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Original Research

Assessment of serum Apelin level in type II diabetic mellitus patients

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ABSTRACT

Background: Central/abdominal obesity, systemic hypertension, insulin resistance (IR) or type 2 diabetes mellitus (T2DM), and atherogenic dyslipidemia are among the clinical disorders that make up metabolic syndrome (MetS). The present study was conducted to assess serum Apelin level in type II diabetic mellitus patients.

Materials & Methods:70 type II diabetes mellitus patients of both genders were selected. Fasting blood glucose (FBG), triglyceride (TG) and high-density lipoprotein cholesterol (HDL-C) and Apelin (ng/mL) level was measured among subjects with metabolic and non- metabolic syndrome.

Results: Out of 70 patients, 43 were males and 27 were females. The mean age (years) in age in patients with MetS and without MetS was 46.2 years and 45.4 years respectively. BMI (kg/m2) was 26.7 and 26.2, WC (cm) was 106.2 and 97.6, SBP (mm Hg) was 126.4 and 116.4, DBP (mm Hg) was 82.5 and 74.0, FBG (mg/dL) was 172.0 and 116.4, TG (mg/dL) was 196.4 and 130.6, HDL-C (mg/d L) was 41.5 and 46.2, Apelin level was 230.6 ng/mL and 428.4 ng/mL respectively. The difference was significant (P< 0.05).

Conclusion: The determination of serum apelin may contribute to the evaluation of theMetS occurrence in T2DM patients.

Keywords: Diabetes mellitus, Metabolic syndrome, Obesity adjuvant of choice in patients undergoing elective open cholecystectomy.

Introduction

Central/abdominal obesity, systemic hypertension, insulin resistance (IR) or type 2 diabetes mellitus (T2DM), and atherogenic dyslipidemia are among the clinical disorders that make up metabolic syndrome (MetS). T2DM and atherosclerotic cardiovascular disease (ASCVD) are multiplex risk factors for MetS.[1] It twice the risk of ASCVD and five times the risk of T2DM in non-diabetic people. With a prevalence of 30% to 40%, Met S is widespread throughout the world. In several other populations, the prevalence of MetS is varied. Numerous studies have demonstrated that MetS varies by gender and ethnic group.[2] According to reports, the prevalence of MetS varies between 8% and 24% for men and between 7% and 46.5% for women worldwide. The prevalence of MetS in European Americans and the European population is between 20% and 30% for men and women. It has demonstrated that MetS is becoming more common in Asian nations.[3]

The APLN gene codes for the 12-amino acid peptide that makes up apelin, which is expressed in human adipocytes.[4] Bioactive hormones and mediators (adipokines) that control metabolic activity are produced and secreted by adipose tissue. One of the recently identified adipokines in human adipocytes implicated in numerous obesity-related symptoms of Met S components is apelin.[5] Animal insulin secretion and sensitivity are regulated by apelin. A number of studies, albeit not all of them, have shown that different metabolic disorders are brought on by elevated apelin levels in both people and animals. Aptin has recently emerged as a potential therapeutic target for a number of metabolic diseases, including IR, hyperinsulinemia, and diabetes mellitus.[6]The present study was conducted to assess serum Apelin level in type II diabetic mellitus patients.

Materials & Methods

The study was carried out on 70 type II diabetes mellitus patients of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. The 5-mL blood samples were provided for all subjects after 12 h overnight fast. After the serum separation, it was used to determine biochemical parameters. Fasting blood glucose (FBG), triglyceride (TG) and high-density lipoprotein cholesterol (HDL-C) were

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measured by commercial kits using an automated method. Apelin (ng/m L) level was also measured among subjects with metabolic and non- metabolic syndrome. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table: I Distribution of patients

