharge disposition

Variable	n	%
All patients	3689	
Discharged home	3657	99.1
Discharged to chronic care facility	32	0.9
BMI <60 kg/m ²	3398	
Discharged home	3376	99.4
Discharged to chronic care facility	22*	0.6
BMI ≥60 kg/m ² n = 291		
Discharged home	281	96.6
Discharged to chronic care facility	10*	3.4

BMI = body mass index.

* Significantly different by chi-square test ($P < .05$).

Conclusions (Stephens et al 2007)

- Patients (BMI \geq 60kg/m²) required longer total operating room times,
- Longer hospital length of stay,
- More likely to be discharged to chronic care facilities
- The in-hospital mortality was similar for both groups.

Primary Laparoscopic Gastric Bypass Can Be Performed Safely in Patients with BMI \geq 60

Deborah Abeles, MD, Julie J Kim, MD, FACS, Michael E Tarnoff, MD, FACS, Sajani Shah, MD, Scott A Shikora, MD, FACS

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Methods

- 95 patients with BMI \geq 60kg/m² were compared
- 1,311 patients with BMI < 60kg/m² undergoing LGBP from December 2001 to May 2007.
- Data recorded included age, BMI, estimated blood loss, operating time, length of stay, and complications within the first 30 days after operation.
- Analyses of the data were performed using unpaired Student's t-test, with $p < 0.05$ as significant

Table 1. Patient Demographics

Demographic	BMI < 60 (n = 1,311)	BMI > 60 (n = 95)	p Value
BMI, mean \pm SD	45.8 \pm 5.7	64.9 \pm 5.3	< 0.001
Age (y), mean \pm SD	42.6 \pm 11.2	42.8 \pm 11.8	0.9
Men, n (%)	272 (20.8)	28 (29.5)	0.07
Women, n (%)	1039 (79.3)	67 (70.5)	0.07

BMI, body mass index (calculated as kg/m²).

Table 2. Operative and Postoperative Details

Variable	BMI < 60 (n = 1,311)	BMI > 60 (n = 95)	p Value
Operating time (min), mean \pm SD	111 \pm 34.4	118.7 \pm 30.5	0.02
Estimated blood loss (mL), mean \pm SD	68.5 \pm 92	69.5 \pm 56.2	0.88
Length of stay (d), mean \pm SD	3.1 \pm 2.9	3.1 \pm 1.6	0.91
Overall complications, n (%)	167 (12.7)	13 (13.7)	0.8
Death, n (%)	3 (0.2)	0 (0)	0.08

BMI, body mass index (calculated as kg/m²).

Table 3. Thirty-day morbidity: Specific Complications

Complication	BMI < 60 (n = 1,311)		BMI > 60 (n = 95)		p Value
	n	%	n	%	
Splenic injury	3	0.2	1	1.1	0.44
PE/DVT	4	0.3	2	2.1	0.23
SBO	22	1.7	2	2.1	0.78
Upper GI bleed	44	3.4	3	3.2	0.92
Anastomotic leak	12	0.9	0	0	< 0.001
Anastomotic stricture	8	0.6	0	0	0.005
Marginal ulcer	5	0.4	0	0	0.03
Trocar infection	17	1.3	3	3.2	0.59

BMI, body mass index (calculated as kg/m²); GI, gastrointestinal; PE/DVT, pulmonary embolism/deep vein thrombosis; SBO, small bowel obstruction.

Conclusions (Abeles et al 2008)

- No differences in complications
- No difference in mortality

Is BMI greater than 60 kg/m² a predictor of higher morbidity after laparoscopic Roux-en-Y gastric bypass?

**L. Kushnir · W. J. Dunnican · B. Benedetto ·
W. Wang · C. Dolce · S. Lopez · T. P. Singh**

Methods

- Accredited Bariatric Program (a prospectively collected database) was queried for all laparoscopic Roux-en-Y gastric bypass procedures between January 2004 and July 2006. (single surgeon)
- Average postoperative follow-up time was 1 year. Patients were stratified into two groups: BMI < 60 kg/m² and BMI ≥ 60 kg/m².
- The number of postoperative complications was compared between the two groups using a chi square method with Yates correction.

