ADIPOCYTES FATTY ACID BINDING PROTEIN AND ITS RELATION TO SUBCLNICAL ATHEROSCLEROSIS IN SUBJECTS WITH TYPE 2 DIABETES

Magui Abd Elmonem Shalash, Noha Said Kandil,* Reem Mahmoud Fathalla, Omnia Ezz Eldin Fathy Alsaadany,** Aya Fathy Radwan Ali Essa

Department of Internal Medicine, Department of Chemical Pathology,* Department of Radiodiagnosis,** Faculty of Medicine, Medical Research Institute,* University of Alexandria

Introduction

Diabetes mellitus (DM) is the most common endocrine disorder which characterized by high blood sugar levels over prolonged periods.

Although the precise mechanisms through which diabetes increases the likelihood of atherosclerotic plaque formation are not completely defined, the association between the two is profound.

Atherosclerotic cardiovascular disease (ASCVD) remains the principal cause of death and disability among patients with diabetes mellitus, especially in those with type 2 diabetes mellitus in whom it typically occurs 14.6 years earlier, with greater severity, and with more diffuse distribution than in individuals without diabetes mellitus.

Furthermore, about two-thirds of deaths in people with diabetes mellitus are attributable to cardiovascular disease: of these, ≈40% are from ischemic heart disease, 15% from other forms of heart disease, principally congestive heart failure, and ≈10% from stroke.

Intensive treatment of multiple cardiovascular risk factors can have a major impact among patients with diabetes. Reduction in glycosylated hemoglobin values, systolic and diastolic blood pressure, fasting serum cholesterol and triglyceride levels, and urinary albumin excretion rate all have their value in reducing cardiovascular morbidity and mortality.

Adipocytes produce and secrete a variety of bioactive peptides, termed adipokines, which influence body weight, insulin sensitivity, lipid metabolism and vascular function. Adipocyte fatty acid binding protein (AFABP), also known as fatty acid binding protein-4 and aP2, has recently been suggested as a third adipokine, in addition to leptin and adiponectin, that is preferentially produced in and released from adipocytes.

circulating AFABP concentrations also correlate positively with adverse cardiometabolic risk factors including age, obesity indices, hypertension, homeostatic model of insulin resistance (HOMA-IR), low-density lipoprotein cholesterol (LDL-C), and negatively with high-density lipoprotein cholesterol (HDL-C). Moreover, high circulating AFABP concentrations predicted incident metabolic syndrome and type 2 diabetes, both of which are associated with increased risks of CVD and mortality.

AFABP promotes atherosclerosis, the central event in the pathogenesis of CVD.

Aim of the Work

The study was designed to:

1. Study the circulating level of Adipocyte-Fatty acid binding protein in subjects with type 2 diabetes versus control.
2. Determine the relationship of circulating A-FABP levels with subclinical atherosclerosis, as measured by carotid IMT and ankle brachial index, in subjects with type 2 diabetes versus control.

Subjects And Methods

SUBJECTS:

Study design: This is a cross sectional case-control study.

Study Settings: Outpatient clinic of the diabetes and metabolism unit, Alexandria Main University Hospital, Alexandria, Egypt.

Study subjects and groups:

Group (I): Included 40 type 2 diabetic patients with no previous history or clinical evidence of macrovascular complications (Stroke, ischemic heart disease, Peripheral arterial disease).

Group (II): 40 healthy subjects as a control.

NB: Diagnosis of T2DM according to the criteria of the American Diabetes Association. The patients were diagnosedbased on plasma glucose criteria, either the fasting blood glucose ≥ 126 mg/dl or 2 hour post prandial blood glucose ≥ 200 mg/dl during a 75-g oral glucose tolerance test, or HbA1C ≥ 6.5%.

Exclusion criteria:

1. Subjects with history of cerebrovascular disease (stroke, transient ischemic attack).
2. Subjects with peripheral vascular disease due to diabetes or any other cause.
3. Subjects with known history of coronary heart disease.
4. Severe uncontrolled hypertension.
5. Cardiac decompensation.

METHODS:

All subjects participating in the study were were subjected to:

I. Medical history taking **II.** Thorough clinical examination.

III. Laboratory analysis:

IV. Measurement of plasma Adipocyte Fatty acid binding protein (A- FABP) Kits

V. Resting ECG. **VI.** Ankle-brachial index (ABI).

VII. Carotid artery evaluation

Measurement of carotid artery intima– media thickness (CIMT) by Doppler.

Results

Table 1: Validity (AUC, sensitivity, specificity) for AFABP to discriminate group I (Type 2 diabetic patients) (n = 40) from group II (control group) (n = 40)

	AUC	p	95% C.I	Cut off#	Sensitivity	Specificity	PPV	NPV
AFABP	0.674	0.007*	0.553 – 0.794	>51.1	55.0	77.50	71.0	63.3

Table: Correlation between AFABP and different parameters in group I (Type 2 diabetic patients) (n = 40)

AFABP vs.	r_s	p
Age (years)	-0.180	0.266
Weight (kg)	0.356	0.024*
Height (cm)	0.004	0.981
BMI (kg/m²)	0.467	0.002*
Waist (cm)	0.212	0.190
Hip (cm)	0.319	0.045*
Waist/ Hip ratio	-0.156	0.337
Systolicblood pressure (mmHg)	0.069	0.672
Diastolic blood pressure (mmHg)	0.078	0.632
Right Ankle P	-0.021	0.897
Left Ankle P	-0.061	0.708
ABI	-0.044	0.789
Right CIMT	0.455	0.003*
Left CIMT	0.602	<0.001*
Maximum CIMT	0.583	<0.001*
Urea	-0.079	0.627
Creatinine	-0.234	0.145
Fasting blood glucose	0.280	0.080
HbA1c (%)	0.804	<0.001*
Triglycerides "TG"	0.395	0.012*
Total cholesterol	0.430	0.006*
LDL	0.332	0.036*
HDL	-0.183	0.259

Conclusion

Atherosclerotic cardiovascular disease (ASCVD) remains the principal cause of death and disability among patients with diabetes mellitus.

Increases in ABI and CIMT are indicative of a higher incidence of atherosclerosis, which is linked to type 2 diabetes.

A-FABP levels may be utilized as a biomarker to identify atherosclerosis in diabetic patients early on.