

# Should This Patient Have Weight Loss Surgery?

## Grand Rounds Discussion From Beth Israel Deaconess Medical Center

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Obesity is an important public health priority in the United States. One third of U.S. adults are obese and therefore can expect higher rates of diabetes mellitus, other obesity-related comorbidities, and mortality. In 2013, the American Association of Clinical Endocrinologists, the Obesity Society, and the American Society for Metabolic and Bariatric Surgery issued a guideline that recommended weight loss (bariatric) surgery for all patients with a body mass index (BMI) of 40 kg/m<sup>2</sup> or higher and for those with a BMI of 35 kg/m<sup>2</sup> or greater in the presence of at least 1 obesity-related comorbidity. Among the 3 most commonly performed surgeries, the amount of excess weight reduction ranges from 49% for laparoscopic adjustable gastric banding to 76% for Roux-en-Y gastric bypass. In accredited centers, perioperative mortality averages 0.3%. In this *Beyond the Guidelines*, 2 experts in obesity management, a bariatric surgeon and a general internist, discuss the role of weight loss surgery versus dietary and lifestyle modification, both in general and for a specific patient who is eligible for surgery. Ethnic and age-related variability in the effects of obesity on mortality, as well as potential long-term benefits and risks of weight loss surgery for patient subgroups, are discussed.

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**M**r. O is a 64-year-old man with morbid obesity. Over the past 10 years, his weight has fluctuated between 265 and 291 pounds, with a corresponding body mass index (BMI) of 39.1 to 43.7 kg/m<sup>2</sup>. The diets Mr. O has tried include commercial weight loss programs, but he has had no durable weight loss. He walks and swims for exercise.

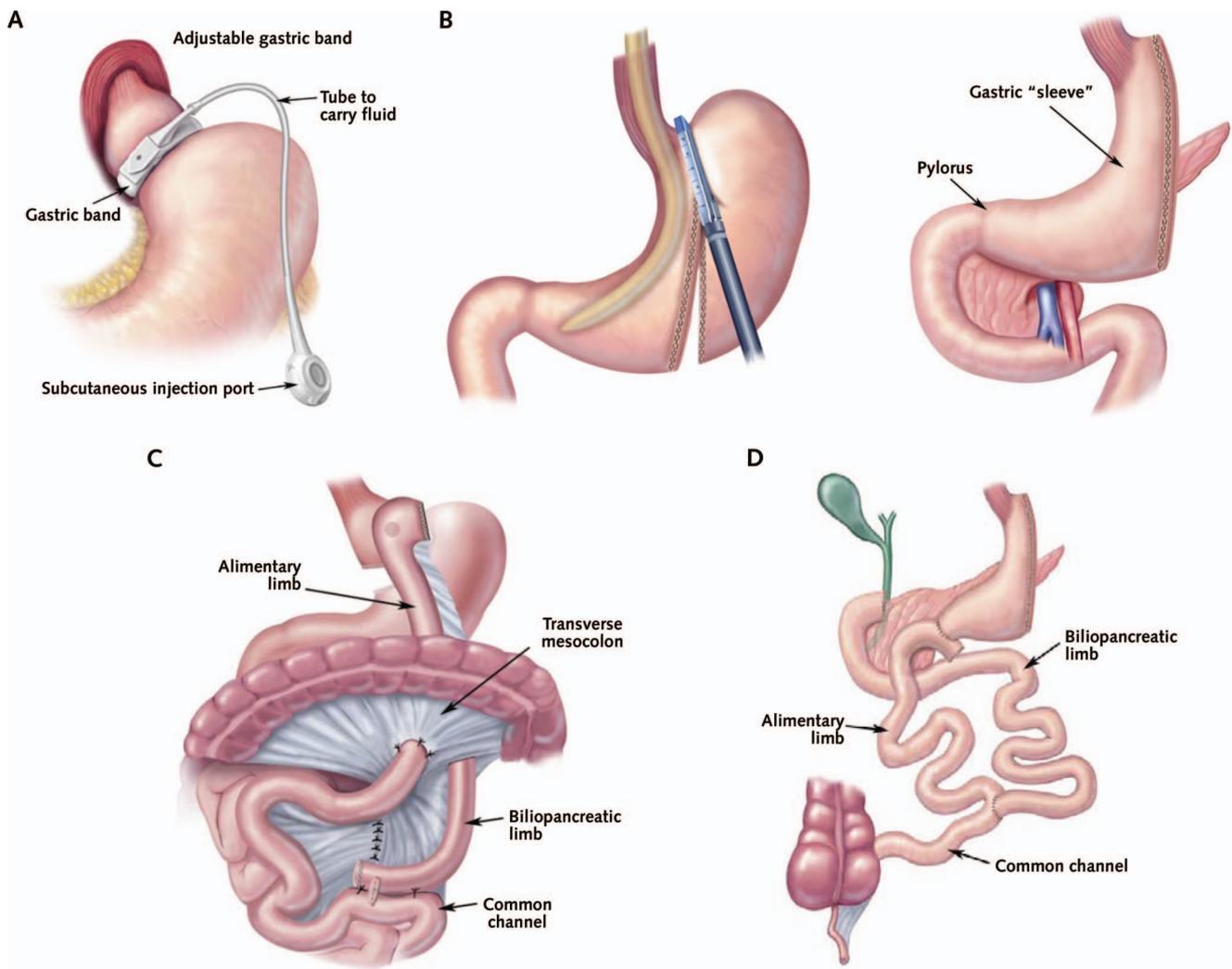
Mr. O's obesity-related conditions include hypertension, hypercholesterolemia, sleep apnea, and knee osteoarthritis with bilateral total knee replacements. Other medical history includes benign prostatic hyperplasia, depression, low back pain, colonic adenomas, and recent upper gastrointestinal bleeding from gastric ulcers. Medications include atenolol, chlorthalidone, fluoxetine, lisinopril, pantoprazole, simvastatin, and tamsulosin. On examination, Mr. O is morbidly obese but is well-appearing. Weight is 291 pounds, height 69.5 inches, blood pressure 126/64 mm Hg, heart rate 77 beats per minute, and BMI is 42.4 kg/m<sup>2</sup>. Chest is clear, heart sounds are normal without murmur or gallop, abdomen is nontender with no hepatosplenomegaly, and extremities reveal bilateral trace edema. The level of hemoglobin A<sub>1c</sub> is 5.2%, total cholesterol is 178 mg/dL (4.6 mmol/L), and low-density lipoprotein cholesterol is 70 mg/dL (2.1 mmol/L). Thyroid-stimulating hormone level is normal.



