THE IMPACT OF HYPER PROTECTIVE DIETS ON THE NUTRITIONAL STATUS OF THE CONSUMERS

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Abstract

Diets specific to different health conditions as well as absolutely any prescribed diet require an analysis, an intervention in the metabolism of the body. Any prescribed diet shall take into consideration the body's health condition, its metabolic implications and, most importantly, any existing pathology. Ultimately, the diet shall be correlated with all the scientific data related to that pathology.

This study mainly aims at informing and making those consumers who are interested in adopting fast weight-loss diets aware of the fact that an imbalance in the composition of the calorigenic nutritional factors will not only lead to a weight loss, but it will also affect certain organic functions and, in some cases, it will lead to the onset of certain pathologies. Irrespective of the type of diet, any unreasonable diet leads to disruptions in the metabolic processes, weakens body resistance and may be the direct or indirect cause of various diseases. Thus, particular hygienic, physiological and nutritional norms are recommended for each individual and population group. By establishing these norms, nutritional science sets up, at the current stage of development, the necessary of energy intake and nutritional principles for a rational nutrition. Protein intake may be sufficient as long as diets consist of a variety of foods including meat, fish, milk and dairy products, eggs and vegetable proteins.

Key words: healthy diet, hyper protective diet, overweight, energy balance

INTRODUCTION

To discuss or to characterize a diet, it is necessary to describe the main factors that make up that diet, to know the role of those factors in the body as well as the metabolic interferences reported to the reference values in the human body.

According to the data presented in the specialized literature, HP diets tend to lower body weight, but the negative effects that may follow from adopting such irrational diets are not known. Piatti et al., 1994, comparing HP diets (45% P, 20% L and 35% C) to HC diets (20% P, 20% L and 60% C) with the same calorific value of 800 Kcal/day in obese women, observed a similar loss in body weight and fat mass in both diets and a loss in the muscle mass only in the HC diet. Glucose level remained unchanged, while insulin level decreased in both diets. Glucose disposal and glucose oxidation increased significantly after the HP diet and decreased significantly after the HC diet. According to Piatti et al., 1994, a hypo caloric diet with a high percentage of natural proteins can improve insulin sensitivity and weight

loss is mainly due to the hypo caloric level and not necessarily to the protein content.

Karin, et al., 2005, compared the effect of high protein intake vs. high carbohydrate intake on insulin sensitivity, body weight, haemoglobin A1c, blood pressure, kidney and liver function in patients with type 2 diabetes from urban areas. The protein-rich diet consisted of 30% P, 30% L, 40% G and the second diet, which consisted of 15% P, 30% L 55% G, was high in carbohydrates for diabetics, but normal for healthy people. At the end of the analysis period, Karin, et al., 2005, observed a weight loss in both experimental groups. Haemoglobin A1c and fasting plasma glucose decreased and insulin sensitivity increased in the high carbohydrate diet compared to the HP diet which showed no significant changes in these parameters. Systolic and diastolic blood pressures decreased in the HP diet. At the end of the analysis period, none of the diets showed any effect on lipid levels (total cholesterol, LDL, HDL), renal function (urea nitrogen and urea serum, serum creatinine) or liver function (aspartate aminotransferase, alanine aminotransferase, bilirubin).

Reducing the caloric intake by 500 kcal/day should result in a weight loss of 0.45 to 0.9 kg per week (Denke, 2001). However, low-carbohydrate diets and HP diets typically induce a weight loss of 2 to 3 kg in the first week, loss that is not due to the miracle of "changing the metabolism of the body in terms of fat burning", but to diet-induced diuresis. When the carbohydrate intake is limited, two metabolic processes occur that simultaneously reduce the total body water content. The first process mobilizes glycogen in the liver and muscle, and the second process generates ketones from the catabolism of food and endogenous fats. Long-term weight loss is due to low caloric intake and not to carbohydrate restriction (Denke, 2001).

To understand these aspects, one should know that, besides their main structural role, proteins are assigned a role in enzyme catalysis, transport of ions and molecules from one organ to another, cellular and physiological regulation of daily activity, functional properties that depend on their three-dimensional structure (Gromiha, 2010). In case of inanition, proteins have an energetic role when amino acids are degraded either directly or after conversion to glucose as to obtain the energy needed for survival.

Proteins are gradually hydrolysed into amino acids that are absorbed and carried by the portal vein to the liver where they are retained for the liver's own needs, but also distributed to other tissues. The absorbed amino acids make up the amino acid pool that contributes to protein biosynthesis and degradation by forming intermediates in the glucose and lipid metabolism. The amino acid pool consists of amino acids released by

hydrolysis of food proteins, tissue proteins and by the de novo synthesis from non-protein compounds. In analysing the metabolic effects of proteins, one must determine the amino acid pool in order to observe all free amino acids present in body fluids. The dynamics of this pool consists of the balance that exists between the processes by which amino acids form and the processes by which amino acids are consumed so that there are no intra-tissue free amino acids. For an irreversible degradation and elimination from the metabolic circuit, amino acids may pass through the pool several times.

