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Very Low Calorie Ketogenic Diet combined with interval training for preserving muscle mass during weight loss in sarcopenic obesity: a pilot study

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Background: The prevalence of sarcopenic obesity (SO) is increasing worldwide, posing important challenges to public health and national health care system, especially during the COVID pandemic. In subjects with SO, it is essential to reduce body weight preserving lean mass, in order to avoid a worsening of muscle function. Lifestyle modification with adequate nutrition and proper physical activity is essential to counteract SO progression. In accordance with the Position Statement of the Italian Society of Endocrinology, Very Low Calorie Ketogenic Diet (VLCKD), a well established nutritional intervention in the context of obesity, has been promoted also for the

treatment of SO (1). To date, the effects of physical training during VLCKD have not been studied. **Aim:** This pilot study aims to determine the efficacy of VLCKD combined with interval training, compared to a VLCKD alone, on weight-loss, body composition and physical performance in patient with SO. **Materials and methods:** Twenty-six patients with SO, aged between 50 and 70 years, who met the inclusion criteria, accepted to adhere to a VLCKD nutritional program (< 800 Kcal/die) and gave informed consent, were enrolled in the study. Thirteen patients followed a structured VLCKD protocol (VLCKD group) and thirteen patients followed a structured VLCKD protocol combined with interval training (IT), two times a week (VLCKD+IT group). Data were collected at baseline (T0) and after 45 days (T45). Anthropometric indexes, body composition analysis by Bioelectrical Impedance Analysis (BIA), muscle strength measurement by Chair Stand Test and physical performance analysis by Short Physical Performance Battery were assessed at baseline and at the end of treatment. **Results:** At the end of the study, Body Mass Index, body weight and waist circumference were significantly reduced both in the VLCKD group and in the VLCKD+IT group. Moreover, significant improvement of muscle strength and physical performance was found in all groups. A significant reduction in hip circumference was observed only in the VLCKD+IT group. A multiple comparison of delta variations in the measured parameters between groups was performed. No differences were observed for the majority of parameters, with the exception of FFM and FM: interestingly, the individuals fed with VLCKD combined with IT preserved their FFM ($p < 0.0001$) and reduced their FM ($p = 0.0006$) to a greater extent than in the VLCKD group. **Conclusions:** Our pilot study showed that VLCKD was effective in terms of body weight reduction, particularly of FM; moreover, we conclude that the combination of VLCKD and interval training determines a better preservation of FFM. References: 1. Caprio, M. et al. Very-low-calorie ketogenic diet (VLCKD) in the management of metabolic diseases: systematic review and consensus statement from the Italian Society of Endocrinology (SIE). *J Endocrinol Invest* 2019, 42, 1365-1386, doi: 10.1007/s40618-019-01061-2.

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