Epicardial fat tissue may predict new-onset atrial fibrillation in patients with non-ST-segment elevation myocardial infarction

ST segment yükselmessiz miyokart enfarktüsü olan hastalarda epikardiyal yağ dokusu yeni başlangıçlı atriyal fibrilasyonu öngördürebilir

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ABSTRACT

Objective: In recent years, epicardial fat tissue (EFT) has been found to be strongly associated with the development of atrial fibrillation (AF). It was also reported to be a predictor of cardiac arrhythmias in different clinical situations. However, in the current literature, the role of EFT thickness in the development of AF in patients with non-ST-segment elevation myocardial infarction (NSTEMI) has not been studied. In this study, we aimed to investigate the relationship between EFT thickness and the development of new-onset AF in patients with NSTEMI during in-hospital follow-up.

Methods: We enrolled 493 consecutive patients who were diagnosed NSTEMI in this study. During in-hospital follow-up, 68 patients developed AF, and the remaining 425 patients were determined as the control group. The thrombolysis in myocardial infarction (TIMI) risk score for NSTEMI was calculated. All clinical, echocardiographic, and laboratory parameters were compared between the 2 groups.

Results: EFT thickness was higher in the AF group than in the controls (p<0.001). The TIMI risk scores were higher in the AF group (p<0.001). Logistic regression analysis demonstrated that EFT was an independent determinant for the development of AF (odds ratio 3.521, 95% confidence interval 1.616-6.314, p<0.001).

Conclusion: Incident AF was observed more frequently in patients with NSTEMI and higher EFT thickness. EFT was an important determinant of AF in patients with NSTEMI.

ÖZET

Amaç: Son yıllarda, epikardiyal yağ dokusu (EFT) ile atriyal fibrilasyon (AF) gelişimi arasında güçlü bir ilişki bulunmaktadır. Ayrıca farklı klinik durumlarda EFT’nin kardiyak artımı gelişi için bir prediktör olduğunu göstermiştir. Bununla birlikte, mevcut literatürde ST segment yükselmessiz miyokart enfarktüsü (NSTEMI) olan hastalarda AF’nin gelişiminde EFT kalınlığının rolü çalışılmamıştır. Bu çalışmada NSTEMI’li hastalarda EFT kalınlığı ile hastanede takip sırasında yeni başlangıçlı AF gelişi arasındaki ilişiyi araştırmayı amaçladık.

Yöntemler: Bu çalışmaya NSTEMI tanıları konmuş 493 ardişık hasta dahil etik. Hastanın iç izlemde 68 hastada AF gelişti ve kalan 425 hasta kontrol grubu olarak belirlendi. NSTEMI için miyokart enfarktüsüne tromboliz (TIMI) risk skoru hesaplandı. Tüm klinik, ekokardiyografik ve laboratuvar parametreler iki grup arasında karşılaştırıldı.

Bulgular: AF grubunda kontollere göre EFT kalınlığı daha yüksek (p<0.001). AF grubunda TIMI risk skoru daha yüksek (p<0.001). Lojistik regresyon analizi, EFT’nin AF gelişi için bağımsız belirleyici olduğunu gösterdi (OR: 3.521, %95 CI 1.616-6.314, p<0.001).

Sonuç: EFT kalınlığı daha yüksek olan NSTEMI hastalarında AF ortaya çıkışı daha sık gözlenmiştir. EFT, NSTEMI hastalarında AF’nin önemli bir belirleyicisidir.
New-onset atrial fibrillation (AF) is a common complication of non-ST-segment elevation myocardial infarction (NSTEMI), and its incidence varies between 9.4% and 37% according to the type of study group, diagnostic method, and treatment modality used. Previous studies have revealed that AF development in patients with NSTEMI was associated with worsened short- and long-term prognosis. Several clinical parameters were found to be associated with AF development, including hypertension (HT), diabetes mellitus (DM), older age, female gender, number of diseased vessels, and reduced left ventricular fraction. Epicardial fat tissue (EFT) is defined as the fat tissue located between the myocardium and visceral pericardium. Previous clinical studies have shown a strong relationship between EFT thickness and AF development. EFT secretes hormones such as proinflammatory and anti-inflammatory cytokines (adipokine) like an endocrine organ. Adiponectin is an adipokine secreted by EFT that has anti-inflammatory and anti-atherogenic properties. Adiponectin levels are reduced in different pathologic conditions, including ischemic heart disease, and it has also been shown that adiponectin levels predicted development of AF. However, there is limited data regarding the relationship between EFT and AF development in the setting of NSTEMI. In this study, we aimed to investigate the relationship between EFT thickness and the development of new-onset AF in patients with NSTEMI during in-hospital follow-up.