Table 1 Demographics data

	BMI < 60 kg/m ² (N = 147)	BMI ≥ 60 kg/m ² (N = 21)
Gender (% female) [p = 0.005]	127 (86%)	13 (62%)
Mean age, years	44	46.7
Mean no. of comorbidities	4	4
Mean BMI (kg/m ²)	45.1	68.6

Table 2 Results

	BMI < 60 kg/m ² (N = 147)	BMI ≥ 60 kg/m ² (N = 21)
Major		
CP (PE, MI)	0	0
SBO/internal hernia	1 (0.7%)	0
Leak	1 (0.7%)	0
Death	0	0
Minor		
Stricture [<i>p</i> = 0.53]	13 (8.8%)	1 (4.8%)
Incisional hernia	3 (2%)	0
Marginal ulcer	2 (1%)	0

CP cardiopulmonary; *PE* pulmonary embolism; *MI* myocardial infarction; *SBO* small bowel obstruction

Conclusions (Kushnir et al 2010)

- Patients with BMI ≥ 60 kg/m² do not have a higher postoperative morbidity compared with other patients undergoing laparoscopic Roux-en-Y gastric bypass.
- laparoscopic Roux-en-Y gastric bypass can be safely performed in patients with BMI > 60.

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NEW CONCEPT

Bariatric Surgery Operating Room Time—Size Matters

Joseph A. Sanford¹ • Bassam Kadry¹ • Jay B. Brodsky¹ • Alex Macario¹

Methods

- All patients who underwent laparoscopic Roux-en-Y gastric bypass procedures at Stanford University Medical Center between May 2008 and November 2013.
- N=434
- group 1 (n=213) BMI ≥ 35 to < 45 kg/m²
- group 2 (n=188) BMI ≥ 45.0 to < 60 kg/m²
- group 3 (n=33) BMI ≥ 60 kg/m².

Methods (continued)

- Primary variable: total operating room time
- Secondary variables
 - anesthetic induction time
 - nursing preparation time
 - operation time
 - time for emergence from anesthesia
 - total length of hospital stay

Table 1 BMI group demographics

	Group 1	Group 2	Group 3
Mean age (SD)	47.15 (11.63)	44.24* (11.59)	39.94** (10.71)
Male total (percent)	41 (19.2 %)	40 (21.3 %)	6 (18.25 %)
ASA 1 total (percent)	1 (0.005 %)	1 (0.006 %)	0 (0 %)
ASA 2 total (percent)	50 (25.25 %)	35 (19.44 %)	5 (16.1 %)
ASA 3 total (percent)	146 (73.73 %)	142 (78.79 %)	24 (77.42 %)
ASA 4 total (percent)	1 (0.005 %)	2 (0.01 %)	2 (0.065 %)