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**Figure 1.** Commonly performed weight loss surgeries.

Adapted from *Atlas of Metabolic and Weight Loss Surgery*, published by Ciné-Med Publishing, 2010, www.cine-med.com. A. Adjustable gastric banding. B. Sleeve gastrectomy. C. Roux-en-Y gastric bypass. D. Biliopancreatic diversion and duodenal switch.

## MR. O'S STORY

When I was in high school, because of the athletics that I did—football and wrestling—I was in much better physical condition and did not really have weight problems at that time. It wasn't until I was in my 30s that I really started gaining weight. Two or three weeks ago I was in the upper 290s.

I have high blood pressure due to being overweight, and I take several medications to control it. I take a cholesterol medication as well. My primary care doctor has told me that if I lost weight, it probably would help my sleep apnea. The extra weight does not prevent me from doing anything that I want to do, you know, except possibly enter a swimsuit competition. I am aware of the risk associated with being overweight and have to come to terms with my own mortality. In the scheme of life, the grim reaper wins every time, so

I am in the process of trying to make some lifestyle changes and hopefully those will produce some benefits.

I have discussed weight loss surgery with my primary care doctor. I think that the risks of staying the current course are worse than the risks associated with the surgery. I certainly would be better off in 10 years if I had bariatric surgery than if I did nothing. If I did not have the surgery and lost weight anyway, then I probably would be better off than if I had the surgery. The surgery would sort of give you a starting point, but you can certainly undo any good that the surgery does by resuming your old lifestyle choices. So if you're not going to make those changes, there is no point in having the surgery.

See the **Patient Video** (available at [Annals.org](http://Annals.org)) to view the patient telling his story.

## CONTEXT, EVIDENCE, AND GUIDELINES

According to statistics from the Centers for Disease Control and Prevention (CDC), 36.5% of U.S. adults are obese (defined as a BMI of 30 kg/m<sup>2</sup> or greater) (1); rates are higher among African American and Hispanic persons (1). In a study of 1.46 million white adults, mortality after 10 to 14 years of follow-up was 2.65-fold higher in persons with a BMI of 40 to 49.9 than in those with a healthy BMI (22.5 to 24.9) (2). Obesity also increases the rate of type 2 diabetes. In the Nurses' Health Study, women with a BMI of 35 or greater were compared with those with a BMI less than 22, and the relative risk for diabetes in 14 years of follow-up was 93.2 (95% CI, 81.4 to 106.6) (3). Obesity is also a risk factor for hypertension, coronary heart disease (4), obstructive sleep apnea, and fatty liver disease. Lifestyle modification, typically resulting in a maximum 5% to 10% loss in body weight, is often insufficient to improve health outcomes and is not sustained. Although approximately 5% of the U.S. population has a BMI greater than 40, fewer than 1% have weight loss surgery (WLS) (5). Most eligible patients are never offered this option.

In 2013, the American Association of Clinical Endocrinologists, the Obesity Society, and the American Society for Metabolic and Bariatric Surgery published a joint clinical practice guideline on selection for and perioperative management of patients having WLS (6). The guideline recommends WLS for patients with a BMI of 40 or greater and no obesity-related comorbidities (Grade A recommendation) based on evidence that surgery in this group decreases long-term mortality (7) and may result in remission of type 2 diabetes (8). In a cited systematic review, bariatric surgery was associated with an odds ratio of 0.55 (CI, 0.49 to 0.63) for all-cause, long-term mortality (mean follow-up, 7.5 years) (7).