METHODS

Study group

This study was designed as a cross-sectional and retrospective study. A total of 493 consecutive patients with NSTEMI (303 men, mean age: 61±13 years) who underwent coronary angiography between February 2016 and October 2019 were enrolled in the study. Patients with a chronic kidney disease; a history of coronary heart disease; previous stroke; valvular heart diseases; heart failure; a history of atrial fibrillation; a neoplastic, inflammatory, hepatic, or kidney disease; renal dysfunction; disabling diseases such as dementia and inability to cooperate; and poor echocardiographic quality were not included. Furthermore, patients who were admitted with cardiogenic shock and received inotropic agents, which could induce AF, were excluded from the study. All the patients provided written informed consent, and the protocol of study was approved by the Ethics Committee of Istanbul Fatih Sultan Mehmet Training and Research Hospital (Approval Date: April 27, 2020; Approval Number: 2020/6150) in accordance with the Declaration of Helsinki and Good Clinical Practice guidelines.

Definitions and laboratory measurements

Admission blood samples were used for laboratory assessment. The baseline clinical characteristics and risk factors for coronary artery disease (CAD), including age, sex, smoking history, HT, and DM, were collected. AF was defined as any episode of atrial fibrillation during the hospital stay after myocardial infarction. According to the current guidelines, NSTEMI was defined by the elevation of cardiac enzymes to more than the upper limit of normal in patients with ischemic symptoms but without ST-segment elevation or left bundle branch block. Coronary angiography was performed with the Judkins technique via the physician’s preferred access site. Conventional coronary angiograms were recorded in multiple projections for the left and right coronary arteries and reviewed for significant coronary artery obstructions (defined as >70% diameter stenosis in major coronary arteries) by 2 cardiologists.

Thrombolysis in myocardial infarction (TIMI) risk score

The TIMI risk score was calculated for each patient by combining the data from the medical history, electrocardiogram (ECG), and laboratory parameters on admission. A total score of 0–7 was possible according to the presence of the following characteristics: age >65 years, existence of ≥3 classic risk factors.

Abbreviations:

| Abbreviation | Description |
|--------------|-------------|
| AF | Atrial fibrillation |
| AV | Atrioventricular |
| BMI | Body mass index |
| CAD | Coronary artery disease |
| CI | Confidence interval |
| CT | Computed tomography |
| DM | Diabetes mellitus |
| EAT | Epicardial adipose tissue |
| ECG | Electrocardiogram |
| EFT | Epicardial fat tissue |
| IV | Interventricular |
| LV | Left ventricle |
| LVEF | LV ejection fraction |
| MRI | Magnetic resonance imaging |
| NSTEMI | Non-ST-segment elevation myocardial infarction |
| OR | Odds ratio |
| TIMI | Thrombolysis in myocardial infarction |
| TTE | Transthoracic echocardiography |

Coronary angiography was performed with the Judkins technique via the physician’s preferred access site. Conventional coronary angiograms were recorded in multiple projections for the left and right coronary arteries and reviewed for significant coronary artery obstructions (defined as >70% diameter stenosis in major coronary arteries) by 2 cardiologists.
(HT, hypercholesterolemia, DM, smoking, or family history of ischemic heart disease), previous significant CAD (stenosis of ≥50%), taking aspirin in the last 7 days, at least 2 episodes of angina within the previous 24 hours, elevation of cardiac necrosis markers, and ST deviations of at least 0.5 mm.[14]

**ECG**

Twelve-lead ECG was performed at 25 mm/s paper speed, with a 0.16-100 Hz filter range and 10 mm/mV height, in all the patients in the supine position. ECG was taken at the time of admission and at 6-hour intervals. Patients with ST elevation were not included in the study. The patients were divided into 2 groups as AF group and controls according to the development of AF during hospitalization. All clinical, demographic, echocardiographic, and laboratory parameters were compared between the AF group and controls.

