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FUNCTIONAL STATUS IN PATIENTS WITH CHRONIC ISCHEMIC HEART DISEASE AND OBESITY USING COMORBIDITY SCALES

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Abstract. The study is to analyze the relationship between coronary artery calcification (CAC), epicardial fat thickness (EFT), and polymorbidity in patients with chronic ischemic heart disease (CIHD) and obesity, as well as to assess their impact on the functional status of patients using various comorbidity scales. The study included 110 patients aged 45–72 years with CIHD and obesity, with measurements of coronary artery calcium index (CAC), epicardial fat thickness (EFT), and various inflammatory biomarkers. It was found that with an increase in CAC and EFT, there was a rise in inflammatory markers and polymorbidity, which was associated with a deterioration in the functional status of patients. The use of comorbidity scales (CIRS, FCI, KFI) in combination with CAC and EFT data allows for more accurate prediction of cardiovascular complications and effective risk management in such patients.

Keywords: coronary Artery Calcification, Epicardial Fat Thickness, Polymorbidity, Chronic Ischemic Heart Disease, Obesity, Comorbidity Scales, Functional Status.

Аннотация. Анализ взаимосвязи коронарного кальциноза (КИ), эпикардального жира (ЭЖТ) и полиморбидности у пациентов с хронической ишемической болезнью сердца (ХИБС) и ожирением, а также оценка их влияния на функциональное состояние пациентов с использованием различных шкал коморбидности. В исследование были включены 110 пациентов в возрасте 45-72 лет с ХИБС и ожирением, у которых были измерены показатели кальциевого индекса коронарных артерий (КИ), толщины ЭЖТ, а также различные биомаркеры воспаления. Было выявлено, что с увеличением КИ и толщины ЭЖТ наблюдается повышение уровня воспалительных маркеров, а также увеличение полиморбидности, что связано с ухудшением функционального состояния пациентов. Применение шкал коморбидности (CIRS, FCI, KFI) в сочетании с данными о КИ и ЭЖТ позволяет более точно прогнозировать сердечно-сосудистые осложнения и эффективно управлять рисками у таких пациентов.

Ключевые слова: коронарный кальциноз, Эпикардальный жир, Полиморбидность, Хроническая ишемическая болезнь сердца, Ожирение, Шкалы коморбидности, Функциональное состояние.

Annotatsiya. Koronar arteriyalar kalsinozi (KAK), epikardial yog‘ to‘qimasi (EYT) va polimorbidlikning surunkali yurak ishemik kasalligi (SYuIK) va semizlik bilan xastalangan bemorlardagi o‘zaro bog‘liqligini, shuningdek, bemorlarning funksional holatiga ta‘sirini turli komorbidlik shkalalari yordamida baholashdir. Tadqiqotga 45-72 yoshdagi 110 bemor kiritilgan bo‘lib, ular bilan koronar arteriyalardagi kalsinozni (KAK), epikardial yog‘ to‘qimasining qalinligini (EYT) va yallig‘lanish biomarkerlari o‘rganildi. KAK va EYT darajasi ortib borishi bilan yallig‘lanish markerlari va polimorbidlikning ortishi kuzatildi, bu esa bemorlarning funksional holatining yomonlashuvi bilan bog‘liq bo‘ldi. CIRS, FCI, KFI kabi komorbidlik shkalalarini KAK va EYT ma‘lumotlari bilan birgalikda qo‘llash yurak-qon tomir

kasalliklarining asoratlarini aniqroq prognoz qilish va bunday bemorlarda xavfni samarali boshqarish imkonini beradi.

***Kalit so‘zlar:** koronar arteriya kalsinozi, Epikardial yog‘ to‘qimasi, Polimorbidlik, Surunkali ishemik yurak kasalligi, Semizlik, Komorbidlik shkalalari, Funksional holat.*

Introduction. Chronic ischemic heart disease (CIHD) and obesity are major contributors to the global burden of cardiovascular disease. CIHD, a consequence of prolonged coronary artery disease, often coexists with obesity, a key risk factor for cardiovascular morbidity. The relationship between coronary artery calcification (CAC), epicardial fat thickness (EFT), and cardiovascular complications is becoming increasingly recognized. Furthermore, polymorbidity, characterized by multiple concurrent health issues, complicates the management of these patients. This study aims to examine the role of CAC, EFT, comorbidity scales, and coronary artery involvement in predicting cardiovascular risk in patients with CIHD and obesity [1,2,4].

Chronic ischemic heart disease (CIHD) and obesity are two major cardiovascular conditions that are highly prevalent worldwide and significantly contribute to the burden of heart-related morbidity and mortality. The interplay between obesity and cardiovascular diseases, especially CIHD, has been well established, with both conditions contributing to the acceleration of atherosclerosis, endothelial dysfunction, and inflammatory processes that promote the development of coronary artery disease (CAD). In recent years, significant attention has been focused on biomarkers and imaging techniques that can help identify at-risk individuals and predict cardiovascular events before they manifest clinically [1,7].