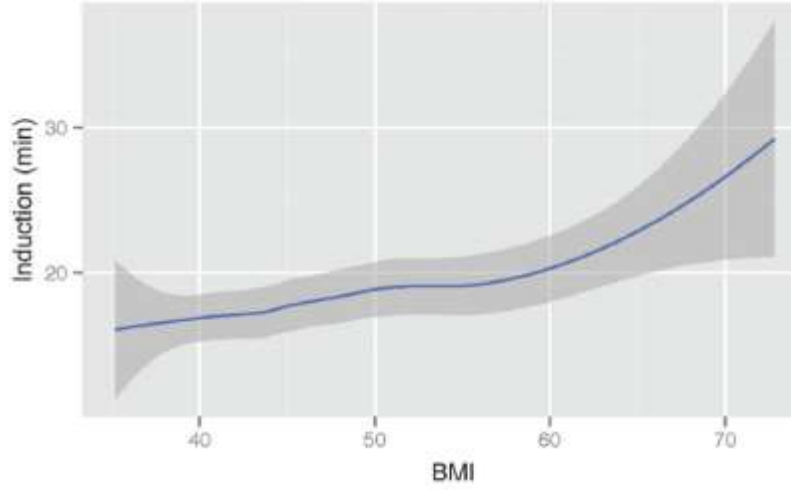
* $p < 0.05$; ** $p < 0.01$

Table 3 BMI grouping regression results

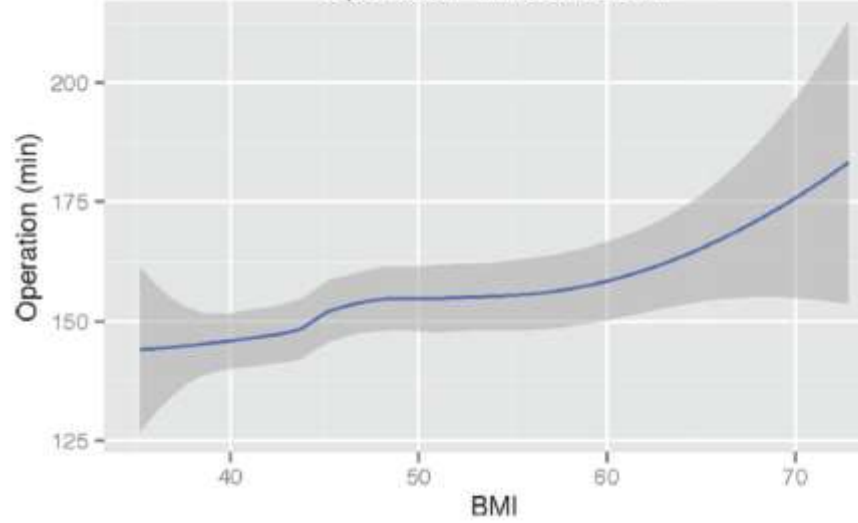
	Dependent duration variables				
	Total OR	Induction	Operation	Emergence	Hospital stay
BMI 45–60	12.725** (5.823)	0.882 (1.050)	6.215 (3.836)	−0.012 (1.127)	0.231** (0.110)
BMI >60	33.289*** (11.075)	6.401*** (2.008)	12.235* (7.296)	10.152*** (2.132)	0.361* (0.212)
Male	−0.266 (7.007)	2.602** (1.267)	1.714 (4.616)	−1.093 (1.363)	0.055 (0.134)
Age	−0.047 (0.248)	0.099** (0.045)	−0.183 (0.163)	0.101** (0.048)	0.010** (0.005)
ASA 2	−2.536 (40.048)	−2.434 (7.205)	−10.012 (26.382)	1.315 (7.708)	0.179 (0.756)
ASA 3	4.968 (39.910)	−1.082 (7.181)	−2.407 (26.291)	0.616 (7.678)	0.212 (0.753)
ASA 4	−27.591 (47.164)	−2.151 (8.755)	−21.098 (31.070)	−2.552 (9.073)	0.962 (0.890)
Constant	201.954*** (40.254)	13.801* (7.242)	161.026*** (26.518)	7.192 (7.745)	1.517** (0.759)
Observations	409	406	409	404	406

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

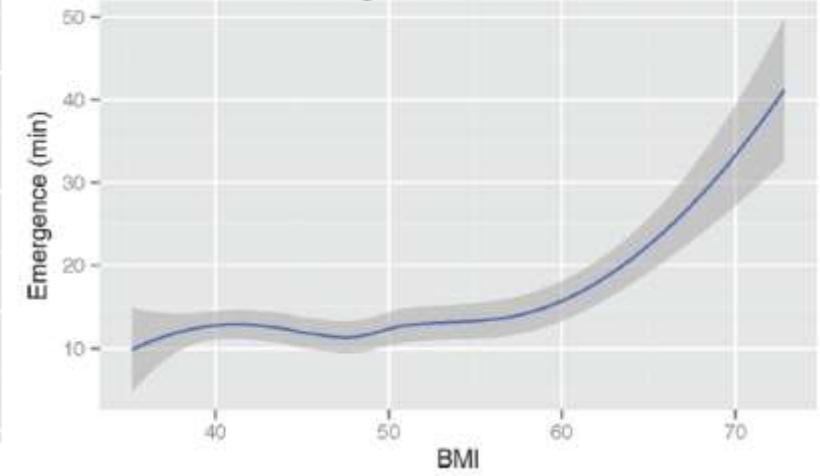
Induction Time and BMI



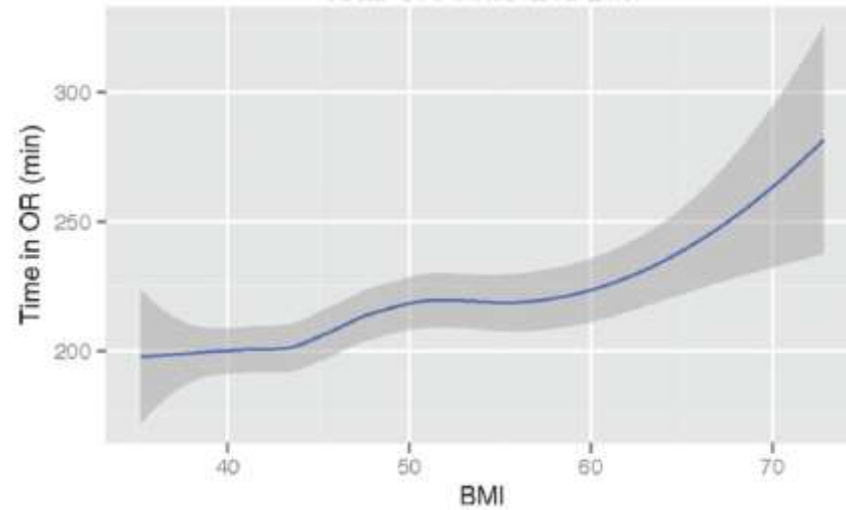
Operation Time and BMI



Emergence Time and BMI



Total OR Time and BMI



Conclusions (Sanford et al 2015)

- For patients undergoing LRYGB, increasing BMI was associated with significantly increased
 - total OR time
 - longer anesthetic induction
 - emergence in patients
- Operating room schedules and plans for resource utilization should recognize that the same bariatric procedure may require more time for patients with BMI >60.