**Echocardiography**

Transthoracic echocardiography (TTE) was performed according to the European Association of Cardiovascular Imaging and American Society of Echocardiography guidelines at the time of admission.[15] Two-dimensional, pulsed, and continuous wave tissue Doppler and color Doppler evaluations were performed. Left atrium size, interventricular septal thickness, posterior wall thickness, and left ventricle (LV) end-diastolic and end-systolic dimensions were measured in M-mode. During apical 4-chamber imaging, the transmitral flow waves (E and A velocities) were measured. Em wave was measured using tissue Doppler, and E/e′ was calculated. The LV ejection fraction (LVEF) was calculated using Biplane Simpson’s method.[15]

**EFT measurement**

Echocardiographic assessment of EFT thickness was performed as described by Iacobellis.[6] The measurement of EFT thickness was performed using TTE from a parasternal long-axis view on the right ventricle’s free wall at end-diastole, and the greatest perpendicular distance to the aortic annulus was achieved and averaged over 3 cardiac cycles.[6] In the parasternal long-axis window, hypoechoic space on the right ventricular free wall was defined as EFT (Figure 1).[16] The intra-observer correlation coefficient was 0.956. EFT thickness can be measured by transthoracic echocardiography, cardiac computed tomography (CT), and cardiac magnetic resonance imaging (MRI) methods. EFT thickness measurement by echocardiography has been first validated by Iacobellis et al.,[16] who reported a good correlation between MRI and echocardiographic measurements of epicardial fat. An echocardiographic study found a significant correlation between EFT in the parasternal long- and short-axis views and LV mass.[16] If measurements by the 2 investigators differed by >5% for any of the variables, the patient was excluded; if the difference was <5%, the measurements were averaged.

**Statistical analysis**

Continuous variables were expressed as mean±standard deviation, whereas categorical variables were expressed as percentage. The chi-square or Fisher exact tests were used for comparison of categorical data. The normality distribution of continuous variables was tested with the Kolmogorov-Smirnov test. Correlation of continuous variables was assessed by Pearson correlation test, and non-continuous variables were assessed by the Spearman test. Student t test or Mann-Whitney U test was used to compare continuous variables between the 2 groups. To identify the independent predictors of AF, multivariate logistic regression analysis was performed. A 2-sided p value of <0.05 was considered as significant. Data were analyzed using SPSS version 22.0 (IBM Corp., Armonk, NY, USA).

**RESULTS**

A total of 493 patients (303 [61%] men and 190 [39%] women with a mean age of 59.7±10.2 years) were in-
cluded in the study. During the follow-up, AF was observed in 68 (14%) patients. The baseline clinical and laboratory characteristics of the patients are shown in Table 1. There was no significant difference between the 2 groups in terms of age, gender, HT frequency, HL frequency, smoking status, family history of CAD, and body mass index (BMI). However, the frequency of DM was observed to be higher in patients with AF (p<0.001). Laboratory parameters were not found to be significantly different between the patient groups with and without AF, except for fasting blood glucose levels (Table 1). However, troponin-I value was observed to be significantly higher in patients with AF (p<0.001). Among the echocardiographic parameters, there was no difference between LVEF, left ventricular systolic and diastolic diameters, and left ventricular wall thickness. However, left atrial diameters were similar between the 2 groups (p=0.114) (Table 2). EFT thickness was higher in the AF group than in the control group (8.3±2.0 vs. 6.1±2.1, p<0.001). In addition, E/e’, which reflects left ventricular filling pressure, was found to be higher in the AF group (p<0.001). Patients with AF showed higher rates of multivessel disease (p=0.006). No difference was observed between the 2 groups in the number of patients who underwent percutaneous coronary intervention, bypass, or medical decision. In addition, the TIMI risk score was found to be significantly higher in the AF group (p<0.001). The univariate linear regression analysis showed that there was a positive correlation of EFT with TIMI risk score (Table 3).

