

*Corridor Consult*

# What Do I Do with My Morbidly Obese Patient? A Detailed Case Study of Bariatric Surgery in Kaiser Permanente Southern California

Pouya Shafipour MS, MD  
Jack K Der-Sarkissian, MD  
Fadi N Hendee, MD  
Karen J Coleman, MS, PhD

## Abstract

Unfortunately, many of the traditional methods for weight loss, such as dietary restriction, exercise, meal replacement, psychosocial and behavioral interventions, and medications, have limited effectiveness in long-term weight maintenance and regulation of chronic diseases such as type 2 diabetes. This has led to the development of surgical approaches to weight loss, generally referred to as bariatric surgery. Most bariatric surgery studies have shown excellent weight-loss rates for up to two years after surgery, with patients losing an average of 61% of their excess weight (losing 100% of excess weight would return patients to their ideal weight). There is also some evidence that most patients maintain some level of weight loss for up to ten years after surgery. The purpose of this article is to provide primary care physicians and other clinicians with some background regarding bariatric surgical procedures and their risks and benefits. We also summarize the bariatric surgery process at Kaiser Permanente Southern California (KPSC), and then provide a detailed case study as an example of how KPSC screens patients referred for surgery, prepares them for the surgery, and cares for them once they have undergone surgery.

## Introduction

Unfortunately many of the traditional methods for weight loss, such as dietary restriction, exercise, meal replacement, psychosocial and behavioral interventions, and medications, have limited effectiveness in long-term weight maintenance and regulation of chronic diseases such as type 2 diabetes.<sup>1-3</sup> This has led to the develop-

ment of surgical approaches to weight loss, generally referred to as bariatric surgery. Most bariatric surgery studies<sup>4,5</sup> have shown excellent weight loss rates for up to two years after surgery, with patients losing an average of 61% of their excess weight (losing 100% of excess weight would return patients to their ideal weight). There is also some evidence that most patients maintain some level of weight loss for up to ten years after surgery.<sup>6,7</sup>

In addition to aiding in weight loss, bariatric surgery decreases rates of serious obesity comorbidities such as type 2 diabetes, hypertension, and sleep apnea.<sup>8-11</sup> There is now compelling evidence that bariatric surgery procedures are effective in resolving type 2 diabetes in 48% to 98% of patients.<sup>12,13</sup> Although the number of bariatric surgeries performed annually has increased exponentially throughout the world since 1991<sup>14</sup> there is still very little research concerning best practices for managing patient health before and after surgery.

The purpose of this article is to provide primary care physicians (PCPs) and other clinicians with some background regarding bariatric surgical procedures and their risks and benefits. We also summarize the bariatric surgery process at Kaiser Permanente Southern California (KPSC), and then provide a detailed case study as an example of how KPSC screens patients referred for surgery, prepares them for the surgery, and cares for them once they have undergone surgery.

## Overview of Bariatric Surgery

The National Institutes of Health guidelines for bariatric surgery<sup>15</sup> and a recent update from the American Society for Metabolic and Bariatric Surgery (ASMBS)<sup>11,16,17</sup>

**Pouya Shafipour MS, MD**, is a Family Physician at the Motion Picture and Television Fund Medical Group in Los Angeles, CA. E-mail: pshafipourmd@gmail.com.

**Jack K Der-Sarkissian, MD**, is the Assistant Chief of Service in the Department of Family Medicine at the Los Angeles Medical Center in Los Angeles, CA. E-mail: jack.k.dersarkissian@kp.org.

**Fadi N Hendee, MD**, is an Endocrinologist at the South Bay Medical Center in Harbor City, CA. E-mail: fadi.n.hendee@kp.org.

**Karen J Coleman, MS, PhD**, is a Research Scientist in the Department of Research and Evaluation at the Kaiser Permanente Regional Offices in Pasadena, CA. E-mail: karen.j.coleman@kp.org.

recommend bariatric surgery for patients who have clinically severe obesity (a body mass index [BMI]  $\geq 40$  kg/m<sup>2</sup>) with or without comorbid conditions or a BMI of 35 to 39.9 kg/m<sup>2</sup> with serious comorbid conditions.

