Academy of Nutrition and Dietetics

POCKET GUIDE TO
Bariatric Surgery
THIRD EDITION

Weight Management Dietetic Practice Group

Editors

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Frequently Used Terms and Abbreviations

AACE	American Association of Clinical Endocrinologists
AAP	American Academy of Pediatrics
ACS	American College of Surgeons
AGB	adjustable gastric band
ASA	American Society of Anesthesiologists
ASMBS	American Society for Metabolic and Bariatric Surgery
ASPEN	American Society for Parenteral and Enteral Nutrition
BMI	body mass index
BMR	basal metabolic rate
BOLD	Bariatric Outcomes Longitudinal Database
BP	biliopancreatic
BPD	biliopancreatic diversion
BPD/DS	biliopancreatic diversion with duodenal switch
BUN	blood urea nitrogen
CBC	complete blood count
CBT	cognitive behavioral therapy

CDC	Centers for Disease Control and Prevention
CKD	chronic kidney disease
CSOWM	Certified Specialist in Obesity and Weight Management
DEXA	dual-energy x-ray absorptiometry
DFE	dietary folate equivalent
DIAAS	Digestible Indispensable Amino Acid Score
DPG	dietetic practice group
EAL	Academy of Nutrition and Dietetics Evidence Analysis Library
EBT	Endoscopic Bariatric Therapies
EBW	excess body weight
EN	enteral nutrition
ESG	endoscopic sleeve gastroplasty
EWL	excess weight loss
FDA	Food and Drug Administration
FFM	fat-free mass
GDM	gestational diabetes mellitus
GERD	gastroesophageal reflux disease
GI	gastrointestinal
GLP-1	glucagon-like peptide 1
H&P	history and physical
HbA1c	hemoglobin A1c
HDL	high-density lipoprotein
IAA	indispensable amino acids
IBW	ideal body weight
IFSO	International Federation for the Surgery of Obesity

IGB	intragastric balloons
iPTH	intact parathyroid hormone
IV	intravenous
LOC	loss of control
LOS	length of stay
MBS	metabolic and bariatric surgery
MBSAQIP	Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program
MGB	mini-gastric bypass
MI	motivational interviewing
MMA	methylmalonic acid
MNT	medical nutrition therapy
NASH	nonalcoholic steatohepatitis
NCP	Nutrition Care Process
NHLBI	National Heart, Lung, and Blood Institute
NIDDKD	National Institute of Diabetes and Digestive and Kidney Diseases
NIH	National Institutes of Health
NSV	nonscale victory
OAC	Obesity Action Coalition
OAGB	one-anastomosis gastric bypass
ODS	Office of Dietary Supplements
OHS	obesity hypoventilation syndrome
OMA	Obesity Medicine Association
OTC	over-the-counter
PBH	postbariatric hypoglycemia

PCP	primary care provider
PDCAAS	protein digestibility-corrected amino acid score
%EBMIL	percent excess body mass index loss
%EWL	percentage of excess weight loss
%TBWL	percentage of total body weight loss
%TWL	percentage of total weight loss
PES	problem, etiology, and symptoms
PN	parenteral nutrition
POD	postoperative day
POSE	Primary obesity surgery endoluminal
PPI	proton pump inhibitor
PSU	Penn State University
PYY	peptide YY
RAE	retinol activity equivalent
RCT	randomized controlled trial
RDN	registered dietitian nutritionist
RMR	resting metabolic rate
RYGB	Roux-en-Y gastric bypass
SADI-S	single-anastomosis duodeno-ileostomy with sleeve
SG	sleeve gastrectomy
SGA	small for gestational age
SIBO	small intestinal bacteria overgrowth
T2DM	type 2 diabetes mellitus
TBWL	total body weight loss
TIBC	total iron-binding capacity
TOS	The Obesity Society

TTM	transtheoretical model
TWL	total weight loss
UGI	upper gastrointestinal series
UL	tolerable upper limit
WM	weight management
WNL	within normal limits

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Preface

In the 6 short years since the second edition of the *Academy of Nutrition and Dietetics Pocket Guide to Bariatric Surgery* was published, the metabolic and bariatric surgery (MBS) literature has exploded. The sleeve gastrectomy has officially become the most performed surgery, and the popularity of endoscopic procedures has increased. The third edition of the *Academy of Nutrition and Dietetics Pocket Guide to Bariatric Surgery* is meant to serve as a snapshot into the most up-to-date literature to support the registered dietitian nutritionist (RDN) and the interdisciplinary team to care for the MBS patient with evidence-based practices. The RDN new to MBS practice may use the pocket guide to gather background on the medical and nutrition components of MBS surgery, or the RDN who has devoted their career to the care of the MBS patient may refer to this book to validate the care of the complex patient with kidney disease, pregnancy, or nutritional deficiencies.

The third edition includes updates to reflect the gains in the literature and shifts in the field:

- Descriptions of single anastomosis procedures have been added to Chapter 1.
- More long-term data on the outcomes of MBS have been added.
- The biliopancreatic diversion with duodenal switch is included throughout the pocket guide.
- More liberal diet progression options are reviewed in Chapter 3 and Appendix B.
- Nutrition-related enhanced recovery interventions are discussed in Chapters 2 and 3.

- A more thorough review of MBS in adolescents is included in Chapter 6, as practitioners and researchers now have more studies in the adolescent population.
- A full chapter (Chapter 9) is devoted to endoscopic weight loss therapies: balloons, aspiration therapies, and revisional procedures performed endoscopically.
- Appendixes C and D, which deal with vitamin and mineral supplementation and biochemical surveillance, have been reformatted. They now include easy-to-interpret tables with valuable updates for the treatment of nutritional deficiencies in the MBS patient.
- A new appendix on nutrition counseling and education (Appendix H) has been added to relate evidence-based counseling methods and theories of change to the MBS population.

Acknowledgments

We would like to thank the authors and reviewers for their perseverance during a global pandemic and devotion to evidence-based practice. We appreciate the thorough and careful feedback of our peer reviewers. It is with the teamwork and attention to detail of this esteemed group that we can produce this valuable resource.

We would like to acknowledge Sue Cummings, MS, RD, LDN, for providing the foundation for this work in the first and second editions of the text. We would also like to thank Mary Litchford, PhD, RDN, LDN, for her intellect on protein quality (Chapter 3) and Edo Aarts, MD, PhD, for his surgical drawings (Chapter 1). We also appreciate the support and patience of our family and friends, as we have edited during late nights and weekend mornings.

Publisher's Note on Gender-Inclusive Language

The Academy of Nutrition and Dietetics encourages diversity and inclusion by striving to recognize, respect, and include differences in ability, age, creed, culture, ethnicity, gender, gender identity, political affiliation, race, religion, sexual orientation, size, and socioeconomic characteristics in the nutrition and dietetics profession.[1]

As part of our commitment to diversity and inclusion, all new and updated editions of professional books and practitioner resources published by the Academy of Nutrition and Dietetics will transition to the use of inclusive language. As appropriate, gender-neutral language, such as person/persons, individual/individuals, or patient/patients, is used to respect and recognize the spectrum of gender identities, including transgender and nonbinary identities. Where gender or sex is referred to in this book, it is important to note that data on sex assigned at birth or gender identity were not further specified for study participants, and specific recommendations or data for transgender and gender-diverse people were not provided.

Existing guidelines for nutrition assessment and interventions rely primarily on gender-specific values and recommendations. As research continues to explore the unique health and nutrition needs of transgender and gender-diverse people, nutrition and health practitioners can expand their knowledge and understanding by reviewing available resources that provide general guidance for person-centered nutrition

care of gender-diverse individuals.[2-4] The use of inclusive language is consistent with the American Medical Association's *AMA Manual of Style*[5] as well as other health professional groups and government organizations. The Academy of Nutrition and Dietetics will continue to evolve to adopt consensus best practices related to nutrition care of gender-diverse individuals that maximize inclusivity and improve equitable and evidence-based care.