The guideline recommends WLS for patients with a BMI of 35 or greater and one or more obesity-related

comorbidities (Grade A recommendation). Based on limited data (Grade C recommendation), the guideline suggests bariatric surgery for patients with type 2 diabetes or metabolic syndrome and a BMI of 30 or greater. It did not consider the role of ethnicity on candidacy for and benefits of bariatric surgery. In a study using the National Surgical Quality Improvement Program database, among 48 378 patients there was a nonsignificant trend toward higher perioperative mortality associated with advanced age but the absolute rates were low for patients aged 70 years or older (9).

The guideline compared the benefits of laparoscopic adjustable gastric banding (LAGB), laparoscopic sleeve gastrectomy (LSG), laparoscopic Roux-en-Y gastric bypass (RYGB), laparoscopic biliopancreatic diversion (BPD), and BPD duodenal switch (BPD-DS) (Figure 1). The authors found insufficient evidence to recommend one procedure over another (Grade D recommendation). They advised caution in the use of BPD or BPD-DS because of the risk for nutritional insufficiencies from the increased length of bypassed small bowel. Patients can expect an average loss of 76% of excess weight (actual weight loss/weight in excess of ideal body weight) at 2 years (39% of total body weight) after RYGB (10). By comparison, LAGB resulted in a 49% reduction in excess weight in a meta-analysis (11). Loss of excess weight with LSG (55%) is between that of RYGB and LAGB (12).

## CLINICAL QUESTIONS

To structure a debate between our 2 discussants, we mutually agreed on the following key questions to consider when applying this guideline in clinical practice and to Mr. O in particular.

1. What is the risk of the status quo: 10-year morbidity and mortality of untreated severe obesity? Should this frame our discussions with patients?

2. What is the role of WLS in obese patients? Should there be different BMI thresholds for specific populations, including African American, Asian American, elderly, and diabetic persons and those with existing cardiovascular disease?

3. How do surgical weight loss procedures vary in terms of degree of weight loss expected and risk? How should we counsel our patients?

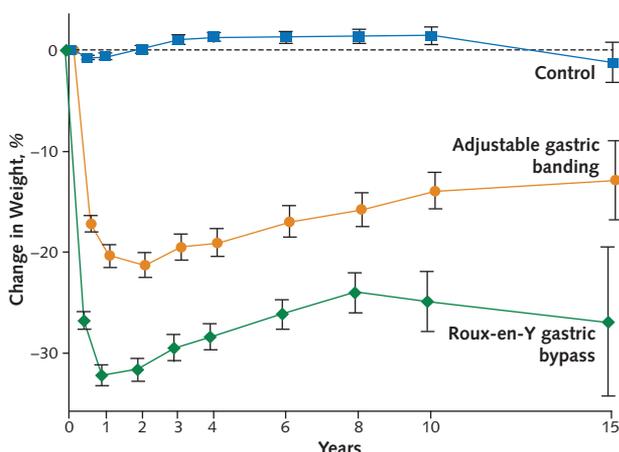
## DISCUSSION

### A Specialist's Viewpoint (Dr. Daniel B. Jones)

**Question 1: What is the risk of the status quo: 10-year morbidity and mortality of untreated severe obesity? Should this frame our discussions with patients?**

Obesity is spiraling out of control. Data from the the CDC show that in nearly every state, one-third of the population is obese (BMI of 30 or greater) and another third are overweight (BMI of 25 to 29.9) (1). Even more concerning is the exponential increase in those with the highest BMIs. Obesity is associated with a host of comorbid conditions. As one's weight increases over

Figure 2. Long-term comparison of weight loss surgeries.



From reference 14.

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time, so do the number of comorbid conditions and mortality (13).

For most of us, diets do not work (Figure 2). Ten years after intensive diet and exercise, obese individuals, on average, weigh even more (14). In the Swedish Obese Subjects study, an observational study that compared patients who had bariatric surgery with a matched control group, those in the control group were more likely to die than those who had bariatric surgery (Figure 3) (14). Several states now mandate coverage for this surgery (15).

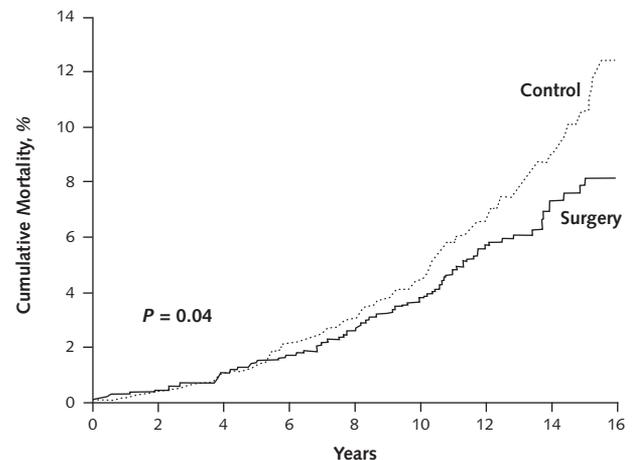
**Question 2: What is the role of WLS in obese patients? Should there be different BMI thresholds for specific populations, including African American, Asian American, elderly, and diabetic persons and those with existing cardiovascular disease?**

New research suggests that earlier surgical intervention at lower BMIs than currently recommended may be beneficial in some subgroups of patients. Today, commonly performed bariatric operations differ in technique and are safer than the now-outdated vertical banded gastroplasty, jejunoileal bypass, and open RYGB. Further, the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program now accredits bariatric programs that have proper facilities, multidisciplinary teams, sensitivity training, and verified good outcomes (16). Perioperative mortality for bariatric surgery is 0.3% and thus safer than other common operations, such as colectomy, pancreatectomy, and esophagectomy (17). While we are speaking about weight loss surgery, it would be more appropriate to think of these operations as metabolic surgery.

