

Weight Management in Primary Care

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Keywords

Obesity · Conservative therapy · Diet · Exercise

Summary

Background: Obesity is one of the greatest public health challenges worldwide. It is not only a medical but also a philosophical, ecological, economic, sociocultural, and psychological problem as well as a severe consequence of our modern value definition to ‘receive more and more’. Therefore, physicians are not able to treat obesity broadly and should not be used as tools to achieve certain weight goals. **Methods:** This article presents an outline of conservative obesity therapy. Using the key words ‘obesity’, ‘diet’, and ‘exercise’, a search was conducted in the PubMed and ScienceDirect databases for the period from 1995 to 2015. **Results/Conclusion:** The goal of obesity therapy is primarily the reduction of abdominal fat distribution. Only after achieving this main objective, weight loss reduction can be included by changes in eating and activity habits as well as further lifestyle modifications supplemented by weight-reducing medical, invasive, and/or surgical therapy measures in order to reduce obesity-associated comorbidities and to improve quality of life. A reduction of fat intake while avoiding unsaturated fatty acids, an optimization especially of the quality of carbohydrate and protein intake, an increase in physical activity (about 30–60 min per day) with individual adaption, and a personal, ongoing therapeutic leadership is necessary to reach the main goal, i.e. losing 5–15% of the initial weight.

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Introduction

The World Health Organization (WHO) defines obesity and overweight as ‘abnormal or excessive fat accumulation that presents a risk to health’ [1]. As one of the greatest public health challenges worldwide, the prevalence of obesity has tripled in many European countries since the 1980s. Obesity and overweight increase the risk of developing numerous so-called non-communicable diseases (NCDs) such as cancer, diabetes, and cardiovascular diseases and of causing a variety of physical disabilities and psychological problems. NCDs are the leading cause of death globally, being responsible for 38 million (68%) of the 56 million deaths in the world in 2012 [2].

The following article mainly focuses on indications for obesity treatment as well as possible lifestyle interventions, which are the principal elements of any obesity treatment program.

Nevertheless, the formula of weight loss is simple: ‘less input + more output = obesity reduction’ [3].

Thresholds for Management

The primary goal of weight management in primary care is to reduce the morbidity and mortality of overweight or obese patients and to improve psychological well-being and social function. To achieve this reduction in morbidity or mortality, the risks inducing these have to be decreased. The treatment should be tailored to the patient’s individual needs and risk profile. In general, obesity interventions are used for patients with an increased risk of morbidity or mortality.

In the past, treatment was initiated based on anthropometric measures. The body mass index (BMI) was demonstrated as one important risk factor; in 1997, the WHO defined overweight as a BMI ≥ 25 kg/m² and obesity as a BMI ≥ 30 kg/m² [4, 5]. For obese non-smoker females, life expectancy is reduced by 7.1 years whereas obese non-smoker males have an average life expectancy

reduction of about 5.9 years compared to normal-range BMI [6]. However, the BMI is insufficient in evaluating a patient's individual risk profile. To acquire additional information, waist circumference measurements are used due to their correlation with visceral fat mass. A waist circumference over 102 cm in men and 88 cm in women is associated with increased cardiovascular and metabolic risks [7]. In the past years, more publications revealed that anthropometric parameters are helpful; however, they only partly mirror a patient's risk. A stratification of risks according to the Edmonton Obesity Score System (EOSS) offers an additional possibility to draft the treatment indications more independently from the BMI. According to this score system, comorbidities can be grouped into four categories, i.e. metabolic, mechanical, mental, and monetary (meaning social and economic conditions) – the 4M system. Depending on which comorbidity is shown, the patient can be assigned to a certain stage, ranging from stage 0 (no apparent obesity-related risk factors) to stage 4 (severe, potentially end-stage disabilities due to obesity-related chronic diseases). Therefore, the mortality is not increased even with a BMI > 40 kg/m² if no associated diseases of the 4M system are shown. With this score system, weight loss treatment can be adapted according to the stage or the kind of comorbidity. For example, patients with stage 1 or only metabolic comorbidities only need to lose 5–10% of their initial body weight to reduce those morbidities while patients with stage 2 or only mechanical comorbidities need to lose 10–20% [8].

