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In a nutshell

Low carbohydrate diets (such as `Atkins diet'), with relatively high protein and fat, do reduce weight at least as effectively (if not more so) than conventional low energy, low fat diets, and without adverse effects on cardiovascular risk factors.

However, these results have been short to medium term. Long term follow up is now required.

Low carbohydrate weight loss diets

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NUTRITION RESEARCH REVIEW

Study 1: Atkins diet in obese adults

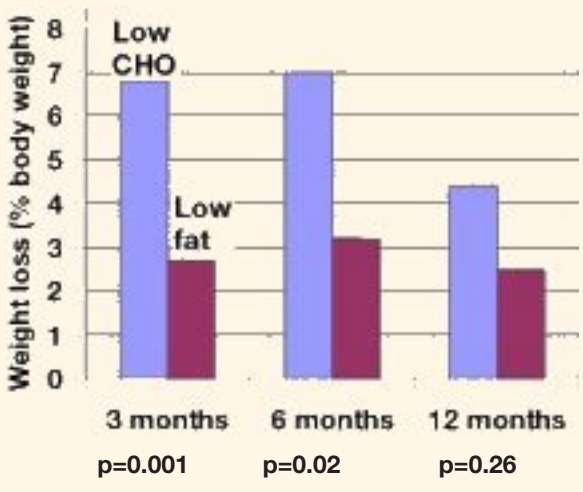
A low CHO, high fat and high protein diet results in greater weight loss than a conventional low energy, low fat diet over at least 6 months, according to a new American clinical trial which has just been published.

Subjects: 63 obese men and women.

Method: Randomised controlled trial (RCT) over 12 months. The low CHO diet group were given a copy of the popular book "Dr. Atkins' New Diet Revolution". The other group was asked to follow a diet low in energy (1,200-1,500 kcal/day for women, 1,500-1,800 kcal/day for men) and low in fat (25% of energy).

Thereafter both groups had minimal professional contact, in order to simulate the conditions under which most dieters attempt to lose weight.

Graph 1: Weight loss over 12 months of diet



Results: The Atkins diet produced a greater weight loss than the conventional diet for the first 6 months, but not significantly so at 1 year. See Graph 1.

LDL and total cholesterol levels were similar between the two groups. Subjects on the low CHO diet had greater rises in HDL cholesterol and greater falls in serum triglycerides than subjects on the conventional diet. Both groups had significant falls in diastolic blood pressure and rises in insulin response to glucose.

Drop out rate by the end of 12 months was 59%.

Reference: Foster GD. et al. A randomized trial of a low-carbohydrate diet for obesity. N Engl J Med. 2003 May 22;348(21):2082-90

Study 2: Low CHO diet in the severely obese

A low CHO diet was more effective over 6 months as a weight reducing approach than a low fat diet, in severely obese subjects who had a high rate of metabolic complications. These were the results of another US study.

Subjects: 132 obese subjects with mean BMI=43. There was a high prevalence of diabetes (39%) and metabolic syndrome (43%).

Method: RCT. The low CHO group was told to restrict CHO to 30 gm/day, whilst the low fat group was instructed to eat 500 kcal/day less than their estimated daily weight maintenance requirement and to consume only 30% of energy as fat.

Results: Low CHO diet subjects lost more weight, had lower triglycerides and greater improvement of insulin sensitivity (in those without diabetes). See Graph 2. Drop out rate to the end of the study was 40%.

Graph 2: Changes after 6 months weight loss diet

Reference: Samaha FF. et al. A low-carbohydrate as compared with a low-fat diet in severe obesity. N Engl J Med. 2003 May 22;348(21):2074-81

Study three: Moderately obese women

Fifty-three healthy, obese female volunteers (mean body mass index, 33.6) were randomised to either a diet that was free in energy but very low in CHO or energy-restricted and low in fat (30% of energy) for 6 months. 79% of subjects completed the trial.

Women in both groups ended up reducing their energy intake by similar amounts, but the very low CHO group lost more weight (8.5 kg vs 3.9 kg $p < 0.001$) and body fat (4.8 kg vs. 2.0 kg, $p < 0.01$). In relation to blood pressure, lipids, fasting glucose and insulin, both groups improved over the 6 months to a similar degree.

Reference: Brehm BJ. et al. A randomized trial comparing a very low carbohydrate diet and a calorie-restricted low fat diet on body weight and cardiovascular risk factors in healthy women. J Clin Endocrinol Metab 2003 Apr;88(4):1617-23

Comments

Studies showing that low CHO diets can produce at least as much weight loss, if not more, than conventional energy-restricted, low fat diets have been published for over 20 years (e.g. see [1]).

The effect of low CHO diet on cardiovascular and diabetic risk factors has been more uncertain (e.g. [2,3]). However, a recent systematic review of over 100 trials of low CHO diet concluded that, at least in the short term, such diets "had no significant adverse effect on serum lipid, fasting serum glucose, and fasting serum insulin levels, or blood pressure" [4].

But that very matter of "short term" cannot be overlooked. Most studies have been for diets lasting 3 months or less. The main concern for nutritionists regarding a low CHO diet is the possibility of adverse long term consequences due to the increase in protein and especially saturated fat intake that may occur when CHO is reduced [5].

These three new studies are important because they are all RCTs of 6 months duration or longer. The amount of support given to the subjects was realistic in terms of `real world' of clinical practice.

The results were consistent - low CHO diet more effectively reduced weight than conventional low energy, low fat diet, without any adverse impact on cardiovascular and diabetic risk factors.

Since approaches such as the Atkins diet have often been seen as `fad' [5], this is significant, and in view of the current 'epidemic' of metabolic syndrome (see our issues #120, 121, March 2002) potentially very important. What we now need are follow up studies over years, rather than months. We note that the difference in weight loss between the two diets in study one was no longer significant at 12 months.

It is also interesting that compliance figures in at least two of these studies was poor, as is so often the case in weight reducing diets. One of the advantages claimed for low CHO diets is that the higher protein and fat intake improves satiety and thus compliance.

How might low CHO diet work? To what extent is incidental lowered energy intake important? Is the weight loss the result of changes in insulin response?

Some believe that, in evolutionary terms, humans are well suited to a diet of relatively high protein and low CHO (particularly processed CHO), and that this may be crucial to determining our insulin resistance [6]. Others are less sure of this argument [7]. The questions remain open, and we are bound to hear more on this.

References: 1. Sommariva D. et al. Low-fat diet versus low-carbohydrate diet in the treatment of type IV hyperlipoproteinaemia. Atherosclerosis 1978 Jan;29(1):43-51
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