The prevalence of overweight and obesity has increased dramatically in recent decades. According to the guidelines released by the National Institutes of Health in June 1998, overweight is defined by a body mass index (BMI) calculated as weight in kilograms divided by the square of height in meters between 25.0 and 29.9 kg/m². Obesity is defined as a BMI higher than 30 kg/m². An estimated 97 million adults in the United States meet the criteria for overweight or obesity. Obesity affects individuals of all ages, both sexes, and diverse racial/ethnic backgrounds. Obesity is associated with increased morbidity and mortality. There is unchallenged evidence that obesity increases the risk for hypertension, dyslipidemia, type 2 diabetes mellitus, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, and endometrial, breast, prostate, and colon cancers. In addition, obese individuals are often the subject of discrimination in social settings. There is evidence that modest weight losses of 5% to 10% have beneficial effects on diabetes, high blood pressure, dyslipidemia, and cardiovascular disease. The challenge lies in how to help patients achieve meaningful sustained weight loss.

EVALUATION OF THE OBESE PATIENT

A complete medical evaluation serves an important role in the approach to the obese patient. It can serve to answer three basic questions: (1) What is contributing to weight gain or inability to lose weight? (2) What medical conditions are present that may benefit by weight loss? (3) What weight loss program would be safe and effective in this individual?

What Is Contributing to Weight Gain or Inability to Lose Weight?

A detailed weight history can identify if obesity is a lifelong problem or recent in onset. The presence of a family history of obesity should be recorded. For the patient with a longstanding history of obesity, past weight loss efforts should be discussed to detail response and identify reasons for failure. Potential triggers for weight gain should be identified such as illness or injury, the use of medications that may be associated with weight gain (eg, steroids, tricyclic antidepressants), or events such as discontinuation of smoking. When triggers are identified, consideration should be given to how best to manage these triggers. Can regular physical activity be resumed? Can a medication be discontinued or an alternative used?

A diet history, although frequently unreliable in estimating energy intake, is helpful in delineating an individual’s eating patterns and food choices and identifying abnormal eating behaviors (eg, bulimia, binge eating). Direct questions such as “Have you ever consumed an excessive amount of food in a short amount of time?” or “Have you ever induced vomiting?” are helpful. When an eating disorder is suspected, formal evaluation by a psychologist and the potential benefit of cognitive behavioral therapy or pharmacotherapy in the management of these symptoms should be pursued. Normalization of eating patterns should take precedence over weight loss, since dieting can often
precipitate or worsen abnormal eating behaviors. Weight loss is also difficult to achieve in the presence of active binge eating behaviors. Current level of physical activity as well as obstacles to exercise should be outlined. Physicians should inquire about musculoskeletal complaints, dyspnea, and other symptoms limiting physical activity. Responses should be taken into consideration when outlining an exercise regimen. Secondary causes for weight gain should be considered. Hormonal abnormalities are infrequent in this population, but thyroid function disorders and excessive cortisol production should be considered.

Physical examination should document height, weight, and calculated BMI. This will serve to differentiate the overweight from the obese individual. Waist circumference also aids in identifying the individual with upper body obesity, an independent risk factor for the development of metabolic complications, including diabetes, dyslipidemia, and hypertension. Higher risk is associated with a waist circumference greater than 40 inches in men and 35 inches in women. The remainder of the examination should focus on physical findings suggestive of secondary causes of obesity and aim at identifying complications of obesity. It is important to document the blood pressure reading and any abnormalities of the thyroid gland, heart, abdomen, and musculoskeletal system.

Laboratory testing should be guided by the clinical situation. Screening tests should include serum thyroid-stimulating hormone, fasting glucose, and lipid determinations. A 24-hour urine free cortisol and an overnight dexamethasone suppression test are appropriate screening tests for the individual with symptoms and physical findings that suggest Cushing syndrome. If obstructive sleep apnea is suspected, screening with an overnight oximetry or a formal sleep study should be pursued.