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CHAPTER 1

Overview of Metabolic and Bariatric Surgery

Introduction

From 2017 to 2018, 42.4% and 9.2% of US adults met the criteria for obesity and severe obesity, respectively. The trends are unfortunately similar for children and adolescents in the United States. From 2015 to 2016, 18.5% of US adults met the criteria for obesity. The prevalence of both obesity and clinically severe obesity was highest in non-Hispanic Black adults compared to other races and Hispanic-origin groups. Adults aged 40 to 59 years were more likely to suffer from clinically severe obesity compared with other age groups.[1,2]

The increase in clinically severe obesity among adults in the United States continues to fuel the demand for metabolic and bariatric surgery (MBS). Approximately 252,000 MBS procedures were performed in the United States in 2018.[3]

MBS continues to be more effective than conventional management for weight loss in patients suffering from clinically severe obesity.[4] This class of procedures is the most effective way to achieve significant, durable weight loss and can lead to amelioration or resolution of most obesity-related comorbidities in adults and adolescents.[5-8] In adolescents

affected by clinically severe obesity, MBS may lead to improvements in health and psychosocial well-being that exceed those that would be expected if the operation was delayed until later in life.[9,10]

Overweight and Obesity

Obesity is defined using body mass index (BMI) criteria, calculated as weight (kg)/height (m)^2, as shown in Box 1.1.[11,12] This criteria includes the latest guideline suggesting lowering BMI criterion for those of Asian ethnicity due to the risk correlation of type 2 diabetes; however, US insurance companies are not lowering their criterion at this time for this population.[13] The BMI criteria for obesity are subdivided into classes I through III, with class I regarded as low-risk obesity, class II deemed moderate-risk obesity, and class III associated with the highest obesity-related health risks. Class III is often referred to as clinically severe obesity. The prevalence of individuals affected by clinically severe obesity has been increasing at faster rates than in lower BMI classes since 1990.[14]

The utility of using BMI is often debated, and it is critical for clinicians to have a general understanding of the most commonly used techniques for the assessment of adiposity (eg, waist circumference, waist-to-hip ratio, body composition analysis, skinfold thickness, underwater weighing, and dual-energy x-ray absorptiometry).[15] Health care providers should also be able to understand how to interpret these measurements, and there are limitations for each type of analysis, especially when applied to varied populations. Various analysis techniques will provide differing insight into not only percentage body fat but also fat distribution, muscle mass, and bone mass.[16]

Criteria for Metabolic and Bariatric Surgery

In 1991, the National Institutes of Health (NIH) Consensus Development Conference Panel developed the criteria for MBS.[17] Although new

BOX 1.1 Classification of Body Weight According to Body Mass Index[11-13]

Adults body mass index (BMI)

	All ethnicities except Asian	Asian ethnicity
Underweight	less than 18.5	less than 18.5
Normal or acceptable weight	18.5 to 24.9	18.5 to 22.9
Overweight	25 to 29.9	23 to 24.9
Obesity	30 or greater	25 or greater
Obesity Class I	30 to 34.9	25 to 29.9
Obesity Class II		30 or greater
Obesity Class III (clinically severe obesity)	40 or higher	—

Children (aged 2 to 18 years) BMI-for-age percentile growth chart

Underweight	less than 5th percentile
Normal or healthy weight	5th percentile to 85th percentile
Overweight	85th percentile to 95th percentile
Obesity	95th percentile or greater

surgical techniques and procedures have been developed since then, the current criteria for MBS deviate little from these recommendations. Box 1.2 on page 4 lists the criteria originally recommended by the NIH and some additional requirements by many insurers.[17,18] See Chapter 6 for criteria and preoperative and postoperative care of adolescent MBS patients.

BOX 1.2 Qualifications for Consideration of Metabolic and Bariatric Surgery[13,17-23]

Inclusion criteria

Body mass index (BMI) 40 or greater, or more than 100 lb overweight.

BMI 35 or greater with comorbid conditions[a] (at least one, such as type 2 diabetes, hypertension, sleep apnea and other respiratory disorders, nonalcoholic fatty liver disease, osteoarthritis, lipid abnormalities, gastrointestinal disorders, or heart disease).

Of note, laparoscopic adjustable gastric band (AGB) is a US Food and Drug Administration–approved option for those patients with a BMI 30 or greater with one comorbid condition.

Inability to achieve and sustain a healthy weight loss for a period of time with prior weight loss efforts.

Also recommended

The National Institutes of Health as well as the American College of Surgeons and the American Society for Metabolic and Bariatric Surgery also recommend that surgery be performed:

- by a board-certified surgeon with specialized training or experience in bariatric and metabolic surgery or
- at a center that has a multidisciplinary team of experts for follow-up care (this may include a nutritionist, exercise physiologist or specialist, and a mental health professional).

Some insurance companies require that the surgery be performed at a facility that is accredited by the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP).

[a] Clinical Practice Guidelines (2019) state that patients with a BMI of 30 to 34.9 and type 2 diabetes mellitus with inadequate glycemic control despite optimizing lifestyle and medical therapy should be considered for a bariatric procedure. Current evidence is insufficient to support recommending a metabolic and bariatric procedure in the absence of obesity. See reference 13.

Types of Bariatric Surgery

Metabolic and bariatric procedures are grouped according to their mechanisms of action and were previously referred to as either restrictive or malabsorptive procedures, with some procedures characterized by both mechanisms of action.[17,24] However, to truly understand the mechanisms of MBS, these complex metabolic changes should be considered[25]:

- **Nonmetabolic operations provide significant weight loss without altering the physiology of energy (fat) storage.** One example includes the adjustable gastric band (AGB) procedure (see Figure 1.1 on page 6).
- **Metabolic procedures that include gastric manipulation have a profound effect on the secretion of gut hormones that lead to decreased hunger and increased satiety.** These procedures include the Roux-en-Y gastric bypass (RYGB) (see Figure 1.2 on page 7) and the sleeve gastrectomy (SG) (see Figure 1.3 on page 8). Research on the impact of metabolic and gastric manipulation procedures on changes to gut-brain communication is ongoing. Changes in gastric manipulation may decrease hydrochloric acid production in the stomach, which may hinder nutrient absorption.[26-28]
- **Metabolic procedures cause severe malabsorption of nutrients.** These procedures result in significant intestinal malabsorption of protein, calories, and micronutrients, as well as changes in the secretion of gut hormones that lead to decreased hunger and increased satiety. These surgical procedures include the biliopancreatic diversion (BPD) (not illustrated) and the BPD with duodenal switch (BPD/DS) (see Figure 1.4 on page 9). A newer subcategory within the metabolic procedures category includes one anastomosis procedures. The American Society for Metabolic and Bariatric Surgery (ASMBS) recently endorsed the single-anastomosis duodeno-ileostomy with sleeve (SADI-S) (see Figure 1.5 on page 10), and this procedure will likely be aligned closer to the RYGB than the BPD/DS regarding micronutrient malabsorption, but more research is necessary.[29] The one-anastomosis gastric bypass (OAGB) (see Figure 1.6 on page 11) is not endorsed by the

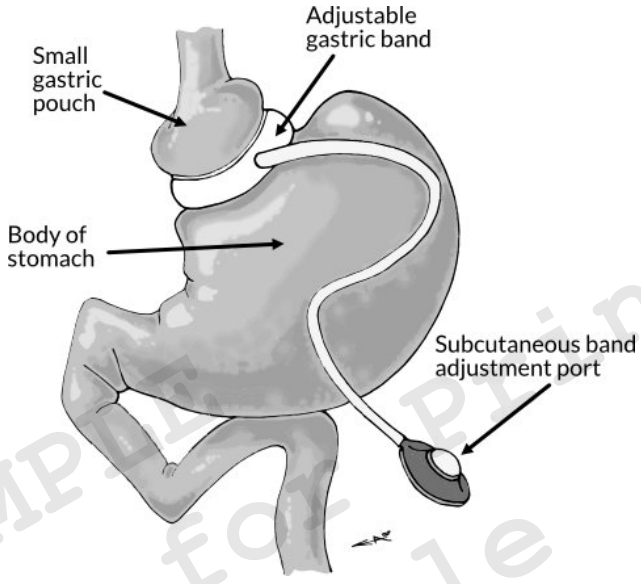

FIGURE 1.1 Adjustable gastric band (AGB) procedure

An adjustable band is placed around the top of the stomach, reducing the capacity of the stomach, thereby reducing food intake. The band is tethered to tubing attached to a port that is placed just under the skin. The port provides access for saline to be injected in small amounts over time to allow for adequate restriction of food intake by filling the balloon inside the band. Adjustments are completed as necessary to adjust the volume of food intake, ensure food tolerance, and help patients feel full sooner and stay full longer.
Illustrations reprinted with permission by Dr. Edo Aarts, MD, PhD.