Comorbid conditions include life-threatening cardiopulmonary problems (severe sleep apnea and obesity-related cardiomyopathy), nonalcoholic steatohepatitis, gastroesophageal reflux disease, uncontrolled diabetes, and/or hypertension. Other possible surgery indications for patients with a BMI of 35 to 39.9 kg/m<sup>2</sup> include obesity-induced physical problems that interfere with daily functioning (eg, cannot leave the house, cannot work, cannot care for family members).

Shinogle et al<sup>18</sup> provide an excellent overview of bariatric surgery and its complications, and the most recent ASMBS guidelines for perioperative care of obese patients also provide an extensive review of procedures as well as published health-related outcomes from these procedures.<sup>11</sup> This information is easily accessed on the ASMBS Web site: [www.asbs.org](http://www.asbs.org). Currently there are two surgical options available for KPSC patients: restrictive procedures (laparoscopic banding or sleeve gastrectomy) and those that restrict with partial malabsorption (commonly referred to as Roux-en-Y gastric bypass [RYGBP]). Some older procedures require careful monitoring of after-surgery weight loss and nutritional status<sup>11</sup> and thus are not commonly used. The most common of these is the biliopancreatic diversion with (BPD/DS) or without (BPD) duodenal switch.

## Surgical Procedures

### Roux-en-Y Gastric Bypass

Because it produces superior long-term weight loss compared with other procedures that only restrict food intake, RYGBP is the most prevalent procedure in the US.<sup>14</sup> In the 1980s, RYGBP was considered to be major surgery, with a number of peri- and postoperative risks.<sup>19–23</sup> Most RYGBP surgeries are now performed laparoscopically and require minimal recovery time. Reported death rates directly related to the procedure vary from less than 1% at 30 days after surgery<sup>14</sup> to 6% after five years.<sup>14,24</sup> Rapid weight loss ensues after surgery in part because stomach restriction prevents patients from consuming the volume and types of foods and beverages that they did before surgery.

The risk of mortality due to suicide in US patients who have undergone RYGBP is higher than the national rates of suicide for men and women of similar age who have not undergone the procedure.<sup>24,25</sup> This could be in part because of the psychologic state of many severely obese patients who are referred for RYGBP surgery.

Given that food cannot be fully absorbed in these patients, it would stand to reason that medications such as psychotropics may not be absorbed adequately and thus dosage would have to be adjusted and carefully monitored after surgery.

### Laparoscopic Band

Laparoscopic banding surgery<sup>18</sup> has recently received extensive media and commercial ([www.lapband.com](http://www.lapband.com)) coverage. Consequently, obese patients are asking their PCPs about the procedure and for referral to a bariatric surgery center. Although the procedure does not result in the same weight loss outcomes as RYGBP surgery,<sup>5</sup> it is far superior to results produced by meal replacement,<sup>9</sup> and recent evidence supports its use as a treatment for type 2 diabetes in the severely obese.<sup>12</sup> Complications in the newest generation of laparoscopic bands are most often due to port infections, band disconnection or slippage, or port disconnections.<sup>26</sup> Of these, the most serious complication is slippage, which can lead to gastric obstruction, esophageal dilation, erosion into the lumen of the stomach, and esophageal dysmotility.<sup>19</sup>

### Sleeve Gastrectomy

Sleeve gastrectomy, or gastric sleeve, is a procedure that results in weight loss by restricting food intake. Approximately 60% of the greater curvature of the stomach is removed in the procedure, resulting in a tube or “sleeve.” The typical patient for this procedure is one who has a BMI  $\geq 40$  kg/m<sup>2</sup> or for whom RYGBP is deemed to be too great a risk. Gastric sleeve is meant to serve as a bridge to a bypass procedure at a later date, once the patient has achieved sufficient weight loss.<sup>27</sup> However, some patients do well with this procedure alone and never progress to a bypass procedure.

