

Editorial

LOW CARB DIET – TO LOVE OR TO HATE?

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Nutrition is a field of major interest in the last decades, not only for the medical community, but also for the general population. We know today that what one eats can influence one's health and well-being. This simple truth is unfortunately not so simple at all, because there is no consensus about what exactly one should eat in order to stay healthy and there is a lot of information in the medical (and not only) literature about nutrition and a debates are going on about the best diet composition. More than that, things are changing, information that was true and proven yesterday is not valid anymore today. This is why we need to be informed, to think and to choose in order to be able to pick the best data.

A trend that is, on one hand, gaining more and more credit and, on the other hand, having a lot of opponents, is the low carbohydrate, known as low carb, diet.

There are quite impressive theories stating the beneficial effects of a low carb diet, but also, in a traditional way, it is (or was?) a habit to take a high percentage of total energy intake from carbs. Where is this tradition coming from? First of all, from the landmark studies published in the '60s and '70s that showed the negative effects of fats on weight, cardiovascular disease, etc. One of these publications is The Seven Countries Study that showed an association between

saturated fat intake and cardiovascular mortality [1]. Since then, the guidelines recommended a low fat diet that provided subsequently a higher percentage of carbohydrates (around 50-60% of total energy intake). Newer study showed that a diet high in carbohydrates elevates postprandial glycaemia and serum insulin level, leading to an accelerating in the progression of type 2 diabetes and atherosclerotic cardiovascular disease [2]. So maybe it is time for a paradigm change.

Before debating about the effects of a low carb diet, we need to answer the question: what is a low carb diet? There are several definitions in the medical literature; the easiest way is to consider that restricted carbohydrate intake means an intake below the currently recommended amount of 45-65% of total daily energy intake [3]. But for a more detailed definition the classification in to three different types of low carb diet is useful [4]: moderate carbohydrate diet (26-45% of total daily energy intake), low carbohydrate diet (<26% of total energy intake or <130 g carbohydrates/day) and very low carbohydrate (ketogenic) diet (20-50 g carbohydrates/day or <10% of total daily energy intake in a 2000 kilocalories/day diet).

There are many studies published in the last decades that show evidence for the beneficial effect of a low carb diet on various parameters of the cardio-metabolic syndrome.

First of all, a low carb diet promotes weight loss through various mechanisms, not necessarily related to energy restriction. It has been proven that a low carb diet increases satiety and has also a specific metabolic advantage. By increasing satiety, it allows a lower energy intake without feeling hunger, thereby making it easier to patients to adhere to this kind of diet [3]. It is not yet perfectly clear how the effect of increasing satiety occurs, but probably the higher protein intake and the production of ketone bodies are involved. In addition, a smaller number of hypoglycemic episodes occur, this also contributing to the diminished hunger feeling [3].

The specific metabolic advantage is related to an increase in the thermogenic effect of protein intake, a higher protein turnover for gluconeogenesis, energy loss through excretion of ketone bodies in urine and sweating. More than that, a decreased serum level of insulin increases lipolysis, lipid oxidation, especially during physical activity and decreases lipogenesis [5]. High levels of serum insulin act like promoters of weight gain and, probably, one of the main advantages of a low carb diet is the decrease in circulating insulin levels, thereby inhibiting lipogenesis. Typically, low carbohydrate diets are not explicitly prescribed to be hypocaloric, but due to the satiating effects of protein and fat, energy intake is often lower [6].

There are a lot of studies showing that low carb diets may induce weight loss in people with obesity, with or without diabetes mellitus. In patients with type 2 diabetes mellitus, low carb diets appear to be very effective in promoting weight loss, reducing visceral adiposity and lower medication requirement [3].

Weight loss is one of the cornerstones in management of the cardio-metabolic syndrome, but as it has been shown, low carb diets

influence health status not only through weight loss, but it seems there are also benefits not directly related to weight loss, since they can occur without it [3].

Besides promoting loss of excessive weight, carbohydrate restriction has been shown to improve body composition and blood lipids [2].

Another important effect of low carb diets, studied in patients with diabetes mellitus, is the beneficial influence on blood glucose, contributing to a better control of this parameter. Low carb diets reduce blood glucose, insulinemia and HbA1c [6]. The restriction of carbohydrates reduces postprandial hyperglycemia and limits the potential harmful consequences on the cardiovascular system of excessive glucose excursions (Francois ME). One study found that despite no change in total body mass, an isocaloric diet comprising 30% protein, 50% fat, and 20% carbohydrate leads to an absolute reduction of HbA1c by 2% and improves fasting and postprandial blood glucose control in patients with type 2 diabetes mellitus [7].

