

Assessment of the association between the personality traits of young patients with acute coronary syndrome and the severity of coronary artery disease

Akut koroner sendromlu genç hastalarda kişilik özelliklerini ve koroner arter hastalığı yaygınlığı arasındaki ilişkinin değerlendirilmesi

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ABSTRACT

Objective: The role of psychosocial risk factors is becoming increasingly important in the etiology of acute coronary syndrome (ACS). The purpose of this study was to assess an association between the personality types of young patients with ACS and the prevalence and severity of coronary artery disease (CAD).

Methods: Patients younger than 45 years of age who presented with ACS and who underwent coronary angiography in the period from 2012 to 2016 were included in the study. The coronary angiography records of the patients were examined and their Gensini score (GS) was calculated; GS ≥20 was considered to be severe CAD. The Eysenck Personality Questionnaire-Revised Short Form scales were used to measure psychoticism, extraversion, lying, and neuroticism.

Results: A total of 139 patients were included in the study. The median psychoticism score of patients with GS <20 was found to be significantly higher than that of patients with GS ≥20 [1.0 (25th and 75th percentile: 0.0–2.0) vs. 1.0 (25th and 75th percentile: 0.0–1.0); p=0.015]. The median psychoticism score was 1.0 (25th and 75th percentile: 1.0–2.0) in the unstable angina pectoris group, 0.5 (25th and 75th percentile: 0.0–1.0) in the ST segment elevation myocardial infarction group, and 1.0 (25th and 75th percentile: 0.0–1.0) in the non-ST segment elevation myocardial infarction group (p=0.004).

Conclusion: The presence of psychoticism characteristics in patients who present with ACS is associated with less severe CAD.

ÖZET

Amaç: Akut koroner sendrom (AKS) etiyolojisinde psikososyal risk faktörlerinin yeri giderek daha fazla önem kazanmaktadır. Bu çalışmada amaç AKS'li genç hastalarda kişilik özellikleri ile koroner arter hastalığı (KAH) yaygınlığı arasındaki ilişkiye araştırmaktır.

Yöntemler: Çalışmaya 2012–2016 yılları arasında AKS tablosuyla başvurup koroner anjiyografi yapılan 45 yaş altı hastalar alındı. Hastaların koroner anjiyografi kayıtları incelenerek Gensini skorları (GS) hesaplandı, GS ≥20 olması yaygın KAH olarak değerlendirildi. "Eysenck Personality Questionnaire-Revised Short Form" (EPQ-RSF) uygulanarak psikotizm, dışadönüklük, yalan ve nörositizm puanları hesaplandı.

Bulgular: Çalışmaya toplam 139 hasta alındı. Gensini skoru <20 olan hastalarda psikotizm puanı GS ≥20 olanlardan anlamlı olarak yüksek bulundu (1.0 [25-75 percentil: 0.0–2.0] ve 1.0 [25-75 percentil: 0.0–1.0], p=0.015). Ortanca psikotizm puanı kararsız anjina pektorisli grupta 1.0 [25-75 percentil: 1.0–2.0], ST segment yükselmeli miyokart enfarktüsü olanlarda 0.5 [25-75 percentil: 0.0–1.0], ST yükselmesiz miyokart enfarktüsü olanlarda 1.0 [25-75 percentil: 0.0–1.0] bulundu (p=0.004).

Sonuç: AKS tablosu ile başvuran hastalarda psikotizm özelliklerinin varlığı daha az yaygın KAH ile ilişkilidir.

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Risk factors other than those classically associated are more common among patients with premature atherosclerosis, when compared with the elderly population. The stress, depression, and anxiety scores of young patients with coronary artery disease (CAD) who were evaluated during a hospital stay were reported to be higher than those of elderly patients.^[1] Furthermore, studies have reported that type A and D personality traits were associated with the development of CAD.^[2,3]

A growing body of data concerning a connection between psychosocial risk factors and the development of CAD gives rise to the thought that it is important to assess these risk factors in patients. The purpose of this study was to explore whether there was a difference between patients diagnosed with acute coronary syndrome (ACS) in terms of the relatively stable parameters of the Eysenck Personality Questionnaire (EPQ): psychoticism, extraversion, lie, and neuroticism scale scores, and the presence and severity of CAD.

