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SCIENTIFIC STUDIES

KETOGENIC DIET, WEIGHT LOSS AND BODY COMPOSITION

Cenci L, Fongaro S, Lukashina N, Marchetti B.
Eat Weight Disord 2018 DOI 10.1007/s40519-018-0576-0

INTRODUCTION

Health organizations report a worldwide increased prevalence of overweight and obesity [1] which is a great source of concern considering the fact that obesity and in particular abdominal obesity is one of the principle risk factors for cardiovascular disease and is strongly linked to dyslipidaemia, hypertension, diabetes and metabolic syndrome [2]. The most commonly accepted weight loss strategy is based on a simple reduction of daily calorie intake as part of a low fat/high carbohydrate diet but there are still no clear data about which dietary protocols are most effective in both the short and long term [3] or even what is the correct nutritional approach in general [4]. There has been increased interest in recent years in very low carbohydrate ketogenic diets (VLCKD) [5] that have undoubtedly been shown to be effective, at least in the short to medium term [3], as a tool to tackle obesity, hyperlipidemia and some cardiovascular risk factors [5]. Ketogenic diets are characterized by a reduction in carbohydrates (usually less than 50 g/day) and a relative increase in the proportions of protein and fat [6]. After a few days of such a nutritional regimen there is an increase of the "so called" ketone bodies that can be used by tissues for energy as an alternative to glucose. It is important to underline that this kind of mild ketosis should not be confused with the pathological ketosis of diabetes, indeed to reinforce this difference Hans Krebs called it "physiological ketosis" [7]. The positive effects of a VLCKD also seem to apply to cardiovascular risk parameters and respiratory pattern [8,9]. Despite some authors' doubts regarding ketogenic long-term safety [10] and effectiveness compared to 'balanced' diets [11], and the possible association to the increase in triglycerides [12], the majority of recent studies appear to demonstrate how a reduction in carbohydrates, even to the point of reaching a condition of physiological ketosis, can lead to definitive improvements in biochemical parameters [13-15]. The effects of a VLCKD appear to be particularly significant in terms of reducing blood triglycerides, lowering total cholesterol and increasing HDL-cholesterol [16-19]. Furthermore, VLCKD appear to be able to increase the volume of HDL-cholesterol micelles [18], thus contributing to a reduction in cardiovascular risk, unlike the small LDLs which have greater atherogenic potential [20]. The VLCKD effect of reducing total cholesterol can clearly be explained by the reduction in insulinemia, subsequently attenuating the facilitating action on HMGCoA reductase, which is entrusted with the production of cholesterol. As a result of these biochemical considerations and experimental and epidemiological data, strong doubts have recently risen regarding the importance of dietary fats, at least as a sole cause, in the rise of cholesterol and triglyceride values. On the other hand, the dyslipidemic role of refined carbohydrates in this area has been strongly reevaluated [21-23]. Recently Paoli et al. demonstrated how a keto-mediterranean diet works to reduce biochemical patterns linked to cardiovascular risk [24].

METHODS

Health organizations report a worldwide increased prevalence of overweight and obesity [1] which is a great source of concern considering the fact that obesity and in particular abdominal obesity is one of the principle risk factors for cardiovascular disease and is strongly linked to dyslipidaemia, hypertension, diabetes and metabolic syndrome [2]. The most commonly accepted weight loss strategy is based on a simple reduction

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Table 1 – Ketogenic diet composition

Energy, kcal (%)	*Protein, g/day (%)*	*Carbohydrate, g/day (%)*	*Fat, g/day (%)*
1100	99 (36)	34 (12)	63 (52)

Table 2 – Duration of the VLKCD and results

	n	Age (mean/sd) Years	WL (mean/sd) Kg	p	FFM (mean/sd) Kg	p	FM (mean/sd) Kg	p	TBW (mean/sd) Kg	p
D15	*11*	*40.8 / 10*	*-2.3 / 1.51*	*ns*	*+0.2/1.5*	*ns*	*-1.6/1*	*ns*	*-1.2/0.7*	*ns*
D20	*9*	*44.4 / 10.4*	*-4.5 / 2.71*	*ns*	*+0.4/1.9*	*ns*	*-1.7/2*	*0.05*	*-1.1/1.5*	*ns*
D30	5	*50.8 / 17.5*	*-6.3 / 1.23*	*ns*	*-1.8/0.6*	*ns*	*-3/1.5*	*ns*	*-1.1/1.2*	*ns*

Table 3 – Plant extracts

Extract	*mL/day*	*Composition*
A	30	Durvillea antarctica, black radish, mint, liquorice, artichoke, horsetail, burdock, dandelion, rhubarb, gentian, lemon balm, chinaroot, juniper, spear grass, elder, fucus, anise, parsley, bearberry, horehound.
B	60	Horsetail, asparagus, birch, cypress, couch grass, corn, dandelion, grape, fennel, elder, rosehip, anise.
C	30	Eleuthero, eurycoma longifolia, ginseng, corn, muira puama, grape, guarana, arabic coffee, ginger.

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RESULTS AND CONCLUSION

To determine the significance of the results obtained, it was placed p <0.05 and it was used the testT on weight loss (WL), FM, FFM and TBW for each study group (D15-D20-D30). Despite for none of the variables analysed (Table 2) the variation turns out to be statistically significant, probably due to the limited number, the VLCKD confirms (17) the effectiveness as tool for rapid weight reduction, mainly at the expense of the FM. A larger cohort would certainly have been decisive in confirming the result obtained.

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