Total- 70		
Gender	**Male**	**Female**
Number	43	27

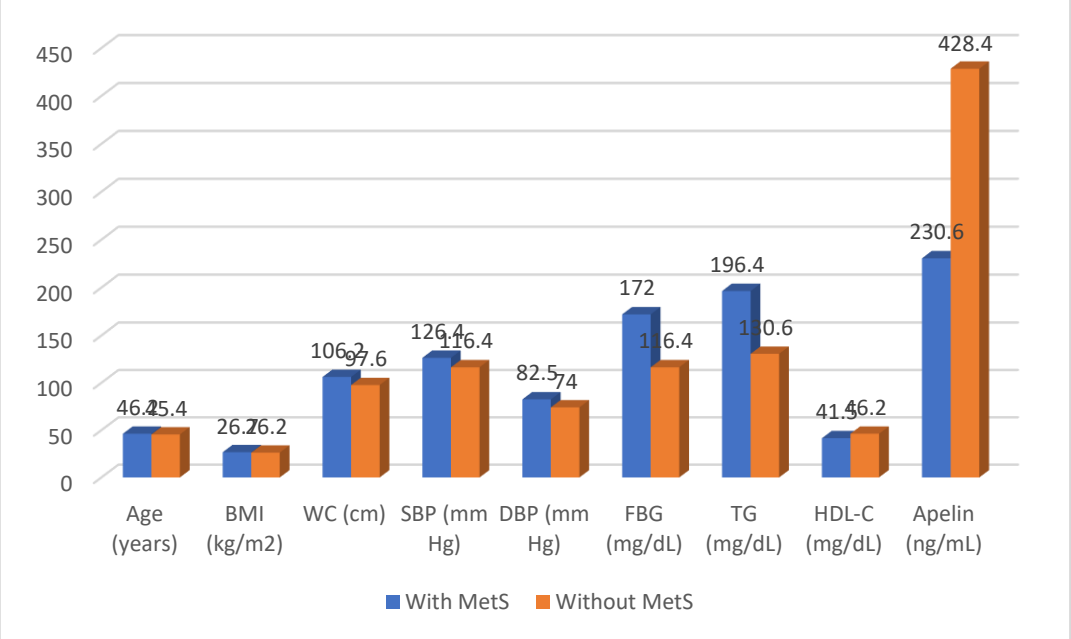
Table I shows that out of 70 patients, 43 were males and 27 were females.

Table: II Assessment of parameters

Parameters	With Met S	Without Met S	P value
Age (years)	46.2	45.4	0.83
BMI (kg/m2)	26.7	26.2	0.91
WC (cm)	106.2	97.6	0.05
SBP (mm Hg)	126.4	116.4	0.04
DBP (mm Hg)	82.5	74.0	0.03
FBG (mg/dL)	172.0	116.4	0.01
TG (mg/dL)	196.4	130.6	0.02
HDL-C (mg/dL)	41.5	46.2	0.03
Apelin (ng/mL)	230.6	428.4	0.01

Table II, graph I shows that mean age (years) in age in patients with Met S and without Met S was 46.2 years and 45.4 years respectively. BMI (kg/m2) was 26.7 and 26.2, WC (cm) was 106.2 and 97.6, SBP (mm Hg) was 126.4 and 116.4, DBP (mm Hg) was 82.5 and 74.0, FBG (mg/dL) was 172.0 and 116.4, TG (mg/dL) was 196.4 and 130.6, HDL-C (mg/dL) was 41.5 and 46.2, Apelin level was 230.6 ng/mL and 428.4 ng/mL respectively. The difference was significant (P< 0.05).

Graph: I Assessment of parameters



Discussion

Met S may raise the chance of developing certain illnesses, such heart disease, which can be fatal.[7] The specific pathophysiology of Met S is still unknown, however apelin has been demonstrated to affect a variety of organs and tissues, including the kidney, gut, heart, and brain.[8,9] The discovery of apelin in adipocytes may provide insight into apelin's endocrine function as an adipokine. Increased apelin levels in humans and animals have been linked to a number of metabolic diseases, according to some but not all research.[10] With its anti-obesity and anti-diabetic properties, apelin has emerged as a useful adipokine that may be a useful therapeutic target for a number of

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metabolic issues.[11] The present study was conducted to assess serum Apelin level in type II diabetic mellitus patients.

We found that out of 70 patients, 43 were males and 27 were females. Zhang et al[12] assessed insulin resistance (HOMA-IR) and β-cell function. Plasma apelin-17 levels were determined by radioimmunoassay (RIA). Plasma apelin levels were significantly lower in the diabetic group compared with the control subjects (0.11 vs. 0.25 ng/ml, $P < 0.0001$). Apelin levels were negatively correlated with CRP ($r = -0.357$, $P = 0.001$), HOMA-IR ($r = -0.509$, $P < 0.0001$), FPG ($r = -0.607$, $P < 0.0001$), and A1C ($r = -0.467$, $P < 0.0001$) and positively correlated with HOMA-IS ($r = 0.566$, $P < 0.0001$). Multiple stepwise regression analysis showed that apelin increased 565 fg/ml along with 1 SD, which increased in HOMA-IS in our subjects ($R2 = 0.107$, $P = 0.002$). Compared with the lowest quartile, the highest quartile of HOMA-IS had significantly higher plasma apelin level (0.27 vs. 0.07 ng/ml, $P < 0.0001$). Such results were also obtained in FPG and A1C ($P < 0.0001$ for both).

