

Chromium picolinate, biotin, and sodium bicarbonate combination as a dietary supplement in the treatment of type 2 diabetes

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Background

Type 2 diabetes mellitus (T2DM) is characterized by hyperglycemia due to insulin resistance, which can lead to micro and macrovascular complications. The importance of glycemic control for prevention demands the need to promote accessible and safe treatments such as scientifically-proven nutritional supplements, such as chromium picolinate and biotin. Previous studies have suggested that the consumption of bicarbonate-rich mineral water altered blood metabolites and gut microbiome which had beneficial effects on patients with T2DM. The objective of our study was to evaluate the supplementation with chromium picolinate, biotin, and sodium bicarbonate in patients with T2DM.

Methods

We planned and supervised the execution of a crossover, randomized, double-blind, placebo-controlled study of patients with the diagnosis of T2DM that was conducted in the University Hospital "Dr. José E. González" of the Autonomous University of Nuevo Leon in Monterrey, Mexico from June 2011 to July 2012. Patients' contacts during the study included a day-0 baseline visit and six more visits over the next six months. Efficacy of treatment was assessed by expressing changes in hemoglobin A1c (HbA1c), body mass index (BMI), and blood pressure (BP).

Results

Forty-seven (62.6%) of the original 75 patients completed the trial. Regarding the baseline characteristics, 25 (53.1%) of the participants were male and the mean age was 55.23 ± 9.88 . The mean HbA1c was $8.38 \pm 1.08\%$, the mean BMI was 29.34 ± 4.64 , the mean systolic BP of 143.84 ± 23.6 mm Hg, and the mean diastolic BP of 84.5 ± 12.13 mm Hg. When comparing the changes that occurred after both interventions, we observed that the HbA1c in the active principle group decreased (-0.15%) and in the placebo increased (+0.12%) ($p=0.148$). When we subdivided both groups according to their HbA1c level prior to the intervention, we compared the participants with HbA1c ≥ 9 , the placebo group had an increase of $0.15 \pm 1.32\%$ and the reduction in the active principle was $-0.68 \pm 1.58\%$ ($p=0.158$).

Conclusions

In our study, we observed that the supplementation with chromium picolinate, biotin, and sodium bicarbonate decreased HbA1c in a period of 3 months compared to the placebo group in which there was an increase, but without a statistically significant difference. We believe that this could be due to two reasons: the size of our sample, due to the large

percentage of participants who dropped out of the study, or because the treatment period to observe a greater difference should have been longer.