In general, many medical complications associated with obesity can be improved by intentional weight loss, and even very modest weight losses were shown to affect cardiovascular and metabolic risk markers. A reduction of 40–50% in sum of risk factors can be achieved by losing 2.25 kg over 16 years [9].

The informative value of the BMI as a risk factor is limited. It is obvious that associated mechanical diseases correlate with the patient's weight. The pattern of abdominal fat distribution can be more significant and more informative regarding metabolic comorbidities. The identification of obesity states according to the EOSS provides a good means of determining treatment indications.

Lifestyle Modifications

Nutrition and Energy Intake

The nowadays very common high-fat diet is an independent risk factor for overweight and obesity [10]. Especially energy-dense and carbohydrate-rich food, e.g. soft drinks, consumed in childhood or adolescence predisposes children and teenagers to weight gain [11]. However, this weight gain varies due to the individual environment and the genetic background of individuals.

An increased intake of dietary fat leads to elevated cardiovascular and metabolic risks. Nonetheless, the composition of fat or fatty acids is as important as the total intake. An increased intake of saturated fat leads to impaired insulin action [12, 13]. In contrast, an elevated intake of unsaturated fat improves insulin sensitivity [14,

15], especially omega-6 polyunsaturated fatty acids, which were shown to have positive effects on increasing said sensitivity in diabetic patients [16].

In addition to the effects on insulin sensitivity, fatty acids influence the lipoprotein metabolism. Therefore, the quality of fatty acid composition is as important as the energy content in treatment. Replacement of saturated fat with unsaturated fat led to reduced low-density and very-low-density lipoprotein concentrations in patients with insulin resistance [17]. Long-chain omega-3 fatty acids lower the triglyceride levels without affecting insulin sensitivity [18]. The blood pressure can be reduced by intake of monounsaturated acids [19, 20].

In order to adapt the treatment to the patient's needs, it is beneficial to adjust the composition of fatty acids individually. The best ratio for saturated, monosaturated, and polysaturated fatty acid intake is 1:1:1 instead of the more common 7:2:1 ratio.

The composition of carbohydrates is important for weight reduction as well. Carbohydrates differ in the speed of their absorption. Simple sugars can be absorbed more quickly and more efficiently. Therefore, food with the same amount of carbohydrates can vary in its hormonal effects as well as glucose response [21, 22]. This observation led to the establishment of the glycemic index [23]. Food with low glycemic indices and mainly containing slowly absorbable carbohydrates was shown to prolong postprandial satiety [24, 25]. This index is, however, only applicable for foods within the same food group [26]. The total energy content is still important. The impact of complex versus simple carbohydrates was shown in a study with *ad libitum*, fat-reduced (by 10% of total energy) regimen in overweight individuals. Both diets led to a significant reduction in body weight and the maintenance of fat-free mass after 6 months [27].

Several studies showed that the replacement of some carbohydrates with proteins led to a positive effect on body composition changes during energy restriction; therefore, body fat loss can be improved by an increased intake of dietary proteins while lean body mass can be better maintained [28]. Additionally, maintenance of the resting metabolic rate can be enhanced by a high-protein diet [29]. In general, the loss of energy when proteins are absorbed, processed, or stored is the highest among all nutrients with approximately 25–30% of ingested energy [30]. There are several studies that showed proteins promoting satiety and reducing appetite [28, 31]; these findings are controversial though [32]. All in all, a high-protein diet was shown to be superior in improving insulin sensitivity [33] while not adversely affecting blood pressure [34], cholesterol or triglyceride levels [28, 35], and bone turnover [35, 36]. When proteins are ingested in combination with carbohydrates, insulin secretion increases. Therefore, a separation of carbohydrate and protein intake can be suggested. A higher protein intake after weight loss can contribute to a better stability of the new weight [37].

