

ORIGINAL ARTICLE

Research on the changes and significance of serum RBP4 level in patients with senior coronary heart disease accompanying diabetes mellitus

Qinxue Li*, Biao Ge, Ruijing Yan, Yinlong Bai, Yan Liu

Physical Examination Department, the Third Affiliated Hospital of Inner Mongolia Medical University, Baotou, Inner Mongolia, China

Received: February 5, 2019

Accepted: March 3, 2019

Online Published: March 10, 2019

DOI: 10.5430/dcc.v6n1p26

URL: <https://doi.org/10.5430/dcc.v6n1p26>

ABSTRACT

Objective: To explore the significance of serum Retinol binding protein 4 (RBP4) and its relationship with coronary artery lesion in patients with senior coronary heart disease accompanying T2DM by determining the level of serum RBP4 and Gensini score.

Methods: 30 cases of patients who were 60 years old above with coronary heart disease accompanying T2DM were selected and included in the experimental group, and 30 cases of patients of 60 years old above with coronary heart disease alone were included in the control group. Both groups of patients were given CAG examinations. In addition, Gensini score was calculated according to different degrees and parts of coronary artery lesion. It was required to record each patient's age, gender, fasting blood glucose (FPG), triglycerides (TG), total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C), glycated hemoglobin (HbA1c) and other laboratory examination indexes. ELISA was used to detect the level of serum RBP4 in each group, and statistical analysis was performed to the data in each group.

Results: (1) RBP4 level, GS score, FPG and LDL-C in the experimental group were all higher than those in the control group, and the difference was of statistical significance ($p < .05$). There was no statistically significant difference in age, gender, TC, TG and HDL-C between two groups. (2) RBP4 was positively correlated to FPG and HbA1c. (3) In patients with senior coronary heart disease accompanying diabetes mellitus, HbA1c was positively correlated to GS score, RBP4 and FPG. (4) RBP4 was a risk factor for coronary artery stenosis in patients with senior coronary heart disease accompanying diabetes mellitus.

Conclusions: The level of serum RBP4 in patients with senior coronary heart disease accompanying diabetes mellitus is higher than that in patients with coronary heart disease alone, with a deeper degree of coronary artery lesion. The level of serum RBP4 is increased with the degree of lesion deepened in patients with senior coronary heart disease, suggesting that the level of serum RBP4 is expected to be an early predictor of coronary artery lesion for patients with senior coronary heart disease.

Key Words: Retinol binding protein 4, coronary heart disease, T2DM, GS score

1. INTRODUCTION

Cardiovascular and cerebrovascular diseases are macrovascular complications commonly seen in T2DM. About 50% of T2DM patients die of CHD.^[1] The main pathophysiological

basis of CHD is considered to be atherosclerosis (AS). AS is a chronic inflammatory reaction,^[2] abnormal lipid metabolism and vascular endothelial cell injury can promote the development of AS. High glucose environment resulting

*Correspondence: Qinxue Li; Email: nmgbyyyy@163.com; Address: Physical Examination Department, the Third Affiliated Hospital of Inner Mongolia Medical University, Baotou, Inner Mongolia 014010, China.

from diabetes mellitus induces peroxidation reaction and then leads to a more extensive and serious macrovascular disease. Research findings show that, acute myocardial infarction (AMI) occurring in old patients with senior DM is mainly a painless myocardial infarction with an early onset and a high incidence and mortality.^[3]

Retinol binding protein 4 (RBP4) is a type of adipocytokine found by Yang et al., the research shows that RBP4 is an important risk factor for CHD patients. Currently, there are rare reports on the correlation of RBP4 to senior CHD accompanying DM. This research is designed to explore the relationship of RBP4 with macrovascular disease in patients with senior CHD accompanying T2DM.

2. OBJECTS AND METHODS

2.1 Research objects

60 cases of patients over 60 years old with senior CHD during the period of October 2015 - January 2017 were selected from Department of Cardiology in the Third Affiliated Hospital of Inner Mongolia Medical University and given CAG examinations, including 39 male patients and 21 female patients. All patients were required to sign the informed consent form.

The enrollment criteria were: (1) The diagnostic standard of coronary heart disease: the stenosis occurring in at least one coronary artery or its main arterial branch was no less than 50%. (2) T2DM diagnostic standard: WHO (1999). Grouping standards: 60 cases of patients were divided into the experimental group and the control group, with 30 cases in each group. The experimental group was made up of patients with coronary heart disease accompanying DM, and the con-

trol group consisted of patients with CHD alone. There were 19 cases of male patients and 11 cases of female patients in the experimental group, and the average age was (64.77 ± 5.02); there were 20 cases of male patients and 10 cases of female patients in the control group, and the average age was (66.67 ± 6.04).

Exclusion criteria were as follows: (1) T1DM; (2) DM with acute complications (diabetic ketoacidosis, diabetic hyperosmolar syndrome, diabetic lactic acidosis); (3) cardiac, hepatic and renal insufficiency; (4) acute and chronic infectious diseases; (5) malignant tumors and autoimmune diseases; (6) Patients who took retinol drugs and drugs affecting retinol metabolism within 30 days.

2.2 Methods

(1) CAG examination Mostly, CAG catheters were threaded through right radial artery, in few cases, these catheters were threaded through right femoral artery or left artery. The multi-position projection was applied conventionally: postero-anterior position, right foot position, left acromion position, splenic position were adopted when choosing left coronary artery, and postero-anterior position and left anterior oblique position 45° when choosing right coronary artery. All CAG examinations were performed by no less than three interventional cardiologists. CAG results were evaluated by means of Gensini score (see Table 1).