### Table 1. Baseline characteristics and laboratory findings of study patients

| Parameters                      | AF     | Control | p     |
|---------------------------------|--------|---------|-------|
| **Demographic parameters**      |        |         |       |
| Age, years                      | 60.5±8.9 | 59.8±10.4 | 0.470 |
| Gender, male                    | 37 (54.4) | 238 (56) | 0.233 |
| HT                              | 35 (51.4) | 208 (48.9) | 0.176 |
| Hyperlipidemia                  | 29 (42.6) | 177 (41.4) | 0.131 |
| Smoking                         | 39 (57.3) | 232 (54.5) | 0.508 |
| DM                              | 27 (39.7) | 121 (28.4) | <0.001 |
| Body mass index (kg/m²)         | 29.7±4.6 | 29.3±4.3 | 0.233 |
| Family history                  | 18 (26.4) | 107 (25.1) | 0.432 |
| **Biochemical parameters**      |        |         |       |
| Glucose (mg/dL)                 | 125±32 | 112±17 | <0.001 |
| Troponin peak level (ng/mL)     | 4.3±1.2 | 2.7±0.6 | <0.001 |
| Hg (mg/dL)                      | 12.7±2.3 | 12.5±2.1 | 0.112 |
| Creatinine (mg/dL)              | 0.89±0.18 | 0.87±0.16 | 0.231 |
| Total cholesterol (mg/dL)       | 191±36 | 189±27 | 0.304 |
| Triglyceride (mg/dL)            | 161±67 | 158±45 | 0.239 |
| Low-density lipoprotein (mg/dL) | 120±25 | 118±21 | 0.129 |
| High-density lipoprotein (mg/dL)| 36±8 | 37±11 | 0.716 |
| White blood cell                | 11.3±3.1 | 11.1±3.2 | 0.102 |
| CRP                             | 1.28±0.53 | 1.13±0.41 | 0.097 |

### Table 2. Comparison of echocardiographic and angiographic findings of both groups

| Parameters                      | AF     | Control | p     |
|---------------------------------|--------|---------|-------|
| **Echocardiographic parameters**|        |         |       |
| Epicardial fat tissue thickness (mm) | 8.3±2.0 | 6.1±2.1 | <0.001 |
| LV ejection fraction (%)        | 59±5 | 61±5 | 0.422 |
| LV end-diastolic diameter (cm)  | 4.6±0.4 | 4.5±0.4 | 0.211 |
| LV end-systolic diameter (cm)   | 3.1±0.5 | 2.9±0.4 | 0.213 |
| Interventricular septal thickness (cm) | 0.86±0.06 | 0.84±0.07 | 0.211 |
| Posterior wall thickness (cm)   | 0.83±0.09 | 0.82±0.07 | 0.112 |
| Left atrial diameter (cm)       | 3.7±0.5 | 3.6±0.4 | 0.114 |
| E/e’                            | 9.1±1.2 | 5.5±0.9 | <0.001 |
| **Angiographic features**       |        |         |       |
| Number of coronary arteries with >70% stenosis | 44 (64.7) | 220 (51.7) | 0.006 |
| PCI decision                    | 51 (75.1) | 328 (77.1) | 0.312 |
| CABG decision                   | 8 (11.7) | 45 (10.6) | 0.561 |
| Medical decision                | 9 (13.2) | 52 (12.3) | 0.279 |
| TIMI risk score                 | 4.6±1.2 | 2.1±0.9 | <0.001 |

AF: atrial fibrillation; CRP: C-reactive protein; DM: diabetes mellitus; Hg: hemoglobin; HT: hypertension.

