The effect of a high weekly dose of cholecalciferol and calcium supplement on weight loss regimen among obese female subjects

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Abstract

Background: Recently, obesity is diagnosed as a major health issue worldwide and in Jordan due to the fact that 50% of the population in Jordan is diagnosed as obese or overweight. In addition, studies have shown a close relationship between obesity and vitamin D deficiency. Objectives: Our study was designed to examine the impact of a high monthly dose (50,000 IU) of vitamin D3 and calcium supplementation (1200 mg/dl) on the visceral adiposity reduction while improving serum vitamin D status in vitamin D deficient patients visiting the dietitian for weight loss. Also, to evaluate the potential effect of vitamin D supplementation on serum lipid profiles, fasting glucose levels, PTH, TSH, insulin sensitivity and HbA1c. Methods: A total of 45 morbidly obese subjects (BMI (kg/m2)a%30) and vitamin D deficient were randomly assigned to 4 groups, CON group who only received a weight loss diet (n=10). Diet/D group (n=13) received 50.000 IU/week of cholecalciferol in addition to the weight loss regimen, Diet/Ca group (n=10) received 1200 mg/dl calcium in addition to the weight loss regimen. Diet/D/Ca group received 50,000 IU/week of cholecalciferol and 1200 mg/dl/d calcium (n=12). Serum 25 (OH) D, calcium, PTH, TSH, insulin, fasting glucose, triglycerides, cholesterol and HbA1c were measured at baseline and 3 months after supplementation. **Results:** Three months after supplementation and following a diet, waist circumference was significantly reduced in Diet/D and Diet/D/Ca groups, the most weight reduction % and BMI reduction was observed in Diet/D and Diet/D/Ca as well (pâ%0.05). Fasting glucose was reduced in all groups (pa%0.05) which is most likely due to weight loss rather than supplementations. Diet/D and Diet/D/ Ca groups had a significant reduction in PTH levels after 3 months of supplementations when compared with treatment groups (pâ%0.05). Finally, Diet/D and Diet/D/Ca groups had a significant reduction of triglycerides and cholesterol levels (pa%0.05). Neither insulin nor TSH had been affected by supplementation. Conclusion: The findings of this study showed that correcting vitamin D deficiency is a very effective approach that should be followed in weight loss regimen when accompanied with a low-caloric diet. Vitamin D also improved lipid profile and PTH as well.

Obesity, a chronic condition associated with several lifethreatening diseases, affects a significant proportion of the global population and has long been associated with vitamin D deficiency. The prevalence of both obesity and vitamin D deficiency has increased dramatically in Jordan in recent decades, especially among women. Few studies in Jordan and the surrounding area address this issue. In this study, we hypothesize that calcium and vitamin D have beneficial effects on weight reduction and metabolic profile in obese women. The objective of this study is to examine the effect of vitamin D3 and calcium supplementation on anthropometric measurements and some blood metabolites. Forty-five obese female subjects with vitamin D deficiency were recruited by a dietitian and randomly assigned to the same weight loss diet in addition to the following treatments (4 groups): control (CON), no prescribed supplements; vitamin D3 (Diet/D), given a high weekly dose of cholecalciferol (50 000 IU/subject/week); calcium (Diet/Ca), given 1200 mg/dL calcium/subject/day; vitamin D3 plus Ca (Diet/Ca/D), given cholecalciferol (50 000 IU/subject/week) and calcium (1200 mg/dL calcium/subject/day). Results revealed that after 3 months of supplementation, the Diet/Ca/D group subjects experienced a significant reduction (P \leq .05) in weight (10.49) kg), BMI (4.61 \pm 2 kg/m2), waist circumference (11.41 \pm 8.9 cm), body fat percentage (2.43 ± 1.7%), FBG (25.81 ± 11.4 mg/dL), PTH (27.58 ± 8.9 pg/mL), cholesterol (0.56 ± 0.2 mmol/L), and triglycerides $(0.53 \pm 0.21 \text{ mmol/L})$ when compared to the Diet/Ca and the CON groups. Interestingly, however, the CON group showed a significant increase in serum PTH concentration (9.51 \pm 3.8 pg/mL, P \leq .05). Based on these results, a combined Ca and vitamin D3 supplement appears to enhance weight loss and improve some of the blood metabolic profiles in obese women subjected to a weight loss diet, thus supporting our study hypothesis.

Recent evidence suggests that higher calcium and/or vitamin D intake may be associated with lower body weight and better metabolic health. Due to contradictory findings from intervention trials, we investigated the effect of calcium plus vitamin D3 (calcium+D) supplementation on anthropometric and metabolic profiles during energy restriction in healthy, overweight and obese adults with very-low calcium consumption.

Fifty-three subjects were randomly assigned in an open-label, randomized controlled trial to receive either an energy-restricted diet (-500 kcal/d) supplemented with 600 mg elemental calcium and 125 IU vitamin D3 or energy restriction alone for 12 weeks. Repeated measurements of variance were performed to evaluate the differences between

groups for changes in body weight, BMI, body composition, waist circumference, and blood pressures, as well as in plasma TG, TC, HDL, LDL, glucose and insulin concentrations.

Eighty-one percent of participants completed the trial (85% from the calcium + D group; 78% from the control group). A significantly greater decrease in fat mass loss was observed in the calcium + D group ($\cdot 2.8 \pm 1.3 \text{ vs.} \cdot 1.8 \pm 1.3 \text{ kg}$; P=0.02) than in the control group, although there was no significant difference in body weight change (P>0.05) between groups.

The calcium + D group also exhibited greater decrease in visceral fat mass and visceral fat area (P<0.05 for both). No significant difference was detected for changes in metabolic variables (P>0.05).

Calcium plus vitamin D3 supplementation for 12 weeks augmented body fat and visceral fat loss in very-low calcium consumers during energy restriction.

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