Original article

Surgery type and psychosocial factors contribute to poorer weight loss outcomes in persons with a body mass index greater than 60 kg/m²

Ryan J. Marek, Ph.D.^{a,*}, Gail A. Williams, M.S.^b, Samantha H. Mohun, B.A.^c,
Leslie J. Heinberg, Ph.D.^d

^a*College of Human Sciences and Humanities, University of Houston – Clear Lake, Houston, Texas*

^b*Department of Psychological Sciences, Kent State University, Kent, Ohio*

^c*Cleveland Clinic Bariatric and Metabolic Institute, Cleveland, Ohio*

^d*Cleveland Clinic Lerner College of Medicine, Cleveland, Ohio*

Received September 1, 2017; accepted September 11, 2017

Methods

- Bariatric surgery candidates (n=1231, 71.9% female and 65.8% Caucasian)
 - a presurgical psychological evaluation
 - Minnesota Multiphasic Personality Inventory–2–Restructured Form.
- Participants with a baseline BMI ≥ 60 kg/m² (n=164) were compared with BMI <60 (n=1067) on psychosocial and demographic factors, the MMPI, and in the subset that had surgery (n=870), percent total weight loss extending to the 3 year follow up.

Table 2

Statistically significant descriptive and inferential statistics between BMI groups and presurgical psychological criteria.

Criteria	BMI ≥ 60 kg/m ²		BMI < 60 kg/m ²		Inferential statistics		
	M	SD	M	SD	<i>t</i>	<i>P</i> value	Cohen's <i>d</i>
Age	43.5	10.8	46.5	11.7	3.02 ₁₂₂₉	.003	.27
Years of education	13.5	2.1	14.0	2.6	2.26 ₁₁₉₄	.024	.21
Binge eating episodes	1.4	2.1	1.1	1.8	2.14 ₁₁₇₅	.033	.18
Demoralization	53	10	51	10	2.84 ₁₂₂₉	.004	.20
Low positive emotions	55	12	52	11	3.51 ₁₂₂₉	<.001	.26
Ideas of persecution	53	10	50	10	2.28 ₁₂₂₉	.008	.30
Dysfunctional negative emotions	49	10	46	10	3.11 ₁₂₂₉	.002	.30
	%		%		χ^2	<i>P</i> value	Cohen's <i>d</i>
Sex (male)	17.6		11.6		7.73 ₁	.005	.16
Hx of psychiatric inpatient hospitalization	21.4		12.4		7.88 ₁	.005	.16
Hx of sexual abuse	21.5		11.7		13.67 ₁	<.001	.22
Binge eating disorder	17.3		11.3		7.30 ₁	.007	.16
Major depression disorder	20.9		11.8		9.00 ₁	.003	.18

BMI = body mass index; M = mean; SD = standard deviation; Hx = history.

Cohen's *d* is a measure of effect size and benchmark interpretations are as follows: .20 = small effect, .50 = medium effect, and .80 = large effect.

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Criteria	BMI ≥ 60 kg/m ²		BMI < 60 kg/m ²		Inferential statistics		
	M	SD	M	SD	<i>t</i>	<i>P</i> value	Cohen's <i>d</i>
Age	43.5	10.8	46.5	11.7	3.02 ₁₂₂₉	.003	.27
Years of education	13.5	2.1	14.0	2.6	2.26 ₁₁₉₄	.024	.21
Binge eating episodes	1.4	2.1	1.1	1.8	2.14 ₁₁₇₅	.033	.18
Demoralization	53	10	51	10	2.84 ₁₂₂₉	.004	.20
Low positive emotions	55	12	52	11	3.51 ₁₂₂₉	<.001	.26
Ideas of persecution	53	10	50	10	2.28 ₁₂₂₉	.008	.30
Dysfunctional negative emotions	49	10	46	10	3.11 ₁₂₂₉	.002	.30
	%		%		χ^2	<i>P</i> value	Cohen's <i>d</i>
Sex (male)	17.6		11.6		7.73 ₁	.005	.16
Hx of psychiatric inpatient hospitalization	21.4		12.4		7.88 ₁	.005	.16
Hx of sexual abuse	21.5		11.7		13.67 ₁	<.001	.22
Binge eating disorder	17.3		11.3		7.30 ₁	.007	.16
Major depression disorder	20.9		11.8		9.00 ₁	.003	.18

BMI = body mass index; M = mean; SD = standard deviation; Hx = history.

