J. Indian Dietetic Association Volume 41, No.2, pp. 28-33, 2018

MONITORING INTAKE OF MACRONUTRIENTS INDIVIDUALLY IS MORE IMPORTANT THAN MONITORING TOTAL ENERGY INTAKE IN ONE- TO TWO-YEAR POST-BARIATRIC SURGERY SUBJECTS

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ABSTRACT

Background: Roux-en-Ygastric bypass (RYGP) is one of the most successful bariatric surgeries as it results in long-lasting weight loss.

Objective: To see the distribution of calories in subjects one- to two-year post surgery, in terms of protein, carbohydrate and fat.

Methods: One- to two-year post-surgery subjects who underwent Roux-en-Y gastric bypass were eligible for this observational study. Food intake was evaluated from two-day dietary recall and the same was used to find the distribution of macronutrients in terms of percentage of carbohydrates, proteins and fats. Descriptive analysis was presented using mean ± standards deviation (SD) or percentages where appropriate.

Conclusion: This study concludes that nutritional counselling and monitoring need to be conducted with the emphasis on individual macronutrient intake rather than only emphasising on total energy intake after RYGB surgery.

Keywords: Macronutrients, total energy intake, obesity, post surgery, observational study.

Introduction

Obesity results from the excessive and abnormal fat deposition that harms the health of an individual. More than 250 million people are affected by obesity in the world, of which 10 million are affected by morbid obesity. Therefore, obesity is emerging as a public health problem globally.[1,2] Bariatric surgery is a highly recommended treatment for obesity to promote weight loss, and improve quality of life and co morbidities associated with obesity.[3] Roux-en-Ygastric bypass (RYGP) is one of the most successful bariatric surgeries as it results in long-lasting weight loss. However, it may results in long-term or short-term clinical complications and nutritional deficiencies which require micronutrient and/or macronutrient supplementations.[4] The number of patients undergoing bariatric surgery for morbid obesity has been increased dramatically in recent years. Patients after surgery are required to follow special dietary recommendations to achieve weight loss goals and further maintenance of weight.[5] Therefore,

it becomes important to monitor food intake and its effect on weight loss and nutritional status. The chances of successful obesity treatment increases with a healthy lifestyle after surgery, ie, increase in physical activity and decrease in calorie intake. For positive outcomes, patient should be highly motivated.[2]

The effect of RYGB on body weight has been amply documented, but few studies have assessed the evolution of energy and macronutrient intakes, after an RYGB. Diet forms an integral part in the management and success of bariatric surgery. After surgery a normal progression in caloric intake has been observed. Patients post procedure has a low capacity of food intake due to reduced pouch size. Studies have shown that patients in the first six months postoperative experience a sharp drop in caloric intake in relation to the pre-operative phase.[6-8] Literature indicates that the bariatric population can increase their caloric intake over time, but dietary control is important to prevent weight regain. Protein-rich foods should be eaten during initial months of surgery and in the recommended amount. Low protein intake may lead to a loss of lean mass and malnutrition.[5] Therefore, the recommendation for protein is between 60 and 120 g/day, with a consumption of more than 1 g/kg of current body weight proving to be effective in promoting weight loss and preserving lean mass.[10,11]

After RYGB, consumption the right amount of carbohydrates plays important role in maintaining body weight. Excessive consumption of carbohydrates is associated with less excess weight loss.[1] Patient with RYGB should be reinforced to a high protein and low carbohydrate diet. Attention should be given to both the quality and quantity of food. But it should also be kept in mind that low intake of carbohydrates may cause some damage by causing ketonemia.[2] In a study food pyramid model for bariatric surgery has been proposed in which carbohydrate intake between 40 and 45 percent of daily TEI is recommended.[3]

Diet forms the integral part of management after bariatric surgery, but quality of calories intake is more important than just the total calorie intake. Hence the study was undertaken to see the distribution of calories in patients one- to two-year post surgery, in terms of protein, carbohydrate and fat.