The efficacy of WLS has been studied in various subpopulations. Asian Americans develop type 2 diabetes at a lower BMI; for that reason, the 2016 Diabetes Summit, endorsed by 45 worldwide medical and scientific societies, concluded that this group should be offered WLS at a BMI 2.5 kg/m<sup>2</sup> lower than that for other patients (18). Likewise, patients with cardiovascular disease may benefit from early WLS. Patients older than 65 years benefit from WLS but have a slightly increased perioperative risk and tend to lose less weight than younger patients (19). Many elderly patients seek improved health but not necessarily maximum weight loss and may be more inclined to choose a less-invasive operation despite less weight loss.

Patients with diabetes may be most likely to benefit from early surgical intervention, and in 2011, the U.S. Food and Drug Administration (FDA) expanded the indications for LAGB to patients with diabetes and a BMI between 30 and 35. The 2016 Diabetes Summit guidelines expanded indications for surgical treatment of diabetes to a BMI between 30 and 35 when hyperglycemia is inadequately controlled despite optimal medical treatment (18). However, insurance plans have yet to expand bariatric coverage for diabetic patients with a BMI in this range. Weight loss surgery can result in resolution and remission of weight-related comorbid illnesses (Table).

**Figure 3.** Survival advantage after weight loss surgery.



From reference 14.

**Question 3: How do surgical weight loss procedures vary in terms of degree of weight loss expected and risk? How should we counsel our patients?**

The most commonly performed operations today include LAGB, LSG, RYGB, and BPD-DS (20). In general, LAGB is considered the safest operation, and BPD-DS is the riskiest (20). Laparoscopic adjustable gastric banding is the least effective for weight loss, whereas BPD-DS results in the most weight loss and is most likely to resolve diabetes (21). In the United States, LSG is now the most commonly performed procedure.

In our program, Mr. O would be asked to watch a webinar and attend a new patient information session to learn more about the 3 principal surgical options (RYGB, LSG, and LAGB). Although BPD-DS is effective, we do not offer it because we feel the operative risks and potential for malabsorption are too high. Mr. O would have several appointments and educational meetings with our nurses, dietitians, social worker, and bariatrician. He would be encouraged to make behavior changes, eat healthier, and continue exercising. He would be expected to try to lose 10 pounds preoperatively and to pass a written examination to document his knowledge about the risks, benefits, and expectations of the various weight loss operations. He would need to demonstrate a good understanding and to voice realistic expectations as part of informed consent. After extensive education and counseling, Mr. O. might elect to have an operation.

Given his history of gastric ulcers and repeated upper gastrointestinal endoscopy, an *H pylori* test would be done and treatment performed if necessary. If Mr. O is ulcer-free, he could proceed with WLS. Laparoscopic sleeve gastrectomy would likely result in more weight loss than LAGB and less than RYGB. However, RYGB makes surveillance endoscopy difficult because of the excluded gastric pouch. Therefore, LAGB or LSG would be preferred.

Laparoscopic adjustable gastric banding is less effective than LSG and requires more postoperative visits

**Table.** Percentage of Patients With Resolution of Comorbid Conditions, by Type of Surgery\*

| Procedure                               | Hypertension | Diabetes | Hyperlipidemia | Sleep Apnea | Gastroesophageal Reflux Disease |
|---|--------------|----------|----------------|-------------|---------------------------------|
| Laparoscopic adjustable gastric banding | 50           | 40       | 50             | 50          | 65                              |
| Sleeve gastrectomy                      | 65           | 60       | 75             | 60          | 75                              |
| Roux-en-Y gastric bypass                | 75           | 80       | 85             | 75          | 95                              |
| Duodenal switch                         | 85           | 90       | 90             | 75          | 75                              |

\* Adapted from ASMBS Foundation. Fundamentals of Bariatric & Metabolic Surgery. Accessed at <http://essentials.asmb.org/> on 12 April 2017.

to optimize the band's tightness (22). For these reasons, most patients today would elect to have LSG. After LSG and with adherence to a healthy diet and moderate exercise, Mr. O could expect a 50% to 60% loss of excess weight as well as improvement in sleep apnea, lower back pain, hypertension, and hyperlipidemia (23). He could also anticipate a significant improvement in measured quality of life. On average, he could expect to live several years longer after WLS than with a supervised diet, intense exercise, and optimum medical therapy (14).

We need to intensify prevention efforts. We need more research regarding the physiology of obesity and the specific mechanisms by which weight loss operations result in better clinical outcomes. But until we have a pharmacologic treatment that is safe and at least moderately effective, we should not forgo current surgical treatments that can restore health and prolong life. Once a patient is approximately 100 pounds above ideal body weight and begins to accumulate weight-related comorbid conditions, primary care physicians should encourage patients to consider surgery (24). In my opinion, insurance companies should not create hurdles for operations that can improve health, quality of life, and longevity.