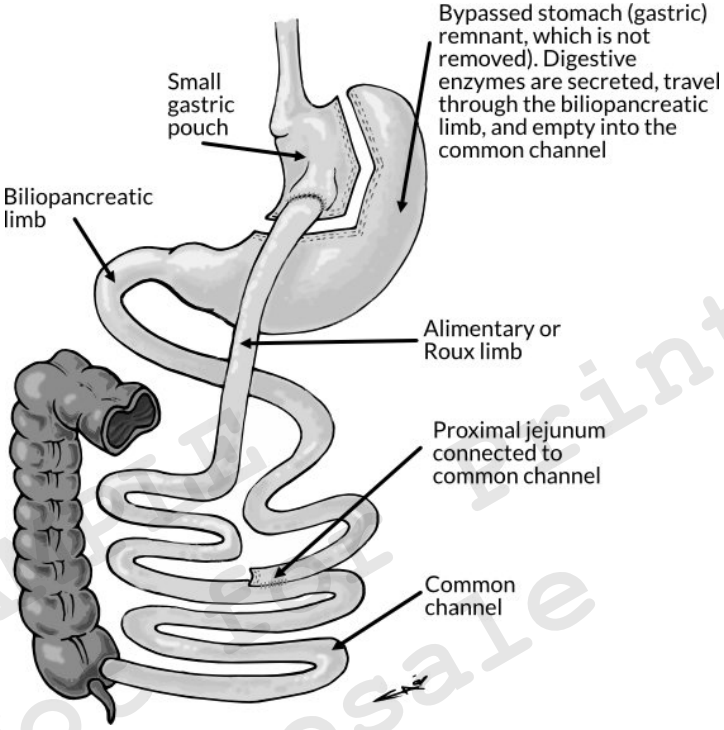

FIGURE 1.2 Roux-en-Y gastric bypass (RYGB) procedure

In the laparoscopic procedure, the stomach is divided into two parts, thereby creating a small pouch (the proximal pouch of the stomach) and a larger excluded pouch (remnant portion of the stomach). Part of the small intestine is bypassed creating the intestinal "short" Roux limb. The bypassed intestine is attached to the proximal pouch.
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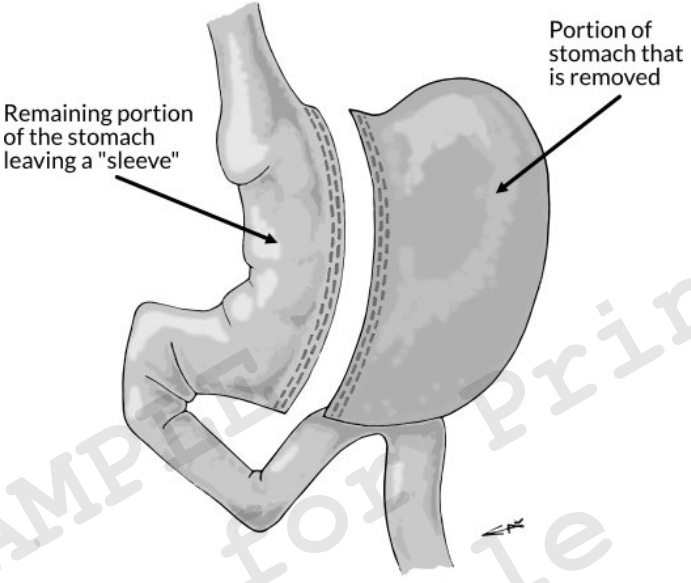

FIGURE 1.3 Sleeve gastrectomy (SG) procedure

In this procedure, about 75% to 80% of the stomach (the fundus) is removed, leaving what resembles a "sleeve" or a narrow tube. The pyloric sphincter and intestines remain intact, so the food pathway is not altered.
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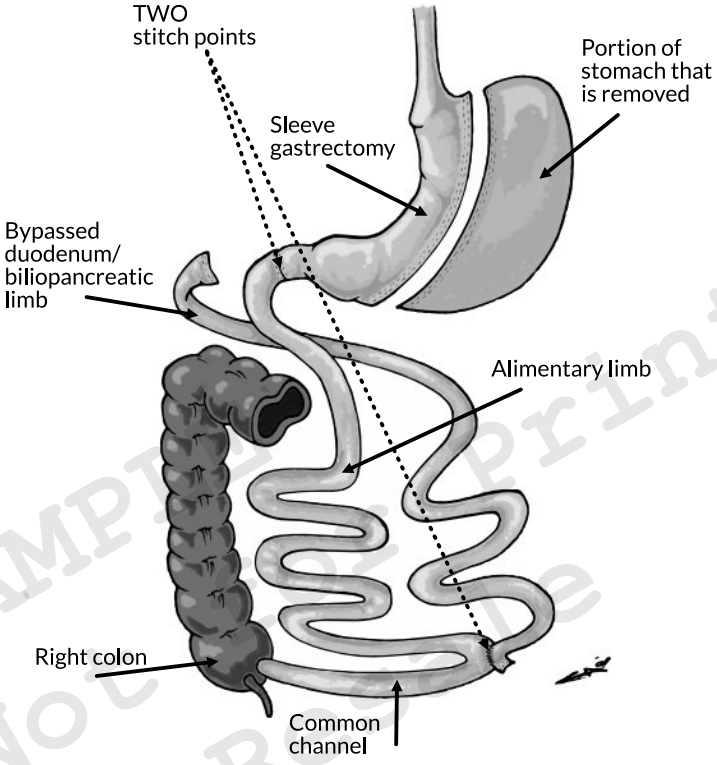

FIGURE 1.4 Biliopancreatic diversion with duodenal switch (BPD/DS) procedure

Roughly 75% to 80% of the stomach is permanently removed, similar to a sleeve gastrectomy. The pylorus, which is the valve at the outlet of the stomach, remains intact. The stomach is then connected to the last 250 cm (~8 feet) of small intestine. The remainder of the small intestine is connected 75 to 150 cm from the end of the small bowel, forming the common channel, where food mixes with the digestive enzymes.
Illustrations reprinted with permission by Dr. Edo Aarts, MD, PhD.

