21. Screening for Obesity

RECOMMENDATION

Periodic height and weight measurements are recommended for all patients (see ***Clinical Intervention***).

Burden of Suffering

Obesity is an excess of body fat.[1] Most epidemiologic studies rely on indices of relative weight, such as body mass index (BMI), an index of body weight that is normalized for height, to estimate the prevalence of obesity.[a] For example, the National Center for Health Statistics currently uses the 85th percentile sex-specific values of BMI for persons aged 20–29 (≥27.8 kg/m^2 for men and ≥27.3 kg/m^2 for women) from the second U.S. National Health and Nutrition Examination Survey (NHANES II) as a cutoff to define overweight in adults.[2]

Approximately one third of adult Americans aged 20 and older are estimated to be overweight, based on data from NHANES III.[3] Using 1990 census figures, this corresponds to 58 million people. The prevalence of overweight in the United States has increased dramatically during the past 15 years in men and women of all age and ethnic groups, and remains disproportionately high among black and Hispanic women.[3] Other groups that have a high prevalence of obesity include Asian and Pacific Islanders, Native Americans and Alaska Natives, and Native Hawaiians.[4] The prevalence of overweight among adolescents has also increased.[5] Based on NHANES III data, about one fifth of adolescents aged 12–19 are overweight.[5] The prevalence of obesity among younger children is uncertain, but is estimated to be between 5% and 25%,[6] and may also be increasing.[7]

Increased mortality in adults has been clearly documented as a result of morbid obesity, weight that is at least twice the desirable weight.[8,9] Less severe obesity (e.g., as low as 26.4–28.5 kg/m^2) has also been associated with increased mortality in large prospective cohort studies.[10–13] Although some studies have reported greater mortality among the thinnest individuals,[14] a 1993 prospective cohort study that carefully controlled for smoking and illness-related weight loss found a linear relationship between BMI

[a] *Overweight* refers to an excess of body weight relative to height that includes all tissues and therefore may reflect varying degrees of adiposity. Despite the distinction between *obesity* and *overweight*, the majority of overweight persons are also obese, and these terms tend to be used interchangeably in the medical literature.

and mortality.[15] Two cohort studies suggest that overweight children and adolescents may have increased mortality as adults.[16,17] Childhood obesity may be a significant risk factor for adult obesity, with adolescent obesity being a better predictor than obesity at younger ages.[8,18,19]

Persons who are overweight are more likely to have adult-onset diabetes, hypertension, and risk factors for other diseases.[8,20] The prevalence of diabetes and hypertension is 3 times higher in overweight adults than in those of normal weight.[21] Observational studies have established a clear association between overweight and hypercholesterolemia and suggest an independent relationship between overweight and coronary artery disease.[8,10,11,20–23] Being overweight has also been associated with several cardiovascular risk factors in children and adolescents, including hypercholesterolemia and hypertension.[24–26] An elevated waist/hip circumference ratio (WHR), which may indicate central adiposity, has been shown to correlate with the presence of these conditions independent of BMI,[27–35] and may predict the complications of obesity in adults better than BMI does.[35,36] Obesity has also been associated with an increased risk of certain cancers (including those of the colon, rectum, prostate, gallbladder, biliary tract, breast, cervix, endometrium, and ovary), and with other disorders such as cholelithiasis, obstructive sleep apnea, venous thromboembolism, and osteoarthritis.[8,20,37] Finally, obesity can affect the quality of life by limiting mobility, physical endurance, and other functional measures,[8] as well as through social, academic, and job discrimination.[38–40]

Accuracy of Screening Tests

Extremely overweight individuals can be identified easily in the clinical setting by their physical appearance. More precise methods may be necessary, however, to evaluate persons who are mildly or moderately overweight. The complications of obesity occur among those with elevated body fat composition, which is most accurately measured by underwater (hydrostatic) weighing, isotopic dilution measures, and other sophisticated techniques that are not suited to clinical practice.[41] Bioelectric impedance, which provides an estimate of total body water from which the percentage of body fat can be calculated, is not widely available in clinical practice. This method has been reviewed elsewhere.[42]

