CLINICAL AND BIOCHEMICAL EVALUATION OF ATRIAL FIBRILLATION RISK IN INDIVIDUALS WITH METABOLIC SYNDROME

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Abstract. *Metabolic syndrome (MetS) increases the risk of atrial fibrillation (AF). This study assessed 40 patients with MetS and AF to identify risk factors and guide management.*

Clinical evaluation included BMI, blood pressure, glucose tolerance, and ECG.

Laboratory tests measured lipid profile and 24-hour urinary catecholamines, and hemostatic parameters were assessed. Risk scores (CHA2DS2-VASc, CHARGE-AF, HAS-BLED) were calculated. Results showed high prevalence of obesity, hypertension, dyslipidemia, and elevated catecholamines. Significant correlations were found between MetS components and AF risk scores. Comprehensive assessment enables targeted interventions to prevent AF development in MetS patients.

Keywords: *Metabolic syndrome, Atrial fibrillation, Risk assessment, CHA2DS2-VASc, Lipid profile, Hemostasis.*

Introduction. Metabolic syndrome (MetS) is a combination of metabolic disorders including obesity, hypertension, dysglycemia, and dyslipidemia, which significantly increase cardiovascular risk. Among these complications, atrial fibrillation (AF) is a common arrhythmia associated with morbidity and mortality.

Early identification of patients with MetS at risk for AF and targeted management are essential to prevent disease progression and reduce complications [1, 2]. This study aimed to evaluate the risk factors for AF development in patients with MetS and to implement appropriate management strategies.

Materials and methods. The study included 40 patients diagnosed with metabolic syndrome and atrial fibrillation. All participants underwent a comprehensive clinical evaluation, which included measurement of body mass index, blood pressure, and glucose tolerance, as well as electrocardiographic examination. Laboratory assessments were performed to determine the plasma lipid profile, and 24-hour urinary excretion of adrenaline and noradrenaline was measured using enzyme-linked immunosorbent assay.

Hemostatic parameters, including prothrombin time, international normalized ratio, and fibrinolytic system activity, were evaluated using standard biochemical methods. Additionally, risk stratification was conducted using the CHA2DS2-VASc, CHARGE-AF, and HAS-BLED scoring systems, and correlations between primary metabolic mediators and components of metabolic syndrome were analyzed to identify potential targets for intervention.

Results. Among the 40 patients (22 males, 18 females), the mean age was 56.3 ± 8.5 years.

Average BMI was 32.7 ± 3.5 kg/m², and mean systolic/diastolic blood pressure was 138 ± 12 / 86 ± 8 mmHg. Impaired glucose tolerance was detected in 28 patients (70%).Lipid profile analysis showed elevated total cholesterol in 26 patients (65%), LDL cholesterol in 24 patients (60%), triglycerides in 30 patients (75%), and reduced HDL in 22 patients (55%).

24-hour urinary catecholamine analysis revealed increased adrenaline excretion in 18 patients (45%) and noradrenaline in 21 patients (52.5%).

Hemostatic assessment indicated prolonged PT in 5 patients (12.5%) and elevated INR in 3 patients (7.5%). Fibrinolytic system evaluation showed mild dysregulation in 10 patients (25%).

Risk scoring identified high thromboembolic risk (CHA2DS2-VASc ≥2) in 32 patients (80%), elevated AF risk per CHARGE-AF in 28 patients (70%), and increased bleeding risk (HAS-BLED ≥3) in 6 patients (15%).

Correlation analysis demonstrated significant associations between BMI, triglyceride levels, catecholamine excretion, and AF risk scores ($p<0.05$), suggesting interrelated metabolic and neurohormonal contributions to AF development in MetS patients.

Discussion. In this study of 40 patients with metabolic syndrome, multiple interrelated risk factors for atrial fibrillation were identified, including obesity, hypertension, impaired glucose tolerance, and dyslipidemia. Elevated urinary catecholamines suggest increased sympathetic activity contributing to arrhythmogenesis.

Risk assessment using CHA2DS2-VASc, CHARGE-AF, and HAS-BLED scores highlighted patients at high thromboembolic and bleeding risk. Correlations between metabolic components and AF risk scores indicate that metabolic and neurohormonal factors interact to increase AF susceptibility.

These findings emphasize the importance of comprehensive evaluation and targeted interventions to prevent AF development in patients with metabolic syndrome.

Conclusion. In patients with metabolic syndrome, comprehensive clinical, biochemical, and hemostatic assessment enables effective evaluation of atrial fibrillation risk. Among the 40 patients studied, significant correlations between MetS components and primary mediators were observed, providing a basis for individualized management aimed at preventing AF and improving outcomes.

References:

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