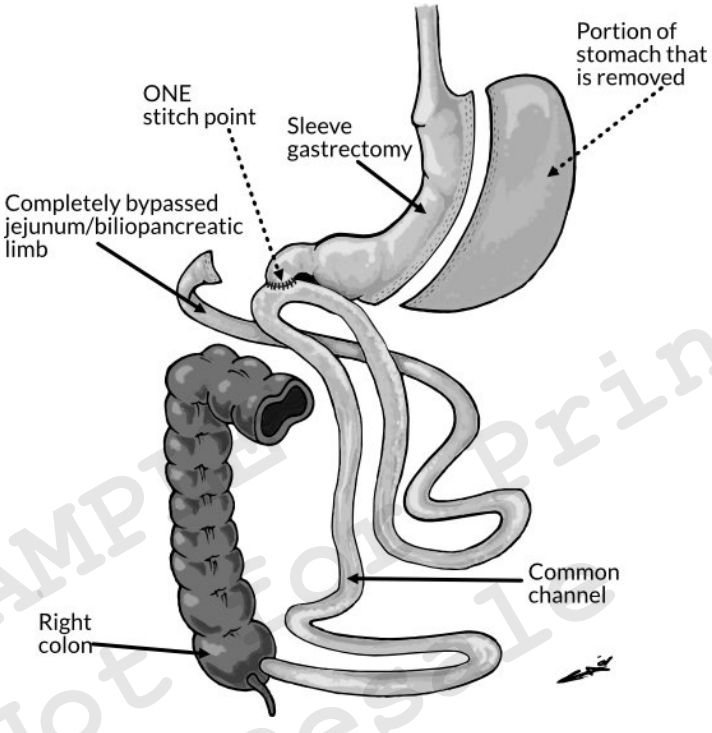

FIGURE 1.5 Single-anastomosis duodeno-ileostomy with sleeve (SADI-S) procedure

Roughly 75% to 80% of the stomach is permanently removed, similar to a sleeve gastrectomy.. The pylorus, which is the valve at the outlet of the stomach, remains intact. Unlike the biliopancreatic diversion with duodenal switch, the SADI-S completely bypasses the jejenum and leaves very little duodenum and some of the ileum. The remainder of the small intestine is connected 250 to 300 cm from the end of the small bowel, forming the common channel, where food mixes with the digestive enzymes.
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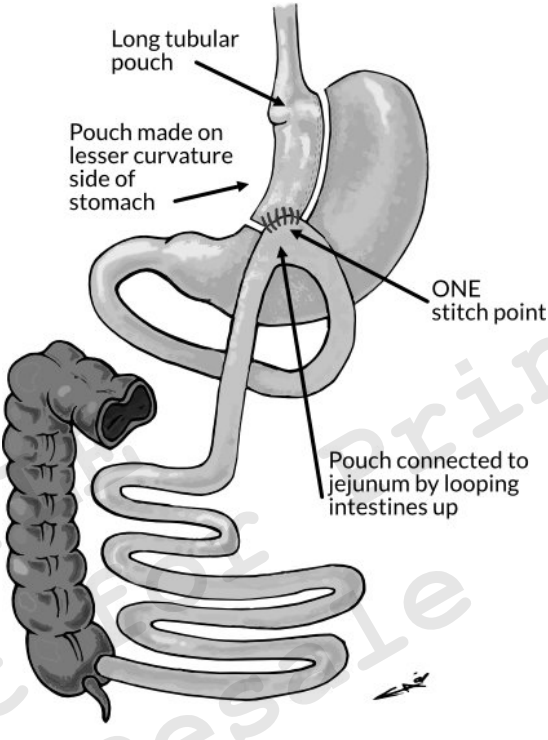

FIGURE 1.6 One-anastomosis gastric bypass (OAGB) procedure

A long tubular pouch is made on the lesser curvature of the stomach. The pouch is then connected to a loop of the jejunum portion of the small intestine at roughly 150 to 250 cm from the ligament of Treitz.
Illustrations reprinted with permission by Dr. Edo Aarts, MD, PhD.

by the ASMBS; however, it is growing in popularity worldwide with a very small number being performed in the United States. In addition, patients are traveling to other countries to get this procedure, more commonly referred to as mini-gastric bypass (MGB); however, the OAGB is a modification of the original version of an MGB. Therefore, a brief overview of these procedures should be provided if care is needed for these patients.

Procedure variation of recommendations for necessary vitamin and mineral supplementation is expected due to the metabolic changes and gastric manipulation by surgery type. Some patients may require additional supplementation due to their procedure having an increased need for certain nutrients due to higher rates of malabsorption or the inability to absorb certain nutrients as compared with other procedures. Food intolerance may also play a role when it comes to individual patient variation regarding necessary supplementation. Most importantly, it is critical to evaluate each patient by reviewing their medical history, medication usage (to evaluate for potential drug-nutrient interactions), food intake, MBS history, biochemical analysis, and any signs or symptoms of potential deficiencies. See Appendix C for information regarding vitamin and mineral requirements. Appendix D includes recommended biochemical surveillance to assist with evaluating and treating potential nutrient deficiencies. For further information regarding tips on educating and counseling patients that may assist with enhancing supplement adherence, see Appendix H.

Each procedure has variable, but often profound, effects on weight and comorbidity. Investigation of the changes that occur due to the manipulation of the stomach or digestive tract due to MBS has been ongoing over the past couple of decades. The mechanisms of action and metabolic changes associated with the various types of MBS are not completely understood. Recent data suggest that the RYGB, in addition to affecting neural and hormonal pathways, also affects gut microbiota.[30] Box 1.3 describes the characteristics of the gut hormones that have been the most studied.[24,31-37]

BOX 1.3 Gut Hormones and Their Role in Metabolic and Bariatric Surgery[24,31-38]

Glucagon-like peptide-1

Mechanism

Acts synergistically with peptide YY: induces satiety and inhibits food intake

Augments the insulin response to nutrients

Slows gastric emptying

Inhibits glucagon secretion

Postoperative effect

Sleeve gastrectomy (SG), Roux-en-Y gastric bypass (RYGB), biliopancreatic diversion with duodenal switch (BPD/DS), and single-anastomosis duodeno-ileostomy with sleeve (SADI-S): increased

Adjustable gastric band (AGB): no effect or increased (conflicting data)

Peptide YY

Mechanism

Inhibitory effect on gastrointestinal motility

Shown to induce satiety and reduce food intake

Postoperative effect

SG, RYGB, and BPD/DS: increased

AGB: no effect

SADI-S: unknown

Ghrelin

Mechanism

Produced from the fundus of the stomach and the proximal intestine

Only known orexigenic ("hunger") hormone in the gut

Primary source is the gastric mucosa

Nutrient exposure to the small intestine is sufficient for food-induced ghrelin suppression in human beings; therefore, gastric nutrient exposure is not necessary for suppression.

Continued on next page

BOX 1.3 Gut Hormones and Their Role in Metabolic and Bariatric Surgery[24,31-38] (cont.)

Postoperative effect

AGB: increased

RYGB: decreased

SG and BPD/DS: inconclusive

SADI-S: unknown

Weight Loss Outcomes of Surgery

Since obesity is a complicated condition of weight regulation and the causes of obesity vary, obesity therapy outcomes, including surgery outcomes, also vary. In addition, weight loss outcomes are reported in multiple ways, including:

- excess weight loss (EWL) (eg, in pounds or kilograms),
- the percentage of excess weight loss (%EWL),
- total body weight loss (TBWL), and
- the percentage of total body weight loss (%TBWL).

Registered dietitian nutritionists (RDNs) must be aware of how %EWL is calculated and be able to distinguish among these four terms in the literature. Box 1.4 explains how to determine a patient's excess body weight (EBW) prior to MBS, the %EWL after surgery, TBWL, and %TBWL. Table 1.1 on page 17 shows weight loss by procedure as %EWL and %TBWL at 2, 10, and 20 years postoperatively.[5,7,39]

Morbidity and Mortality Outcomes of Surgery

Surgical operations for weight loss are often considered both metabolic and bariatric (or bariatric in the case of the AGB) surgeries because, as

BOX 1.4 Calculating Excess Body Weight Before Bariatric Surgery and Percentage of Excess Weight Loss and Total Body Weight Loss

Excess body weight (EBW)

To determine a patient's EBW prior to metabolic and bariatric surgery:

1. Calculate what a patient's weight would be if body mass index (BMI) were 25.

$$25 \times \frac{\text{height in inches}^2}{703} = \text{weight in lb to be at BMI of 25}$$

   Online BMI calculators may be helpful in this determination

2. Subtract that weight from the patient's actual weight before metabolic and bariatric surgery.

   Example: Patient's preoperative weight is 320 lb and their height is 5′7″ (67″)

$$\text{BMI of } 25 = 25 \times \frac{67^2}{703} = 159.6 \text{ lb}$$

$$\text{EBW} = 320 \text{ lb} - 159.6 \text{ lb} = 160.4 \text{ lb}$$

Percentage of excess weight loss (%EWL)

To determine %EWL after metabolic and bariatric surgery:

1. Measure the amount of weight lost after surgery.
2. Divide that amount by the amount of preoperative excess body weight.
3. Multiply by 100.

   Example using the previously referenced patient that now weighs 200 lb postoperatively:

$$320 \text{ lb} - 200 \text{ lb} = 120 \text{ lb}$$

$$\frac{120 \text{ lb}}{160.4 \text{ lb}} \times 100 = 74.8\% \text{ EWL}$$

Continued on next page

BOX 1.4 Calculating Excess Body Weight Before Bariatric Surgery and Percentage of Excess Weight Loss and Total Body Weight Loss (cont.)

Percentage of total body weight loss (%TBWL)

To determine a patient's %TBWL after metabolic and bariatric surgery:

1. Subtract the patient's current weight from their preoperative weight.
2. Divide that by their preoperative weight.
3. Multiply by 100.