METHODS

Patients younger than 45 years of age who presented with ACS and underwent coronary angiography in the period from 2012 to 2016 were included in the study. Those patients who had a previously diagnosed psychiatric disease were excluded from the study. Patients were included in the study when they presented to the cardiology polyclinic for the first routine control. Participants gave written, informed consent. Approval was obtained from the local ethics committee for this study.

Data of classic risk factors of the patients were recorded. Their electrocardiographic and echocardiographic findings, as well as laboratory results during hospital stay, were examined. Patients were assigned to unstable angina pectoris (USAP; with normal or noncritical coronary artery disease), ST segment elevation myocardial infarction (STEMI), or non-ST segment elevation myocardial infarction (NSTEMI) group. All patients' coronary angiography records were examined. Gensini score (GS) was also calculated to assess the severity of CAD. Gensini score of 20 or more was recognized as severe CAD.^[4,5]

A version of the Eysenck Personality Questionnaire-Revised Short Form (EPQ-RSF), which included 24 items, was used for a personality analysis of the participants. This self-conducted survey is designed to

evaluate personality in 3 phases: extraversion, neuroticism, and psychoticism. In addition to these criteria, there is a lie scale, a measurement of social willingness. The extraversion scale reflects sociability and liveliness. The neuroticism scale determines emotional instability and anxiety. The psychoticism scale assesses aggression, impulsiveness, and assertiveness. There are only 2 answer options for each question (yes/no). Each dichotomous item was scored 1 or 0, and each scale had a maximum possible score of 6 and minimum of 0, with higher scores indicating a higher level of the personality trait.^[6,7] The Turkish language version of the EPQ-RSF has been demonstrated to be valid and reliable in the literature.^[8]

The relationship between the clinical picture of the patients, their GS, and the scores from the neuroticism, extraversion, psychoticism, and lie scales of the EPQ-RSF were analyzed.

Statistical analysis

The statistical analysis was completed using IBM SPSS Statistics for Windows, Version 21.0 (IBM Corp., Armonk, NY, USA). Categorical variables were presented as frequency and percentage. The chi-square test was used to compare categorical variables. The Kolmogorov-Smirnov test was used to assess the distribution of continuous variables. Student's t-test was used for variables with normal distribution, and the values were presented as mean \pm SD. Continuous variables without normal distribution were analyzed using Mann-Whitney U test and obtained values were presented as median [50th] values and interquartile ranges [25th and 75th]. Comparisons between more than 2 groups were performed using the Kruskal-Wallis test. A value of $p<0.05$ was considered statistically significant.

RESULTS

A total of 139 patients, 22 of whom were female, were included in the study. According to the clinical, electrocardiographic, and coronary angiography findings of the patients, 42 were diagnosed with USAP (with normal or noncritical lesion), whereas 54 were diag-

Abbreviations:

ACS	Acute coronary syndrome
CAD	Coronary artery disease
EPQ-RSF	Eysenck Personality Questionnaire-Revised Short Form
GS	Gensini score
NSTEMI	Non-ST segment elevation myocardial infarction
STEMI	ST segment elevation myocardial infarction
USAP	Unstable angina pectoris

nosed with STEMI, and 43 with NSTEMI. There was no significant difference between the 3 groups with respect to age, hypertension, diabetes mellitus, or family history. However, female patients accounted for 7% of patients diagnosed with NSTEMI, 11.1% of patients diagnosed with STEMI, and 31.0% of patients diagnosed with USAP ($p=0.005$). In all, 69.8% of NSTEMI patients, 66.7% of STEMI patients, and 45.2% of USAP patients were smokers ($p=0.039$). Additionally, 30.2% of NSTEMI patients, 48.1% of STEMI patients, and 9.5% of USAP patients were found to have hyperlipidemia ($p<0.001$). There was a statistically significant difference between groups in terms of GS ($p<0.001$) (Table 1).