### A Primary Care Physician's Viewpoint (Dr. Christina C. Wee)

#### **Question 1: What is the risk of the status quo: 10-year morbidity and mortality of untreated severe obesity? Should this frame our discussions with patients?**

Current obesity treatment guidelines are based primarily on risk-benefit data obtained in young to middle-aged Caucasian adults and may not generalize to other patients with obesity.

For example, the adverse impact of obesity on longevity is reduced among older adults (25-27) and probably reduced among African Americans (28-30), but it is greater for Asians and Latinos (Figure 4) (28, 31). Among older community-dwelling Medicare beneficiaries, only a BMI of 35 or greater was associated with adverse mortality risk (32), and the increase was modest (Figure 5).

Race and age may also influence the impact of obesity on quality of life (33, 34). African Americans report less pronounced adverse physical function and social consequences from obesity than Caucasians. In contrast, among older adults, even modest increases in BMI above the normal range were associated with fairly substantial increases in functional decline (Figure 5) (32). Thus, preserving functional independence may be the most relevant health outcome for Mr. O.

Finally, while obesity contributes to the development of many comorbidities, for some conditions it may actually be neutral or even protective in terms of mortality once those conditions, especially coronary artery disease and congestive heart failure, are established—the “obesity paradox” (35, 36). Postulated mechanisms for these protective effects include greater metabolic reserve and higher circulating peptides and lipoproteins that nullify some of the adverse effects of inflammatory cytokines (36).

The risks of obesity thus appear higher in Asians, lower in older adults, and potentially lower in African Americans. The threat of obesity to functional independence is a greater concern in older adults than its negative effects on longevity. Moreover, obesity may paradoxically reduce mortality risk for those with some preexisting comorbidities.

#### **Question 2: What is the role of WLS in obese patients? Should there be different BMI thresholds for specific populations, including African American, Asian American, elderly, and diabetic persons and those with existing cardiovascular disease?**

Bariatric surgery is the only current treatment producing 20% or greater weight loss (37-39). However, much of the long-term data on effectiveness, including the mortality benefit, are derived from observational studies, primarily of middle-aged Caucasian adults, and with inadequate comparators (i.e., inactive control groups rather than active nonsurgical treatment interventions). Thus, selection bias likely favored surgery (40, 41). Randomized clinical trials have been few, small in size, and of short duration and have enrolled selected patients with preexisting diabetes and lower BMIs (30 to 40) (42, 43).

Race, age, and BMI appear to modify WLS effectiveness. One study found that for each additional decade of age, patients lost 9% less of their baseline weight (40% less than the mean weight loss of 22%) (44). A meta-analysis estimated 8% less excess weight lost in African Americans relative to Caucasians (45); few data are available comparing other ethnic minority groups. Mortality reduction is greater for those with a BMI greater than 45 (41). Thus, WLS should be individualized according to risks of obesity, the likely effectiveness and risk of the procedure, and availability of other effective treatments.

Weight loss surgery is not risk-free. Some long-term adverse effects that are poorly understood include a potential rise in alcohol misuse (46, 47), as well as a paradoxical increase in suicide, overdose, and ac-

cidental death (41). Weight loss leads to a preferential loss of lean mass, and if weight is regained, a preferential regain of adipose tissue (48, 49). This is particularly problematic for older adults like Mr. O who are already predisposed to sarcopenia and osteopenia. The precipitous weight reduction associated with WLS causes more dramatic loss of bone and muscle than other weight loss treatments (50). In 1 small study, patients lost 10% of their bone density at the hip after WLS—representing a ratio of bone-to-weight loss 3 times greater than that observed with weight loss from lifestyle interventions (51).

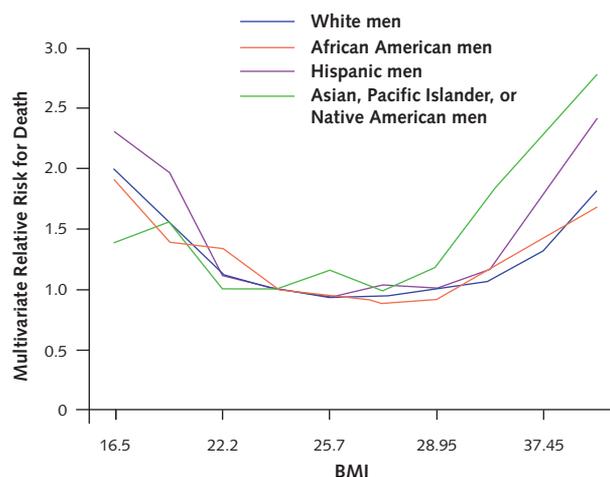
In contrast, intensive lifestyle treatments have a better safety profile and are supported by large randomized trials of demographically diverse populations. While intensive lifestyle treatments produce more modest weight loss (5% to 10%), they lead to improvements in metabolic parameters and cardiovascular risk factors (52, 53). The Diabetes Prevention Program intervention, a weekly to monthly behavioral intervention consisting of a low-fat, low-calorie diet combined with increased physical activity, reduced the risk for diabetes at 4 years by 50% (53) and was considered cost-effective (54). In contrast, health care use increases several years post-WLS due to both short- and long-term adverse effects (52, 53). Furthermore, lifestyle interventions produce more (as much as 60%) weight loss in older adults (55) than in younger adults but are less effective in African Americans. A program consisting of a high-protein diet combined with resistance exercise may ameliorate the loss of lean mass resulting in greater improvement in frailty measures (49). Villareal compared a high-protein weight-loss diet alone, resistance exercise training alone, and diet plus exercise with a control group and found that the diet-plus-exercise group performed the best (56). While the exercise-only group lost no weight, it outperformed the high-protein-diet-only group (average weight loss of 10%) on physical performance measures, suggesting that the degree of weight loss may be less important in improving functional outcomes. It is not clear if Mr. O has ever undergone these intensive lifestyle interventions.

