AD-1578 – Calcium-phosphorus product is associated with non-alcoholic fatty liver disease in type 2 diabetes mellitus

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Table 1-Clinical characteristics of participants by non-alcoholic fatty liver disease (NAFLD) category

Variables	non-NAFLD	NAFLD	P
Male(%)	356 (51)	393 (53.6)	0.309
Age(years)	58.9±12.5	54.4±13.6	<0.001
Duration(years)	11.0(6.0-18.0)	8.3(3.0-14.0)	<0.001
BMI(kg/m ²)	23.85±3.16	27.23±3.81	<0.001
HbA _{1c} (%)	8.9(7.4-10.7)	9.2(7.8-10.7)	0.007
Fasting glucose(mmol/L)	6.91(5.58-8.83)	7.37(6.01-9.40)	0.001
Triglyceride(mmol/L)	1.22(0.91-1.64)	1.86(1.36-2.60)	<0.001
HDL-c(mmol/L)	1.04(0.88-1.26)	0.92(0.80-1.06)	<0.001
Uric acid(umol/L)	305±79	351±93	<0.001
Serum calcium(mmol/L)	2.20±0.13	2.23±0.13	<0.001
Serum phosphorus(mmol/L)	1.24±0.19	1.28±0.18	<0.001
Calcium-phosphorus product (mg ² /dl ²)	33.81±5.88	35.25±5.70	<0.001
PTH(IU/mL)	31.82(24.13-39.57)	32.30(25.10-41.27)	0.056
Vitamin D(nmol/L)	39.70(30.72-51.42)	37.77(30.27-48.32)	0.058

Continuous variables are expressed as mean ± standard division and compared by t test. Categorical variables were expressed by median (interquartile range) and compared by χ² test. BMI= body mass index; HDL-c= high density lipoprotein cholesterol; PTH= parathyroid hormone.

Objective

To determine whether calcium and phosphorus levels are associated with the prevalence of non-alcoholic fatty liver disease (NAFLD) in patients of type 2 diabetes mellitus (T2DM) in China.

Method

2715
participants

➢ With T2DM who were admitted to the ward of the department of Peking University People's Hospital were enrolled

➢ Between January 2012 and February 2017

1805
participants

Exclusive Criteria :

➢ Age < 18 years

➢ History of heart failure, hypoparathyroidism, hyperparathyroidism

➢ Alcoholic intake: man≥30 g/day, woman≥20 g/day

➢ HBsAg(+), HCVAb(+), eGFR < 60 ml/min/1.73m²

➢ Missing variables of abdominal ultrasonography, serum calcium and phosphorous

1202
participants

Sensitivity analysis in patients with vitamin D and PTH data

Clinical characteristics were compared between NAFLD and non-NAFLD participants. Logistic regression models were used to detect the association between calcium-phosphorus product and the prevalence of NAFLD.

Results

1 Clinical characteristics

The prevalence of NAFLD is 52.2%(1805) in T2DM patients. Mean age of the participants was 56.2±13.3 years. Compared with the group without NAFLD, individuals diagnosed with NAFLD were younger, had shorter duration

Figure 1-Association between calcium-phosphorus product and presence of non-alcoholic fatty liver disease using logistic regression.

SBP = systolic blood pressure; BMI= body mass index; TG = triglyceride.

of diabetes. Individuals with NAFLD have higher levels of BMI, HbA_{1c}, fasting glucose, triglyceride and uric acid. Serum calcium, phosphorus and calcium-phosphorus product were higher in NAFLD group compared with the group without NAFLD (Table 1).

2 Association between calcium-phosphorus product and non-alcoholic fatty liver

The prevalence of NAFLD increased with increasing calcium-phosphorus product quartiles. In multiple logistic regression model, the ORs for the prevalence of NAFLD were increasing in IQR2 group, IQR3 group and IQR4 group in reference to IQR1 group, after adjusting sex, age, SBP, BMI, HbA_{1c} and TG (Figure 1).

3 Confounding factor of vitamin D and PTH

Similar results were found after vitamin D and PTH was adjusted in 1202 participants with data on vitamin D and PTH.

Conclusion

Increasing level of calcium-phosphorus product is associated with the presence of NAFLD in this Chinese hospitalized T2DM population.

Limitation

This cross-sectional study cannot prove a causal relationship between calcium-phosphorus product and NAFLD. Potential unmeasured confounding factors may be not excluded even though many possibilities were taken into consideration.