Medically Complicated Obesity

In my practice the term morbid obesity (due to its negative connotation) has been replaced with medically complicated obesity. Medically complicated obesity applies to the obese individual with medical conditions influenced by weight. These can include type 2 diabetes mellitus, impaired fasting hyperglycemia, dyslipidemia, hypertension, arthopathy/arthritis, obstructive sleep apnea, or gallbladder disease. The presence of these disorders may already be apparent after a detailed medical history and physical examination. When these disorders are suspected, additional evaluation as previously detailed should be pursued. The benefits of weight loss in the treatment of many of these conditions should not be underestimated or ignored. Weight loss has been shown to lead to lowering of blood pressure, lowering of blood glucose levels, and improvement of dyslipidemia. Hence, weight management should be an integral part of treatment.

Tailoring a Weight Loss Program

This is the most challenging component in the management of the obese individual. Patient motivation is critical for a successful outcome of a weight loss effort. To assess patient readiness, it is helpful to outline the patient’s reasons for pursuing weight loss, to identify a supportive social framework, to inquire about the patient’s willingness to increase physical activity, and to recognize potential barriers to weight loss. In the patient who is not prepared to pursue a weight loss program, weight maintenance should be encouraged. Establishing realistic goals is also important. Goals should not be limited to weight changes but include improvement in identified medical conditions (eg, improved glycemic control). A reasonable initial goal is a 10% to 15% reduction in weight over a 6- to 12-month period. Weight goals should then be reassessed periodically.

TREATMENT OF THE OBESE PATIENT

Diet

A dietary prescription is of critical importance in pursuing a weight loss program. Dietary guidelines creating an energy deficit are essential for active weight loss. Although decreasing the percentage of dietary fat is favorable and popular, it will not lead to weight loss unless total energy intake (calories) is also reduced. This holds true for most commercial weight loss programs and fad diets in the lay literature. These provide guidelines with either menus or prepared meals that produce a calorie deficit leading to weight loss. The consumption or avoidance of a particular type of food offers no advantage in weight loss unless total energy intake is reduced. These diets are often not maintained and are frequently associated with weight regain. Well-balanced meals allowing for 30% or less of energy as fat and rich in fruits and vegetables is preferred. Initial calories recommended may be based on measured resting energy expenditure or more frequently on estimated needs based on the Harris Benedict equation. A calorie deficit can be tailored individually. A deficit in calories of 250 to 500 kcal/d, either by restricting intake or increasing physical activity, will be associated with a 0.5- to 1-lb average weight loss per week.

Very low-calorie diets (250-800 kcal/d) produce a larger initial weight loss. They are often difficult to maintain long term and are associated with a high rate of weight regain. They are generally not recommended. When pursued in the patient at high risk for medical problems, very low-calorie diets should be completed under the supervision of a specialized team with monitoring of metabolic parameters. A
It helps achieve a calorie deficit and leads to a reduction in the risk for diabetes and coronary heart disease beyond that attributable to weight loss alone and preserves lean body mass. Physical Activity

Regular physical activity should be an integral part of any weight loss regimen. Although it is not associated with substantially greater weight loss compared with diet, the benefit of physical activity lies in preventing weight regain. It helps achieve a calorie deficit and leads to a reduction in the risk for diabetes and coronary heart disease beyond that attributable to weight loss alone and preserves lean body mass.

The best exercise regimen is the one an individual can perform comfortably and regularly. The latest recommendations from the American College of Sports Medicine and the Centers for Disease Control and Prevention include 30 minutes or more of moderate-intensity exercise most days of the week. Only 25% of the population is compliant with this recommendation. We must take into consideration physical, emotional, and practical limitations in choosing a physical activity for our patients. The important points to emphasize first are consistency and frequency, followed by duration and intensity. An initial goal of 10 to 15 minutes of physical activity every day should be encouraged. The individual with joint problems may benefit from a conditioning program or modified exercise regimen prescribed by a physiatrist from a department of physical medicine and rehabilitation. Long term, a consistent program of physical activity for 30 minutes most days of the week is desirable. Duration of activity can be increased as conditioning and physical tolerance improve. If unable to increase duration, frequent short bursts of activity throughout the day (at least 10 minutes in duration) will help with weight management. Intensity of exercise is the last component of exercise to be stressed, especially to the markedly overweight individual.

