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Relationship Between Adipocyte Fatty Acid–Binding Protein In Obese Men With Cardiovascular Diseases.

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ABSTRACT

A-FABP (adipocyte fatty acid-binding protein), one of the most abundant proteins in adipocytes, plays a key role in obesity-related insulin resistance, inflammation and atherosclerosis, newly (A-FABP), contribute to the pathogenesis of CVD. (A-FABP are estimated in(140) CVD patients (aged between 30 - 65 years) , in the different Body Mass Index (BMI) in AL-Sader teaching hospital in AL-Najaf AL-Ashraf and (40) healthy as control, the result showed a significant increase ($P<0.05$) in A-FABP in CVD patients compared with control. Also the result showed a significant increase ($P<0.05$) in individual patients (BMI<25) and overweight individuals (BMI>25, BMI>30, BMI>40) in A-FABP compared with the control group. Further, there was evidence of worsening BMI with cardiovascular risks also The study suggested that inflammatory marker A-FABP correlated with cardiovascular risk factors in obesity, rather than just being a manifestation of the inflammatory state.

Keywords: Adipocyte fatty acid-binding protein, Obesity, A-FABP, CVD.

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INTRODUCTION

FABP4 which also named P2 is considered as small molecular weight , expressed in adipose tissue predominantly [1]. In mature adipocytes FABP4 is the main protein present in the cytosol approximately ≈6% also A-FABP is existing in macrophages [2] . Evidence postulates that this protein" correlate positively with obesity and many characteristics of metabolic syndrome such as, fasting glucose, dyslipidemia [3]. Adipose tissue is the major source of adipokines secretion of bioactive molecules for example for these adipokine , leptin , (TNF-α) and adiponectin. Several studies documented that adipocytes is the major source of FABP4 secretion [4. Obesity ,hypertension, atherosclerosis and insulin resistance has been shown to be associated with high level of FABP4 [5] .The pathophysiological role of A-FABP may also apply to atherosclerotic disease in humans. Associations between serum A-FABP with CVD.The circulating FABP4 in serum may be an important pathway physiological mediator of future cardiovascular morbidity and mortality in individuals with manifest atherosclerosis [6].

MATERIALS AND METHODS

Subjects:

Inclusion criteria: One hundred thirty eight men (138) CVD patients and (40) control . The samples were collected from Al- Najaf Al-Ashraf /Al- Sader Teaching Hospital.

Body Mass Index: Body mass index values were calculated from the following equation BMI=Weight(Kg)/Height (m^2).

Determination of FABP-4 **Serum**

FABP-4 concentrations in serum, was supplied byElabscience Biotechnology Co., Ltd.(Catalog No: E-EL-H0285).

Procedure

1. Add 100µL standard or sample to each well. Incubate 90mintues at 37℃
2. Remove the liquid. Add 100µL Biotinylated Detection Ab. Incubate 1 hour at 37℃
3. Aspirate and wash 3 times
4. Add 100µL HRP Conjugate. Incubate 30 minutes at 37℃
5. Aspirate and wash 5 times
6. Add 90µL Substrate Reagent. Incubate 15 minutes at 37℃
7. Add 50µL Stop Solution. Read at 450nm immediately
8. Calculation of results

FABP4

Comparison between serum level FABP4 of cardiovascular disease (CVD) and healthy group.

The result of Figure (1) showed a significant increase ($p<0.05$) in serum FABP4 concentration in CVD group (29.235±0.580 ng/ml) in comparison with healthy group (9.599±0.982 ng/ml).