## Bariatric Surgery at Kaiser Permanente Southern California

Approximately 2400 surgeries, primarily RYGBP, are performed per year on Kaiser Permanente (KP) patients nationwide. Half of these surgeries are done for patients in the KPSC Region. Currently, KPSC has two internal bariatric surgery centers. The South Bay Medical Center, recently accredited by the American College of Surgeons (ACS), has been performing surgeries since 1998 and handles approximately 30% of all KPSC bariatric surgeries. The West Los Angeles Medical Center recently began in 2009. Most KPSC patients are still referred to outside bariatric surgery centers in Los Angeles, Riverside, and San Diego counties with whom KPSC has contracted. Although there is a brief

**As with any program or procedure for rapid weight loss, the PCP must monitor the patient's medications, blood pressure, comorbid conditions, and psychologic state.**

period after surgery (up to six months) when patients are monitored by the surgery centers, all patients return to KPSC for treatment by their PCPs. KPSC also provides care for patients who have had bariatric surgery in other health care systems before joining KPSC (including those who have had surgeries in other countries). In general, patients who have bariatric surgery at KPSC are women (76%), non-Hispanic white (46%), and 30 to 60 years of age (72%). These data are similar to that reported for other insured populations.<sup>14</sup>

### Overview of the Role of the Primary Care Physician

The PCP determines surgery eligibility (Table 1) and refers an eligible patient to the Options surgery preparation program coordinator, whose office is in either Health Education or Preventive Medicine at the patient's medical center. The Options program is explained in the "Surgery Preparation" section of this article. The PCP is kept up to date about patients' progress through the program by the Options coordinator or the bariatric care manager at the medical center and is notified when a patient undergoes physiologic and psychologic evaluation for surgery.

Once the patient has finished the Options program, the bariatric care manager arranges a surgery consultation and the PCP takes over the patient's care (in col-

laboration with the bariatric care manager) after surgery, although the patient may also be seen at the surgery center for up to one year after surgery. The bariatric care manager works closely with the surgery centers and will continue to send periodic reports to the PCP about any surgery complications, revision procedures, and any other post-surgery issues. As with any program or procedure for rapid weight loss, the PCP must monitor the patient's medications, blood pressure, comorbid conditions, and psychologic state.

### Referral Process

Table 1 summarizes the criteria for referral of a KPSC patient for bariatric surgery. In general, patients must be at least 18 years of age and have a BMI of  $\geq 40$  kg/m<sup>2</sup>. In addition, patients with a BMI  $\geq 35$  kg/m<sup>2</sup> with comorbid conditions, such as type 2 diabetes and sleep apnea, can be referred for surgery. Disease burden and potential for surgical complications are just a few of the issues a surgeon must consider in proceeding with bariatric surgery. Other issues include severe mental illness, poor social support for behavioral changes required after surgery, and failure to lose some weight (typically 2.5%–10% of body weight) before surgery. These factors are not necessarily contraindications to surgery. Some patients who have not lost weight or have gained weight before surgery may be good candidates for surgery. Surgeons, the regional bariatric surgery steering committee, the regional bariatric medical director, and the local champion for adult weight management oversee decisions regarding patient referral and eligibility. If the PCP has any questions about this process, s/he should contact their adult weight management champion.

