

SUMMARY

Arterial hypertension is the most frequently occurring chronic disease at the present time which significantly influences the number of premature deaths around the world. Data gathered in the period of last 20 years have shown the increase in arterial hypertension occurrence. Methods used in the treatment of arterial hypertension enable to obtain therapeutic effect only in a small number of patients. Unfortunately, together with ill compensation of arterial blood pressure, myocardial infarction, stroke, and other circulatory diseases may occur in majority of patients.

Diabetes mellitus, one of metabolic diseases, is another chronic disease. It is connected with hyperglycemia caused by improper action and/or secretion of insulin. The most frequent is type 2 diabetes with insulin resistance. Probability of type 2 diabetes incidence is increased in the group of people with obesity or overweight, with low physical activity, and women with history of gestational diabetes. Unfortunately, due to poor prevention, late diagnosis, and ineffective treatment, numerous complications may occur.

Chronic renal failure is still another chronic disorder caused by poorly compensated arterial blood pressure and diabetes mellitus. It is defined by the occurrence of abnormalities in the structure or functions of kidneys for the period of at least 3 months.

Thus, regular follow-up examinations and tests are recommended for the group of risk factor patients as the course of the disease is usually long and asymptomatic. The main aim of the treatment is to inhibit the progress of the disease, decrease in complications occurrence, and treatment of co-existing diseases.

According to the articles on the subject, a possible significance of irisin and adropin in chronic diseases, mainly in arterial hypertension, type 2 diabetes, and chronic renal disease, can be noticed. Irisin is described as a fragment of fibronectin type III domain containing protein 5 (FNDC5) encoded by human gene FNDC5, localised on chromosome 1. At present, no data on the specific irisin receptor is available while the molecular mass of the adipokin/miokine is 12 kDa. Irisin release is probably connected with physical activity and significantly affects the energetic homeostasis of the organism.

Adropin, a novel 76-amino acid peptide is encoded by Enho gene. The exact molecular mass of the protein and its half-life have not been determined yet. According to the literature, a

relationship between serum adipon concentration and energetic homeostasis of the organism, glucose concentration, or fatty acids concentration may occur.

The aim of the study was:

1. The evaluation of irisin and adipon concentrations in sera of patients with primary arterial hypertension and comparison to that in the control group of healthy individuals.
2. The evaluation of correlation of irisin and adipon concentrations in patients with co-existing diseases, type 2 diabetes and chronic renal disease.
3. The evaluation of correlation of irisin and adipon concentrations with chosen laboratory parameters and results of accessory tests in the examined group of patients.

The examined group consisted of 219 individuals (120 males and 99 females) with age median of 63 years. The control group comprised 21 healthy individuals. All patients suffered from primary arterial hypertension. Moreover, 90 patients (46%) revealed co-existing type 2 diabetes and 27 patients (14%) had chronic renal diseases. All patients were treated in The Outpatient Clinic of Arterial Hypertension in the Medical University of Białystok Clinical Hospital or were hospitalized in the Teaching Hospital of Invasive Cardiology with the Intensive Cardiological Care Unit and the Haemodynamics Lab of the Medical University Hospital.

The arterial blood pressure, echocardiographic parameters as well as current pharmacotherapy were analyzed in the study. The biochemical analysis was also performed, which included basic laboratory tests results, HbA1c concentrations, glomerular filtration evaluation, serum adipon concentration, and plasma irisin concentration.

Moreover, correlation between arterial hypertension, type 2 diabetes, chronic renal disease, coronary disease, post myocardial infarction, chosen echocardiographic parameters and plasma irisin concentrations and serum adipon concentrations were evaluated.

The results point to the fact that the median of adipon concentrations in examined patients with co-existing type 2 diabetes was statistically significantly lower and equaled 10.97ng/ml in comparison to that in patients without type 2 diabetes (Me=21.56 ng/ml, $p=0.001$).

Moreover, it was observed that the median of adipon concentrations in sera of examined patients with type 2 diabetes was statistically significantly lower (Me=10.97 ng/ml) as compared with median values in healthy individuals from the control group (Me=21.61, $p=0.001$).

The median of irisin concentrations in examined patients with co-existing type 2 diabetes was also statistically significantly lower (Me=4.04 ng/ml, $p=0.001$) than the median in the group of examined patients without co-existing type 2 diabetes (Me=9.01 ng/ml, $p=0.001$) and the median of irisin concentrations in control patients (Me=11.11 ng/ml, $p=0.001$).

The median of irisin concentrations in patients of the examined group (Me=7.53 ng/ml, $p=0.001$) was also statistically significantly lower in comparison with healthy volunteers from the control group (Me=11.11 ng/ml, $p=0.001$).

It is also worth noticing that adropin concentrations in examined patients with familial history of cardio-vascular problems were significantly higher while examined patients after myocardial infarction revealed lower adropin concentrations as compared to the rest of examined patients.

Moreover, in case of irisin, statistically significantly lower serum concentrations were observed in patients with coronary disease (Me=3.98 ng/ml vs 8.66 ng/ml), in patients after myocardial infarction (Me=4.04 ng/ml vs Me 8.19 ng/ml), and in patients with co-existing chronic renal problems (Me=4.48 ng/ml vs Me=8.15 ng/ml) in comparison to other patients in the examined group.

However, statistically significantly higher concentrations were revealed in patients with positive history of cardio-vascular problems (Me=8.24 ng/ml vs 4.38 ng/ml) as compared to other patients in the examined group.

Among patients in the examined group, a negative correlation between serum adropin concentrations ($r=-0.18$, $p=0.015$) and plasma irisin concentrations ($r=-0.42$, $p=0.001$) and serum creatinine concentrations were observed.

Moreover, the examined group of patients revealed negative correlation between heart left ventricle dimension and serum adropin concentrations ($r=-0.19$, $p=0.018$) and between heart rate and plasma irisin concentrations ($r=-0.17$, $p=0.018$).

In the study, positive correlation was observed in the examined group between plasma irisin concentrations ($r=0.36$, $p=0.001$; $r=0.54$, $p=0.001$) and adropin in blood sera ($r=0.25$, $p=0.001$; $r=0.42$, $p=0.001$) and haemoglobin concentrations and total cholesterol.

What is more, adropin concentration correlated positively with left ventricular ejection fraction ($r=0.26$, $p=0.001$), systolic ($r=0.17$, $p=0.001$) and diastolic arterial blood pressure ($r=0.24$, $p=0.001$) in the examined group.

Irisin concentration in this group of patients correlated positively with the value of glomerular filtration estimated according to the short formula MDRD ($r=0.37$, $p=0.001$).

On the other hand, in patients with co-existing type 2 diabetes, irisin concentrations correlated positively ($r=0.28$, $p=0.0017$) with the value of systolic arterial blood pressure.

The following conclusions were drawn on the basis of the study:

1. Irisin concentrations in the group of patients with arterial hypertension depend on co-existing diseases, e.g. type 2 diabetes and chronic renal failure.
2. Low adropin concentrations in the serum in patients with arterial hypertension may have connection with the occurrence of cardio-vascular diseases.
3. Low irisin concentrations in plasma are probably related with the development of insulin resistance and type 2 diabetes.
4. Chronic renal failure is connected with decreased irisin concentrations in plasma of examined patients.

It is not possible, based on the results of the study, to determine the significance of irisin and adropin in arterial hypertension, type 2 diabetes and chronic renal failure. Further studies, both experimental and clinical ones, are required to establish the role of the substances.