   Example using the same patient mentioned earlier (320 lb preoperatively; currently 200 lb):

$$\frac{320\,\text{lb} - 200\,\text{lb}}{320\,\text{lb}} \times 100 = 37.5\%\text{TBWL}$$

noted, they not only lead to significant weight loss but also influence metabolic processes and, in turn, morbidity and mortality outcomes. There is now a large body of scientific evidence demonstrating remission of type 2 diabetes mellitus (T2DM) following MBS. A large review of 621 studies that included more than 135,247 patients found that MBS results in improvement of T2DM in more than 85% of patients with diabetes and remission of the disease in 78% of patients. Remission was highest for BPD/DS patients at 95%, followed by RYGB patients with remission in 80%, and AGB patients reporting a remission rate of 60%. Other studies found comparable rates between SG and RYGB (ie, 80% remission).[43] SADI-S has been reported to have a resolution rate of 74.1% for T2DM.[44] Other morbidity outcomes for the four most common procedures combined (AGB, SG, RYGB, and BPD/DS) plus SADI-S are described in Table 1.2 (see page 18).[44-46]

The differences between procedures were marginal regarding improvement or resolution of comorbid conditions.[46] The mortality rate for MBS is less than 0.3% (3 out of 1,000) and is similar to that of gallbladder removal and considerably less than that of a hip replacement.[43] In fact, Medicare has approved metabolic and bariatric surgical procedures

TABLE 1.1 Weight Loss Outcomes of Metabolic and Bariatric Procedures[5,7,39-42]

	Weight loss outcomes over time					
Procedure	**2 years postoperative**		**10 years postoperative**		**20 years postoperative**	
	%EWL[a]	**%TBWL**[b]	**%EWL**	**%TBWL**	**%EWL**	**%TBWL**
AGB[c]	52.6%	20.4%	45.9%	19.4%	48.9%	22.2%
SG[d]	58%	25%	58.3%	26.3%	ND[e]	
RYGB[f]	68%	35%	56.7%	25%	ND	
BPD/DS[g]	65.1%	ND	74.1%	ND	ND	
	1 year postoperative		**2 years postoperative**		**5 years postoperative**	
	%EWL	**%TBWL**	**%EWL**	**%TBWL**	**%EWL**	**%TBWL**
SADI-S[f]	72%	38.6%	ND	38.7%	ND	37%

[a] % EWL = percentage of excess weight loss
[b] % TBWL = percentage of total body weight loss
[c] AGB = adjustable gastric band
[d] SG = sleeve gastrectomy
[e] ND = no data
[f] RYGB = Roux-en-Y gastric bypass
[g] BPD/DS = biliopancreatic diversion with duodenal switch
[h] SADI-S = single-anastomosis duodeno-ileostomy with sleeve

TABLE 1.2 Morbidity Outcomes 1 Year After Metabolic Bariatric Surgery[44-46]

	Patients achieving improvement/resolution	
Comorbidity	**Four main procedures combined (AGB,[a] SG,[b] RYGB,[c] and BPD/DS[d])**	**SADI-S[e]**
Hypertension	53.2%-68%	96.3%
Dyslipidemia	69.8%-71%	68.3%
Obstructive sleep apnea	66.6%	63.3%
Gastroesophageal reflux	74.4%	87.5%

[a] AGB = adjustable gastric band
[b] SG = sleeve gastrectomy
[c] RYGB = Roux-en-Y gastric bypass
[d] BPD/DS = biliopancreatic diversion with duodenal switch
[e] SADI-S = single-anastomosis duodeno-ileostomy with sleeve

based on data that showed a 7-year increase in life expectancy for individuals undergoing metabolic and bariatric surgery.[47]

There are more than 15 randomized controlled trials (RCTs), which are the highest standards for research protocols, discussing comorbidity outcomes of T2DM remission after bariatric surgery. Reports of T2DM remission among postoperative MBS patients have varied. Table 1.3 summarizes five RCTs showing diabetes remission following MBS.[48]

Procedure Choice

In the United States, experts estimate that more than 250,000 patients had surgery in 2018; SG was ranked as the most performed procedure. SG has been the most popular MBS option for more than 5 years.[3] RYGB and revision are nearly tied for second place at somewhere between 15% and 20%, with all other procedures ranging from less than 1% to 2%.[3] The most common procedures will be focused on more closely in this pocket guide, with brief overviews of the other procedures.

TABLE 1.3 Summary of Randomized Controlled Trials Showing Diabetes Remission Following Metabolic and Bariatric Surgery[20,48-53]

Author/ year	Country	Sample size (n)	Follow-up (months)	Surgery type	Type 2 diabetes mellitus remission rate	
					Bariatric	Conventional
O'Brien et al, 2006[49]	Australia	80	24	Adjustable gastric band	93%	46.7%
Dixon et al, 2008[20]	Australia	60	24	Adjustable gastric band	73%	13%
Mingrone et al, 2012[50]	Italy	60	24	Roux-en-Y gastric bypass & biliopancreatic diversion with duodenal switch	85%	0%
Schauer et al, 2012[51]	United States	150	12	Roux-en-Y gastric bypass & sleeve gastrectomy	39.4%	12%
Schauer et al, 2017[52]	United States	[a]	[a]	Roux-en-Y gastric bypass & sleeve gastrectomy	50%[a]	21%
Ikramuddin et al, 2013[53]	United States	120	12	Roux-en-Y gastric bypass	49%	19%

[a] Please review article for more clear data points as Roux-en-Y gastric bypass and sleeve gastrectomy were evaluated separately in this study but combined for clearer presentation purposes.

The MBS options offered to today's patient vary in their rate of postoperative weight loss, remission, or improvement of obesity-related comorbid conditions, nutritional requirements, and nature and severity of complications. There is no perfect procedure, and it is critical that an informed risk and benefit assessment should be made by each patient.[54] The choice of having MBS and then choosing which procedure ultimately depends on factors related to individual risk/benefit analysis. For further information regarding determining the risk/benefit analysis, visit the American College of Surgeons website to utilize their bariatric surgical risk/benefit calculator.[55]

The Role of the Registered Dietitian Nutritionist

The RDN is responsible for the nutrition care of the MBS patient and plays an important role in every aspect of care, from preoperative assessment and education of the patient to long-term follow-up, evaluation, and monitoring. There are few standardized recommendations for postoperative RDN visits, and nutrition protocols vary greatly among surgical centers. Therefore, RDNs working in a metabolic and bariatric practice should set up standard postoperative nutrition protocols appropriate for that practice (see Figure 1.7 for suggestions; only the four most common procedures were included in this data set).[13]

All patients should have access to a bariatric-trained RDN. The visits described later are merely for suggestion to assist with standardizing medical nutrition therapy (MNT) visits across surgical centers. Long-term RDN-provided MNT is helpful to assist with returning hunger, weight regain, and mitigating the risk of nutritional deficiencies.[56,57] Patients may benefit from any combination of one-on-one visits with the RDN, group visits (or classes), or support groups provided by the surgical center. All three types of visits may be in-person or may be provided through telemedicine to increase patient efficacy and potentially enhance patient outcomes.

	AGB	SG	RYGB	BPD/DS
Early Postoperative Care				
1. Protocol-derived staged meal progression	X	X	X	X
2. Healthy eating education	X	X	X	X
3. Education regarding proper supplementation and nutrient deficiency prevention program	X	X	X	X
4. Hydration education	X	X	X	X
Follow-Up Care				
1. First Visit Postoperatively (X Month Postoperatively)	1	1	1	1
2. Visit Intervals Until Stable (Every X Months)	1-2	3	3	3
3. Visits Once Stable (Months)	12	6, 12	6-12	6
4. Monitor adherence with physical activity recommendations in collaboration with the multidisciplinary team	X	X	X	X
5. In collaboration with the multidisciplinary team, encourage support group attendance; educate patient on available offerings if needed	X	X	X	X
6. Provide ongoing nutrition education	X	X	X	X
7. Provide ongoing education regarding proper micronutrient supplementation and nutrient deficiency prevention	X	X	X	X

FIGURE 1.7 Suggested postoperative care and follow-up of the metabolic and bariatric surgery patient by the registered dietitian nutritionist

Abbreviations: AGB, adjustable gastric band; SG, sleeve gastrectomy; RYGB, Roux-en-Y gastric bypass; BPD/DS, biliopancreatic diversion with duodenal switch; RDN, registered dietitian nutritionist.