Other nutritional strategies recommend dietary protein supplementation in cases of trauma due to an increase in protein catabolism under these conditions (Newsholme et al., 1991, Reeds et al., 1994). The recommended dietary allowance for protein in grams per kilogram of body weight per day is set at 0.8 g/kg body weight/day (Kaysen, et al., 1984, Karin, et al., 2005, Liu et al., 2014). Protein intake may be sufficient as long as diets consist of a variety of foods including meat, fish, milk and dairy products, eggs and vegetable proteins.

MATERIAL AND METHOD

The analytical methods in assessing consumers' nutritional status in order to highlight the mistakes that are made willingly or not in their daily diet consist of the analysis of the Energetic Balance of each body based on the determination of the basal metabolism and the daily energy expenditure for the body's activity.

Energy expenditure is comprised of three components: basal metabolism rate, food consumption expenditure and muscle-related expenditure. The first two cannot be controlled, while the last one, related to muscular activity, can be controlled to a certain extent.

The assessment of the nutritional intake consists in collecting information on the amount and type of food ingested and on the nutrition and energy calculation by analysing ingestion as total energy intake, the ration value in terms of food, the nutritional value of the ingested ration, eating habits and seasonal variations. It is also important to be aware of the financial means allotted to supply food both quantitatively and qualitatively. Last but not least, it is necessary to correlate food consumption with existing clinical data and to compare the effect of education on eating habits.

From a nutritional point of view, this study was based on a statistical analysis of nutrition that included food frequency questionnaires, 24-hour recalls during 3 different seasons. Based on these questionnaires, we calculated the energetic value of the ingested food and the contribution of the macronutrients to the total daily energy expenditure.

The methods of assessing energy inputs are represented by the food questionnaires that provide information on the nutritional expenditure of an individual or of a group and consist of the quantitative method of ingestion- represented by 24-hour diet assessment during 7 days and of the qualitative method - represented by the diet history and the food frequency questionnaire.

We should remark from the beginning that there is no method for an accurate assessment of food intake. However, these methods are essential in determining food disorders and, in order to establish a real diagnosis, they need to be complemented by additional paraclinical analyses such as: circulating proteins as markers of denutrition, reporting a diminution of their synthesis through deficiency in amino acid intake, completed by the nitrogen balance analysis that shows the nutritional balance when B = I - (F + U).

The most common paraclinical indicator in the practice of evaluating the nutritional status is albuminemia whose normal plasma concentration is 42±3 g and persists above 38 g/l even if the subject is very old. Transferinemia is considered a marker of denutrition that is more sensitive than albuminemia due to its shorter half-life. Values of 2-4 g/l in adults, 2.2-3.5 g/l in children aged 1-3 years and 2.3-3.6 g/l in children aged 7-9 years are considered normal values, with no related differences of gender. Iron deficiency lowers its synthesis.

The analysis of plasma amino acids varies with food intakes and with the physiological state of the body, being influenced by infections, traumas, diarrhoea etc.

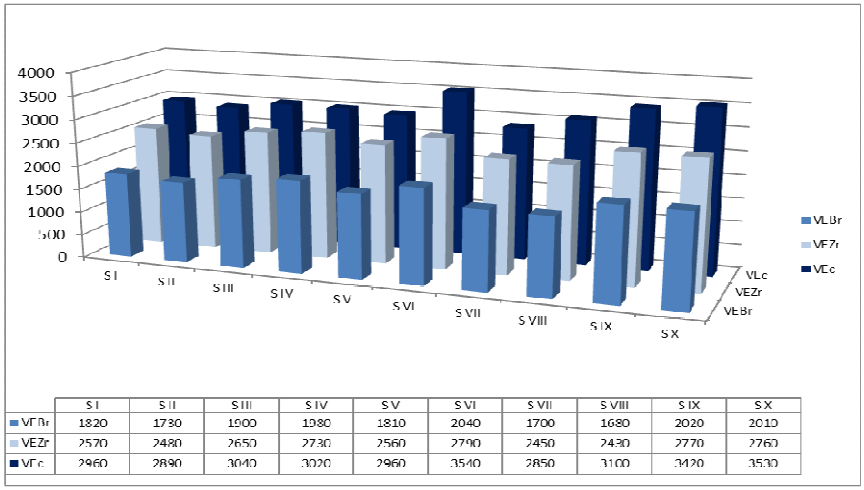
Increased non-essential/essential amino acids ratio is observed during chronic denutrition. The value of the ratio increases over 3 in children with protein denutrition (the Kwashiorkor type) and falls below 2 in normal children or in those with marasmus.