Cohen's *d* is a measure of effect size and benchmark interpretations are as follows: .20 = small effect, .50 = medium effect, and .80 = large effect.

Conclusions (Marek et al 2017)

- Patients with a BMI ≥ 60 kg/m² presented as a more psychiatrically vulnerable group compared with patients with lower BMIs before surgery
- However, patients with a BMI ≥ 60 kg/m² did not have attenuated weight loss outcomes once other demographic and psychological variables were accounted for.
- Tended to not lose as much weight regardless of starting BMI status.
 - older patients
 - Males
 - those with a greater severity of psychosocial functioning
- Overall, emphasis on education and the importance of psychological treatment should be highlighted during the presurgical psychological evaluation for patients exhibiting current psychological symptoms.



ORIGINAL CONTRIBUTIONS

Enhanced Recovery after Bariatric Surgery in the Severely Obese, Morbidly Obese, Super-Morbidly Obese and Super-Super Morbidly Obese Using Evidence-Based Clinical Pathways: a Comparative Study

Aparna Sinha¹ • Lakshmi Jayaraman¹ • Dinesh Punhani¹ • Pradeep Chowbey¹

Methods

- Retrospective analysis of prospectively collected data of **823** patients who underwent laparoscopic bariatric surgery.
- Goal: assess the effects of BMI on the recovery and anesthetic outcome parameters, under the categories:
 - severely obese (SeO: BMI < 39.9 kg/m²)
 - morbidly obese (MO: BMI 40–49.9 kg/m²),
 - super-morbidly obese (SMO: BMI 50–59.9 kg/m²)
 - super-super morbidly obese (SSMO: BMI > 60 kg/m²).
- **Time to ambulate (TA) was the primary variable.**

Fig. 1 Evidence-Based Clinical pathways applied for enhanced recovery after surgery in the bariatric patients in this study

Preoperative Assessment

Preoperative Optimisation

- Deep breathing Exercises
- CPAP as appropriate
- Very low calorie diet as appropriate
- Incentive Spirometry
- Leg Exercises

Familiarization with

- Postoperative pain management
- Early ambulation

Preoperative Preparation

- Deep breathing Exercises
- CPAP as appropriate
- Incentive Spirometry
- Leg Exercises
- Continue sips of clear liquids (2h preop)
- H2 blocker/Proton pump inhibitor
- Thromboprophylaxis with LMWH night prior to surgery

Fig. 1 Evidence-Based Clinical pathways applied for enhanced recovery after surgery in the bariatric patients in this study

Anesthesia Protocol

Preoxygenation with CPAP
Induction in Ramped position
Intraoperative PEEP
Port Infiltration with Local Anesthetic
Dexmedetomidine Infusion
Predetermined Dexamethasone
Intraoperative Fentanyl as appropriate
Intraoperative NSAIDS/Paracetamol
Goal directed fluid therapy
Transversus Abdominis Plane (TAP) Block
Recruitment maneuver
Awake Extubation
Extubation in ramped position
Minimal/No Opioids postoperatively
Sequential Compression Device

Postoperative Period

Early Ambulation ASAP
Can suck ice cubes
Sips clear liquids ASAP
Deep breathing Exercises
Incentive Spirometry
CPAP as appropriate
Leg Exercises
Sequential Compression Device while at rest
LMWH to resume within 24 hrs Postop

Avoidance of urinary catheter
No orogastric tube
Avoidance of intra-abdominal drain
Predetermined NSAIDS/Paracetamol
Predetermined Antiemetics

