Impact of metabolic syndrome and its components on clinical severity and long-term prognosis in patients with premature myocardial infarction

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Background: Metabolic syndrome (MetS) is involved in the occurrence, development and prognosis of cardiovascular diseases, especially acute myocardial infarction (AMI). In recent years, the trend of AMI at a younger age has gradually attracted people's attention. Relevant studies have confirmed that MetS affects the prognosis of people aged ≥45 with AMI. However, there is still a lack of research on MetS in people with premature myocardial infarction (PMI).

Purpose: To explore the impact of MetS and its components on clinical severity and long-term prognosis in PMI patients.

Methods: 772 Patients with AMI who aged ≤45 years old from 2015 to 2020 in a hospital were enrolled. The patients were divided into MetS group (n=417) and non-MetS group (n=355) according to the criteria proposed by NCEP ATP III in 2005 (Any 3 of the following 5): 1) Hypertension: BP ≥130/85 mmHg or consistent hypertensive patients undergoing treatment; 2) Hypertriglyceridemia: fasting plasma triglyceride ≥1.7 mmol/L; 3) Fasting HDL-C <1.0 mmol/L in men and <1.3 mmol/L in women. 4) Hyperglycemia: fasting blood glucose level ≥6.1 mmol/L or known diabetic patients undergoing treatment; 5) Central obesity: BMI ≥28.0 kg/m². Patients were followed for median of 42 months for major adverse cardiovascular events (MACE). The parameters of clinical severity were compared using logistic regression analysis. Cox regression were used to analyze the relationship between MetS and its components and prognosis.

Results: A total of 772 patients were included in the analysis. Hyperglycemia was associated with multi-vessel disease (OR=1.700, 95% CI 1.172–2.464, P=0.005) and Syntax score ≥33 (OR=2.736, 95% CI 1.241–6.032, P=0.013). Increased MACE were observed in the MetS group (17.9% vs 10.3%, P=0.004) after 42 months follow-up. The Kaplan-Meier curve also showed significant differences (P<0.001). MetS was an independent risk factor for MACE (HR=2.181, 95% CI 1.392–3.418, P=0.001). Of each component of the definition, BMI ≥28.0 kg/m² (HR=2.047, 95% CI 1.229–3.410, P=0.006) and hyperglycemia (HR=2.911, 95% CI 1.850–4.580, P<0.001) were independent risk factors for MACE.

Conclusions: In patients with PMI, (1) hyperglycemia usually indicates more severe lesions; (2) MetS as a whole was an independent risk factor for MACE; (3) Of each component of the MetS, BMI ≥28.0 kg/m² and hyperglycemia were associated with MACE.

Figure 1. Multivariate logistic regression analysis of MetS and its components on PMI severity. (A) Logistic regression analysis of MetS on multi-vessel disease. (B) Logistic regression analysis of MetS on Syntax score ≥33.

Figure 2. MetS and PMI prognosis. (A) The Kaplan-Meier curve between MetS group and non-MetS group. (B) Multivariate Cox regression analysis of MACE.