Multidisciplinary team may include RDNs, bariatric surgeons, primary care physician, bariatricians, nurse practitioners, physician assistants, behavioral health experts, exercise physiology experts, registered nurses, medical assistants, and so on. See Appendix E for more information.

Adapted from Mechanick JI, Apovian C, Brethauer S, et al. Clinical practice guidelines for the perioperative nutrition, metabolic, and nonsurgical support of patients undergaoin bariatric procedures—2019 update: cosponsored by American Association of Clinical Endocrinologists/American College of Endocrinology, the Obesity Society, American Society for Metabolic & Bariatric Surgery, Obesity Medicine Association, and American Society of Anesthesiologists. *Surg Obes Relat Dis*. 2020;16(2):175-247. doi:10.1016/j.soard.2019.10.02. See reference 13.

Support Groups

Support groups are a critical tool in the care of MBS patients, as they have been shown to improve patient outcomes.[58-61] Support groups can be held for preoperative patients, postoperative patients, or combined for preoperative and postoperative patients. Different modalities can be utilized, such as in-person, virtual, phone conference, or peer-run support groups. The ASMBS Integrated Health Support Group Manual[62] is a valuable resource for support group implementation. No matter the approach, support groups provide an opportunity for RDNs to provide patients with information and deal with unexpected challenges.

Patient-Centered Care

It is the intent of the bariatric RDN to provide patient-centered care to MBS patients. The patient and the RDN work in partnership to meet the patient's health goals.[63] It is the right of every patient to receive respectful, responsive care, and the RDN must take into account individual patient preferences, needs, and values when guiding clinical decisions. Thus, it is of utmost importance for the RDN to utilize the evidence-based practice in this text within the context of the individual patients they are serving. In addition, the RDN is guided by the Academy of Nutrition and Dietetics Code of Ethics for the Nutrition and Dietetics Profession. This includes adherence to "the core values of customer focus, integrity, innovation, social responsibility, and diversity," as well as using "science-based decisions."[64]

Patient-Centered Language

In addition to patient-centered care and following the direction of the Academy of Nutrition and Dietetics Code of Ethics, it is critical that patient-centered language is used when working with patients with obesity and other diseases. Similar references to other individuals avoid defining the patient by their ability or their disease (eg, "disabled person" and "diabetic patient"). The proper terms, "individual with a disability" and "patient with diabetes," should be used; this is commonly referred to as person-first, patient-first, or person-centered language. The RDN

and other health care professionals should use person-first language and words that respect and acknowledge an individual as a whole person and avoid the use of describing a patient by their disease. For example, avoid using the term, "obese person," and replace it with "person with obesity." Putting the patient first and the disease second helps eliminate stereotypes.

It is important to note that some clinicians perceive the word "obesity" to have a negative connotation. However, obesity is a medical term, disease diagnosis, and nutrition diagnosis. Therefore, it is a medically appropriate word; however, it is important to be respectful of the preferred language of a patient when communicating with them. Research suggests that individuals with obesity prefer their medical providers to use the words, "BMI" and "weight" when referring to excess adiposity.[65-68]

Weight Bias and Sensitivity Training

In addition to patient-centered language, addressing the issue of weight bias among health care professionals is a critical undertaking. In a sample of 2,449 people with obesity, 69% reported experiencing weight stigma from doctors, 46% from nurses, 37% from RDNs, and 21% from mental health professionals.[69] As such, it is a requirement for a Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) to provide bariatric or obesity sensitivity training to everyone at their institution.[70] These trainings should address the necessity for patient-centered care, person-first language, and identification and awareness of explicit and implicit weight bias among health care professionals working with MBS patients. In order to assess implicit weight bias, visit the Project Implicit website (www.implicit.harvard.edu).[71] Awareness of one's bias is the first step in changing it. Thus, RDNs are uniquely poised to champion for antiweight bias, sensitivity training, and the use of patient-first language in the field of MBS.

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CHAPTER 2

Evaluation and Nutrition Care of Preoperative Patients

Introduction

During the preoperative phase, metabolic and bariatric surgery (MBS) patients undergo surgical, medical, psychological, and nutrition evaluation. In addition to program requirements, patients who are using insurance benefits will need to meet insurance requirements. Some insurance providers will not authorize surgery until patients participate in a medically supervised weight loss program.

The registered dietitian nutritionist (RDN) has a crucial role in preparing the patient for optimal surgical success. At this point, the RDN provides nutrition education and counseling to help patients understand the necessary lifestyle changes, improve weight-related conditions, and resolve vitamin and mineral deficiencies. They also help manage patient expectations for outcomes.

Preoperative Evaluation

The Clinical Practice Guidelines published in 2019 were a collaboration of the American Association of Clinical Endocrinologists (AACE), The

Obesity Society (TOS), American Society for Metabolic and Bariatric Surgery (ASMBS), Obesity Medicine Association (OMA), and American Society of Anesthesiologists (ASA). These practice guidelines recommend that the preoperative work-up includes a comprehensive medical history, psychosocial-behavioral evaluation, clinical nutrition evaluation, and laboratory testing.[1]

Medical Evaluation

The preoperative medical evaluation includes assessment of obesity-related conditions and causes of obesity.[1] The evaluation may be conducted by a bariatric surgeon, an obesity medicine specialist, or an advanced practice provider specializing in obesity management. Box 2.1 provides an overview of the data collected during the initial medical evaluation.

BOX 2.1 Components of Preoperative Medical Evaluation[1]

Complete history and physical reviewing obesity-related conditions, causes of obesity, weight history, and possible contraindications to surgery

Physical examination including measurement of height and weight, calculation of body mass index, evaluation of blood pressure, pulse, and respiration rate

Cardiopulmonary evaluation with sleep apnea screening

Gastrointestinal evaluation

Endocrine evaluation

Pregnancy test

Laboratory tests to evaluate vitamin and mineral status and determine the need for additional testing[a]

[a] See Box 2.5 on page 35 for more information.

Surgical Evaluation

The bariatric surgeon conducts a surgical evaluation (see Box 2.2 on page 32). An important component of the surgical evaluation is the selection of surgery. This decision is made together through consideration

BOX 2.2 Components of Preoperative Surgical Evaluation[1]

Physical examination

Review of past medical and surgical history

Selection of the type of surgery and the surgical procedure based on patient preference and analysis of all presurgical evaluations

of patient preferences and desired health outcomes, expertise of the surgeon and institution, results of the integrated health team's evaluation, and personalized risk stratification.[1] To provide valuable insight for the surgery selection process, the RDN should understand the types of surgery, mechanisms of actions, and outcomes on comorbidities and weight (see Chapter 1).

Following the evaluations from the interdisciplinary team, the final clearance to proceed with surgery is generally provided by the surgeon who will perform the procedure. At this time, medical need has been established, no medical or psychological contraindications have been identified, medical comorbidities are well managed, and the patient has expressed good understanding and commitment to the planned surgical intervention.[1]

Psychosocial Evaluation

The primary goal of a preoperative psychological evaluation is to identify risk factors or potential postoperative challenges that could negatively impact surgical outcomes (see Box 2.3). The evaluation may lead to recommendations of additional management or intervention before or after surgery. It also serves to develop trust and rapport between the clinician and patient for a long-term supportive relationship after surgery. The psychological evaluation may be performed by a licensed behavioral health clinician who specializes in the field of obesity, MBS, or eating disorders.[2] The behavioral health clinician and RDN work closely together for assessment and treatment of disordered eating behaviors and health-related behaviors that could limit a patient from achieving optimal outcomes after surgery.