### Surgery Preparation

In an effort to provide responsible medical treatment and the best possible outcomes from surgery, KPSC has institutionalized a program called Options, administered either through the Department of Health Education or through Preventive Medicine at most medical centers, which prepares all patients for surgery. The Options curriculum is designed to help patients lose weight; master behavior-change techniques; educate them about surgery and post-surgery care, including nutrition and vitamin supplementation; inform them of possible complications of the surgery; and help them set realistic goals for both their weight loss and their behavior change after surgery. Each patient has a personalized exercise program to use outside of the classes. The Options program is provided to each patient free of charge, however, patients can enroll concurrently in a meal-replacement program of-

<b>Table 1. Criteria for referral to a bariatric surgeon in Kaiser Permanente Southern California<sup>a</sup></b>
<b>Age criteria</b>
<ul style="list-style-type: none"> <li>At least 18 years of age</li> </ul>
<b>BMI criteria</b>
<ul style="list-style-type: none"> <li>BMI of <math>\geq 40</math> kg/m<sup>2</sup> with or without comorbidities</li> <li>BMI of 35 – 39.9 kg/m<sup>2</sup> with significant comorbidities outlined below that confer a high risk for obesity-associated morbidity or mortality</li> </ul>
<b>Eligible comorbid conditions</b>
<ul style="list-style-type: none"> <li>Established coronary heart disease, including a history of myocardial infarction, angina pectoris (stable or unstable), coronary artery surgery, or coronary artery procedures (eg, angioplasty)</li> <li>Type 2 diabetes, defined as a fasting plasma glucose <math>\geq 126</math> mg/dL or 2-h postprandial plasma glucose <math>\geq 200</math> mg/dL</li> <li>Moderate-to-severe sleep apnea (eg, Respiratory Disturbance Index [Apnea/Hypoxia Index] defined by apnea plus hyperpnea/<math>&gt;19</math> hours of sleep) requiring use of a CPAP machine</li> <li>Other clinically significant conditions directly related to obesity and placing the patient at high risk for obesity-associated morbidity or mortality as recommended by an appropriate specialist to the regional bariatric champion and approved by the medical director at the respective medical center</li> </ul>

<sup>a</sup> These criteria mirror the recommendations from the National Institutes of Health<sup>15</sup> and the American Society for Metabolic and Bariatric Surgery.<sup>11,16,17</sup>  
BMI = body mass index.

ferred at their KPSC medical center (low-calorie and very low-calorie diet programs) to help them lose weight before surgery. There is an additional cost associated with all meal-replacement programs.

### Surgery Eligibility

In addition to meeting the criteria necessary for referral to Options (Table 1), patients must attend all Options classes, with makeup sessions provided for those who miss classes. Patients have a clinical and psychologic assessment during Options before meeting with the bariatric surgeon. A set of laboratory tests must be done before week ten of the Options program (Table 2). These are usually ordered by the bariatric care manager. Tests are also done within 30 days of the surgery consultation. These tests differ somewhat by surgery center and thus will vary depending on where the patient will undergo surgery. Patients with serious psychiatric or physical illness are referred for treatment before they can advance to surgery, regardless of their performance in the Options program.

### Postoperative Follow-Up Care

For those KPSC patients who have surgery at one of the contract surgery centers, their follow-up care is often handled by surgeons at these centers. However, the PCP should also see the patient during this time to monitor medications, comorbid conditions, and psychological state. The laboratory part of this care is handled at KPSC facilities. Suggested post-surgical laboratory tests are shown in Table 3. Surgery centers

<b>Table 2. Laboratory tests to be done before week ten of the Options program</b>
25-hydroxy vitamin D
Calcium
Complete blood count without differential
Ferritin, iron, total iron binding capacity
Thyroid-stimulating hormone
Fasting blood glucose
Fasting lipid panel
Hemoglobin A <sub>1c</sub>
Urine quantitative microalbumin
Serum uric acid
Serum creatinine
Serum electrolytes
Liver function panel
Chronic panel for hepatitis
Serum total protein, serum albumin
Stool <i>Helicobacter pylori</i> antigen

monitor complications and weight loss and provide this information to bariatric care managers for review. This information is then scanned and appended to patients' charts. The timing of follow-up visits varies, but patients generally are scheduled for multiple laboratory tests and examinations in the first weeks after surgery, and then for laboratory tests and examinations at three- to six-month intervals thereafter. In addition, patients' body weight should be checked annually for life.