There should be increased awareness regarding the importance of activities of daily living. Incorporating physical activity throughout the day has been shown to be helpful in weight management, as reported by Levine et al. Such activities as walking longer distances and using the stairs instead of the elevator should be encouraged.

Cognitive Behavioral Therapy

Behavioral therapy for the management of obesity has been practiced for decades. It has been shown effective in promoting weight loss when used in combination with diet and medical therapies. The goals are to identify, monitor, and alter behaviors that are not conducive to weight loss. No single method of behavioral therapy has been proven superior. Techniques used include self-monitoring of eating habits and physical activity, stress management, stimulus control, problem solving, cognitive restructuring, contingency management, and social support. Behavioral therapy is particularly helpful in individuals with abnormal eating behaviors such as binge-eating disorder. This disorder has been reported in up to 30% of obese patients. Control of this behavior is a critical first step in a weight management program. Active weight loss should not be pursued until binge-eating behaviors are well controlled. Like all long-term therapies, relapse remains a problem with resumption of previous behaviors and associated weight regain. Relapse prevention should include prevention or anticipation of problematic situations and regular follow-up with program staff to encourage continued adherence to diet, physical activity, and behavioral changes.

Drug Therapy

Despite the recent reports of cardiac valve abnormalities associated with the use of dexfenfluramine and the novel combination of fenfluramine and phentermine, interest in identifying agents that can promote weight loss safely remains high.

The decision to start drug therapy should carefully weigh the risk of therapy (potential adverse effects) vs the benefits of potential weight loss. Medical therapies are not indicated in the mild or moderately overweight individual in the absence of medical complications that would benefit from weight loss. In this situation the risks outweigh the health benefits and conservative measures at weight management should be continued. In the mild to moderately overweight individual (BMI >28 kg/m²) with medical complications that would benefit from weight loss, the potential benefits (and risks) of drug therapy should be discussed. In the obese individual (BMI >30 kg/m²), drug therapy can be considered in view of increased risk for medical complications.

Sibutramine.—Sibutramine is a reuptake inhibitor of both serotonin and noradrenaline. These 2 mechanisms acting synergistically are responsible for its anorectic effect. This medication differs from previously available anorectic agents (fenfluramine, dexfenfluramine) that increased serotonin release. Although some literature suggests that sibutramine may increase metabolic rate, this has not been proven conclusively in humans.

Most of the studies evaluating sibutramine have looked at efficacy at 1 year. Daily dosages of 10 and 15 mg have been reported to promote a 10.6-lb and 13.4-lb weight loss, respectively, compared with 4.0 lb in the placebo group. If nonresponders (defined as individuals failing to lose 1% of body weight after 4 weeks) are excluded, 15 mg of sibutramine was associated with an average weight loss of 15 lb compared with an average 4-lb weight loss with...
placebo. Hence, a clinical judgment of efficacy can be made early in therapy.  

Adverse effects include headache, dry mouth, constipation, and insomnia. The most concerning adverse effect is an increase in blood pressure. The mean increase observed in blood pressure was approximately 2 mm Hg (both systolic and diastolic) at the 15-mg dose. Although this change seems small, 13% of subjects experienced an increase of at least 15 mm Hg in systolic pressure (compared with 9% taking placebo), and 17% of subjects experienced an increase of at least 10 mm Hg in diastolic pressure (compared with the 7% taking placebo). Blood pressure should be monitored regularly. At present, there is no evidence that sibutramine is associated with cardiac valve abnormalities. Since it affects serotonin metabolism, patients should be counseled regarding the unknown risk in this regard.