BOX 2.3 Components of Preoperative Psychosocial Evaluation[2]

- Weight history
- Current and past history of eating disorders, such as binge eating, night eating syndrome, compensatory behaviors, anorexia nervosa
- Psychiatric history and psychosocial functioning
- Developmental and family history
- Current and past mental health treatment
- Cognitive functioning
- Personality traits and temperament
- Current stressors
- Social support
- Quality of life
- Substance use
- Physical activity
- Sleep hygiene
- Patient motivation and knowledge, including weight loss expectations

Nutrition Evaluation

A preoperative nutrition assessment guides the RDN's nutrition diagnoses and intervention recommendations.[3] This clinical interview allows the RDN to learn about the patient's weight history, current eating behaviors, social support system, and MBS knowledge to gather information to determine the patient's nutritional status and to manage expectations for life after surgery.[3,4] This is also an opportunity to establish rapport with the patient and to promote the value of a lifelong relationship with the bariatric team.

Box 2.4 on page 34 shows data the RDN should collect or analyze during the preoperative nutrition assessment.[3,4] See Figure E.1 on page 270 for a preoperative nutrition evaluation template using the Nutrition Care Process (NCP).

BOX 2.4 Components of Preoperative Nutrition Assessment[3,4]

Anthropometrics: height, weight, body mass index

List of previous weight loss attempts, including the following:

- commercial programs
- medical programs, including weight loss medications and behavior modification group programs
- medical nutrition therapy
- self-directed diets

Weight history, including highest and lowest adult weights

Dietary history (24-hour food intake or food frequency)

Supplement use (including vitamins, minerals, or dietary supplements)

Cultural and social history factors related to weight and diet

Eating behaviors

Meal/snack patterns

Sleep hygiene

Physical activity, including the following:

- sedentary time (hours/day)
- exercise patterns (ie, type of exercise, time spent exercising per day, number of days of activity per week)

Knowledge of metabolic and bariatric surgery (MBS), including weight expectations and impact of surgery on current eating behaviors and habits

Laboratory data about vitamin and mineral status (from the medical evaluation), with focus on micronutrients that can be affected by the specific bariatric procedure as well as potential deficiencies that will need to be repleted before MBS

Biochemical Surveillance

The RDN should assess the findings of the laboratory studies listed in Box 2.5 in the preoperative nutrition evaluation.[1,5]

Food/Nutrition-Related History

The preoperative nutrition evaluation includes a food/nutrition-related history. Items in the history include assessment of nutrient intake, eating patterns, and nutrition management.

BOX 2.5 Preoperative Laboratory Studies[1,5]

Liver function tests
Lipid profile
Complete blood count with differential
Hemoglobin A1c
Serum iron, ferritin, and total iron-binding capacity
Serum vitamin B12 and methylmalonic acid
Serum vitamin B1 (thiamin)
Red blood cell (RBC) folate and serum homocysteine
Intact parathyroid hormone, 25-hydroxyvitamin D, serum alkaline phosphatase
Retinol-binding protein and plasma retinol (vitamin A status)
Plasma a-tocopherol (vitamin E status)
Des-gamma-carboxy prothrombin (vitamin K status)
Serum zinc or RBC zinc[a]
Serum copper or ceruloplasmin[a]

[a] Indicated only in patients having Roux-en-Y gastric bypass or biliopancreatic diversion with duodenal switch.

Nutrient Intake and Eating Patterns

The nutrient intake assessment includes information on overall energy intake, protein-rich foods, calorically dense foods, nutritive quality of foods, and alcohol consumption. The RDN should assess intake patterns, with attention to the following:

- meals eaten away from home
- frequency of eating including all meals and snacks
- pace of eating
- disordered eating patterns, such as binge eating, night eating, and grazing
- emotional, habitual, and other nonhunger triggers for eating

Nutrition Management

The nutrition history also should include aspects of the client's nutrition management, including:

- nutrition knowledge and attitudes;
- weight loss readiness;
- confidence, readiness, and motivation to make behavior changes;
- self-monitoring abilities;
- social and family support; and
- economic and time limitations related to the purchase or preparation of food.

Energy Requirements

Energy requirements can be assessed most accurately using indirect calorimetry. In the absence of indirect calorimetry, resting metabolic rate (RMR) can be estimated using the Mifflin-St. Jeor equation and the client's actual body weight, as shown in Box 2.6.[3]

Box 2.6 Mifflin-St. Jeor Formula for Estimating Resting Metabolic Rate[a,6]

Men resting metabolic rate in kcal/d = (10 × weight in kg) + (6.25 × height in cm) − (5× age in years)+5

Women resting metabolic rate in kcal/d = (10 × weight in kg) + (6.25 × height in cm) − (5× age in years) − 161

[a] Specific recommendations for transgender and gender-diverse people were not provided.

To estimate total energy needs, the RMR is multiplied by a physical activity factor as outlined in the following[3]:

- sedentary: 1.0 to 1.39
- low active: 1.4 to 1.59
- active: 1.6 to 1.89
- very active: 1.9 to 2.5

Nutrition-Related Physical Findings

In addition to reviewing laboratory data, the RDN should identify physical factors that suggest nutrient deficits. Appendix D lists a selection of physical findings that may be noted in the medical evaluation or witnessed by the RDN.

Nutrition Intervention

After completing the nutrition assessment, the RDN determines a nutrition intervention.[3] Common preoperative interventions include weight stabilization or loss; addressing vitamin and mineral deficiencies; improvement of glycemic management; and education on nutrition, lifestyle, and behavioral changes.[1]

Preoperative Diets and Weight Loss

Research does not support a mandate of weight loss for all patients prior to MBS.[7,8] With surgery being the most effective intervention for obesity, withholding it until an arbitrary degree of weight loss is achieved is considered an inappropriate and potentially harmful practice.[8] A surgeon or program may prescribe weight loss in specific cases, such as a patient with a body weight that exceeds the weight limit of the program's equipment or a patient with a body weight distribution that will increase the risks associated with surgery.[1]

The RDN can help patients establish goals that promote weight stabilization before surgery and instill healthy habits that will likely contribute to success after surgery. These goals should be developed collaboratively with the patient and may address nutrient density of the diet, protein-based meals, structured eating patterns, eating behaviors that will prevent gastrointestinal distress, and increased physical activity.[9]

Independent of weight loss, a short-term, low-carbohydrate diet can reduce liver glycogen stores resulting in liver volume reduction and improved access to the stomach during surgery. These diets can be a mix of meal replacements, protein shakes, and real foods. They are effective when prescribed for the 2 weeks leading up to surgery with a daily

carbohydrate intake of less than 50 g and individualized daily calorie restriction to prevent weight gain.[10-12]

Repletion of Vitamin and Mineral Deficits

Patients seeking MBS may have vitamin and mineral deficiencies that need to be identified and corrected before surgery.[1,5] See Appendix D for examples of potential micronutrient deficiencies related to obesity as well as repletion guidelines.

Glycemic Management

Blood glucose management before MBS can reduce the risk of postoperative infections and promote wound healing. The AACE/TOS/ASMBS guidelines encourage optimization of blood glucose through medical nutrition therapy, physical activity, and pharmacotherapy and have recommended the glycemic targets listed in Box 2.7.[1] Considering that surgery is a recognized treatment for type 2 diabetes mellitus, individualization of targets is crucial to ensure that patients who can benefit from surgery are not unnecessarily prevented from receiving it.[13]

BOX 2.7 Glycemic Targets Before Metabolic and Bariatric Surgery[1]

Hemoglobin A1c

Desired goal is hemoglobin A1c(HbA1c) 7.0% or less

HbA1c of 7% to 8% should be considered for patients with advanced microvascular or macrovascular complications, extensive comorbid conditions, or long-standing diabetes where intensive efforts have not produced lower HbA1c

For patients with HbA1c more than 8%, clinical judgment needed to proceed with surgery

Blood glucose levels

Fasting blood glucose: 110 mg/dL or less

2-hour postprandial blood glucose: 140 mg/dL or less

Preoperative Carbohydrate Loading

Enhanced recovery after MBS protocols have been implemented in the field of colorectal surgery for several years and are credited with converting inpatient surgeries to day surgeries.[14] These protocols are now being applied in the field of MBS. Enhanced recovery protocols rely on the collaboration of the patient, interdisciplinary team, and institution administration. They include multiple interventions at all phases of surgery. Common interventions include prehabilitation, skin prep prior to surgery, tight glycemic management, scheduled dosing of nonopioid analgesics before and after surgery and minimizing the use of fluids, tubes, and drains intraoperatively as well as postoperative radiologic studies.[15] In a study with 36 participating centers performing Roux-en-Y gastric bypass, sleeve gastrectomy, and adjustable gastric banding surgeries, adherence to an enhanced recovery protocol reduced the length of stay from 2.24 to 1.76 days without an increased risk of bleeding, reoperation, or readmission.[16]