### Malnutrition

The recommended tests for nutrition monitoring are shown in Table 3 and are available as Smart Sets through KP's HealthConnect system. These recommendations are based upon those of the ASMBS<sup>11,16,17</sup> as well as the experiences of KPSC nutritionists in caring for bariatric patients. For the first two years after the surgery, the PCP should work closely with a staff nutritionist and refer patients who are having persistent dietary problems. In general we recommend that all bariatric patients take a daily serving of a *balanced* multivitamin that has minerals including zinc, folic acid, selenium, and copper.

Patients should also take a calcium citrate supplement for 1000 mg (Laparoscopic Band) or 1500 mg per day (Gastric Sleeve and RYGBP) in divided doses not to exceed 500 mg. For the first six months after surgery, all bariatric patients should take 50 mg of thiamine (Vitamin B<sub>1</sub>) daily. Only RYGBP patients need to continue thereafter. Finally, because there is evidence that some patients continue to have deficiencies in the B vitamins even after supplementation,<sup>22</sup> 1000 µg B<sub>12</sub> should be given to RYGBP and Gastric Sleeve patients three times a week sublingually or once per month intramuscular injections.

### Mental Health

In addition to nutritional monitoring after bariatric surgery, these patients also need close monitoring for depression, suicide, and substance abuse. Although not extensively studied, preliminary research has shown that these patients are at increased risk for suicide and drug overdose,<sup>25</sup> especially one year or more after surgery. If a change in mental health status is suspected, the PCP is encouraged to follow the KPSC clinical practice guidelines for major depressive disorder. Patients who were taking medications for mental health conditions before surgery should be monitored carefully because dosages will likely have to be adjusted.

**... these patients need close monitoring for depression, suicide, and substance abuse. ... because preliminary research has shown that they are at increased risk for suicide and drug overdose<sup>25</sup> ...**

**Chronic Health Conditions**

There is mounting evidence<sup>4,5,19</sup> that bariatric surgery leads to normalized indicators of cardiovascular and metabolic function. In the case of type 2 diabetes, bariatric surgery may lead to full remission.<sup>13</sup> The PCP should monitor comorbid conditions and their medications very closely after surgery. Patients will likely need lower doses of medication as they continue to lose weight and may even be able to discontinue medications. Table 2 contains recommended postsurgery laboratory tests; however, the PCP should order any additional tests relevant to the patient’s comorbid conditions throughout this period.

**Pregnancy and Reproductive Health**

A new review of recommendations regarding bariatric surgery and pregnancy was published in 2008.<sup>28</sup> Women who are planning to become pregnant or who are already pregnant after surgery should be referred to an obstetrician and a registered dietitian who handle high-risk pregnancies. General practice at KPSC is to advise women to wait 18 months after having surgery to become pregnant to insure that they are not losing weight during pregnancy. Even for women of reproductive age who do not plan to be pregnant, bariatric surgery shows promise for resolving polycystic ovary syndrome.<sup>28</sup> A woman’s fertility may increase with weight loss, and thus she should be advised to use birth control if she does not want

to become pregnant. Women who have had RYGPB or BPD±DS and are using oral contraceptives should use additional forms of birth control.

**Cosmetic Surgery**

Depending on the amount of weight lost and the patient’s level of exercise after surgery, there is often some amount of excess skin that does not retain its elasticity after bariatric surgery. KP will cover a panniculectomy if the PCP or plastic surgeon details the skin conditions that result from this excess skin and if the pannus extends below the pubis. However, no other skin removal is covered, so patients should be made aware of this possible outcome of bariatric surgery.