We observed that mean age (years) in age in patients with MetS and without MetS was 46.2 years and 45.4 years respectively. BMI (kg/m2) was 26.7 and 26.2, WC (cm) was 106.2 and 97.6, SBP (mm Hg) was 126.4 and 116.4, DBP (mm Hg) was 82.5 and 74.0, FBG (mg/dL) was 172.0 and 116.4, TG (mg/dL) was 196.4 and 130.6, HDL-C (mg/dL) was 41.5 and 46.2, Apelin level was 230.6 ng/mL and 428.4 ng/mL respectively. Cavallo et al[13] recruited 369 subjects, 119 with T2D, 113 with T1D and 137 non-diabetic controls. All subjects underwent a complete clinical examination, including anthropometric and laboratory measurements. Serum apelin levels were determined by EIA (immunoenzyme assay). Patients with T2D had significantly higher serum apelin levels compared to controls (1.23 ± 1.1 ng/mL vs 0.91 ± 0.7 ng/mL, $P<0.001$) and to T1D subjects (0.73 ± 0.39 ng/mL, $P<0.001$). Controls and T1D subjects did not differ significantly in apelin levels. Apelin concentrations were directly associated with fasting blood glucose (FBG), body mass index (BMI), basal Disposition Index (DI-0), age, and diagnosis of T2D at bivariate correlation analysis. Multiple regression analysis confirmed that diagnosis of T2D, basal DI-0 and FBG were all determinants of serum apelin levels independently from age and BMI. Bariatric surgery performed in a subgroup of obese diabetic subjects ($n = 12$) resulted in a significant reduction of apelin concentrations compared to baseline levels ($P = 0.01$).

Yu et al[14] investigated whether chemerin and apelin play an important role in the pathophysiologic proceeding of diabetes. This study enrolled 81 newly diagnosed obese type 2 diabetes mellitus (T2DM) patients (T2DM group, $n = 81$). All the patients were randomly assigned to DM1 group treated with metformin ($n = 41$) and DM2 group treated with pioglitazone ($n = 40$). After hypoglycemic agents treatment, patients under better blood glucose control were chosen to be given antioxidant treatment. Another 79 subjects without T2DM were recruited as normal control group (NC group), including 40 subjects (NC1 group) with normal body mass index (BMI) and 39 obese subjects (NC2 group). Levels of chemerin, apelin, BMI, tumor necrosis factor-α (TNF-α), homeostasis model assessment of IR (HOMA-IR) and 8-isoprotaglandim F2α (8-iso-PGF2α) were examined at baseline and post-treatment. The relationship between chemerin, apelin and BMI, TNF-α, HOMA-IR, 8-iso-PGF2α was analyzed. The baseline levels of chemerin, apelin, TNF-α, HOMA-IR and 8-iso-PGF2α in T2DM group were significantly higher than normal control group ($P < 0.001$). All indices mentioned above were significantly decreased after treatment ($P < 0.05$). In T2DM patients treated with pioglitazone, indices mentioned above except for HOMA-IR, were decreased significantly compared with patients treated with metformin ($P < 0.05$). After antioxidant treatment using lipoic acid, levels of chemerin, apelin, TNF-α and 8-iso-PGF2α were further significantly decreased ($P < 0.05$). Correlation analysis showed that the levels of chemerin and apelin correlated positively with BMI, TNF-α, HOMA-IR and 8-iso-PGF2α before and after treatment with hypoglycemic agents ($P < 0.01$). The levels of chemerin and apelin also had positive correlation with TNF-α and 8-iso-PGF2α after antioxidant treatment ($P < 0.05$).

The shortcoming of the study is small sample size.

Conclusion

Authors found that the determination of serum apelin may contribute to the evaluation of the MetS occurrence in T2DM patients.

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