A component of prehabilitation is preoperative carbohydrate loading. Although a minimum of 6 to 8 hours of preoperative fasting is requested by many surgeons and anesthesiologists, technical advances have made this practice questionable. Studies have not demonstrated a greater risk of aspiration with a shortened fast of 2 to 3 hours. Preoperative fasting leads to insulin resistance; a physiological state of stress; and increased thirst, hunger, and anxiety in patients.[17]

Research suggests that oral ingestion of 100 g carbohydrate the night before surgery and 50 g carbohydrate 2 hours before surgery can shift the body from fasting to a fed state. A preferred beverage to achieve this purpose is a clear liquid with 12% carbohydrate coming from complex carbohydrates, such as maltodextrin.[18] There are beverages on the market that have been designed to these exact specifications. However, many MBS programs that are trialing preoperative carbohydrate loading use clear liquid sports drinks or fruit juices.[17] Although it is unclear if this extrapolation of the literature results in the same benefits when compared with a complex carbohydrate beverage, the evidence supporting a shortened preoperative fast is mounting.[14,17]

Nutrition Education and Counseling

Preoperative nutrition education is encouraged to help patients understand the changes they will need to make after surgery. The RDN can provide these nutrition interventions on a one-on-one basis or in small groups. Recommended topics of discussion include :

- the impact of surgery on the gastrointestinal tract,
- eating behaviors to prevent gastrointestinal distress,
- preoperative diet preparation,
- postoperative diet progression, and
- vitamin and mineral supplementation.

Lifestyle and Behavior Changes

Initiation of lifestyle changes can result in weight loss before surgery, which may align with insurance or program requirements. In addition, healthy changes to diet and exercise patterns may position patients for improved long-term postoperative success. Discussing behavior change before surgery allows patients time to become aware of their habits related to food and exercise and make necessary changes for improved postoperative outcomes. Box 2.8 provides examples of preoperative behavior modification and nutrition goals. Appendix H provides information on education and counseling techniques.

Nutrition Care Process Case Study

Box 2.9 on page 42 offers a case study with application of the NCP to the preoperative period.

Health Insurance Requirements

If a patient is using health insurance benefits to subsidize the cost of surgery, they will be required to meet the requirements from the insurance

BOX 2.8 Preoperative Behavior Modification and Nutrition Goals

Behavior modification goals

Follow a structured eating pattern.

Practice mindful eating.

Eat in designated eating areas, preferably without distraction.

Use smaller plates (recommend patients use 7- to 9-inch plates).

Avoid drinking with meals.

Self-monitor eating and physical activity.

Observe environmental cues to nonhunger eating.

Develop awareness of physical hunger and satiety.

Nutrition goals

Decrease/eliminate fast food meals.

Eliminate calorie-containing beverages.

Decrease processed foods and added sugars.

Focus on increasing intake of lean protein foods, whole fruits and vegetables, and whole grains.

Drink 48 to 64 oz of no- or low-calorie fluids throughout the day.

company. Some companies have minimal criteria—for example, a BMI of 35 or greater along with comorbidities or a BMI of 40 or more without comorbidities and a history of inability to achieve durable weight loss.[19] Other companies have rigorous requirements that may include a specified duration of obesity, age limits, drug/alcohol screenings, or participation in medically supervised weight loss programs.[20]

Despite it being a requirement by many insurance providers, there is limited evidence to support mandated preoperative weight loss in order to receive surgical treatment.[7,8] Some insurance companies have acknowledged the lack of evidence while others continue to require a weight loss program; see Box 2.10 on page 43 for examples of insurance requirements.[19,20] Typical programs are 3 to 6 months long with patients monitored by a physician or other health care provider, such as an RDN.

BOX 2.9 Nutrition Care Process Case Study for Preoperative Metabolic and Bariatric Surgery Patient

Nutrition assessment

Patient has a long history of dieting and weight cycling, has type 2 diabetes mellitus, and reports daily intake of six regular sodas. Patient meal and snack patterns are not structured. Patient reports snacking excessively between meals. Patient reports a sedentary lifestyle.

Nutrition diagnosis (PES [problems, etiology, signs and symptoms] statement)

Predicted excessive energy intake related to undesirable food choices of sugar-sweetened beverages as evidenced by intake history of six regular sodas per day.

Nutrition intervention

- Decreased energy diet—reduction in sugar-sweetened beverages
- Modified schedule of foods/fluids—development of structured eating pattern
- Nutrition education content: physical activity guidance
- Nutrition counseling based on:
  - transtheoretical model to stages of change approach
  - motivational interviewing strategy to clarify benefits vs costs of changing
  - cognitive behavioral theory approach to identify substitutes for sugar-sweetened beverages
- Collaboration and referral of nutrition care: referral by nutrition professionals to other providers; referral to exercise physiologist or community program for development of exercise prescription

Nutrition monitoring and evaluation

At follow-up appointment in 2 weeks, evaluate progress with goals. The following outcome indicators are monitored and evaluated:

- Fluid intake: sugar-sweetened beverage estimated oral intake in 24 hours
- Food intake: meal/snack pattern
- Physical activity
  - Consistency
  - Frequency
  - Duration
  - Intensity

BOX 2.10 Sample Insurance Requirements[19,20]

No medical weight loss required

The individual should have documented failure to respond to conservative measures for weight reduction prior to consideration of MBS, and these attempts should be reviewed by the practitioner prior to seeking approval for the surgical procedure. As a result, some centers require active participation in a formal weight reduction program that includes frequent documentation of weight, dietary regimen, and exercise. However, there is a lack of evidence on the optimal timing, intensity, and duration of nonsurgical attempts at weight loss and whether a medical weight loss program immediately preceding surgery improves outcomes.

Medical weight loss required

Documentation of active participation for a total of at least 3 consecutive months in a structured, medically supervised nonsurgical weight reduction program. A comprehensive commercial weight loss program is an acceptable program component, but it must be approved and monitored under the supervision of the health care practitioner providing medical oversight. Comprehensive weight loss programs generally address diet, exercise, and behavior modification (eg, WW or Nutrisystem).

Documentation from the clinical medical records must indicate that the structured medical supervision meets all of the following criteria:

- Occur during a total of at least 3 consecutive months within the 12 months prior to the request for surgery
- Include at least two visits for medical supervision, during the 3 consecutive months of program participation. One visit must occur at the initiation, and another at least 3 months later
- Be provided by an MD, DO, NP, PA, or RDN under the supervision of an MD, DO, NP, or PA
- Include assessment and counseling concerning weight, diet, exercise, and behavior modification

Some insurance providers stipulate that the program include counseling concerning weight, diet, exercise, and behavior modification, but they typically do not specify a therapeutic diet for preoperative bariatric patients.[20] Centers may tailor the preoperative weight loss program based on individual client needs or use a standard weight loss program.

Access to care is a barrier for many people pursuing MBS. The Obesity Action Coalition (OAC) has resources for patients and providers to use when navigating insurance requirements.[20] Box 2.11 contains a list of questions recommended by the OAC when speaking with insurance providers to verify benefits.

BOX 2.11 Questions to Ask When Verifying Benefits[21]

What are your health insurance benefits?

What is the definition of stage III obesity according to your plan?

If any, what coverage of stage III obesity is listed?

What limits or requirements are stated in order to receive stage III obesity treatment? For example:

- Is there a certain amount of required time you must document attempted weight loss?
- Does the documented time have to be consecutive?
- Is your physician required to document your weight loss attempts?
- Do you need to weigh a certain amount before treatment is performed or initiated?
- Is there an age requirement to receive care?
- Must you use a specific Center of Excellence or medical provider to receive coverage?
- Are there weight limitations preventing coverage?

Is there a maximum dollar limit on your benefits?

What treatment options are excluded or specifically included?

What is the copayment for medical services?

What testing is covered, such as nutritionist, psychologist, laboratory, sleep apnea study, and ultrasounds?

Does your insurer require weight loss prior to surgery? If so, what percentage or number of pounds is required?

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