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Association of Prediabetes and Obesity with Systemic Inflammation Markers in Patients with Atrial Fibrillation

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Introduction: Atrial fibrillation is associated with certain metabolic disorders, such as diabetes, prediabetes, and obesity. These conditions are associated with metabolic alterations that may be accompanied by changes in the systemic inflammatory response.[1,2] The aim of this study was to investigate differences in selected systemic inflammation indices between individuals with normoglycemia, prediabetes, and diabetes, as well as between groups classified according to body mass index (BMI: 25–29.9 kg/m², overweight; BMI ≥ 30 kg/m², obesity).

Patients and Methods: Data from 208 patients with atrial fibrillation were analyzed. The patients were classified into normoglycemia, prediabetes, and diabetes groups and separately categorized according to BMI as overweight or obese. The systemic inflammation indices SIRI, SII, NLR, PLR, LMR, and AISI, Castelli Risk Indices I and II, and the AST/ALT ratio were compared. Differences between groups were assessed using one-way analysis of variance (ANOVA), with the homogeneity of variances evaluated using Levene's test.

Results: The prediabetes group exhibited the highest mean values of the inflammatory indices SIRI, SII, NLR, PLR, and AISI compared with the normoglycemia and type 2 diabetes groups (**Table 1**). According to BMI classification, the obesity group had higher mean values of the same indices than the overweight group (**Table 2**). However, the differences in the analyzed indices between the groups did not reach statistical significance ($p > 0.05$).

TABLE 1. Inflammatory indices according to glycemic status.

Inflammatory index	Normoglycemia (n = 89), M ± SD	Prediabetes (n = 96), M ± SD	Diabetes (n = 20), M ± SD	p-value
SIRI	1.648 ± 1.113	1.863 ± 1.268	1.499 ± 0.796	0.292
SII	618.718 ± 394.364	692.064 ± 481.126	481.404 ± 166.099	0.109
NLR	2.615 ± 1.473	2.873 ± 1.735	2.198 ± 0.825	0.173
PLR	138.453 ± 60.195	144.069 ± 70.992	116.594 ± 30.121	0.214
LMR	3.320 ± 1.451	3.152 ± 1.494	3.307 ± 1.322	0.720
AISI	390.367 ± 281.637	446.566 ± 326.473	332.032 ± 168.140	0.199

p-values were obtained using one-way analysis of variance (ANOVA)

Abbreviations: SIRI – Systemic Inflammation Response Index, SII – Systemic Immune-Inflammation Index, NLR – Neutrophil-to-Lymphocyte Ratio, PLR – Platelet-to-Lymphocyte Ratio, LMR – Lymphocyte-to-Monocyte Ratio, AISI – Aggregate Index of Systemic Inflammation, M – Mean, SD – Standard Deviation, BMI – Body Mass Index, p – p-value (statistical significance), n – Number of participants in the group.

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TABLE 2. Inflammatory indices according to body mass index category.

Inflammatory index	Overweight (n = 106), M ± SD	Obesity (n = 102), M ± SD	p-value
SIRI	1.658 ± 1.093	1.807 ± 1.224	0.354
SII	596.705 ± 374.625	683.979 ± 466.413	0.138
NLR	2.574 ± 1.410	2.817 ± 1.685	0.260
PLR	132.788 ± 57.285	145.411 ± 69.218	0.153
LMR	3.304 ± 1.405	3.177 ± 1.498	0.530
AISI	384.728 ± 269.933	436.262 ± 317.091	0.208

p-values were obtained using one-way analysis of variance (ANOVA).

Abbreviations: SIRI – Systemic Inflammation Response Index, SII – Systemic Immune-Inflammation Index, NLR – Neutrophil-to-Lymphocyte Ratio, PLR – Platelet-to-Lymphocyte Ratio, LMR – Lymphocyte-to-Monocyte Ratio, AISI – Aggregate Index of Systemic Inflammation, M – Mean, SD – Standard Deviation, p – p-value (statistical significance), n – Number of participants in the group.

Conclusion: The results revealed certain descriptive differences in systemic inflammation indices between the groups studied, particularly among individuals with prediabetes and obesity. However, no statistically significant differences in the analyzed indices were found between the groups. Further studies controlling for potential confounding factors are needed to clarify the association between impaired glucose regulation and obesity and markers of systemic inflammation.

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