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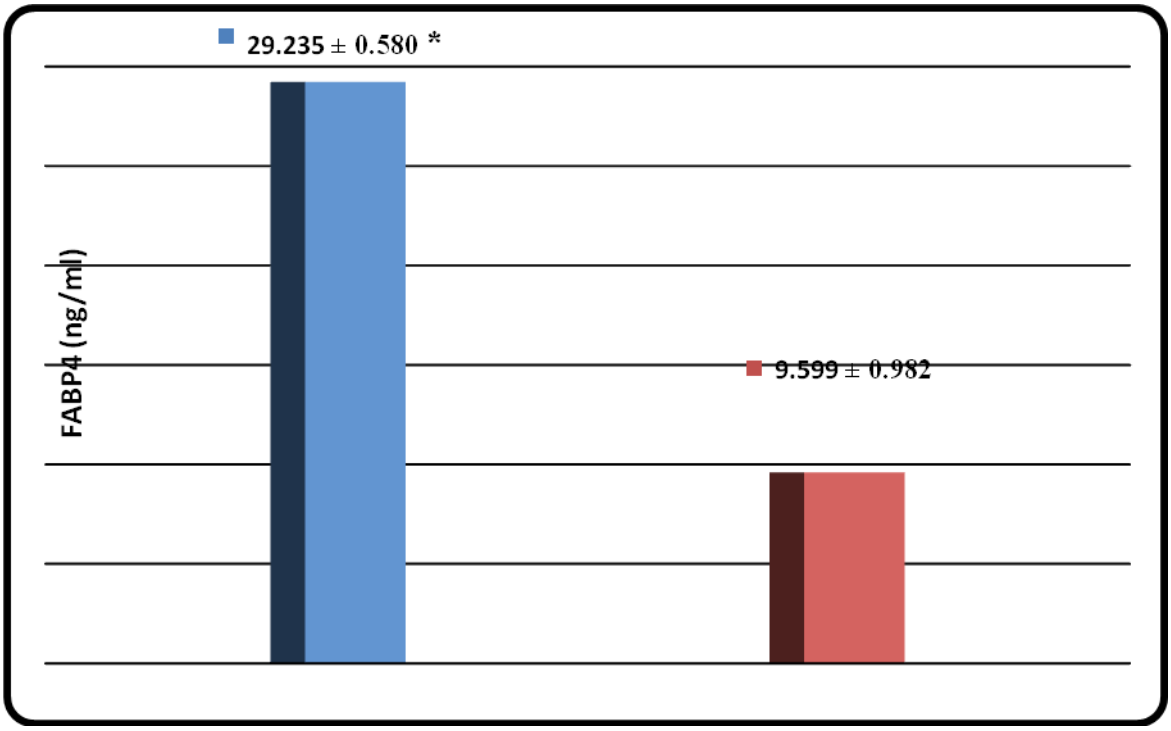
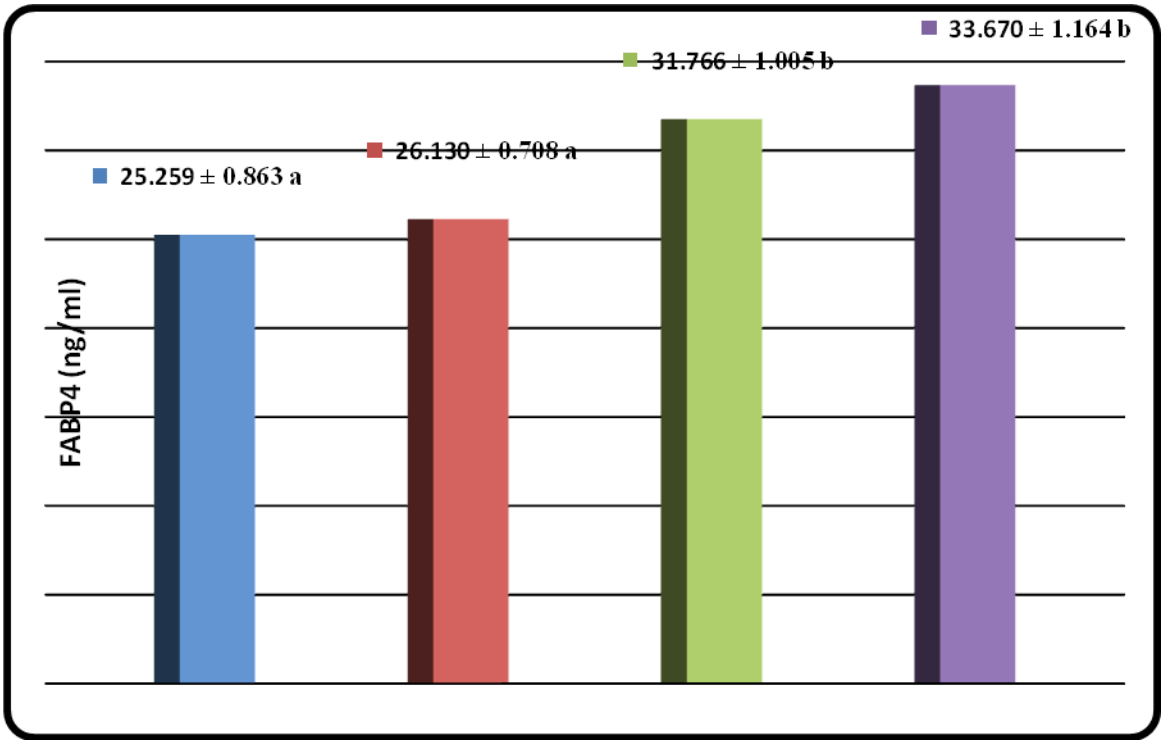


(*)Statistically significant differences (p<0.05) between patients and control groups**.**

Figure 1: Serum level of FABP4 in cardiovascular disease (CVD) and control groups.