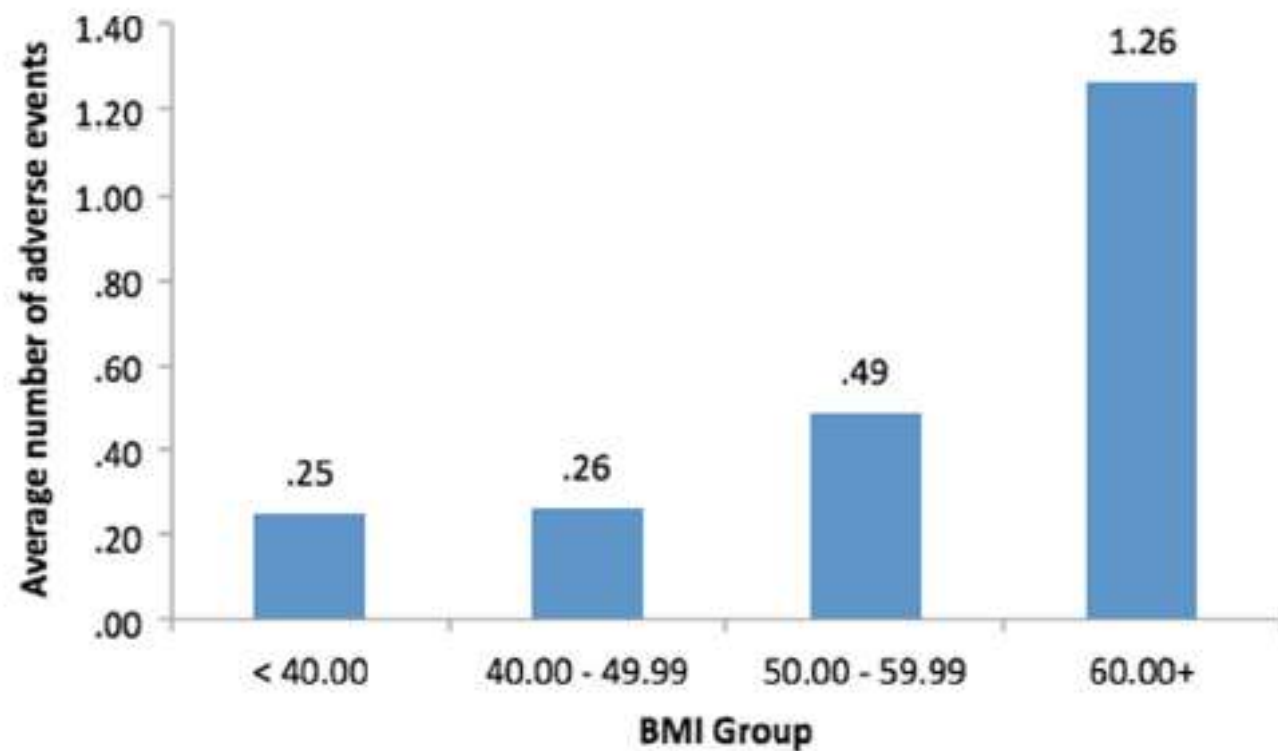


Fig. 3 This figure represents average number of adverse events (Y axis) across the BMI groups expressed in kg/m^2 (X axis) and clearly depicts higher number of adverse events in high BMI segments

Table 1 Patient characteristics

BMI group	SeO	MO	SMO	SSMO	Overall	<i>P</i> value
<i>n</i>	28	442	285	68	823	
BMI kg/m ² (mean ± SD)	39.6 ± 0.4	45 ± 3	54 ± 3	65 ± 4	49.7 ± 7	
Mean age (years) (mean ± SD)	43 ± 13	41 ± 12	43 ± 12	42 ± 11	42 ± 12	
Male/female (%)	28.6	44.6	45.6	58.8	45.6	0.041*
Bypass <i>n</i> (%)	19(67.9)	360(81.4)	220(77.2)	24 (35.3)	623(75.8)	<0. 001*
Sleeve gastrectomy <i>n</i> (%)	6(21.4)	69(15.6)	62(21.8)	38(55.9)	175(21.1)	
Others <i>n</i> (%)	3(10.7)	13(2.9)	3(1.1)	6(8.8)	25(3.0)	
Anesthesia duration (Minutes) (Mean ± SD)	158 ± 36.5	183 ± 37	180 ± 46	159 ± 41	179 ± 41	<0.001*

Values are expressed as *n* (%). Severely obese (SeO BMI < 39.9 kg/m²), morbidly obese (MO: BMI 40–49.9 kg/m²), super-morbidly obese (SMO: BMI 50–59.9 kg/m²), and super-super morbidly obese (SSMO: BMI >60 kg/m²)

SD standard deviation

**P* < 0.05 considered statistically significant

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BMI group	SeO	MO	SMO	SSMO	Overall	<i>P</i> value
Number	28	442	285	68	823	
<i>n</i> (%)						
Neuropathy	2(7.1)	3(0.7)	3(1.1)	2(2.9)	10(1.2)	0.012*
<i>n</i> (%)						
Osteoarthritis	14(50)	218(49.3)	149(52.3)	38(55.9)	419(50.9)	0.719
<i>n</i> (%)						
Walks with support (WS)	2(7.1)	10(2.3)	32(11.2)	7(10.3)	51(6.2)	.001*
<i>n</i> (%)						
Hypothyroid	1(3.6)	12(2.7)	40(14.0)	0(0.0)	53(6.4)	0.000*
<i>n</i> (%)						