Contraindications to sibutramine therapy are clear, as are situations in which it should be used with caution. Contraindications include anorexia nervosa, hypersensitivity to drug or ingredients, therapy with monoamine oxidase inhibitors or other serotonergic drugs, coronary heart disease, congestive heart failure, stroke, arrhythmia, uncontrolled hypertension, severe hepatic or renal disease, pregnancy, and lactation. Caution is advised in individuals younger than 18 years or older than 65 years and in those with a history of seizures and those who use other medications capable of raising blood pressure or with central actions. Initial weight loss is a good predictor for response. If patients have not experienced any weight loss within the first 4 to 6 weeks of therapy, sibutramine should be stopped.

**Orlistat**—Orlistat is a lipase inhibitor that blocks the absorption of dietary fat by inhibiting gastrointestinal lipases. There is no documented effect on intestinal hydrodases (amylase, trypsin, chemotrypsin, etc) and hence no effect on the absorption of carbohydrates, protein, and phospholipids. Orlistat has been reported to increase fecal fat from 5% to 30%. Orlistat is minimally absorbed from the gastrointestinal tract, and excretion is almost completely in feces.

Clinical trials in the United States and Europe included subjects aged 40 to 65 years and with BMIs of 28 to 47 kg/m². Orlistat at 120 mg 3 times daily was associated with an 8.8% to 10.2% weight loss after 1 year. This was statistically better than the 5.8% to 6.1% weight loss observed in the placebo cohorts. There were also statistically significant decreases in total cholesterol, low-density lipoprotein cholesterol, fasting blood glucose, insulin levels, and blood pressure. Orlistat has also been studied for weight maintenance. A dosage of 120 mg 3 times daily was associated with less weight regain (35.2%) than orlistat, 60 mg 3 times daily (51%), or placebo (63%).

Incidence of adverse effects was similar in placebo and treated groups, but more frequent gastrointestinal tract adverse effects were observed in the orlistat-treated groups. Adverse effects were mild, encountered early in therapy, and generally resolved. Decreases in fat-soluble vitamins were observed, but no deficiencies were reported. All individuals taking orlistat should be advised to take a daily multivitamin 2 hours before or after orlistat dosing.

Contraindications to orlistat therapy include malabsorption, cholestasis, known hypersensitivity, pregnancy, and lactation. No notable drug-drug interactions have been reported, but caution is advised when it is used in combination with cyclosporine. High and low dietary fat intake has been shown to affect cyclosporine absorption.

**Selective Serotonin Reuptake Inhibitors**—Selective serotonin reuptake inhibitors (SSRIs) are not approved in the treatment of obesity but have been studied in the obese subjects with and without binge eating disorder in the absence of clinical depression. Fluoxetine (60 mg/d) was found effective in decreasing the frequency of bingeing episodes. Subjects on SSRIs also experienced significant weight loss when compared with the cognitive behavioral therapy and placebo cohorts. Greeno and Wing reported a decrease in caloric intake (of more than 600 kcal/d) in the treatment group receiving fluoxetine, 60 mg/d, when compared with the group receiving placebo. There was no decrease in the frequency of eating suggesting that the effect is primarily to induce satiety rather than to decrease appetite. Hence, the potential benefits of these agents in obese individuals with either binge eating disorder or clinical depression requiring therapy should be considered.

**Bariatric Surgery**

Bariatric surgery remains an option for the severely obese individual with medical complications. Over the past 10 to 12 years the bariatric procedure performed at the Mayo Clinic has been a Roux-en-Y gastric bypass. It separates the stomach into a small-volume upper pouch (<15 cm³), limiting oral intake, and connects the stomach to a limb of the jejunum. This prevents the intake of high-calorie sweets by inducing a “dumping” physiology. At last report, 85% of individuals had lost at least 50% of their excess weight at 4 years. The main issue is patient selection.

The patient should meet several criteria (Table 1) to be recommended for gastric bypass surgery. This treatment involves a multidisciplinary approach addressing all issues important for long-term success. Preoperative evaluation includes consultations by a physician nutritionist, dietitian, psychologist, and surgeon. Consultations serve to ensure there are no contraindications to surgery and to inform the patient regarding the risk and benefits, as well as the dietary...
changes required after surgery. Bariatric surgery is an aggressive way to lose weight and therefore is reserved for the patient who has a considerable amount of weight to lose and who has medical complications that would place health at risk without meaningful weight loss. Long-term success, however, is still guided by the individual’s ability to make lifestyle changes, especially in terms of diet and physical activity.

