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The Relationship between Serum Calcium and Type 2 Diabetes Mellitus

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Abstract

The present work is a cross-sectional study aimed to evaluate the serum levels of calcium in patients with type 2 diabetes mellitus,Type 2 diabetes Mellitus characterized by hyperglycemia as a result of an individual's resistance to insulin with an insulin secretory defect. The present study was conducted using data from the Ansung–Ansan cohort, an ongoing community- based, prospective cohort. Detailed information on the Ansung–Ansan cohort are presented elsewhere. In brief, 10,038 participants aged 40–69 years who resided in the Ansung or Ansan regions of the Republic of Korea were recruited between 2001 and 2003 using a two-stage cluster sampling method.

introduction

Calcium is an element that plays an important role not only in skeletal mineralization but also in a wide range of biological functions. The free calcium fraction is the biologically active form, its concentration in plasma is tightly regulated by the calcium-regulating hormone PTH and vitamin D. Intercellular calcium has a key role in many important physiological functions including muscle contraction, hormone secretion, glycogen metabolism, and cell division.[(1)]

Diabetes mellitus is a global epidemic disease that affects more than 150 million people worldwide. It is estimated that a global number of adults suffering from all forms of diabetes will reach 439 million in 2030; most of them type 2 diabetes mellitus cases. Diabetes mellitus is a major cause of morbidity and mortality.

The term diabetes mellitus describes a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both.Type 2 diabetes Mellitus characterized by hyperglycemia as a result of an individual's resistance to insulin with an insulin secretory defect.

The present work is a cross-sectional study aimed to evaluate the serum levels of calcium in patients with type 2 diabetes mellitus, in Khartoum state. This study was done during the period of January to March 2017. The sample size is sixty including both male and female. calcium and Glucose were measured by Spectrophotometer. [(2)]

Methods

Prospective assessment of participants from two Spanish predimed study centerss where serum calcium levels were measured at baseline and yearly during follow-up. Multivariate-adjusted Cox regression models were fitted to assess associations between baseline and changes during follow-up in serum calcium levels and relative risk of diabetes incidence.

The present study was conducted using data from the Ansung–Ansan cohort, an ongoing community- based, prospective cohort. Detailed information on the Ansung–Ansan cohort are presented elsewhere. In brief, 10,038 participants aged 40–69 years

who resided in the Ansung or Ansan regions of the Republic of Korea were recruited between 2001 and 2003 using a two-stage cluster sampling method. Follow-up surveys were con- ducted biennially. During each survey, participants took part in interviews using structured questionnaires, health examinations, and laboratory tests. Among the 10,038 participants in the Ansung–Ansan cohort, 676 were excluded from analysis because they reported at enrollment that they had been previously diagnosed with T2D. In addition, 560 participants were excluded from analysis because they had prevalent T2D during the baseline survey, as determined by pre- defined criteria, based on fasting glucose concentra- tion (≥ 126 mg/dL), post-load glucose concentration (≥ 200 mg/dL), and antidiabetic medication use.[2]

Results

The mean age at enrollment was 51.8 years, and there was a slightly higher proportion of women (53%) than men (47%). Majority of the participants were non-smokers (59%), current drink- ers (47%), and did not exercise regularly (75%). The mean body mass index was 24.5 kg/m2. The mean (standard deviation) albumin-adjusted serum calcium level was 9.41 (0.52) mg/dL (first quartile, 9.12 mg/dL; median, 9.48 mg/dL; third quartile, 9.76 mg/dL). The median (interquartile range) dietary calcium intake was 389.59 (283.71) mg/day (first quartile, 268.94 mg/day; third quartile, 552.65 mg/day).The associations of serum calcium levels and dietary calcium intake with T2D were found to be robust in penalized regression spline models,In the fully-adjusted Cox proportional hazard models, we did not find the evidence for the association between serum cal- cium levels and risk of T2D.When we assessed the association between dietary calcium intake and serum calcium levels at the baseline survey by linear regression model, dietary calcium intake was inversely associated with serum calcium levels after adjusting for potential confounders ($\beta = -0.04$, 95% CI -0.07, -0.02). The associations of serum calcium levels and dietary calcium intake with T2D did not differ according to sex ($p > 0.10$ for all interactions). After excluding those who had used diuretics (14 par- ticipants, 0.16%) or those who were using diuretics at the baseline survey (8 participants, 0.09%), the results were almost similar.[2]

Discussion

In the present study with a community-based cohort followed-up for 10 years, the association between serum calcium levels and a risk of incident T2D was not evident, while higher dietary calcium intake was associated with a decreased risk of incident T2D.Previous studies on the association between serum calcium levels and T2D have demonstrated inconsistent results. In a population-based prospective cohort study conducted in Norway, higher serum calcium concentra- tions were associated with an increased risk of incident T2D.

This is a cross-sectional study conducted in Khartoum state. Sixty type 2 DM patients were enrolled in both sexes in the period from January 2017 to March 2017. Blood Sample was collected from each individual from both Khartoum Bahri Teaching Hospital and Ibrahim Malik Teaching Hospital. The age range of patients was (20-86 years). In this study, the male's percentage was 52% while females represent 48%. [(2)]

Conclusion

Anincrease in serum calcium concentrations is associated with an increased risk of type 2 diabetes**.** The present work is a cross-sectional study aimed to evaluate the serum levels of calcium in patients with type 2 diabetes mellitus,Type 2 diabetes Mellitus characterized by hyperglycemia as a result of an individual’s resistance to insulin with an insulin secretory defect.

References

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