Another issue that might be of interest in the future is that carbohydrate restriction may provide beta cell rest by removing hyperglycemia and can reverse the insulin secretory defects present in animal models of type 2 diabetes mellitus [8].

As shown in a recent review, at the time being, there is enough evidence supporting the use of low carbohydrate diets as the first approach to treating type 2 diabetes and as the most effective adjunct to pharmacotherapy in type 1 [4].

Body weight and blood glucose levels are not the only parameters of the cardio-metabolic syndrome beneficially influenced by a low carb diet. It improves also other parameters, like blood pressure and lipid profile. Studies showed that low carb diets may reduce triglyceride and

apoB concentrations and increase HDL concentrations. In addition, low carb diets consistently reduce the proportion of small, dense LDL particles, thereby decreasing the risk of major cardiovascular events [3].

The PURE Study, a trial that has changed some of our beliefs regarding healthy eating showed that high carbohydrate intake was associated with higher risk of total mortality, whereas total fat and individual types of fat were related to lower total mortality [9].

Overall, by implementing a low carb diet for 3 to 8 month, the prevalence of the metabolic syndrome in overweight and obese patients decreased from 58% to 19% [3].

Another diseases that is related to the metabolic syndrome and that has an increasing prevalence in the last decades is nonalcoholic fatty liver disease, a condition that might become the leading cause for liver transplantation in the Western world. For sure, the so-called modern dietary habits contributed to this increasing prevalence. What was observed in this direction by studies that used dietary intervention with carbohydrate restriction for patients with nonalcoholic fatty liver disease is the ability of this type of diet to reverse the liver disease [3].

Regarding safety, the existing evidence shows that nutritional ketosis is safe and, more than that, it might be beneficial in some patients. The possible negative effects of low carb diets are headache, fatigue and muscle pain. Usually, if these symptoms occur at all, this happens only in the first days and they improve thereafter [3].

With respect to patient's compliance, low carb diets appear to have at least similar adherence as other types of diet do [3].

This are some of the thoughts explaining why low carbohydrate diets are recognized in the medical nutrition therapy guidelines of the American Diabetes Association [10].

Considering the benefits and the compliance, maybe, low carb diet will be the "best" and most loved diet in the future. Or not?

Although there are many publications, studies, reviews, and meta-analysis stating the beneficial effects of restricting carbohydrates in the diet, we need to be aware that by decreasing the percentage of one of the energogenic macronutrients, we automatically will be increasing the percentage of the others. This is a situation of concern for a part of the medical community. Before analyzing this aspect, it is important to keep in mind that a low carb diet is usually associated with a lower total energy intake and, even if in terms of percentage the relative intake of protein and fat is higher, as an absolute amount it is lower than the intake that person had before.

Nevertheless, my generation grew up learning that a high fat intake and especially a high intake of saturated fat increases the cardiovascular risk. This was shown by numerous studies published in the last 60 years. And by implementing a low carb diet, the consequence is that the diet will contain a higher percentage of fat, up to 50%. This tendency is in complete opposition to the recommendations of the former and, in many situation, current guidelines. More than that, a very recent paper brings some concern. The study included more than 15,000 adults aged 45-64 years, who completed a dietary questionnaire at enrolment in the Atherosclerosis Risk in Communities study. After a median follow-up of 25 years, the investigators found a U-shaped association between the percentage of energy consumed from carbohydrates and mortality. The intake of 50-55% of energy from carbohydrates was associated with the lowest risk of mortality. In the meta-analysis of all cohorts (more than 400,000 participants), both low carbohydrate consumption (<40%) and high carbohydrate

consumption (>70%) was associated with a higher mortality risk than did moderate intake [11]. But this conclusion needs an interpretation because the results varied by the source of macronutrients, mortality increased when carbohydrates were exchanged for animal-derived fat or protein and decreased when the substitutions were plant-based [11].

Probably the future will bring more data and will decide about right and wrong. For the time being, it is sure that the type of diet we used in the last 50 years did not lead to a decrease in obesity, type 2 diabetes mellitus, cardiovascular

disease and so on. Therefore, one can assume that the interventions regarding life style changes were either not efficient or not appealing to people and, as a consequence, they did not comply with. So, maybe it is time to move one step forward and try something new that promises better results. And by the way, speaking of new, it is not that new at all, because if we think of the beginning of the 20th century, low carb diet was the only available treatment for type 2 diabetes mellitus.

And the story goes on and the question remains: low carb: to love, to hate or just to use?

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