Values are expressed as *n* (%). Severely obese (SeO BMI < 39.9 kg/m²), morbidly obese (MO: BMI 40–49.9 kg/m²), super-morbidly obese (SMO: BMI 50–59.9 kg/m²), and super-super morbidly obese (SSMO): BMI >60 kg/m²

SD standard deviation, *OSA* obstructive sleep apnea, *NIV* non invasive ventilation, *RVSP* right ventricular systolic pressure, *CMP* cardiomyopathy, *CAD* coronary artery disease

**P* < 0.05 considered statistically significant

Table 4 Tukey's test

Time to ambulate (minutes)					
	Over-all	SeO	MO	SMO	SSMO
	823	28	437	284	65
Mean ± SD	158.9 ± 60.9	155.2 ± 65.9	156 ± 56	156.2 ± 64.1	191.6 ± 67.3
95 % Confidence interval	154.8, 163.1	132.8, 177.5	150.4, 161.6	149.2, 163.2	177.3, 205.9
	SeO	–	<i>P</i> > 0.05	<i>P</i> > 0.05	<i>P</i> = 0.036
	MO	<i>P</i> > 0.05	–	<i>P</i> > 0.05	<i>P</i> < 0.001*
	SMO	<i>P</i> > 0.05	<i>P</i> > 0.05	–	<i>P</i> < 0.001*
	SSMO	<i>P</i> = 0.036	<i>P</i> < 0.001*	<i>P</i> < 0.001*	–
Discharge Readiness (hours)					
	Over-all	SeO	MO	SMO	SSMO
	30.5 ± 9.3	27.4 ± 6.4	28.1 ± 6.7	31.5 ± 8.7	43.3 ± 15.7
95 % Confidence Interval	29.9, 31.14	24.3, 30.6	27.3, 28.9	30.5, 32.5	41.2, 45.2
	SeO	–	<i>P</i> = 0.975	<i>P</i> = 0.069	<i>P</i> < 0.001*
	MO	<i>P</i> = 0.975	–	<i>P</i> < 0.001*	<i>P</i> < 0.001*
	SMO	<i>P</i> = 0.069	<i>P</i> < 0.001*	–	<i>P</i> < 0.001*
	SSMO	<i>P</i> < 0.001*	<i>P</i> < 0.001*	<i>P</i> < 0.001*	–

Values are expressed as *n* (%). Severely obese (SeO BMI < 39.9 kg/m²), morbidly obese (MO: BMI 40–49.9 kg/m²), super-morbidly obese (SMO: BMI 50–59.9 kg/m²), and super-super morbidly obese (SSMO): BMI >60 kg/m²

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95 % Confidence interval	154.8, 163.1	132.8, 177.5	150.4, 161.6	149.2, 163.2	177.3, 205.9
	SeO	–	$P > 0.05$	$P > 0.05$	$P = 0.036$
	MO	$P > 0.05$	–	$P > 0.05$	$P < 0.001^*$
	SMO	$P > 0.05$	$P > 0.05$	–	$P < 0.001^*$
	SSMO	$P = 0.036$	$P < 0.001^*$	$P < 0.001^*$	–
Discharge Readiness (hours)					
	Over-all	SeO	MO	SMO	SSMO
Mean \pm SD	30.5 \pm 9.3	27.4 \pm 6.4	28.1 \pm 6.7	31.5 \pm 8.7	43.3 \pm 15.7
95 % Confidence Interval	29.9, 31.14	24.3, 30.6	27.3, 28.9	30.5, 32.5	41.2, 45.2
	SeO	–	$P = 0.975$	$P = 0.069$	$P < 0.001^*$
	MO	$P = 0.975$	–	$P < 0.001^*$	$P < 0.001^*$
	SMO	$P = 0.069$	$P < 0.001^*$	–	$P < 0.001^*$
	SSMO	$P < 0.001^*$	$P < 0.001^*$	$P < 0.001^*$	–

Values are expressed as n (%). Severely obese (SeO BMI < 39.9 kg/m²), morbidly obese (MO: BMI 40–49.9 kg/m²), super-morbidly obese (SMO: BMI 50–59.9 kg/m²), and super-super morbidly obese (SSMO): BMI > 60 kg/m²

SD standard deviation

* $P < 0.05$ considered statistically significant

Conclusion - Patients with BMI >60 undergoing bariatric surgery

- Have longer operative times
- Have longer induction/emergence times
- Have more psychological issues
- More likely to require an ICU stay
- Longer time to ambulation
- May be at increased risk for some complications.
- Similar mortality
- Require careful selection of patients and matching the correct patient to the correct procedure

Original article

2022 American Society for Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO): Indications for Metabolic and Bariatric Surgery