AF: atrial fibrillation; CABG: coronary artery bypass grafting; LV: left ventricle; PCI: percutaneous coronary intervention; TIMI: thrombolysis in myocardial infarction.
were the independent predictors of AF (Table 3). In receiver observing characteristic analysis, a cut-off point of 6.5 mm was the optimal for EFT thickness to predict the occurrence of new-onset AF (sensitivity 72%, specificity 77%, and area under curve 0.762; p<0.001) (Figure 2).

**DISCUSSION**

In this study, we focused on the potential relationship between EFT and the development of AF in patients with NSTEMI. Our results indicate that EFT thickness is independently associated with AF and may be a useful marker to predict AF in patients with NSTEMI. We also found that EFT thickness was associated with the TIMI risk score, which has a prognostic significance in NSTEMI. To our knowledge, this is the first study demonstrating the potential role of EFT in the development AF in patients with NSTEMI.

EFT covers 80% of the surface of the heart and constitutes 20% of its total weight. In contrast with subcutaneous fat tissue, EFT is metabolically active and produces cytokines, hormones, and other vasoactive agents that affect the functions of the ventricular and atrial myocardium. These adipokines may cause arrhythmogenic effects on myocyte, and because of the absence of a fibrous fascia layer between EFT and the myocardium, adipokines can affect directly on myocardium. The EFT has been also suggested to play a significant role in promoting arrhythmogenesis owing to its proinflammatory properties and anatomical proximity to the myocardium. In addition, EFT has an additional role in the modulation of different triggers, including meta-

**Table 3. Independent predictors of atrial fibrillation in multivariate logistic regression analysis**

| Variables                                      | Univariate OR (95% CI) | Univariate p value | Multivariate OR (95% CI) | Multivariate p value |
|------------------------------------------------|------------------------|--------------------|--------------------------|----------------------|
| EFT thickness                                  | 5.850 (1.778-11.491)   | <0.001             | 3.521 (1.616-6.314)      | <0.001               |
| TIMI risk score                                 | 2.547 (1.381-8.732)    | <0.001             | 1.713 (1.225-4.173)      | 0.002                |
| Troponin peak level                             | 1.977 (1.442-5.287)    | <0.001             | 1.328 (1.013-3.248)      | 0.004                |
| DM                                             | 2.123 (1.098-7.323)    | 0.002              |                          |                      |
| Age                                            | 0.980 (0.938-1.023)    | 0.105              |                          |                      |
| Gender                                         | 1.333 (0.719-2.472)    | 0.162              |                          |                      |
| Smoking                                        | 1.447 (0.749-2.792)    | 0.171              |                          |                      |
| EF                                             | 0.966 (0.896-1.042)    | 0.370              |                          |                      |
| HT                                             | 1.534 (1.156-2.178)    | 0.017              |                          |                      |
| Number of coronary arteries with >70% stenosis | 1.992 (1.062-3.025)    | 0.022              |                          |                      |
| E/e'                                           | 1.612 (1.219-2.133)    | 0.001              |                          |                      |

CI: confidence interval; DM: diabetes mellitus; EF: ejection fraction; EFT: epicardial fat tissue; HT: hypertension; OR: odds ratio; TIMI: thrombolysis in myocardial infarction.

