Clinical Role of Estimation Metabolic Syndrome’s Components in Type 2 Diabetic Population with Symptomatic Coronary Artery Disease — a Comparison of Two Criteria

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SUMMARY
Objective of our study was to estimate the metabolic syndrome (MSy)’ components in type 2 diabetic subjects (T2D) with symptomatic coronary artery disease (CAD): arterial hypertension, waist circumference, triglyceridemia and plasma level of HDL, in order to define their clinical role in angina severity status. Second objective was to compare Adult Treatment Panel (ATP III) and International Diabetes Federation (IDF) criteria in testing of association MSy with current coronary status of population. Three hundred and twenty seven pts with T2D and manifested CAD were randomly included in a survey. Angina severity was assessed with the Canadian Cardiovascular Society (CCS). Data relieved MSy and its components, defined by ATP III, with predictive role for advanced angina stages. Presence of MSy is predictive for CCS3 angina severity (OR 9,93, 95%CI 0,78-126,28). Increased waist is a predictor for CCS3 (OR 1,22, 95%CI 0,27-5,46) and CCS4 symptoms onset (OR 1,55, 95%CI 0,36-6,73). CCS4 severity symptom is independently associated with arterial hypertension (OR 3,72, 95%CI 1,03-12,40) and hypertriglyceridemia (OR 1,72, 95%CI 0,42-7,00). MSy components: increased waist, arterial hypertension and hypertriglyceridemia have been found predictive for angina CCS4 stage in T2D subjects, when IDF criteria were used. These findings raise the question of importance of metabolic syndrome and its individual constellations in T2D subjects with CAD. Results indicate that both criteria ATP III and IDF are reliable to define MSy in predictive model for coronary clinical status in T2D population.

Key words: coronary artery disease, metabolic syndrome, type 2 Diabetes.

1. INTRODUCTION
Clinical outcome and severity of symptoms of coronary artery disease (CAD) pts are dependent on the presence of type 2 diabetes (T2D) (1, 2, 3, 4, 5). Metabolic syndrome (MSy), defined by Adult Treatment Panel (ATP III) or International Diabetes Federation (IDF) criteria, have been presented as predictor for future events in pts with established CAD and T2D (6, 7). However, there are no investigations on interplay of MSy abnormalities on CAD symptoms severity in pts with T2D.

Objective of our study was to estimate the metabolic syndrome’ components in T2D subjects with symptomatic CAD: arterial hypertension, waist circumference, triglyceridemia and plasma level of HDL, in order to define their clinical role in angina severity status. Second objective was to compare ATP III and IDF criteria in testing of association of metabolic syndrome with current coronary status.

2. METHODS
Three hundred and twenty seven (327) pts with type 2 diabetes (T2D) and manifested coronary artery disease (CAD), were randomly included in a survey. Type 2 diabetes was defined based on the criteria of International Diabetes Federation. CAD in the evaluated population is defined as symptomatic CAD, angiographically confirmed. The study was conducted according to the Helsinki declaration for clinical studies.

Angina severity was assessed with the Canadian Cardiovascular Society (CCS) classification, ranging from class 1 (mild) to 4 (severe). Blood pressure was measured with a standard sphygmomanometer in a sitting position and presented as a mean value of two readings (in mmHg). Anthropometric measurements were made with patient wearing lightweight clothing and no shoes. Waist and hip circumferences were measured by a plastic tape meter at the level of the umbilicus and of the major trohanter.

The following standard laboratory tests were performed in the evaluated patients: Enzymatic methods for assessment of: total cholesterol, in the presence cholesterol oxidizes, triglycerides, in the presence of glicerokinase and HDL fraction with direct method. LDL fraction was evaluated with Friedewald formula. Non-HDL cholesterol was determinate as a value of total cholesterol minus HDL cholesterol. The values of fasting venous glucose concentration were evaluated with enzymatic-photometric method, in the pres-
ence of gluco-so-dehydrogenase. Inter assay variability was up to 6%.