Comparison serum level of FABP4 among different body mass index (BMI) groups of cardiovascular disease.

The serum FABP4 concentration indicated no significant differences (P>0.05) at (normal and over weight) , (obese and morbid weight) while at the (obese and morbid weight) reveal a highly significant (p<0.05) than (normal and over weight) of CVD group, as show in figure (2).



The different letters refer to significant differences and the same letters refer to no significant differences, between different BMI groups at level (P<0.05).

Figure (2): Comparison Serum level of FABP4among different BMI groups

Comparison between waist circumference (WC) ,body mass index(BMI) of cardiovascular disease (CVD) and healthy group.

The results of the Waist circumference were (108.25±1.40cm) and (98.13 ±2.64 cm) in CVD and healthy group respectively. There is significant increase (P<0.05) in CVD in comparing with healthy group.

Also the results of the Body Mass Index (BMI) were (34.2479 ±0.7425kg/m^2) and (29.2371 ±1.4241 kg/m^2) in CVD and healthy group respectively. There is significant increase (P<0.05) in CVD in comparing with healthy group, these results show in Table (1).

Table (1): Waist circumference (WC) ,body mass index(BMI) in cardiovascular disease (CVD) and control groups.

Groups Aspects	Mean ±S.E.	
	HT	**CVD**
Waist circumference (cm)	**98.13 ±2.64**	**108.25±1.40***
BMI (Kg/m^2)	**29.2371 ±1.4241**	**34.2479 ±0.7425***

(*)Statistically significant differences (p<0.05) between patients and control groups.

DISCUSSION

In this study, we showed the significant association betweenserums FABP4

Levels and CVD inhumans. Serum FABP4 levels increased with CVD compared with the subjects without CVD control, the present findings are indirectly in agreement with the study of Rhee and colleagues (2009) [1] that revealed a significant association between serum FABP4 levels with CAD in humans. Mean serum FABP4 levels increased as the number of stenotic coronary arteries increased and these significances showed a strong, tendency for a difference even after adjustments were made with age, gender, BMI, and fasting blood glucose. For instance, Eynatten (2012**) [6]** pathophysiological role of A-FABP may also apply to atherosclerotic disease in humans. Associations between serums A-FABP with CVD .The circulating FABP4 in serum may be an important pathway physiological mediator of future cardiovascular morbidity and mortality in individuals with manifest atherosclerosis. In this population, increased serum A-FABP levels were also associated with metabolic and inflammatory, cardiovascular risk factors CVD events [7] . An agreement with [3,8] founds increased serum A-FABP levels are associated with a greater risk of developing metabolic syndrome A growing body of evidence suggests that A-FABP plays a pathogenic role in the development of CVDs .Current study postulate that A-FABP may be a key mediator linking obesity with its related cardiovascular disorders, and also raise the possibility that A-FABP may serve as a biomarker for early diagnosis of high-risk individuals with ischemic heart disease [9].

Fatty acid-binding protein 4 (FABP4) is expressed in both adipocytes and macrophages. Recent studies have shown secretion of FABP4 from adipocytes and an association of elevated serum FABP4 level with obesity and atherosclerosis. A study by Fuseya et al [10] is in agreement with a study by Ishimura et al [5] shows that elevated serum concentration of FABP4 to be associated with obesity, insulin resistance, hypertension and atherosclerosis .

Epicardial fat has been reported to directly influence cardiac function because of the absence of a fibrous fascial layer between fat and the underlying myocardium [11]. FABP4 expression in epicardia adipose tissue was recently reported to be profoundly increased compared with its expression in Para aortic adipose tissue in patients with metabolic syndrome [12]. Furthermore, it has recently been reported that exogenous FABP4 acutely suppresses shortening amplitude in cardiomyocytes by attenuating intracellular systolic peak Ca^{2+}level in a dose-dependent manner [13] and impairs the insulin-dependent nitric oxide pathway in vascular

endothelial cells [14]. Therefore, it is possible that either FABP4 secreted from epicardial fat tissue or circulating FABP4 released from subcutaneous and/or visceral adipose tissue or from macrophages may directly modulate cardiac function, these novel data show that FABP4 [10] is released from human adipocytes and elicits a direct and acute Ca2þ-dependent suppressing effect on cardiomyocyte contraction. The increased concentrations of circulating FABP4 and/or locally expressed FABP4 in epicardial fat tissue as observed in obese individuals may be partially responsible for the development of heart dysfunction in these individuals [13].

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