The most common clinical method for detecting obesity is the evaluation of body weight and height based on a table of suggested or "desirable" weights.[e.g.,43–45] These tables generally reflect the weight at which mortality is minimized, and they only approximate the extent of fatness. The criteria for healthy body weight are a matter of controversy among experts and vary considerably as presented in different weight-for-height tables.[46,47] Weights for children and adolescents are typically evaluated in re-

lation to average weight for age, height, and gender. This information can be obtained from growth charts that are based on percentile distributions of body size attained at specific ages.[2] An alternative measure to using weight-for-height tables or growth charts is the BMI, a weight-height index that is calculated by dividing the body weight in kilograms by the square of the height in meters (kg/m^2). The BMI is easily performed, is highly reliable,[48] and has a correlation of 0.7–0.8 with body fat content in adults.[49–52] BMI also correlates with body fat content in children and adolescents.[50,51,53] In adults, overweight has been defined by the National Center for Health Statistics as a BMI ≥ 27.8 for men and ≥ 27.3 for women (the 85th percentile values for persons aged 20–29 in NHANES II);[2] a BMI at this level has been associated with increased risk of morbidity and mortality.[8] In adolescents, a BMI exceeding the 85th percentile for age and gender has been suggested as one definition for overweight[2] or for those at risk of overweight.[54]

Other anthropometric methods that may be useful in the clinical setting include the measurement of skinfold thickness and the indirect assessment of body fat distribution. Skinfold thickness is a more direct measure of adiposity than BMI and correlates well with body fat content in both adults and children, but this technique requires training and has lower intra- and interobserver reliability than height and weight measurements used to calculate BMI.[55,56] The WHR, the circumference of the waist divided by the circumference of the hips, which may be a better predictor of the sequelae associated with adult obesity than BMI, can also be measured in the clinical setting. The reliability of the WHR is comparable to that of BMI.[57] A WHR greater than 1.0 in men and 0.8 in women has been shown to predict complications from obesity, independent of BMI,[36] although the WHR has not been evaluated in all ethnic groups.

Effectiveness of Early Detection

The purpose of screening for obesity is to assist the obese individual to lose or at least maintain weight and thereby prevent the complications of obesity. Such screening may also assist with counseling other patients regarding maintaining a healthy weight. Most studies of interventions for obesity involve subjects who are overweight; we found no studies evaluating interventions for persons identified solely on the basis of an elevated WHR. Although there is little evidence from prospective studies that weight loss by obese individuals improves their longevity, there is evidence that obesity is associated with increased mortality[8–13] and that weight loss in obese persons reduces important risk factors for disease and mortality.[8,58] Prospective cohort studies[59,60] and randomized clinical trials[61–64,66] have demonstrated that caloric restriction or weight loss reduces systolic and di-

astolic blood pressures as well as the requirements for antihypertensive medication in obese adults with hypertension. These effects were independent of sodium restriction. In controlled[67] and uncontrolled trials[68,69] of low-calorie diets in obese diabetic patients, weight reduction was associated with improved glycemic control and reduced need for oral hypoglycemic agents and insulin. Weight loss generally improves the blood lipid profile[70–72] and can reduce symptoms related to obstructive sleep apnea.[73,74] To benefit from the detection of obesity, however, patients must be motivated to lose weight, must have access to an efficacious method of reducing body weight, and must maintain the resulting weight loss.

Various weight-reducing regimens are available, but many have only short-term efficacy and fail to achieve long-term weight loss.[6,9,75,76] Research to explain the difficulty in achieving long-term weight loss is ongoing. One theory is that obesity is related to an internal "set-point" that maintains excess body fat in certain individuals.[77] Some evidence suggests that energy expenditure decreases to compensate for reduced body weight,[78] which would tend to return body weight to the usual weight. Such a decrease in energy expenditure could contribute to the failure of most weight-reducing regimens to achieve long-term benefits.

Dietary modification is the most commonly used weight-loss strategy, and can achieve weight reduction over the short-term in both adults and children.[6,76,79] Very-low-calorie diets (< 800 kcal/day), which have been used for moderately to severely obese adults who have failed more conservative approaches,[80] produce greater short-term weight loss than standard low-calorie diets of 1,000–1,500 kcal/day.[76,79,80] Long-term results, however, are similar with both types of programs: the majority of participants eventually return to their pre-treatment weight within 5 years,[76,79] although sustained weight loss may be achieved by some patients.[81–85] Cohort studies and randomized controlled trials of behavioral modification, often combined with dietary therapy, have shown modest long-term benefits in adults[86–88] and children.[89,90] The results of the intensive dietary and behavioral interventions evaluated in these studies may not necessarily be applicable to the type of counseling likely to be given in a busy clinical primary care practice, and referral to other qualified providers or to qualified weight-management programs[1] may be necessary to achieve similar results. The amount of weight loss that can be achieved with exercise, either alone or in combination with other methods, is relatively limited in adults[76,91–93] and children,[94–96] but physical activity may be beneficial in maintaining weight loss[76,92,97,98] and reducing the WHR[92,99] in adults. Numerous randomized clinical trials have shown that various appetite-suppressant drugs can be effective in producing short-term weight loss in adults.[100–109] The effects, however, are limited to periods when the drug is taken, and some studies have shown a plateauing or gradual regain of weight with pro-

longed use.[76,100,101,104,105,107,110,111] Surgical techniques such as vertical band gastroplasty and gastric bypass may benefit selected adults who are morbidly obese,[112–114] but other procedures such as intragastric balloon insertion have not been shown to be effective.[115–118]