In sum, the net risk-benefit ratio for WLS is less favorable in older adults, those with BMIs less than 45, and those with preexisting cardiovascular disease. Due to their high baseline risk, Asian Americans may warrant more aggressive weight treatment, although very few long-term data are available for WLS in this subgroup.

### Question 3: How do surgical weight loss procedures vary in terms of degree of weight loss expected and risk? How should we counsel our patients?

Roux-en-Y gastric bypass, which has the most robust data and longest duration of use, produces the greatest weight loss, followed by LSG and LAGB (37–39). Even with RYGB, however, weight regain occurs (Figure 2), although 75% of patients sustain 20% weight loss after 10 years, whereas only 25% do so after LAGB

**Figure 4.** Association between BMI and risk for death in men, by race/ethnicity.



Adjusted for age, education, smoking history, physical activity, and alcohol use. Based on data from reference 28. BMI = body mass index.

(37). The mortality benefit commonly cited for all WLS is largely based on data in RYGB (40, 41). Both RYGB and LSG produce physiologic changes, including alterations in gut peptides, that decrease appetite and increase glucose metabolism. As a result, improvement in glycemic control is greater than expected from the level of weight loss alone (57). In contrast, improvements in comorbid conditions after LAGB are largely mediated by weight loss from gastric restriction. For these reasons, RYGB and LSG may be preferable to LAGB for patients with diabetes.

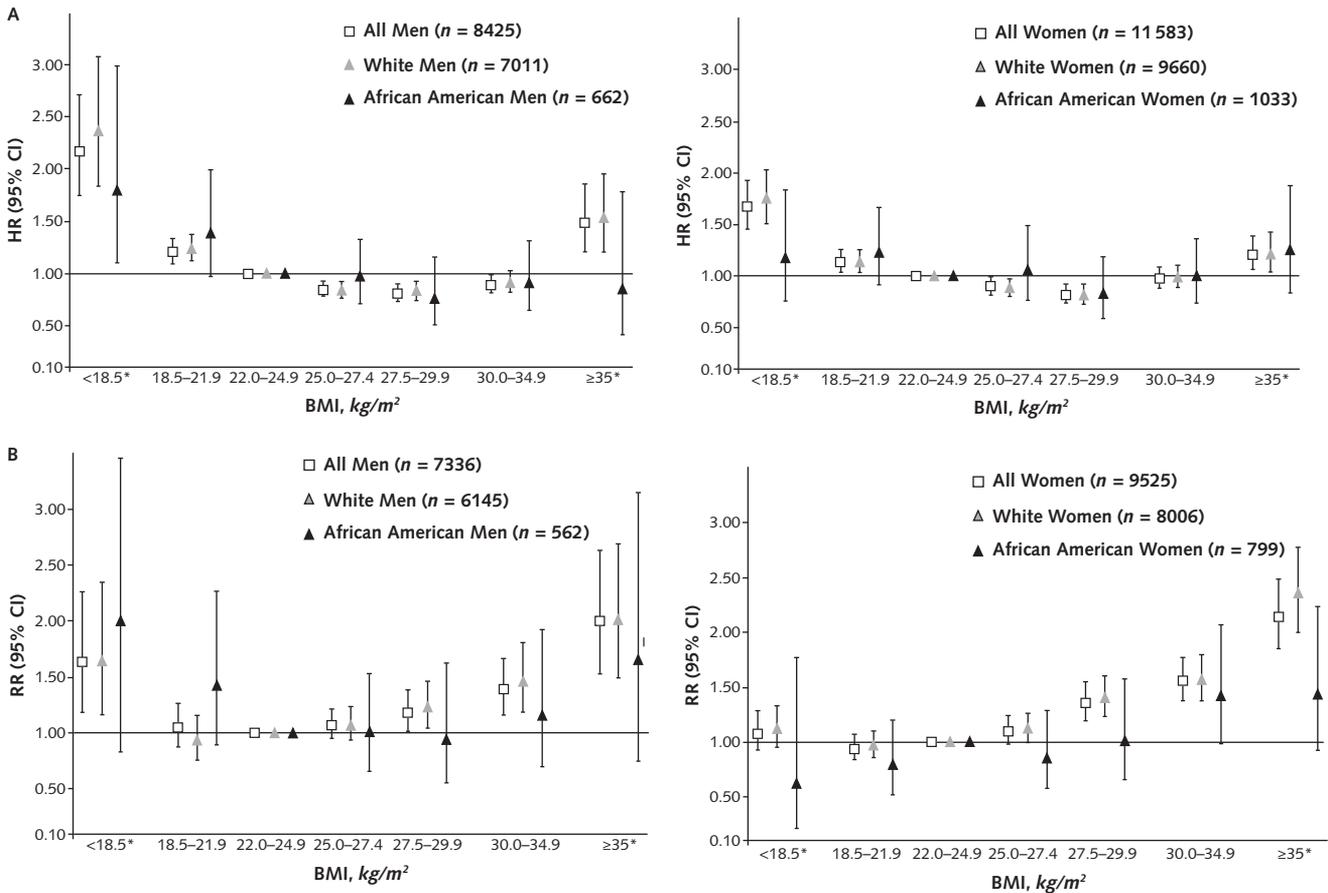
Unfortunately, the harms of WLS are also greatest for RYGB followed by LSG and LAGB (58). Moreover, LAGB is the only reversible WLS. Diversionary surgeries, such as RYGB, also appear to have more deleterious effects on loss of lean mass than purely restrictive procedures, even after accounting for weight loss (59). Because Mr. O is relatively healthy metabolically except for his hypertension, functional outcomes and preservation of lean body mass may be priorities. Roux-en-Y gastric bypass also raises the risk for peptic ulcer disease (58), precluding the use of nonsteroidal anti-inflammatory medications after WLS. This would be particularly problematic for Mr. O, who has a history of gastric ulcers and back pain.