Methods and Materials

One- to two-year post-operative subjects who underwent Roux-en-Y gastric bypass were eligible to participate in this prospective observational study. The patients who met eligibility criteria were called and the subjects who agreed to take part in this observational study signed informed consent after understanding the study protocol. The study was approved by local research ethics committee.

From the medical records of each patient, data on body weight at the time of surgery were collected. During the follow-up visits, body weight of subjects was noted. Other data were also collected from medical records of subjects including age, gender, and date of surgery.

Food intake was evaluated from two-day dietary recall and the same was used to find the distribution of macronutrients in terms of percentage of carbohydrates, proteins and fats. Data were analysed using SPSS Version 20. Descriptive analysis was presented using mean ± standards deviation (SD) or percentages where appropriate.

Results

Results: A total of 40 subjects with mean age of 45.98 years one- to two-year year post surgery were analysed in this prospective observational

study. Patients had been operated in June 2016-17 and came for follow ups in July–August 2018. The mean (SD) age of patients was 45.98 years. The mean total energy intake was 1,182.5±169.29 kcal/day at one- to two-year post surgery. Protein intake was 19.2±5.43 percent of the total energy intake (TEI) at one- to two-year post surgery. Carbohydrates intake was 56.8±7.47 percent and fat intake was 23.85±5.19 percent of TEI. It was seen that 19 patients (47.5 percent) had protein intake less than the recommended level (20 percent), 35 patients (87.5 percent) had carbohydrates (55 percent) intake more than recommended level and four patients (10 percent) had fat intake less than recommended level (30 percent).

Discussion

This observational study was conducted to see the distribution of calories in patients one- to two-year post surgery, in terms of protein, carbohydrate and fat. In was found that though the total intake of calories was well within the recommendation, but the percentage of distribution of macronutrients in terms of carbohydrates, proteins and fats were not per the standards.

The majority of patients were female (65 percent). Most of the patients were compliant with recommended fats (90 percent) followed by protein (52.5 percent). Least compliance was observed with carbohydrates (12.5 percent); these patients consumed carbohydrates more than recommended level with a maximum intake of 77 percent. The weight loss ranges between 25 kg and 80 kg. Previous studies concluded that protein, intake was low in most of the subjects except the subjects who were non-vegetarian and on protein supplements. The average protein intakes -one year post-surgery was largely deficit to the recommended 1.0 g/kg/day maintenance requirements.[11] The lower consumption of proteins than recommended guidelines resulted in loss lean body mass (instead of fat mass), reduction in metabolic rates, and physiological damage. The excessive lean body mass loss may, in turn, induces a decrease in the BMR and total energy expenditure and, thus, limit weight loss or favours the recurrence of obesity in the long-term.[5] In this study, the average protein intake

Figure-1 : Total Energy Intake by Subjects One- to Two-Years After Roux-en-Y Gastric Bypass

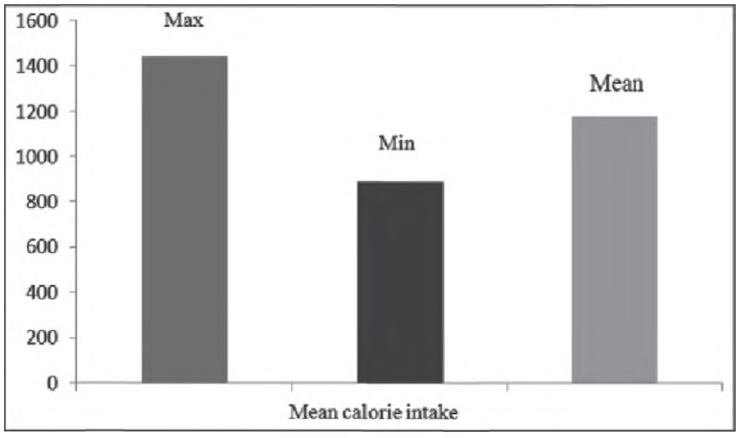
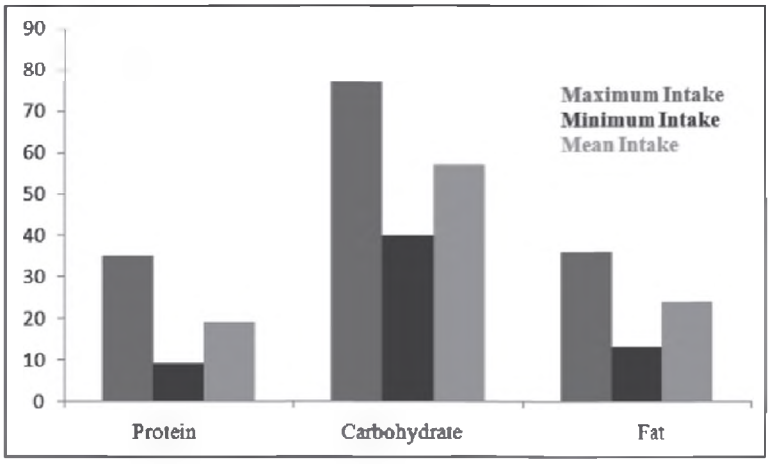