**Case Study**

JR is a man, age 36 years, with a BMI of 45 kg/m<sup>2</sup> who was referred to the Options bariatric surgery preparation program in June 2006 by his PCP after being unable to sustain weight loss and after developing comorbidities. JR had tried multiple commercial weight-loss programs but could not achieve and maintain a healthy body weight. He had never had a bariatric surgical procedure. He had numerous comorbidities related to his weight, including type 2 diabetes for more than 13 years, with diabetic nephropathy and polyneuropathy, hyperlipidemia, hypertension, erectile dysfunction, gastroesophageal reflux disease, gout, and depression. His diabetes had been steadily worsening despite his taking multiple oral hy-

**Table 3. Laboratory tests recommended for post-bariatric nutrition assessment for Kaiser Permanente Southern California bariatric surgery patients**

	RYGPB and BPD/DS				Gastric Sleeve				Laparoscopic Band			
	2-8 weeks	2-5 months	6-11 months	Annual	2-8 weeks	2-5 months	6-11 months	Annual	2-8 weeks	2-5 months	6-11 months	Annual
Creatinine	X	X	X	X	X	X	X	X			X	X
Electrolytes	X	X	X	X	X	X	X	X			X	X
CBC w/o diff	X	X	X	X		X		X			X	X
Albumin		X	X	X		X	X	X			X	X
Thiamin		X	X	X		X					+/-	
Calcium		X	X	X			X	X	X		X	X
Parathyroid hormone			X	X			X	X			X	X
25-hydroxy vitamin D			X	X			X	X				X
Vitamin A			X	X								
Iron panel			X	X			X	X				
Vitamin B <sub>12</sub>			X	X				X				
Liver panel				X				X				X
Uric acid				X				X				X
Lipid panel				X				X				X
Fasting glucose				X				X				X

RYGPB = Roux-en-Y Gastric Bypass; BPD/DS = Biliopancreatic Diversion with Duodenal Switch; CBC w/o diff = Complete blood count without differential; ± = not required

poglycemic agents as well as insulin. His medications included pioglitazone HCl (Actos), metformin, glyburide, insulin, ezetimibe-simvastatin (Vytorin), felodipine (Plendil), lisinopril, atenolol, tadalafil (Cialis), famotidine, naproxen, and paroxetine (Paxil).

At his referral to the Options program in June 2006, he weighed 332 lb (150.6 kg). He started the Options program in August 2006 and finished in May 2007. Afterward, he weighed 302 lb (137 kg), corresponding to a loss of approximately 10% of his total body weight. He was then evaluated by the bariatric care management nurse practitioner under the supervision of the program's medical director. Although he had lost the recommended amount of weight, his diabetes was still uncontrolled, with worsening fasting blood glucose levels and hemoglobin A<sub>1c</sub> (HbA<sub>1c</sub>) of 8.2%. The care manager advised JR that he would have to reduce his HbA<sub>1c</sub> to <7% in order to have surgery. JR was able to change his diet and improve his use of insulin, so that six months later—in August 2007—his HbA<sub>1c</sub> was improved to 6.4%. He was then reevaluated and referred for surgery, which was scheduled for November 2007.

At surgery, JR weighed 337 lb (153.2 kg; BMI of 45.7 kg/m<sup>2</sup>), having gained 35 lb (15.9 kg) by the end of his participation in Options. Despite the weight gain, he underwent a laparoscopic RYGBP and had no complications. He responded well to the surgery, losing an average of 29 lb/mo (13.2 kg/mo). By his five-month postoperative appointment, JR had lost 102 lb (46.4 kg). In addition to having achieved excellent weight loss, he no longer needed any medications, including those he was taking for depression, diabetes, hypertension, and hyperlipidemia. His HbA<sub>1c</sub> was 5.5%, and he had a normal blood pressure of 128/86 mm Hg. He has been monitored by the bariatric care management team and has been following the recommended diet and exercise regimen. The only complication that he has experienced has been occasional nausea and vomiting after eating large meals. As of October 2008, JR had lost 103 lb (46.8 kg), had a BMI of 31.7 kg/m<sup>2</sup>, and was still free of chronic illness.