Coronary artery calcification (CAC) and epicardial fat thickness (EFT) are two critical factors in assessing cardiovascular risk, especially in patients with CIHD and obesity. CAC, a marker of coronary atherosclerosis, is often used in imaging studies to quantify the extent of calcification in the coronary arteries, providing a reliable indicator of atherosclerotic burden. Epicardial fat, on the other hand, is a visceral fat depot surrounding the heart that has been shown to have direct pathological effects on coronary arteries. The relationship between these two factors - CAC and EFT - has been the subject of considerable research. Studies have suggested that the presence of excess epicardial fat is associated with greater coronary artery calcification, endothelial dysfunction, and increased risk of adverse cardiovascular events [2,4,6].

Polymorbidity, defined as the presence of multiple chronic conditions, is another critical aspect that complicates the clinical management of patients with CIHD and obesity. The presence of multiple comorbidities often worsens the prognosis and impairs functional capacity, making it more challenging to treat these patients effectively. Comprehensive tools, such as the Cumulative Illness Rating Scale (CIRS), Functional Comorbidity Index (FCI), and Kaplan–Feinstein Index (KFI), are commonly used to assess the burden of comorbidity and predict clinical outcomes in these patients [3,5,7].

Aim. The goal of this study is to explore the interrelationship between coronary artery calcification, epicardial fat thickness, comorbidity, and functional status in patients with CIHD and obesity. We aim to assess the role of CAC and EFT in predicting cardiovascular risk, determine the impact of comorbid conditions on functional status, and evaluate the utility of combining imaging data with clinical scales to predict adverse cardiovascular events.

Materials and Methods. The study involved 110 patients aged between 45 and 72 years, all diagnosed with chronic ischemic heart disease (CIHD), confirmed by clinical and

instrumental methods, with stable angina (functional class I-III). A key inclusion criterion was the presence of obesity, defined by a body mass index (BMI) ≥ 30 kg/m².

Methods:

1. MSCT (Multislice Computed Tomography):

- Assessment of coronary artery calcium index (CAC).
- Measurement of epicardial fat thickness (EFT).
- Determination of Segment Involvement Score (SIS) for coronary artery involvement.

2. Comorbidity Scales:

- Cumulative Illness Rating Scale (CIRS): For analysis of systemic polymorbidity.
- Functional Comorbidity Index (FCI): To assess functional limitations.
- Kaplan–Feinstein Index (KFI): To identify dominant pathologies.
- Framingham 10-year Risk: For predicting cardiovascular events.

Patients were divided into three groups based on the CAC levels determined by MSCT:

- Group 1: No coronary calcification (CAC = 0), n = 20.
- Group 2: Moderate coronary calcification (CAC = 1–100), n = 45.
- Group 3: High coronary calcification (CAC >100), n = 45.

Results. The clinical characteristics of patients depending on the level of the CAC includes age, body mass index (BMI), epicardial fat thickness, and the SIS (Shunting Index) for three groups of patients with different levels of CAC: Patients with >100 have an older age (60.5 ± 7.4 years) compared to patients with CAC 1-100 (57.4 ± 5.2 years) and CAC = 0 (53.1 ± 3.9 years). The difference is statistically significant with a p-value <0.01. Body Mass Index (BMI, kg/m²): Patients with a higher CAC (CAC >100) also have a higher BMI (36.1 ± 5.1 kg/m²), which is significantly different from patients with CAC 1-100 (34.9 ± 4.8 kg/m²). The difference between groups is significant (p < 0.05). In the CAC = 0 group, the BMI is the lowest (32.9 ± 3.8 kg/m²), indicating a lower level of obesity and possibly a reduced risk of cardiovascular diseases compared to higher CAC levels. Epicardial Fat Thickness (mm): Patients with CAC >100 show the greatest epicardial fat thickness (8.5 ± 2.3 mm), which is significantly higher compared to the other groups. The difference between groups is highly statistically significant (p < 0.001). SIS (points): Patients with a higher CAC have a higher SIS. For patients with CAC >100, the SIS value is 10.2 ± 2.8 points, which is significantly higher than in the other groups (p < 0.001).

The average scores on the comorbidity scales (CIRS, FCI, and KFI) increased with higher CAC values, indicating more pronounced systemic disturbances and functional limitations in patients with high levels of coronary calcification. (table-1)

Table 1.

Scores the comorbidity scales of patients with CIHD and obesity

Scale	CAC = 0 (n=20)	CAC 1–100 (n=45)	CAC >100 (n=45)	p-value
CIRS (points)	5.8 ± 1.2	8.9 ± 1.4	12.1 ± 2.1	<0.001
FCI (points)	2.1 ± 1.0	3.7 ± 1.2	5.4 ± 1.3	<0.001
KFI (points)	1.8 ± 0.7	2.5 ± 0.8	3.4 ± 1.0	<0.001

The table presents the results of the correlation analysis between coronary artery calcification (CAC) and epicardial fat thickness (EFT), as well as other clinical parameters: the CIRS and the FCI index.