**Figure 2.** The receiver operating curve analysis showed that an epicardial adipose tissue thickness greater than 6.5 mm predicted the occurrence of atrial fibrillation with a sensitivity of 72% and a specificity of 77%. AUC: area under the curve; EFT: epicardial fat tissue.
bolic and biochemical triggers, leading to AF.\cite{19} The relationship between the increase in EFT thickness and AF occurrence and severity has been similarly shown in several recent studies.\cite{17,18} In previous studies, EFT was generally measured by CT or MRI. In recent years, EFT evaluated by echocardiography is being used as a practical method to evaluate visceral adiposity and cardiometabolic risk.\cite{18,19} Echocardiography is less expensive and easier to perform than both MRI and CT. Unlike CT, echocardiography does not expose patients to radiation and prevents the unnecessary use of contrast agents. Therefore, we preferred echocardiography in our study for the evaluation of EFT. In recent studies, it has been determined that the differences in epicardial fat (adipose) tissue (EFT-EAT) localization may be associated with different effects. There is an increasing interest in the localization of EFT thickness as a potential predictor of cardioembolic conditions, particularly because of the uneven regional distribution of EFT, which is located in the atrioventricular (AV) groove and interventricular (IV) groove, around the heart. In particular, the relationship between the adipose tissue in the atrioventricular groove and CAD has been clearly demonstrated.\cite{20-22} Nevertheless, echocardiographic measurement of EFT localized in the right ventricular free wall is the most commonly used measurement method in current studies, as it is a simple and easy-to-apply method and correlates well with advanced imaging techniques.\cite{16,23} A significant relationship was demonstrated between CAD and EFT thickness measured in the free wall of the right ventricle in several studies carried out using echocardiography.\cite{20-22} There is no consensus on its use in clinical practice, but there are some recommendations with regard to EFT measurement using echocardiography.\cite{16} EFT thickness should be measured on the free wall of the right ventricle and in at least 2 locations from both parasternal longitudinal and transverse parasternal views, using the mean value of 3 consecutive cardiac cycles. These measurements were reported to have correlated well with the MRI measurements.\cite{16} Thus, as a result of the literature review, it was decided to use EFT measurement on the free wall of the right ventricle in this study. There are several recent studies describing the relationship between EFT and the occurrence and severity of AF.\cite{7,8} The Framingham Heart Study indicated that higher pericardial fat volume was associated with a nearly 40% higher odds of prevalent AF, and the association remained significant even after adjustment for other AF risk factors, including age, sex, myocardial infarction, heart failure, BMI, and other regional fat deposits.\cite{8} In our study, the higher thickness of EFT in the AF group is consistent with the current literature. In addition, Duran et al.\cite{24} found a significant relationship between the development of AF and EFT thickness in patients with paroxysmal AF. Furthermore, in another study, it was found that the EFT tissue was significantly thicker in patients with AF than in the controls.\cite{25}

TIMI risk score predicts poor prognosis and increased cardiovascular complications in patients with NSTEMI.\cite{12} Therefore, it was not surprising that we found a high TIMI risk score in the AF group. Many reasons for increased risk factors for TIMI score have also been associated with increased EFT in different studies.\cite{26-28} Harada et al.\cite{26} have found a higher EFT volume in patients with acute coronary syndrome (both STEMI and NSTEMI) in their study. There are several studies with evidence of the association of EFT with major adverse cardiovascular events\cite{27,28} and vulnerable coronary plaque characteristics.\cite{29} Similarly, in our study, we found a significant correlation between EFT thickness and TIMI risk scores. In our study, the frequency of multivessel disease was also significantly higher in the AF group. Similar to the findings of this study, it was also reported in the Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries (GUSTO-1) study that the patients who developed AF after acute myocardial infarction had a higher rate of multivessel disease.\cite{1} In addition, the fact that a relationship was found between the EFT thickness and the prevalence of CAD in patients with NSTEMI in 2 different studies supports the results of this study.\cite{30,31}

