

From the aspect of Nutrition; Formula diet

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Formula diet is a powdered preparation and is composed of high-protein, low-carbohydrate, low-fat, vitamins and minerals. Formula diet is safe, convenience and effective in weight loss for treatment of obesity. However, the nutritional efficacy is not fully explored.

We compared the effects of partial use of formula diet (MicroDiet®; 170kcal/pack, protein 21.5g/pack, fat 2.4g/pack, carbohydrate 16.5g/pack) and conventional subcaloric diet on weight reduction, body fat distribution and related metabolic variables in obese patients with type 2 diabetes for 24 weeks. In formula diet group, weight reduction, visceral fat reduction, decrease in systolic blood pressure, HbA1c, triglyceride and increase in HDL-C was greater than in conventional diet group. Interestingly, improvements in visceral fat, HbA1c, triglyceride and HDL-C per reduced body weight were higher in formula diet group. These findings have given us a hypothesis that formula diet has specific nutritional effect, which is independent of calorie restriction. To clarify the hypothesis, we investigated the effects of formula diet on visceral fat, metabolic parameters and adipokines expression in Zucker diabetic fatty rats (low-calorie diet; 56kcal/g, P:F:C=25:15:60, formula diet (MicroDiet®); 56kcal/g, P:F:C=50:14:36). The changes in body weight were not different between groups, however in formula diet group, decrease in visceral fat volume and improvement in triglyceride and HDL-C were greater. Adiponectin, LPL, PGC-1 α and PPAR γ mRNA/protein expression in visceral fat tissue were higher in formula diet group. On the other hand, formula diet also led to greater reduction of liver fat content in Zucker rat.

Formula diet may be useful for prevention of malnutrition and long-term weight gain after bariatric surgery. Furthermore, the potent effect on liver fat reduction is also useful before surgery, because enlarged fatty liver in obesity compromises surgical access to gastroesophageal junction. Pre- and post-operative formula diet may be a key nutritional option when bariatric surgery is performed.