Figure-2 : Individual Macronutrient Intake by Subjects One- to Two-Years After Roux-en-Y Gastric Bypass



was 19.2±5.43 percent of the total energy intake (TEI) but in some subjects, intake of protein was quite low with a minimum intake as low as 9 percent of TEI. Twelve (30 percent) subjects were taking high protein diet and meeting the recommendation, and most of these subjects were either taking protein supplementation or were regular with their non-vegetarian intake. A high protein diet leads to increased satiety, more weight loss and improved body composition. This emphasizes on the importance of protein supplements post-bariatric surgery for effective weight loss and maintenance of lean mass.

Carbohydrate recommendations also depend on the degrees of glucose usage by brain. To maintain basic activities, requirement of brain for glucose is 25 g/day. However, current recommended dietary allowance for carbohydrates is 130 g/day. This dietary reference intake was selected by keeping in mind the ideal carbohydrates minimum. This level provides sufficient supply of glucose to brain without the requirement of additional production through triglycerides and proteins. The recommendations for carbohydrates per American Diabetes Association is also same, ie, 130 g/day. Carbohydrates conserve proteins and if consumption of carbohydrates is too low then amino acids from protein structure get deaminated and release carbon group to supply energy to the body. This leads to loss of muscle mass and adherence for this type of diet play a challenging role for patients. Thus, carbohydrates should be taken in low amount but cannot be excluded totally from diet. For normal activity of neurons and red blood cells, a minimal amount of carbohydrates is necessary as carbohydrates are basic source of energy. As per guidelines of the Food and Agriculture Organization/World Health Organization, minimum carbohydrates amount is 50 g/day for normal brain activity. In a study, food pyramid model was proposed for the subjects with bariatric surgery which recommended carbohydrates intake between 40 and 45 percent of daily TEI. In a randomized clinical

trial, it was found that carbohydrates at the maximum amount of 120 g/day is beneficial in reducing and maintaining weight and improving co morbidities related to obesity.[3,12] In the present study, mean percent intake was 56.80 percent with a maximum intake of 77 percent and minimum intake of 40 percent.

Fat intake was well within the recommended range with mean intake of 23.8 percent well with a minimum intake of 5.19 percent and maximum intake of 13 percent. The reason for the same can be as usually fat is considered to be the main culprit for weight gain or obesity; hence all subjects tried avoiding too much oil and other fried foods.

This study had limitations: first, two-day diet recall was taken which probably did not give the exact recall of the diet. Secondly, as the subjects were asked for a self recall, it can be underreporting, which is usually in subjects with overweight and obesity. Therefore, dietary intake data may have been grossly underestimated.

Conclusions

It was found that though the total intake of calories was well within the recommendation, but the percentage of distribution of macronutrients in terms of carbohydrates, proteins and fats was not as per the standards. It can be concluded that for post-bariatric patients nutritional advice should focus not only on quantity of calories but also equally important on the quality of calories. More emphasis should be given on protein rich diet. Carbohydrates and fats intake must be reduced. This study concluded that nutritional counselling and monitoring to emphasise on individual macronutrient intake is more important rather than emphasising on total energy intake after RYGB surgery.

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