### Conclusions and Recommendations

A PCP who decides to refer a patient for bariatric surgery must be aware of the proper criteria for surgical referral, preparation, and follow-up care. The Options bariatric surgery preparation program at KPSC was developed to provide patients with comprehensive information about the surgery so that they could make an informed choice about treatment options. The case study presented here illustrates the process of prepar-

ing for, undergoing, and recovering from regional bariatric surgery within KPSC. The KPSC Department of Research and Evaluation has formed a partnership with the regional bariatric surgery program to develop an interactive patient registry to track patients from their referral to the Options program, through their surgery, and throughout the years after surgery. This registry will be used to assist care managers and clinicians in treating these patients as well as providing KPSC leadership with information to make decisions regarding the expansion of the bariatric surgery program. ♦

### Disclosure Statement

*The author(s) have no conflicts of interest to disclose.*

### Acknowledgment

*Katharine O'Moore-Klopf, ELS, of KOK Edit provided editorial assistance.*

### References

1. Fujioka K. Management of obesity as a chronic disease: nonpharmacologic, pharmacologic, and surgical options. *Obes Res* 2002 Dec;10 Suppl 2:1165-235.
2. Hainer V, Toplak H, Mitrakou A. Treatment modalities of obesity: what fits whom? *Diabetes Care* 2008 Feb;31 Suppl 2:S269-77.
3. Karmali S, Shaffer E. The battle against the obesity epidemic: is bariatric surgery the perfect weapon? *Clin Invest Med* 2005 Aug;28(4):147-56.
4. Shah M, Simha V, Garg A. Review: long-term impact of bariatric surgery on body weight, comorbidities, and nutritional status. *J Clin Endocrinol Metab* 2006 Nov;91(11):4223-31.
5. Buchwald H, Avidor Y, Braunwald E, et al. Bariatric surgery: a systematic review and meta-analysis. *JAMA* 2004 Oct 13;292(14):1724-37. Erratum in: *JAMA* 2005 Apr 13;293(14):1728.
6. Christou NV, Look D, Maclean LD. Weight gain after short- and long-limb gastric bypass in patients followed for longer than 10 years. *Ann Surg* 2006 Nov;244(5):734-40.
7. Sjöström L, Lindroos AK, Peltonen M, et al; Swedish Obese Subjects Study Scientific Group. Lifestyle, diabetes, and cardiovascular risk factors 10 years after bariatric surgery. *N Engl J Med* 2004 Dec 23;351(26):2683-93.
8. Sjöström CD, Peltonen M, Wedel H, Sjöström L. Differentiated long-term effects of intentional weight loss on diabetes and hypertension. *Hypertension* 2000 Jul;36(1):20-5.
9. O'Brien PE, Dixon JB, Laurie C, et al. Treatment of mild to moderate obesity with laparoscopic adjustable gastric banding or an intensive medical program: a randomized trial. *Ann Intern Med* 2006 May 2;144(9):625-33.
10. Scherthner G, Morton JM. Bariatric surgery in patients with morbid obesity and type 2 diabetes. *Diabetes Care* 2008 Feb;31 Suppl 2:S297-302.
11. Mechanick JI, Kushner RF, Sugerman HJ, et al. American Association of Clinical Endocrinologists, the Obesity Society, and American Society for Metabolic & Bariatric Surgery medical guidelines for clinical practice for the perioperative nutri-