Certain weight reduction methods may cause important adverse effects. Very-low-calorie diets can cause fatigue, hair loss, dizziness, and symptomatic cholelithiasis.[76,119] Pharmacologic agents may cause palpitations, dizziness, insomnia, headache, and gastrointestinal discomfort.[120] Surgical therapies such as gastroplasty and balloon insertion can lead to gastric ulceration, perforation, and bowel obstruction.[121] Some cohort studies have reported that weight change or fluctuation in weight (weight cycling) among adults is associated with increased cardiovascular morbidity and mortality, but a review by the National Task Force on the Prevention and Treatment of Obesity concluded there is insufficient evidence that weight cycling is associated with adverse effects.[122] There is conflicting evidence regarding the potential adverse effects of caloric restriction and weight loss on growth velocity and development in obese children and adolescents.[123–127]

Recommendations of Other Groups

The American Academy of Family Physicians,[128] the American Heart Association,[129] the Institute of Medicine,[130] the American Academy of Pediatrics,[131] the Bright Futures guidelines,[132] and the American Medical Association guidelines for adolescent preventive services (GAPS)[133] all recommend measurement of height and weight as part of a periodic health examination for patients. Bright Futures and GAPS also recommend the determination of BMI for all adolescents.[132,133] The Canadian Task Force on the Periodic Health Examination concluded that there is insufficient evidence to recommend the inclusion or exclusion of height, weight, BMI, or skinfold measurement to screen for obesity in a routine health examination of either children or adults.[134] The Canadian Task Force does, however, recommend measuring and plotting the height and weight of infants and children in order to identify those who are failing to thrive.

Discussion

Evidence is limited that screening for obesity and implementing weight-reducing or weight maintenance strategies are effective in decreasing long-term morbidity and mortality. This is unlikely to improve in the near future due to the difficulty and cost of conducting controlled trials of weight loss with these outcome measures and of separating the effect of obesity from that of other risk factors. An additional obstacle is the low rate of long-term success in maintaining weight loss. Obesity is a chronic disorder

that requires continuing treatment, which could explain the failure of short-term interventions in achieving long-term success. Although losing weight has not been proven to reduce morbidity and mortality, it is clear that weight loss reduces an individual's risk for major chronic diseases such as hypertension and coronary artery disease, and it also improves the management of both hypertension and diabetes. Periodic height and weight measurements are inexpensive, rapid, reliable, and require minimal training to perform. They may also be useful for the detection of medical conditions causing unintended weight loss or weight gain, such as cancer or thyroid disorders, and the detection of growth abnormalities in childhood. Once height and weight have been determined, the BMI or standard height and weight tables may be used as a means of evaluating adolescents and adults for obesity. In addition, determination of the WHR may be useful for assessing some adults, particularly those whose weight or BMI is borderline for classification as overweight and who have personal or family medical histories placing them at increased health risk. There are inadequate data to determine the optimal frequency of obesity screening, and this is best left to clinical discretion.

CLINICAL INTERVENTION

Periodic height and weight measurements are recommended for all patients ("B" recommendation). In adults, BMI (body weight in kilograms divided by the square of height in meters) or a table of suggested weights[e.g.,43–45] may be used, along with the assessment of other factors such as medical conditions or WHR, as a basis for further evaluation, intervention, or referral to specialists. In adolescents, a BMI exceeding the 85th percentile for age and gender may be used as a basis for further assessment, treatment, or referral.[54] The height (or length if appropriate) and weight of infants and children may be plotted on a growth chart[e.g.,2] or compared to tables of average weight for height, age, and gender to determine the need for further evaluation, treatment, or referral. The optimal frequency for measuring height and weight in the clinical setting has not been evaluated and is a matter of clinical discretion. There is insufficient evidence to recommend for or against determination of the WHR as a routine screening test for obesity ("C" recommendation).

All patients should receive appropriate counseling to promote physical activity (see Chapter 55) and a healthy diet (see Chapter 56).

The draft update of this chapter was prepared for the U.S. Preventive Services Task Force by Barbara Albert, MD, MS, and Carolyn DiGuiseppi, MD, MPH, based in part on background papers written for the Canadian Task Force on the Periodic Health Examination by James Douketis, MD, William Feldman, MD, FRCPC, and Brenda Beagen, MA.

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