Thus, a trial of a high-protein weight-loss diet combined with resistance exercise may be preferable before to WLS for Mr. O. If he were to undergo surgery, LAGB is a reasonable choice given its lower perioperative and long-term risks and its reversibility. The more modest weight loss would result in functional benefits without the tradeoff of excessive loss of lean mass.

## SUMMARY

Fully one third of U.S. adults have a BMI greater than 30 kg/m<sup>2</sup> and thus are considered obese. Un-

Figure 5. Relationship of BMI to mortality and disability.



Mortality was assessed at up to 14 y from the baseline interview. Disability was assessed at 1 and 2 y after the baseline interview. All models were adjusted for baseline age, smoking status, highest education, proxy response, and individual non-obesity-related comorbidities (chronic lung disease, rheumatoid arthritis, conditions associated with cognitive impairment, and cancer). A few persons with HIV/AIDS were excluded ( $n < 15$ ). Models include a BMI, race, and sex interaction term; BMI of 22.0 to 24.9 kg/m<sup>2</sup> is the reference category within each race- and sex-specific model. From reference 32. BMI = body mass index; HR = hazard ratio; RR = risk ratio. A. Adjusted HRs for death. B. Adjusted RRs for new or progressive disability in activities of daily living.  
 \* Sample size of African American persons in this category is <30.

treated obesity increases mortality and rates of type 2 diabetes mellitus, hypertension, coronary heart disease, obstructive sleep apnea, and fatty liver disease. Lifestyle modification and dietary strategies provide only modest weight loss, have insufficient effects on obesity-related comorbidities, and are usually not sustainable.

Despite a joint guideline endorsed by relevant professional societies, most eligible patients are not offered WLS, despite expected significant excess weight loss after all 3 commonly performed procedures. Bariatric surgery confers decreased long-term mortality and the potential for remission of diabetes. The FDA has now expanded the indications for WLS to include patients with diabetes and a BMI of 30 to 35.

Dr. Jones, a bariatric surgeon, argues that obese patients who follow a dietary and exercise program generally weigh more, not less, after 10 years of follow-up. He emphasizes that patients who undergo WLS have lower 10-year mortality rates than those who do

not, and that in accredited centers WLS has an expected perioperative mortality of 0.3%, which is similar to that of other major abdominal procedures. Dr. Jones encourages primary care practitioners to more actively offer WLS to eligible patients, arguing that not offering this treatment to eligible patients may constitute medical malpractice. Dr. Jones generally considers LAGB to have the least risk and BPD-DS to have the most. He endorses a multidisciplinary model for patient selection and education that includes nurses, dietitians, social workers, and bariatric surgeons.

Dr. Wee, a general internist, notes disparities in the effects of obesity on mortality, with obesity conferring higher mortality rates for Asians and Latinos than whites, and perhaps lower adverse mortality rates among African American and older patients. For older patients, preventing functional decline may be a more relevant outcome than reducing mortality. Bariatric surgery results in less weight loss for African American and elderly patients than for other subgroups. Dr. Wee ar-

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gues that the claim of reduced long-term mortality among patients undergoing WLS is based primarily on observational studies of nonrepresentative patients having RYGB, and cautions that the weight loss after bariatric surgery may preferentially involve loss of bone and muscle mass. On balance, Dr. Wee suggests that dietary and lifestyle interventions are safer and may be preferred over WLS for elderly patients, such as Mr. O.

Thus, for Mr. O, Dr. Jones favors LSG surgery. Dr. Wee recommends a trial of a high-protein, low-calorie diet and resistance training, and if Mr. O subsequently needed WLS, Dr. Wee would recommend LAGB.