AF is the most common supraventricular arrhythmia following NSTEMI.\cite{1,32,33} Previous studies have demonstrated that AF development in the setting of acute myocardial infarction during hospitalization is associated with a worse short- and long-term prognosis in patients with NSTEMI.\cite{1,3} There are many factors associated with the development of AF after myocardial infarction.\cite{33,34} As previous HT, presence of DM, and a high troponin level in the blood at the time of diagnosis are indicative of increased ischemia and increased ventricular systolic functions, these pa-
Parameters are among the main risk factors. In our study, the high frequency of DM and higher troponin values in the AF group seem to be associated with increased arrhythmia development. Moreover, the fact that patients with NSTEMI and AF were found to have higher frequency of DM and higher EFT values compared with the other group in this study stands out as an important finding in terms of the relation between EFT and DM. Concordantly, it has been demonstrated that risk factors such as DM are associated with increased EFT thickness in the long term. The relevant results of this study are consistent with the results of previously conducted studies. To cite a few examples, both the thickness and the volume of EFT were found to be increased in patients with DM in several studies and it was reported in a study recently carried out by Iacobellis et al. that patients with DM have higher EFT values than patients without DM. However, epicardial fat deposition reduces insulin sensitivity and adiponectin levels in patients with DM, leading to increased inflammation in adipose tissue and increased expression and secretion of proinflammatory cytokines, contributing to the development of adverse outcomes such as AF, CAD, and ventricular dysfunction in patients with DM. Therefore, in patients with DM, both the presence of DM and the increase in EFT thickness increase the risk of AF development. The findings of this study in relation thereto support the relevant findings reported in the literature.

In a recent study that evaluated the prognostic effect of AF after NSTEMI, the reported incidence of AF was 6.4%. In a different study, the incidence of silent AF after acute myocardial infarction and in-hospital mortality in patients with AF were reported as 16% and 17.8%, respectively. In our study, AF development was observed in 68 (14%) patients during follow-up. Despite similar left atrial diameters between the groups with and without AF development, EFT thickness was significantly higher in the AF group.

Consequently, the EFT thickness in the echocardiography of patients with NSTEMI may help and guide clinicians to identify the patients with high risk of AF development and to begin preventive therapies.

Limitations

This study had some limitations. First, the sample size was quite small. EFT assessment was based on the measurement of thickness in our study rather than on volume measurement, which can be precisely measured by CT or MRI. We could not explain the mechanism between EFT and AF with our results.

Another important limitation was that intermittent AF episodes might have been missed, as patients with AF were examined via 6-hour ECG. Nevertheless, most of the patients included in the study were monitored while on intermediate care beds. In addition, the patients were informed to report any complaints they might have or any palpitations or irregular heartbeats they might feel. The fact that patient visits were carried out frequently has been another factor to minimize the effects of the said limitation. No significant difference was found between the TTE parameters of the patients included in this study. The similarities observed between the echocardiography results may be attributed to factors such as the fact that echocardiograms were taken at the time of admission, the absence of total occlusion such as the ST elevation, and similar demographic characteristics.

Conclusion

The major finding of this study is that EFT thickness may predict AF development in patients with NSTEMI. EFT is a simple, cheap, and non-invasive modality that could be a valuable tool for predicting cardiac arrhythmias. Future studies with larger sample size will be needed to confirm the results of this study.

The visual summary of the article can be seen in the Appendix 1.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of İstanbul Fatih Sultan Mehmet Training and Research Hospital (Approval Date: April 27, 2020; Approval Number: 2020/6150).

Informed Consent: Written informed consent was obtained from the patients who participated in this study.

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Keywords: Coronary artery disease; new-onset atrial fibrillation; epicardial fat tissue; non-ST-elevation myocardial infarction

Anahtar Kelimeler: Koroner arter hastalığı; yeni başlangıçlı atriyal fibrilasyon; epikardiyal yağ dokusu; ST elevasyonsuz miyokart enfarktüsü
Epicardial fat tissue may predict new onset atrial fibrillation in patients with Non ST-segment elevation myocardial infarction

|                      | AF (+) | AF (-) | P value |
|----------------------|--------|--------|---------|
| EFT thickness        | 8.3±2.0| 6.1±2.1| <0.001  |
| TIMI risk score      | 4.6±1.2| 2.1±0.9| <0.001  |
| E/e'                 | 9.1±1.2| 5.5±0.9| <0.001  |
| ROC analysis         | EFT thickness to predict new onset AF is 6.5mm | <0.001 |

Atrial fibrillation is more frequent during NSTEMI in patients with increased epicardial fat tissue thickness

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Appendix 1. Visual summary of the article.