Indicating a strong and statistically significant positive correlation between coronary artery calcification (CAC) and epicardial fat thickness (EFT) is 0.72 with a p-value <0.001. This suggests that as the thickness of epicardial fat increases, the degree of coronary artery calcification also increases. The correlation coefficient is 0.78 with a p-value <0.001, indicating a strong and statistically significant positive relationship between coronary artery calcification (CAC) and the CIRS index may imply that as the degree of coronary artery calcification increases, the overall CIRS, which considers the condition of various organs and systems, also increases. Between coronary artery calcification CAC and the index FCI (0.72 with a p-value <0.001) are a statistically significant positive relationship.

In summary, the results of the table-2 confirm that the degree of coronary artery calcification (CAC) has strong positive correlations with epicardial fat thickness, the CIRS and FCI, highlighting the importance of these parameters in assessing cardiovascular health and overall well-being.

Table 2

Correlation analysis CAC and EFT

Parameters Correlation	Coefficient (r)	p-value
CAC and EFT	0.72	<0.001
CAC and CIRS	0.78	<0.001
CAC and FCI	0.72	<0.001

Discussion. The integration of the Segment Involvement Score (SIS) significantly enhances the assessment of coronary artery involvement. SIS provides a clear indication of the extent of coronary artery damage, which is crucial for understanding the severity of coronary atherosclerosis and its potential complications. This study highlights the importance of including SIS as part of a comprehensive risk assessment model for patients with chronic ischemic heart disease (CIHD) and obesity.

Thus, the level of CI increases, several clinical indicators worsen, which is confirmed by statistically significant differences between the groups.

Moreover, the results demonstrate the strong predictive value of comorbidity scales (CIRS, FCI, KFI) when combined with coronary calcium scoring and epicardial fat thickness (EFT). These scales not only reflect the burden of comorbidities but also help in evaluating functional limitations and overall health status, which are essential factors in managing patients with multiple health problems.

The study also underlines the relevance of the Framingham 10-year risk model in predicting future cardiovascular events, but its integration with the SIS and comorbidity scales provides a more robust approach for identifying high-risk patients who might benefit from intensive therapeutic interventions.

Conclusion.

1. Patients with high coronary artery calcification (>100) have significantly increased epicardial fat thickness and more severe polymorbidity. These factors contribute to the progression of cardiovascular disease and highlight the need for early intervention.

2. The application of comorbidity scales, including CIRS, FCI, and KFI, in combination with MSCT-derived data on coronary artery calcification and epicardial fat thickness, improves

the prediction of cardiovascular complications in patients with chronic ischemic heart disease and obesity. These tools offer a more comprehensive approach to managing patients at risk.

3. Early detection of patients at high risk of cardiovascular complications through the integration of predictive scales and clinical data allows for timely adjustments to therapeutic strategies. This can reduce the likelihood of acute cardiovascular events such as myocardial infarction or stroke.

REFERENCES

1. Ayton, S.L., Gulsin G.S., McCann G.P., Moss A.J. Epicardial Adipose Tissue in Obesity-Related Cardiac Dysfunction. *Heart* 2022, 108, p339–344.
2. Chen L.Q., Scheiner J. Epicardial fat modifies the relationship between coronary calcium score and all-cause mortality: The St. Francis Heart Study *American Journal of Preventive Cardiology* 2024. p2-7. doi: 10.1016/j.ajpc.2024.100689
3. Fox K.A., Metra, M. The Myth of ‘Stable’ Coronary Artery Disease. *Nat. Rev. Cardiol.* 2020, 17, p9–21. doi.org/10.1038/s41569-019-0233-y
4. Guglielmo M., Lin A. Epicardial fat and coronary artery disease: Role of cardiac imaging *Atherosclerosis* 2021. 321. p 30-38.
5. Lee K.S., Park D, Relationship between comorbidity and health outcomes in patients with heart failure: a systematic review and meta-analysis *BMC Cardiovascular Disorders* 2023. 23. 498-506 doi.org/10.1186/s12872-023-03527-x
6. Sakers, A., Siqueira, M.K. Adipose-Tissue Plasticity in Health and Disease. *Cell* 2022, 185, p419–446. doi.org/10.1016/j.cell.2021.12.016
7. Wang Q., Chen J.Chi., Wang Ch., Yang Y., Tian R. Chen X. Epicardial Adipose Tissue in Patients with Coronary Artery Disease: A Meta-Analysis *Journal of Cardiovascular Development and Disease* 2022. 9(8). p2-14 doi.org/10.3390/jcdd9080253

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