Of note, since this grand rounds took place, a new guideline has been published by members of the Second Diabetes Surgery Summit in collaboration with international diabetes societies (60). The guideline's recommendations for BMI thresholds for WLS candidacy are consistent with those of the 2013 joint guidelines discussed here.

A transcript of the audience question-and-answer period is available in the **Appendix** (available at [Annals.org](http://Annals.org)). To view the entire conference video, including the question-and-answer session, go to [Annals.org](http://Annals.org).

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## APPENDIX: COMMENTS AND QUESTIONS

**Dr. Mark Zeidel:** I think we have the clearest surgical-to-medical divide that I have seen in a long time here, which is great. Internists, the people who are seeing these patients, are looking at a broader spectrum of the data and have some concerns. If the bariatric program is very focused on a goal of surgery, which it appears to be, it is going to be harder to get referrals than if it addressed all aspects of the care of the patient who is obese, including diet, exercise, and psychological problems. We temper some of this, so it's not always, "Well, the train is heading this way," because if the internists believe that every patient sent to the program is going to have an operation, it is going to reduce referrals. On the other hand, if there is a balanced approach, where internists and surgeons argue vigorously over who needs what but the program is really robust, I think far more people who actually need the operation will get it. So, shouldn't we encourage—and I think this is important because programs are often driven by the surgical side, given where the revenues come from—and develop programs that more internists perceive as balanced?

**Dr. Jones:** You are absolutely right in that this is structured as a debate. We have done our best to provide the information and keep you awake, but the goal here is not to claim that every patient needs surgery. If I have made that case, I need to back up a little bit. The real goal is to get internists like yourself, when you are seeing people for coronary artery disease and sleep apnea, to say, "Have you considered weight loss surgery?" The average person takes 2 to 3 years to decide to have a procedure. We are not even trying to get them into the surgeon's office. What we are trying to do is to get them to learn about band, bypass, and sleeve for the first time and start to think about it. When we talk about someone who is being evaluated for weight loss surgery, they don't see the surgeon first, at least in our program—they are referred to a bariatrician (who is an internist), as well as a dietitian and social worker. They are going to have the most comprehensive evaluation you can imagine. Only after all that is said and done does the patient see the surgeon and start to discuss surgery. That could take months, and sometimes the patients don't even qualify. So not everyone who comes to an information session is going to have an operation. We are looking for optimal results, which means picking the best candidates for surgery and not denying appropriate care to the higher-risk patients.

**Dr. Benjamin Bier:** I am one of the internal medicine residents. So, the goal of both lifestyle changes and surgery is to improve weight loss?

**Dr. Wee:** To clarify, it is to improve patient outcomes, which may not solely be weight loss.

**Dr. Jones:** Our goal is to resolve comorbid conditions, improve health, and make you live longer.

**Dr. Bier:** Have any of the studies looked at quality of life? Do patients foresee their lives getting better after surgery or better after intensive weight loss programs or other lifestyle changes? "The Biggest Loser" has shown that massive weight reduction might not actually improve lives.

**Dr. Jones:** Let's talk about "The Biggest Loser." The eighth season in 2009 tracked people for 6 years. Now, you can't get any more intense than the folks in that program. They are in front of a camera, they have personal trainers, they have dietitians, and it has been predetermined that they will probably do well. But when you follow them for 6 years, 13 out of 14—after dieting successfully—gained all of their weight back. Four were much heavier than when they started (61). This phenomenon has been studied, with results showing that with diets, resting metabolism slows down, making it easier to gain weight over time (62). In other words, even with the most intensive lifestyle changes in the youngest, healthiest, and most motivated people on the planet, diets often fail to provide sustained weight loss.

**Dr. Wee:** There are a lot of long-term data on bariatric surgery in terms of improved quality of life. By and large, if you lose weight and sustain the weight loss, your physical functional status improves (63). However, psychosocial functioning does not necessarily improve. In fact, for some patients, it might get worse, which is why I think you might see the higher rates of suicide. There are a subset of patients who eat to cope with their emotional life, and when you take that coping mechanism away, their mental health may actually decline (64). So, I certainly would never recommend surgery solely because a patient said, "I'd be less depressed if I lost the weight and got married." In fact, there is a phenomenon observed where women get divorced after bariatric surgery.

**Dr. Jones:** Men get divorced, too. When you talk about psychosocial problems, we know that some patients tolerate bad relationships, but when they lose the weight and improve their self-esteem, they shed that baggage—that is part of the explanation for divorce.

**Dr. Wee:** Physical functioning does, on average, improve, assuming you are not in the minority of patients who develop serious complications. For those patients, quality of life might be worse. Also, lifestyle

treatment has been shown to be cost-effective but bariatric surgery is associated with higher health care costs several years after surgery (65–67).

**Dr. Jones:** Weight loss surgery pays for itself in 3 years. If you look in quality-adjusted life-years, bariatric surgery is very cost-effective (62). It is more cost-effective than dialysis. Diabetes costs over \$10 000 a year in complications, and weight loss surgery may be curative. So I think that is a wrong statement.

**Dr. Wee:** I disagree. When you include the cost of rehospitalization due to surgical complications, what Dan is suggesting is not always true, but there are formal cost-effective analyses for lifestyle treatment.

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