

*Materials of Conferences***DIFFERENTIATED APPROACH  
ENDOTHELIOPATHY IN THE  
DEVELOPMENT OF IN WOMEN  
METABOLIC SYNDROME**

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MS is one of the most controversial and topical problems of modern medicine. Its distribution amongst the planet's population is characterized as "non-infectious epidemic. Nowadays a great attention is paid to the metabolic syndrome (MS), which is an index of hormonal and metabolic disturbances, that are united by common pathophysiological core-insulin resistance. MS is one of the most controversial and topical problems of modern medicine. Its distribution amongst the planet's population is characterized as "non-infectious epidemic. In common population MS is distributed from 14 to 24%. In persons above 50 MS is diagnosed in 50–60% of cases

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**The purpose of the study:** To study the role of the endotheliocytes in the development of the MS.

**Materials and methods of research.** The study included 69 women aged 19 to 35 years at the age of 18–65. All of them had metabolic syndrome. Also 20 healthy volunteers participated in the research as the control group. The research work was conducted in the 3<sup>rd</sup> clinic of Tashkent Medical Academy. Metabolic syndrome was diagnosed according to the currently functioning criteria which are elaborated by the experts of National Educational Cholesterol Committee (NGEP ATP III, 2001).

The patients with the 2<sup>nd</sup> type of diabetes uncontrollable arterial hypertension of II-III degree,

the acute breach of cerebral circulation myocardial infarction, severe mental and somatic diseases, pregnancy and acute infectious diseases did not participate in the research work.

All the patients with the metabolic syndrome and the patients of control group had undergone standard oral glucose-tolerant test with the determination of glycaemia and the level of the immune reactive insulin on an empty stomach and after 120 min of glucose loading.

Glucose concentration in blood was calculated according to the glucose oxidase technique with the help of the chemical agents of the firm "HUMAN". In order to estimate the insulin resistance the index HOMA-IR was applied. It was calculated according to the formula:  $HOMA-IR = (\text{insulin on the empty stomach (mk Unit/ml)} + \text{serum glucose on the empty stomach (m Mole)}) : 22,5$ .

The internal nitrogen oxide (NO) production, endothelin-1 and Vilebrand factors content were calculated with the commercially adapted set of the firms "technoelone", "Biomedica" and "RSD", represented by the company "BioCim Mac" (Russia) on the immune-enzyme analyser of the firm "HUMAN". The quantity of the desquamated endotheliocytes were explored via the method of Hldovec J. (1978).

The statistical analysis of the acquired results was conducted with the application of the set of applied programs "Statistica". The statistically significant differences were by ( $P < 0,05$ ).

**Results of research and their discussion.** The comparative characteristics of the main and control groups' anthropometric figures are demonstrated in the table 1. The groups were compared according to the sex and age. As it is clearly seen from the results of the research the waist and hips circumferences in these groups differed considerably.

The analysis of glucose metabolism and the dynamics of immune reactivity toward insulin revealed the significant changes in the studied figures. The obtained results clearly demonstrate a considerable increase of the glycaemia on the empty stomach, and also 2 hours after oral glucose tolerant test in patients with metabolic syndrome in comparison with the control group. However, they did not reach the criteria of the diabetes diagnostics. In comparison with the control group, the level of basal insulin rose 2,9 times in patients with the metabolic syndrome group. The indexes of HOMA-IR in patients with metabolic syndrome exceed 4 times the same figures of control group.

The binding link between the syndrome of insulin resistance and metabolic syndrome is the endothelial dysfunction. The endothelial dysfunction can be determined as the inadequate increase or decrease of the desquamated endotheliocytes' contents in the blood. These data confirm the presence of the vascular endothelium's considerable damage in the metabolic syndrome.

According to the formation of different factors in the endothelium (which is mainly connected

with its structure), and also the NO (nitrogen oxide) secretion, which is constantly produced in the endothelium and is discharged from the cells in basolateral direction or into the bloodstream. A considerable decrease of the NO level was regis-

tered in the examined. This fact confirms that NO is not sufficiently produced in the endothelium in the metabolic syndrome. In this case the very low concentrations of NO defend the endothelial cells from the apoptosis.

The indexes of the insulin resistance and endothelium's functional state in patients with metabolic syndrome

| The figures   | Healthy individuals (Control)<br>N = 15 | Patients with metabolic syndrome<br>N = 54 |
|---|---|--|
| Waist circumference(sm)                                 | 75,7 ± 0,61                             | 114,0 ± 6,71*                              |
| Hips circumference(sm)                                  | 96,0 ± 7,44                             | 119,0 ± 9,53*                              |
| Glucose level (on the empty stomach) mMole/l            | 4,5 ± 0,52                              | 6,2 ± 0,54*                                |
| Glucose level(after 2 hours) mMole/l                    | 4,9 ± 0,34                              | 7,0 ± 0,61*                                |
| Insulin(on the empty stomach) mk Unit/ml                | 5,1 ± 0,46                              | 15,2 ± 0,78*                               |
| HOMA-IR   | 1,02 ± 0,01                             | 4,20 ± 0,17*                               |
| The quantity of the desquamated endotheliocytes ×10 m/l | 2,76 ± 0,19                             | 5,8 ± 0,46*                                |
| NO level mkMole/l                                       | 26,51 ± 1,24                            | 17,3 ± 0,72*                               |
| Endotheline-1 concentration(Et-1) fMole/l               | 0,24 ± 0,03                             | 0,763 ± 0,06*                              |
| Villebrand factor concentration                         | 78,63 ± 5,32                            | 102,81 ± 4,71*                             |

Notes: the reliability of the differences ( $P < 0,05$ ) in comparison with the control group.

The concentration of the endotheline-1 in patients with metabolic syndrome increased considerably. This fact clearly indicates that the increase of its production confirms the presence of the endothelial dysfunction in these patients. Endotheline-1 doesn't accumulate in the endotheliocytes, but is produced very fast under the influence of adrenaline, angiotensine II, vasopressin, trombone, cytokines and etc. Endotheline-1 affects the endothelial receptors and causes the releasing of relaxation factors. This activates the receptors of myocytes and stimulate vessels constriction. As the endothelin-1 acts mainly locally, it is clear that the increase of its production and releasing into the blood stream in the MS can cause the origin and aggravation of the endothelial dysfunction.

The level of the Villebrand factor in the MS was much more higher of the same figures in the healthy individuals. The most significant function of these factor is that it plays the role of the stabilizer for the procumulative protein FVIII:C, which circulates in blood as a tied complex and is a protein of adhesion in the process of haemostasis.

The increased levels of Villebrand factor indicate the endothelium damage in the MS.

To sum up the complex clinical-laboratory diagnostics in patients with MS provides the opportunities to reveal the damage of the functional state of the endotheliocytes (the increase of the quantity of the desquamated endotheliocytes and the functional activity of the Villebrand factor in the blood serum)

and also decrease of the NO level as well as the increase of endotheline-1 in the blood serum.

#### Conclusions

1. The patients with MS have the increased quantities of desquamated endotheliocytes and Villebrand factors.

2. The decrease of NO level and increase of endotheline-1 in the blood serum are revealed.

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