According National Cholesterol Education Program: Adult Treatment Panel III criteria (ATP III), hipertriglyceridemia was defined as value of triglycerides >/= 1.7 mmol/L and low HDL as value of < 1.03 mmol/L. Waist circumferences >/= 102 cm in men and >/= 88 cm in women are defined as abdominal obesity. Arterial hypertension was defined as a systolic blood pressure >/= 130 mmHg, or/and diastolic pressure >/= 85 mmHg, or as antihypertensive drugs used. Due to International Diabetes Federation (IDF) increased waist was defined if an abdominal circumference >/= 94 cm in men and >/= 80 cm in women was measured. The levels of triglyceridemia and HDL are the same as defined by ATP III criteria.

MSy was defined in T2D pt, when at least two components were presented (9).

SPSS 10 packet for statistical analysis was used. Data are expressed as mean +/-SD. Group comparisons were performed using t tests for continuous, normally distributed data. P value <0.05 was considered statistically significant. Multivariate logistic regression analysis was conducted to identify variables predictive of coronary artery disease clinical status. The significance of the variables in the multivariate logistic regression model was assessed by the Wald (2) test and CIs.

3. RESULTS

Study population was on age 60,3 +/- 8,3 years, mean diabetes duration 8,6 +/- 6,2 years, and basic characteristics presented in Table 1. Male were dominant than women in a study group: 221 (67,6%) vs. 106 (32,6%). Metabolic syndrome was presented in 86,2% of study population, due to ATP III criteria, or in 92,4% of population, due to IDF criteria. Prevalences of metabolic syndrome’ components and coronary artery disease clinical variables are presented in Table 2. Most dominant study groups were those with CCS1 and CC2 classification.

Data relieved a presence of metabolic syndrome, defined by ATP III criteria with a predictive value for CCS3 angina severity (Table 3). Increased waist is a predictor for CCS 3 and 4 symptoms onset. CCS4 severity symptom is independently associated with arterial hypertension and hypertriglyceridemia. MSy components: increased waist, arterial hypertension and hypertriglyceridemia, defined by IDF criteria, has also showed independent value in a predictive model for angina CCS4 stage in T2D subjects, as shown in Table 3.

4. DISCUSSION

Obtained results presents high prevalence of MSy’s components among T2D population with manifested CAD. Studies in a population-based cohort with T2D, presented a high prevalence of MSy, estimating by ATP III in a range between 70-80% (5, 7, 8). A higher prevalence of MSy in type 2 diabetic population, may be explained by a higher cardiovascular risk, under treated risk factors, and presented coronary artery disease.

CCS grading system of angina severity, previously founded as relevant and practical, has been in relationship to angiographic presence of CAD, left ventricular dysfunction, coronary revascularization and rates of myocardial infarction and mortality (9,10). Previously, MSy abnormalities have been found in independent correlation with angiographic presence of CAD, and as independent factors for future coronary revascularization and future events in T2D subjects (6, 19, 20). Our data relieved independent correlation of advanced angina severity stages with metabolic syndrome’ components in type 2 diabetic population.

Presence of metabolic syndrome, by ATP III criteria has nine-fold risk for CCS3 angina severity (Table 3). MSy defined by IDF has been only modestly associated with angina severity. ATP criteria are more pronounced than IDF criteria in definition of MSy definition, to predict future events in CAD pts (22). Inconsistent with our findings, after T2D adjustment MSy didn’t remain predictive.

Previous findings gave an importance of individual constellations of metabolic syndrome in T2D with CAD (21).

According our data, increased waist presented predictive value for CCS 3 onset, that was also found for CCS 4 symptoms onset (11). Abdominal obesity is related closely with other metabolic disturbances in T2D pts (12). Increased waist defined by IDF criteria, has also showed independent value in a predictive model for angina CCS4 stage in T2D subjects.

Arterial hypertension was presented with over three-fold risk for onset of CCS4 severity symptoms. Consistent with our data arterial hypertension has been presented as dominant risk factor for CAD in diabetic subjects (13,14,15). CCS4 is independently associated with hypertriglyceridemia, by our study. Hypertriglyceridemia was described as a risk and prognostic factor for CAD in T2D (16, 17, 18).

Arterial hypertension and hypertriglyceridemia defined by IDF (same criteria are validated by ATP III), have
been found as independent predictors for severe anagia stages.

5. CONCLUSION

Results indicate metabolic syndrome’ components as independent predictors for advanced stages of anagia severity in type 2 diabetic patients. Both criteria: ATP III and IDF are reliable when MSy is used in predictive model for coronary clinical status in type 2 diabetic subjects.

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