Reimbursement remains challenging since many insurance carriers differ in the eligibility criteria that must be fulfilled for coverage approval. Applications initially declined require additional effort in challenging the third-party payer’s decision. The process may take from 3 to 6 months and even longer.

Postoperative follow-up is completed every 3 months for the first year and yearly thereafter. Weight loss is monitored, and behavioral modification, exercise instruction, and nutritional guidance continue. Laboratory tests monitor metabolic parameters such as serum glucose, lipid, and electrolyte levels and screen for potential vitamin and mineral abnormalities. All patients receive supplementation with oral multivitamins, calcium supplements, and parenteral vitamin B₁₂ injections. Initial weight loss can be dramatic, about 0.5 to 1 lb a day the first 3 months. Potential complications may include iron deficiency anemia, particularly in menstruating women, vitamin B₁₂ deficiency, stomal ulcers at the anastomotic site, and incisional hernias. Long-term success (>5 years) still depends on the individual’s ability to make significant sustained lifestyle changes to avoid weight regain.

CONCLUSIONS

Obesity and its complications are common in clinical practice. Sustained weight loss is difficult to achieve. The primary care physician’s task involves identifying individuals with obesity, addressing potential causes and related complications, and tailoring a weight management program that is safe and effective for the individual. Dietary changes are critical to any weight loss effort. Regular physical activity is the only identifiable predictor of long-term weight maintenance. The potential benefits of medical therapies or surgical intervention should be considered in the select individual with medically complicated obesity. Support for the individual participating in a weight loss effort should be continuous in the hope of enhancing long-term success.

REFERENCES


Questions About Management of Obesity

1. Which one of the following is false regarding BMI?
   a. Calculated weight (kg)/height(m²)
   b. An individual with a height of 5 ft 5 in (165 cm) and weight of 147 lb (67 kg) is considered overweight by the new guidelines
   c. A patient with a BMI greater than 30 kg/m² is considered obese
   d. More than half the US population has a BMI over 25 kg/m²
   e. Individuals with a BMI greater than 30 kg/m² are at increased risk of premature death
2. Which one of the following is incorrect when counseling patients regarding weight loss?
   a. Choosing low-fat foods is effective in achieving weight loss when total calories consumed are reduced
   b. Popular fad diets are successful when total caloric intake is reduced
   c. Strenuous physical activity alone without dieting can be associated with dramatic weight loss
   d. Regular physical activity is a good predictor of long-term weight maintenance
   e. Short bursts of physical activity incorporated throughout the day help in weight management

3. Which one of the following is incorrect regarding sibutramine?
   a. Its mechanism of action is similar to previously available appetite suppressants
   b. It is contraindicated in individuals on antidepressant therapy with SSRIs and monoamine oxidase inhibitors
   c. There can be a significant rise in blood pressure with sibutramine therapy
   d. There has been no reported association of sibutramine with cardiac valve abnormalities
   e. It is not currently indicated for weight maintenance

4. Which one of the following is true about orlistat therapy?
   a. It allows individuals on a high-fat diet to achieve weight loss with minimal adverse effects
   b. It inhibits the absorption of carbohydrates and proteins
   c. It prevents any weight regain after a weight loss effort
   d. It decreases absorption of fat-soluble vitamins
   e. It controls appetite

5. Which one of the following is incorrect regarding gastric bypass surgery?
   a. It induces weight loss by limiting oral intake and inducing a select malabsorption of nutrients
   b. Potential candidates require psychological or psychiatric evaluation
   c. It guarantees long-term weight maintenance
   d. It should be reserved for individuals with multiple medical complications related to obesity
   e. It impairs the absorption of vitamin B₁₂ and iron

Correct answers:
1. b, 2. c, 3. a, 4. d, 5. c