Conclusion

High-fat diets are independent risk factors for overweight and obesity. The composition of fatty acids is important when treating

an overweight patient and improving weight loss. Replacing saturated with unsaturated fat leads to reduced lipoprotein concentrations, while increased intake of unsaturated fat improves insulin sensitivity. In general, an intake of saturated, monosaturated, and polysaturated fat should be adjusted to a ratio of 1:1:1 and that of total fat to not more than 40–60 g/day. The composition of carbohydrate intake is important as well. Simple and complex carbohydrates differ in their speed of absorption. Diets with increased intake of either simple carbohydrates or complex carbohydrates showed a reduction in body weight as well as maintenance of fat-free mass. Insulin-resistant patients can profit from an optimization of the times of carbohydrate intake. We recommend a sufficient amount of complex carbohydrates in the morning and noon as well as passing on carbohydrates in the evening. High-protein diets improve insulin sensitivity.

Diets

Low-Caloric/Low-Fat Diet

A low-caloric diet is applied in most patients because it contains all essential micro- and macronutrients and requires minimal monitoring. This conventional diet restricts the total fat energy to less than 30% of total energy intake. It should have high amounts of complex carbohydrates and fibers; therefore, the intake of whole-grain cereals, vegetables, and fruit should be increased [38]. The total energy content varies between 1,200 and 1,800 kcal/day. However, in order to adapt the diet to the individual needs of a patient, it is more efficient to estimate the total energy requirements, depending on the average activity of this patient, and to subtract a certain number of calories. The deficit, which is mainly accomplished through a reduction in dietary fat, should be approximately 600 kcal/day. When reducing the fat intake by about 10%, a weight loss of 2.9 kg over 6 months can be reached [39]. A reduction in dietary fat without total energy restriction leads to weight gain prevention in normal patients and to weight loss in those with overweight [40].

Very Low-Caloric Diets

Very low-caloric diets (VLCD) contain less than 800 kcal/day. They are used when a larger, more rapid short-term weight loss is desired [41] and to avoid total fasting. Usually, such diets are prepared as formula diets; therefore, it is very likely that they do not contain all required micronutrients and lead to an intake of too much simple sugars. The weight loss resulting from such a diet is two to three times greater than with conventional diets (low-caloric/low-fat diets) [42]. Patients with a BMI above 30 kg/m² or above 27 kg/m² plus associated conditions may benefit from such a diet [41]. Short-term results are for example an improvement in arterial hypertension and insulin sensitivity [43]. However, such diets are not suitable for patients with heart diseases [44] due to the increased stress level that is associated with such a diet, as well as for those patients with renal failure [45]. Additionally, infants, children, and pregnant or lactating women are not suited for such diets [41].

Low-Carbohydrate Ketogenic Diets

In this diet, carbohydrate intake is restricted to 50 g/day, though ingestion of animal products such as meat, eggs, fish, etc. is not limited. A carbohydrate intake of less than 40 g/day leads to ketonuria which can be easily detected with a urine dipstick. Dietary adherence can be tested via this measurement [46, 47]. A low-carbohydrate ketogenic diet is more effective in older or insulin-resistant patients [48]. However, many patients are unable to sustain low carbohydrate intake over long periods [47]. The production of glucose via gluconeogenesis is increased when the carbohydrate intake is reduced. Gluconeogenesis requires the mobilization of ketogenic amino acids. If those are not replenished via intake, muscular proteins are mobilized, leading to the promotion of cardiomyopathies.