(2) Measurement of RBP4 level ELISA kits were made by R&D system.

(3) During the experiment, each patient was required to collect venous blood to measure FPG, TG, TC, HDL-C, LDL-C, HbA1c and other laboratory examination indexes.

Table 1. Gensini score

Degree of Coronary Artery Stenosis	Score	Site of Lesion	Score
1%-25%	1	Left Main Coronary Artery	5
26%-50%	2	Proximal Segment of Left Anterior Descending Branch or Left Circumflex Artery	2.5
51%-75%	4	Middle Segment of Left Anterior Descending Branch	1.5
76%-90%	8	Distal Segment of Left Anterior Descending Branch	1.0
91%-99%	16	Middle or Distal Segment of Left Circumflex Artery	1.0
100%	32	Right Main Coronary Artery	1.0
		Arterioles	0.5

2.3 Statistical methods

All data were statistically analyzed by use of SPSS19.0 Statistical Software Package. The measurement data were represented by mean ± standard deviation ($\bar{X} \pm s$), and *t*-test or ANOVA was applied to the comparison of data (fitted or almost fitted to normal distribution and with homogeneity) between two groups. The correlation of two variances was

analyzed by means of Spearman's correlation coefficient. Multivariate analysis was performed by means of logistic regression analysis, according to the standard of $\alpha_{input} = 0.05$ and $\alpha_{output} = 0.10$, to screen out main factors affecting coronary artery stenosis in old patients with senior CHD accompanying T2DM.

3. RESULTS

3.1 Statistics of the general data in two groups

The results showed that there were no statistically significant differences in gender, age, TC, TG, HDL-C and so on ($p > .05$). FPG, GS score, RBP4 level and LDL-C in the experimental group were all higher than those in the control group, and the difference was statistically significant ($p < .05$). See Table 2 for details.

Table 2. Comparison of data in two groups (n = 30, $\bar{X} \pm s$)

Group	Experimental Group	Control Group	p
Gender (male/female)	19/11	20/10	.19
Age (years old)	64.77 ± 5.02	66.67 ± 6.04	.19
TC (mmol/L)	4.27 ± 0.95	4.11 ± 0.88	.49
TG (mmol/L)	2.03 ± 1.05	2.14 ± 2.0	.78
HDL-C (mmol/L)	0.95 ± 0.23	1.08 ± 0.30	.12
LDL-C (mmol/L)	2.20 ± 0.92	2.02 ± 0.66	.02
FPG (mmol/L)	7.70 ± 1.88	4.59 ± 1.18	.01
RBP4 (µg/ml)	48.62 ± 14.08	38.78 ± 7.83	.00
GS score	46.03 ± 30.93	29.37 ± 24.30	.02

3.2 Correlation analysis of RBP4 and other factors

Correlation analysis showed that RBP4 level was positively correlated to GS score, LDL-C, FPG, and r values were 0.56, 0.27 and 0.37 respectively; RBP4 level was negatively correlated to HDL-C, and r value was -0.28, the difference was of statistical significance ($p < .05$). There was no difference in the comparison of RBP4 level with TG and TC ($p > .05$).

3.3 Correlation analysis of HbA1c and other factors in the experimental group

Correlation analysis showed that HbA1c was positively correlated to GS score, RBP4 and FPG, and r values were 0.66,

0.45 and 0.63 respectively.

3.4 Analysis on predisposing factors of coronary artery stenosis in DM patients

With RBP4, HbA1c, HDL-C and LDL-C taken as independent variables, logistics regression analysis was performed according to the dependent variable that whether CHD was accompanied by DM. Logistic regression analysis was performed to these data, with the application of enter regression ($\alpha_{input} = 0.05, \alpha_{output} = 0.10$); the result of chi-square test was $\chi^2 = 14.696$ and $p = .012$. According to the test level $\alpha = 0.05$, logistic regression equation was considered to be of statistical significance. From the table, it was found that RBP4 was considered to be a risk factor for coronary artery stenosis in senior DM patients, which can be interpreted as: DM patients with RBP4 level had 1.069 times the risk than non-DM patients to develop coronary artery stenosis.

4. DISCUSSION

CAG is a gold standard in the diagnosis of CHD, but old patients can not stand up for it. However, the detection of RBP4 level is easy to perform with good compliance. The experimental results have shown that RBP4 level was related with the severity of coronary artery stenosis in patients with senior CHD, and RBP4 level in patients with senior CHD accompanying T2DM is higher than patients with CHD alone. RBP4 is an independent risk factor for patients with T2DM, which indicates RBP4 is expected to be a predictor of cardiovascular diseases.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare they have no conflicts of interest.

REFERENCES

- [1] Shujun Z. Clinical characteristics analysis on senior CHD accompanying acute MI. *China Practical Medicine*. 2015; (18): 104-106.
- [2] Yu Z, Li X, Han L, et al. Correlations Between Retinol Binding Protein 4 and Severity of Coronary Artery Lesions in Patients with Coronary Heart Disease. *Labeled Immunoassays and Clinical Medicine*. 2015; (10): 964-967.
- [3] Ke S, Yawei S, Dongqing L. Correlation of RBP4 and VCAM-1 to macrovascular complications in patients with senior T2DM. *Chinese Journal of Gerontology*. 2015; (13): 3572-3574.