RESULTS AND DISCUSSION

The information on the nutrition content in P, L, G which should be of 0.8-1 g/day P, 0.8-1g/day L and 3-4 g/day G shows that the daily recommended energy value (VEZr) of the food of the analysed subjects should be between 2,430-2,770 kcal/day, values obtained based on the calorigenic coefficients of the P, L and G.

The recommended basal energy value (VEBr) is motivated by the energy needed by the vital functions. The brain, liver, kidneys and heart are the most metabolically active organs. They account for approximately 60% of the resting and basal metabolism, although they together represent only 5-6% of the total body weight.

The analysed subjects' body weight was between 80 and 97 kg and their height of 1.70 m to 1.85 m, presenting, from the point of view of their daily professional activity, a moderate energy consumption which requires a calorie increase of 750-1,000 kcal more than their basal metabolism rate. The reference values of the VEBr of the analysed subjects range between 1,680 kcal/24 hours and 2,040 kcal/24 hours, showing that a caloric level of 2,430-2,790 kcal/24 hours would ensure a normal weight (Figure 1) .



	S I	S II	S III	S IV	S V	S VI	S VII	S VIII	S IX	S X
VEBr	1820	1730	1900	1980	1810	2040	1700	1680	2020	2010
VEZr	2570	2480	2650	2730	2560	2790	2450	2430	2770	2760
VEc	2960	2890	3040	3020	2960	3540	2850	3100	3420	3530

Fig. 1. Correlation between VEBr, VEZr and VEc

One can notice that the Energetic Balance (EB) is positive in all analysed subjects, proving the weight plus in all cases (Figure 1).

According to the statural and ponderal indexes, the subjects' body mass index ranges from 26.24 to 28.34 (Figure 2). According to current regulations, these BMI values indicate an overweight. A BMI between 25 and 29.9 indicates overweight.

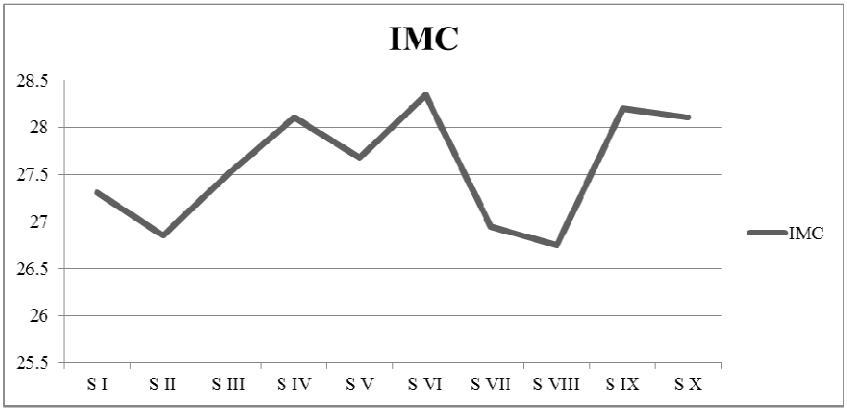


Fig. 2. BMI established on the analysed subjects' statural and ponderal indexes

Current nutritional guidelines state that breakfast should represent 20-25% of the daily calorie intake and dinner 10-15% of the daily calorie intake. The two meals, breakfast and dinner, should consist of light foods.

Lunch, which unfortunately is skipped due to people's busy programme, should represent about 55% of the daily calorie intake. Between the main meals, one should include 1-2 not very consistent secondary meals.

60-75% of the energetic expenditure ingested through food is consumed by the MB and the remaining 25-40% represents the energy that is necessary to support the working activity because the Energetic Balance (EB) must be in equilibrium, i.e. Ingestion = Consumption.

The study also showed an imbalance in the caloric distribution throughout the day, with the largest amount of energy being ingested during the second half of the day, between 4 p.m. and 6 p.m.

The results of the study highlighted a nutritional profile consisting of high protein levels, low carbohydrate levels, mostly refined carbohydrates, and increased consumption of saturated fats and cholesterol. The consumption of simple sugars was also nearly double compared to recommended values.

This study highlighted that a large proportion of consumers are aware of their overweight and of the necessity of following a diet. However, they do not have expert knowledge of healthy eating. Consequently, they adopt diets from the media.

CONCLUSIONS

Unfortunately, hyper protein diets, that are more and more embraced by a large part of today's population, are only after a weight loss of about 10% at a protein intake double than recommended, i.e. a dietary intake of 24-30% of the daily calorie intake instead of 12-15% as recommended for a period of about 30 days, and do not take into account the adverse side effects.

The sudden change in diet, motivated by a high protein diet in order to lose weight as promoted by the mass media, leads to the disruption of food reflexes with major risks of organic damage if this diet is followed for at least three months, damage determined by paraclinical analysis.

High protein diets based on a protein intake double than recommended over a longer period of time, usually 6 weeks, can mainly lead to impaired renal, hepatic and cardiac function as well as to more or less severe metabolic disorders.

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