

# Management of non-insulin dependent obese diabetics

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## ABSTRACT

The management of an obese diabetic patient involves a three- pronged approach which includes i) diet and exercise ii) oral hypoglycemic agents and iii) insulin, 25% of diabetics are over- weight. Weight-loss helps reduce insulin resistance as well as glucose intolerance. It also corrects hyperlipidemia, decreases hypertension and the risk of coronary heart disease.

## INTRODUCTION

An understanding of the etiopathogenesis of obesity is necessary before attempting to comprehend the management of obese diabetics. Obesity could either develop as a primary defect in eating habits or as a secondary event to some pathological states.

Eating behaviour is determined by many factors. The cortical region of the brain exerts the ultimate control over the quantity and quality of food preferred. Both socio-cultural and genetic factors seem to exert influence over the cortex. Ventromedial hypothalamus (VMH, Satiety centre) and ventrolateral hypothalamus (VLH, Feeding centre) send, respectively, negative and positive influences over eating behaviour. The feeding and satiety centres are influenced by gastric distention, glucose and insulin in plasma and adrenergic inflow.

Secondary obesity is caused by hypercortisolism, insulinoma and disorders of hypothalamus involving satiety and feeding centres; it is also seen in hypothyroidism due to myxedematous deposition.

It has been observed that obesity associated with diabetes is more 'androgenic' as manifested by a high waist-to-hip ratio. In addition to insulin resistance and glucose intolerance, the individuals with a central obesity also have hypertension, coronary artery disease, hyperlipidemia, and if very severe, hypo-ventilation syndrome.

Amongst the diabetics, 25% are overweight and weight loss helps reduce both insulin resistance and glucose intolerance. In addition, it corrects hyperlipidemia, decreases hypertension, and the risk of coronary artery disease. Thus, it becomes

important to control weight in diabetics in order to reduce the chronic complications.

## MANAGEMENT OF OBESE NIDDM

The three modes of therapy in obese diabetics include:

1. Diet and exercise
2. Oral hypoglycemic agents and
3. Insulin

### Assessment of obesity

The aim of dietary therapy is to bring the weight nearest to the ideal body weight for the height of the patient. An easy way to calculate ideal body weight is 5 kg less than (height in cm---100) e.g. for a person with height of 165cm the ideal body weight would be  $(165-100)-5 = 60$  kg.

Alternatively, body mass index (BMI) can be used to ascertain obesity.  $BMI = Wt (Kg) / [Ht (m)]^2$ .

BMI above 27 (males), or 25 (females), is taken as obesity. Another way to calculate the ideal body weight (IBW) is  $IBW = 23 \times [Ht (m)]^2$

### Diet

The total caloric requirement is calculated from the ideal body weight. A sedentary life style requires 30 Kcal/Kg of body weight. The obese patient should get 15% less, and the manual workers need 25 to 50% more calories. The breakup of calories in terms of its carbohydrates, protein, and fat content is as follows: Carbohydrates: 65%, Protein: 20%, Fats: 15%. The calories should be distributed in the form of five to six meals, three major and three minor. High fat diets are particularly to be avoided in obese diabetics, because they often have associated hyperlipidemias. Common food stuffs containing a large quantity of fat include coconut, nuts and dry fruits, full cream milk, butter, ghee, fatty mutton, pork and duck. It is also important to look at the quality of fat; higher saturation of fatty acids in dietary fat predisposes to higher blood cholesterol levels and presumably to a higher rate of cardiovascular events. Thus, poly-unsaturated or unsaturated fats are preferred.

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### *Poly-unsaturated oils*

Sunflower Oil, Corn Oil, Soybean Oil

### *Mono-unsaturated oils*

Peanut Oil, Fish Oil, Olive Oil

### *Saturated Oils*

Ghee, Butter, Cheese, Vanaspati Ghee, Palm Oil

High fibre diets are also preferable due to their capacity to decrease LDL and VLDL cholesterol, and increase HDL cholesterol. Fiber also retards absorption of glucose and improves glucose tolerance. Insoluble fibres are present in vegetables, grain coverings and whole grain flour, fruits and legumes. Guar gum has been found to be very effective in reducing the absorption of carbohydrates. Low calorie diets (400-600 kcal/d) are useful in severely obese individuals; however, the danger of complications like cardiac arrhythmias, fluid and electrolyte imbalances should be kept in mind during such regimens. With such starvation diets as much as 20 kg can be lost in first 12 weeks of therapy; but it is more important to maintain the weight loss. This is achievable only with behaviour alterations.

Strategies of behaviour modification programmes:

It is advisable to keep a daily diary of intake of food and exercise pattern. With this the patient becomes fully conscious about his/her weight and will thus be reminded to comply with the programme.

The patient is educated and encouraged by the family physician or diabetologist to set a goal for food intake, exercise and weight loss. In order to lose one kilogram per week, a loss of 1000 Kcal per day is required. Diet is thus reduced accordingly and exercises increased.

The events that precede eating, like the sight of food, smell, seeing television while eating etc. need to be changed. A free access to the refrigerator should be somehow reduced.

Some depressed patients tend to over-eat; thus it is also advisable to avoid and/or treat depression.

### **Exercise**

Brisk walking is the best form of exercise as it seems to be habit-forming and possible on a regular basis. Other exercises include cycling and swimming.

Exercise increases energy expenditure and improves mood, inducing a sense of well-being. It is a mainstay for achieving and maintaining normal weight on a long-term basis. Regular exercise increases the insulin sensitivity and decreases insulin resistance, ultimately leading to a better glucose control. Exercise also alters blood lipids favourably by increasing HDL and decreasing LDL and VLDL.

### **Hypoglycemic agents and other drugs**

Those obese diabetic patients who do not respond to diet and exercise can be put on oral hypoglycemic agents. There is no sufficient proof that the biguanide group of drugs are more useful than sulfonylureas in obese diabetics. Very rarely some obese diabetic patients may require insulin injections for control of diabetes.

The role of appetite-reducing drugs, if any, is controversial.

### **CONCLUSIONS**

The hallmark of management of diabetes in obese patients still remains proper diet control along with behavioural modifications and adequate exercise. Very rarely obese diabetic patients require oral hypoglycemic agents.

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