Conclusion

Different kinds of diets are available. The conventional, low-caloric/low-fat diet restricts the total fat energy to 30%. With this therapy, a long-term and regular observation is required. It contains all required macro- and micronutrients and is well realizable because it matches the normal composition of food. A weight loss of 2.9 kg over 6 months was found (reduction of fat intake by 10%). High amounts of complex carbohydrates are favorable. Reducing only the dietary fat intake without adapting the total energy intake leads to weight gain prevention (normal patients) and weight loss (overweight patients).

VLCD contain less than 800 kcal/day. Larger, more rapid weight loss can be achieved. However, these diets may not include all essential micronutrients due to their preparation as formulas. The weight loss is two to three times greater. Most suitable for such diets are patients with a BMI over 30 kg/m² or over 27 kg/m² plus associated conditions. This diet has proven itself as a first step to weight reduction.

Low-carbohydrate ketogenic diets restrict the carbohydrate intake to 50 g/day. Ingestion of animal products is not limited. Older or insulin-resistant patients profit more from such diets.

Especially regarding long-term support, the following approach has proven to be very helpful: First of all, to start weight reduction, a VLCD can be applied to generate some success at the beginning of therapy; thus, the patient does not have to think too much about the diet. After that, nutrition modifications, especially fat reduction, can be applied. Modern media, such as smartphones, apps, online counseling, and recalls via telephone, can be used as surveillance tools and to prove adherence to the diet. Every 4–6 months, the focus of dietetic treatment should change, e.g. focusing on carbohydrate restriction or protein emphasis. It is especially necessary to establish a practical controlling system, at least once per year, as long as the patient is willing.

Physical Exercise

Physical exercise is in general an important component of daily energy expenditure which is easily modified and therefore very suited to be included into weight loss programs. The effects depend

on the duration and intensity of one exercise unit. Depending on the kind of exercise, e.g. strength training, endurance training, or a combination of both, different responses can be elicited.

Physical exercise can improve blood pressure [49] as well as increase insulin sensitivity [50, 51], cardiovascular fitness [52], and fat oxidation [53, 54] independently from body weight. With regular physical training, abdominal fat can be mobilized [55]. Additionally, a study has brought to light that only 30 min of activity on most days of the week reduces the all-cause mortality by about 20–30% [56].

The effect of physical exercise cannot be solely explained by the increase of energy expenditure during exercise. Studies showed that regular exercise results in small elevations in the resting metabolic rate [57, 58]. However, there are other observations showing a decrease in the resting metabolic rate with exercise training [59, 60]. Nevertheless, exercise training promotes the growth of skeletal muscles [61].

In order to lose weight, low-intensity exercise is usually recommended. With higher intensities, fat oxidation is more likely to be replaced by carbohydrate oxidation [62]. However, the absolute quantity of fat oxidized is increased by a higher amount of work. Therefore, higher intensities are more efficacious if the patient is not physically limited. To prevent weight gain, a caloric expenditure equal to walking 6–7 miles/week, i.e. approximately 30 min/day, is sufficient [63]. More physical activity, about 60–90 min/day, is required to maintain weight loss [64, 65]. A study on the effect of exercise, with or without dieting, showed that overweight men lost

an extra 3 kg over 30 weeks while overweight women lost 1.4 kg over 12 weeks [66].

Weight loss induced only by dietary restriction is accompanied by a decline in the resting metabolic rate, which is partly due to the reduction of fat-free mass. Whether physical exercise can prevent this reduction is still unclear. However, physical exercise without restriction of caloric intake only results in small changes in body weight. Weight loss, especially fat loss, can be promoted by aerobic exercise and a hypocaloric diet.

Conclusion

Physical exercise is important for weight loss programs. Blood pressure, insulin sensitivity, and so forth can be improved by regular exercise. Only 30 min/day of activity can reduce the all-cause mortality as well as prevent weight gain. More physical activity, about 60–90 min/day, is recommended for maintaining weight loss. Higher training intensities are recommended to increase the absolute amount of fat oxidized. This is only applicable if the patient is not physically limited. Physical exercise without any changes in caloric intake leads to rather small changes in body weight.

Disclosure Statement

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