- tional, metabolic, and nonsurgical support of the bariatric surgery patient. *Endocr Pract* 2008 Jul-Aug;14 Suppl 1:1-83.
12. Dixon JB, O'Brien PE, Playfair J, et al. Adjustable gastric banding and conventional therapy for type 2 diabetes: a randomized controlled trial. *JAMA* 2008 Jan 23;299(3):316-23.
  13. Vetter ML, Cardillo S, Rickels MR, Iqbal N. Narrative review: effect of bariatric surgery on type 2 diabetes mellitus. *Ann Intern Med* 2009 Jan 20;150(2):94-103.
  14. Santry HP, Gillen DL, Lauderdale DS. Trends in bariatric surgical procedures. *JAMA* 2005 Oct 19;294(15):1909-17.
  15. National Institutes of Health. Gastrointestinal Surgery for Severe Obesity. NIH Consensus Statement Online. NIH Consensus Development Program 9[1], 1-20. 3-25-1991. 7-3-2008.
  16. Buchwald H; Consensus Conference Panel. Consensus conference statement bariatric surgery for morbid obesity: health implications for patients, health professionals, and third-party payers. *Surg Obes Relat Dis* 2005 May-Jun;1(3):371-81.
  17. Mechanick JL, Kushner RF, Sugerman HJ, et al; American Association of Clinical Endocrinologists; Obesity Society; American Society for Metabolic and Bariatric Surgery. American Association of Clinical Endocrinologists, The Obesity Society, and American Society for Metabolic and Bariatric Surgery medical guidelines for clinical practice for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient. *Obesity* 2009 Apr;17 Suppl 1:S1-70, v.
  18. Shinogle JA, Owings MF, Kozak LJ. Gastric bypass as treatment for obesity: trends, characteristics, and complications. *Obes Res* 2005 Dec;13(12):2202-9.
  19. Maggard MA, Shugarman LR, Suttrop M, et al. Meta-analysis: surgical treatment of obesity. *Ann Intern Med* 2005 Apr 5;142(7):547-59.
  20. Champion JK, Williams M. Small bowel obstruction and internal hernias after laparoscopic Roux-en-Y gastric bypass. *Obes Surg* 2003 Aug;13(4):596-600.
  21. Sugerman HJ, Brewer WH, Shiffman ML, et al. A multicenter, placebo-controlled, randomized, double-blind, prospective trial of prophylactic ursodiol for the prevention of gallstone formation following gastric-bypass-induced rapid weight loss. *Am J Surg* 1995 Jan;169(1):91-6.
  22. Mizón C, Ruz M, Csendes A, et al. Persistent anemia after Roux-en-Y gastric bypass. *Nutrition* 2007 Mar;23(3):277-80.
  23. Couzin J. Medicine. Bypassing medicine to treat diabetes. *Science* 2008 Apr 25;320(5875):438-40.
  24. Omalu BI, Ives DG, Buhari AM, et al. Death rates and causes of death after bariatric surgery for Pennsylvania residents, 1995 to 2004. *Arch Surg* 2007 Oct;142(10):923-8; discussion 929.
  25. Adams TD, Gress RE, Smith SC, et al. Long-term mortality after gastric bypass surgery. *N Engl J Med* 2007 Aug 23;357(8):753-61.
  26. Launay-Savary MV, Slim K, Brugère C, et al. Band and port-related morbidity after bariatric surgery: an underestimated problem. *Obes Surg* 2008 Nov;18(11):1406-10.
  27. Cottam D, Qureshi FG, Mattar SG, et al. Laparoscopic sleeve gastrectomy as an initial weight-loss procedure for high-risk patients with morbid obesity. *Surg Endosc* 2006 Jun;20(6):859-63.
  28. Beard JH, Bell RL, Duffy AJ. Reproductive considerations and pregnancy after bariatric surgery: current evidence and recommendations. *Obes Surg* 2008;18(8):1023-7.

## The Body Too Thick

This is a very great deformity, especially in young women. There are different ways of curing it, the most certain is: 1) not to sleep too much; 2) to drink plenty of tea and coffee; 3) to abstain from chocolate, beer, and everything that is capable of producing too nourishing juices; 4) to eat and drink very moderately, and if you must drink wine, let it be white wine; 5) take a great deal of exercise on foot; 6) take every day, for several weeks, a little of the ashes of crayfish mixed with an egg or diluted broth. These ashes are very effective to hinder the body from growing fat.

— Orthopaedia, or the Art of Preventing and Correcting Deformities in Children,  
*Nicolas Andry, 1658-1742, French founder of the orthopedics specialty*