METABOLIC SYNDROME IN PATIENTS WITH CORONARY ARTERY BY-PASS GRAFTING AND ITS VASCULAR CONSEQUENCES

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ABSTRACT

Objective: We investigated the prevalence of METS and the relationship between its components and vascular damage in patients with history of coronary artery by-pass grafting (CABG). Material and methods: In our retrospective study on 258 patients with history of CABG (monovascular = 11.3%; bivascular = 20.5%; multivascular = 68.2%), we assessed R² for following METS parameters: fasting plasma glucose ≥ 110 mg/dl; high normal blood pressure (120-139/80-89 mmHg); fasting triglycerides ≥ 150 mg/dl; abdominal obesity (≥ 102 cm in men and ≥ 88 cm in women). We assessed R² depending on: LDL ≥ 100 mg/dl; hypertension (≥ 140/90 mmHg); gender and age (men ≥ 55 years and women ≥ 65 years). Results: METs contributed to the severity of vascular damage in male univascular patients above 55 years (R² = 0.33) and in bivascular hypertensive patients (R² = 0.36). Multivascular patients with the 4 components of METS had a significant increase of triglycerides in relation with hypertension (p = 0.003), LDL ≥ 100 mg/dl (p = 0.0002) and gender and age – men above 55 years (p = 0.003). Conclusions: (1) In patients with CABG, the presence of METS was related with severe vascular damage. (2) Adding other risk factors to the four METS analyzed components, the severity of coronary artery disease (CAD) increased. (3) In patients with CAD, the presence of both high fasting triglyceride levels and other major risk factors may be considered as an indicator of high vascular risk.

Key Words: CABG, metabolic syndrome, cardiovascular risk factors

INTRODUCTION

The metabolic syndrome initially defined as an entity which sustains the cardiovascular risk in asymptomatic subjects was recently reconsidered:¹

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risk factors (M ≥ 55 years, F ≥ 65 years), the dysmetabolic status and the metabolic syndrome components (ATPIII): waist circumference (B > 102 cm, F > 88 cm), glycemia ≥ 110 mg/dl, TG ≥ 150 mg/dl, BP ≥ 130/85 mmHg, HDL-cholesterol < 40 mg/dl (M), or < 50 mg/dl (F).

We have analyzed the multiple regression equation defined by the following variables: BMI, BP-normal/high, triglyceride & glycemia, in relationship with the severity of coronary lesions.

**Statistical processing:** percentage of lot, average and standard deviation, correlation factor (p), multiple regression coefficient ($R^2$).

**RESULTS**

Of the 258 coronary patients with CABG, the most significant category was represented by the multivascular (68.2%) vs 11.3% monovascular. In the presence of non-modifiable risk factors, the bivascular lesion becomes major (62.10%) in the group of coronary males > 55 years.

What evidence have we obtained regarding the presence of METS in coronary patients with a history of CABG?

a. The prevalence of METS was 52%. (Fig. 1)

![Figure 1. METS prevalence in operated coronary patients.](image)

b. The prevalence of METS defined by 4 components was significantly higher in bi- and multivascular patients with non-modifiable risk factors in comparison with monovascular patients. (Fig. 2)

c. Multivascular patients with METS defined by 4 components presented a significant increase of triglycerides as related with:
- the hypertension condition (p = 0.003); (Fig. 3)
- LDL-cholesterol values ≥ 100 mg/dL (p = 0.0002); (Fig. 4)

What evidence have we obtained regarding the presence of METS in coronary patients with a history of CABG?

- non-modifiable risk factors: M ≥ 55 years, F ≥ 65 years (p = 0.003). (Fig. 5)

![Figure 2. Prevalence of METS defined by 4 components.](image)

![Figure 3. TG changes in METS4 with defined hypertension (p = 0.003).](image)

![Figure 4. METS4 and LDL (p = 0.0002).](image)

![Figure 5. TG changes in METS4 (p = 0.003).](image)
The severity of atherotrombotic lesions was quantified by a multiple regression model, depending on the following variables: BMI, BP – normal/high, fasting TG and fasting plasma glucose. Thus, these parameters had a powerful correlation with the severity of atherotrombotic lesions in coronary men with mono and bivascular coronary lesions ($R^2 = 0.33$ and 0.36, respectively). (Fig. 6)

<table>
<thead>
<tr>
<th>R square ($R^2$) in coronary patients with CABG</th>
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<tbody>
<tr>
<td>(BMI, high-normal BP, fasting TG, fasting plasma glucose)</td>
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<tr>
<td>Coronary patients (men ≥ 55 years) n = 121</td>
</tr>
<tr>
<td>Univascular</td>
</tr>
<tr>
<td>Bivascular</td>
</tr>
<tr>
<td>Multivascular</td>
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Figure 6. R square in coronary patients with CABG.

DISCUSSIONS

Metabolic syndrome in the apparently healthy population but also in those with different localization of atherotrombotic vascular disease, alters the prognostic and doubles the risk for fatal or non-fatal cardiovascular events.1,3,5

In the coronary patients, METS prevalence defined by 3 criteria (ATPIII) was of 45% in SMART study and of 43% in our study.1,2

The studied lot, characterized by a high incidence of abdominal obesity, BP and hypertriglyceridaemia also presented severe coronary lesions, correlated with the dismetabolic status.

The natural question in this context would be: which of the coronary patients with METS has the highest risk?26 Some answers ought to be kept in mind:

a. Dyslipidemia is an early and constant component of the insulin-resistance, therefore dyslipidemia and metabolic syndrome should be considered as an inseparable couple responsible for the frequency of vascular complications.7,9

b. In subjects followed for up to 10 years after CABG, survival is inversely correlated with the number of risk factors composing the “deadly quartet” (obesity, hypertension, diabetes, hypertriglyceridaemia), relatively close to the metabolic syndrome definition.10,11 It has been shown that survival after CABG decreases with the number of metabolic syndrome components present in a single patient.12,15

CONCLUSIONS

1. In patients with CABG, the presence of METS was in relation with severe vascular damage.

2. Adding other risk factors to the four METS analyzed components, increases the severity of coronary artery disease (CAD).

3. In patients with CAD, the presence of both high fasting triglyceride levels and other major risk factors may be considered as an indicator of high vascular risk.

REFERENCES