Dan Eisenberg, M.D.^{a,*}, Scott A. Shikora, M.D.^b, Edo Aarts, M.D., Ph.D.^c,
Ali Aminian, M.D.^d, Luigi Angrisani, M.D.^e, Ricardo V. Cohen, M.D., Ph.D.^f,
Maurizio De Luca, M.D.^g, Silvia L. Faria, Ph.D.^h, Kasey P. S. Goodpaster, Ph.D.^d,
Ashraf Haddad, M.D.ⁱ, Jacques M. Himpens, M.D., Ph.D.^j, Lilian Kow, B.M.B.S., Ph.D.^k,
Marina Kurian, M.D.^l, Ken Loi, M.B.B.S., B.Sc. (Med)^m,
Kamal Mahawar, M.B.B.S., M.Sc.ⁿ, Abdelrahman Nimeri, M.D., M.B.B.Ch.^o,
Mary O' Kane, M.Sc., R.D.^p, Pavlos K. Pappasavas, M.D.^q, Jaime Ponce, M.D.^r,
Janey S. A. Pratt, M.D.^{a,s}, Ann M. Rogers, M.D.^t, Kimberley E. Steele, M.D., Ph.D.^u,
Michel Suter, M.D.^{v,w}, Shanu N. Kothari, M.D.^x

^aDepartment of Surgery, Stanford School of Medicine and VA Palo Alto HCS, Palo Alto, California

^bDepartment of Surgery, Center for Metabolic and Bariatric Surgery, Brigham and Women's Hospital, and Harvard Medical School, Boston, Massachusetts

^cWeightWorks Clinics and Allurion Clinics, Amerfoort, The Netherlands

^dBariatric and Metabolic Institute, Cleveland Clinic, Cleveland, Ohio

^eDepartment of Public Health, University of Naples Federico II, Naples, Italy

^fCenter for the Treatment of Obesity and Diabetes, Hospital Alemão Oswaldo Cruz, Sao Paulo, Brazil

^gDepartment of Surgery, Rovigo Hospital, Rovigo, Italy

^hGastrocirurgia de Brasília, University of Brasília, Brasília, Brazil

ⁱGastrointestinal Bariatric and Metabolic Center, Jordan Hospital, Amman, Jordan

^jDepartment of Surgery, Delux CHIREC Hospital, Brussels, Belgium

^kAdelaide Bariatric Centre, Flinders University of South Australia, Adelaide, Australia

^lDepartment of Surgery, New York University Grossman School of Medicine, New York, New York

^mSt. George Hospital and Sutherland Hospital, Kogarah, New South Wales, Australia

ⁿDepartment of General Surgery, Sunderland Royal Hospital, Sunderland, United Kingdom

^oDepartment of Surgery, Carolinas Medical Center, University of North Carolina, Charlotte, North Carolina

^pDepartment of Nutrition and Dietetics, Leeds Teaching Hospitals NHS Trust, Leeds, United Kingdom

^qDivision of Metabolic and Bariatric Surgery, Hartford Hospital, Hartford, Connecticut

^rBariatric Surgery Program, CHI Memorial Hospital, Chattanooga, Tennessee

^sDivision of Pediatric Surgery, Lucille Packer Children's Hospital, Palo Alto, California

^tDepartment of Surgery, Penn State Health Milton S. Eisenhower Medical Center, Hershey, Pennsylvania

^uNIDDK Metabolic and Obesity Research Unit, National Institutes of Health, Bethesda, Maryland

^vDepartment of Surgery, Riviera-Clubais Hospital, Rennaz, Switzerland

^wDepartment of Visceral Surgery, University Hospital, Lausanne, Switzerland

^xPrisma Health Department of Surgery, University of South Carolina School of Medicine, Greenville, South Carolina

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MBS in the high-risk patient

$BMI > 60 \text{ kg/m}^2$

There is no consensus concerning the best procedure for individuals with especially high BMI, but the efficacy and safety of MBS have been demonstrated in this population

- There is no consensus concerning the best procedure for individuals with especially high BMI, but the efficacy and safety of MBS have been demonstrated in this population
- Therefore, MBS **should be considered as a preferred method** to achieve clinically significant weight loss in patients with extreme BMI.

PRISMA HEALTHSM

Metabolic/Bariatric Surgery (MBS) in BMI>60 Operation – Strategy & Perioperative Risk



Shanu N. Kothari, MD, FACS, FASMBS
Professor – University of South Carolina – Greenville
Jean and H. Harlan Stone Chair of Surgery
Senior Past President - ASMBS



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SOUTH CAROLINA
School of Medicine