According to the coronary angiography records, the GS of 76 patients was ≥ 20 , while the GS was <20 in 63 patients. Among patients with GS ≥ 20 , 90.8%

were male, while 76.2% of patients with GS <20 were male ($p=0.019$). No significant differences were found between groups with high and low GS with respect to age, hypertension, smoking, or family history. However, the prevalence of diabetes mellitus and hyperlipidemia was higher in the group of patients with GS ≥ 20 than in the group with GS <20 ($p=0.020$, $p=0.006$, respectively) (Table 2).

The median psychoticism score was higher in the group with GS <20 than in the group with GS ≥ 20 [1.0 (25th and 75th percentile: 0.0–2.0) vs 1.0 (25th and 75th percentile: 0.0–1.0); $p=0.015$]. Also, patients with GS <20 were found to have a higher lie scale score than those with GS ≥ 20 [5.0 (25th and 75th percentile: 4.0–6.0) vs 5.0 (25th and 75th percentile: 3.2–6.0); $p=0.039$]. And, patients with GS <20 were found to have higher neuroticism score than patients with GS ≥ 20 [4.0 (25th

Table 1. Demographic characteristics of patients' CAD presentation

	USAP (n=42)	STEMI (n=54)	NSTEMI (n=43)	<i>p</i>
Age (years), Mean±SD	38.3±7.22	39.9±4.31	41.3±3.88	0.080
Male sex, n (%)	29 (69.0)	48 (88.9)	40 (93.0)	0.005
Hypertension, n (%)	8 (19.0)	16 (29.6)	13 (30.2)	0.413
Diabetes mellitus, n (%)	3 (7.1)	13 (24.1)	11 (25.6)	0.054
Smoking, n (%)	19 (45.2)	36 (66.7)	30 (69.8)	0.039
Family history for coronary artery disease, n (%)	19 (45.2)	33 (61.1)	26 (60.5)	0.230
Hyperlipidemia, n (%)	4 (9.5)	26 (48.1)	13 (30.2)	<0.001
Gensini score	0.0 (0.0–2.1)	37.2 (23.7–49.2)	31.0 (18.0–40.5)	<0.001

Mean±SD presented for data with normal distribution, median (25th and 75th percentile) for those without normal distribution, and percentage for categorical variables. USAP: Unstable angina pectoris; STEMI: ST elevation myocardial infarction; NSTEMI: Non-ST elevation myocardial infarction.

Table 2. Baseline demographic characteristics of patients according to Gensini score

	Gensini score <20 (n=63)			Gensini score ≥ 20 (n=76)			<i>p</i>
	n	%	Mean±SD	n	%	Mean±SD	
Age (years)			39.0±6.4			40.6±4.1	0.270
Male sex	48	76.2		69	90.8		0.019
Hypertension	15	23.8		22	28.9		0.490
Diabetes mellitus	7	11.1		20	26.3		0.020
Smoking	34	54.0		51	67.1		0.110
Family history for coronary artery disease	32	50.8		46	60.5		0.250
Hyperlipidemia	12	19.0		31	40.8		0.006

SD: Standard deviation.

Table 3. Median Eysenck personality score of the patients according to Gensini score

	Gensini score <20 (n=63)	Gensini score >20 (n=76)	p
Psychoticism score	1.0 (0.0–2.0)	1.0 (0.0–1.0)	0.015
Extraversion score	3.0 (1.0–5.0)	4.0 (2.0–5.0)	0.350
Lie score	5.0 (4.0–6.0)	5.0 (3.2–6.0)	0.039
Neuroticism score	4.0 (3.0–5.0)	3.0 (2.0–4.0)	0.039

Data shown as median (25th and 75th percentile).

Table 4. Association between coronary artery disease presentation of patients and Eysenck personality score

	USAP (n=54)	STEMI (n=54)	NSTEMI (n=43)	p
Psychoticism score	1.0 (1.0–2.0)	0.5 (0.0–1.0)	1.0 (0.0–1.0)	0.004
Extraversion score	3.0 (1.0–5.0)	4.0 (2.0–5.0)	4.0 (2.0–5.0)	0.304
Lie score	5.0 (4.0–6.0)	5.0 (4.0–6.0)	5.0 (3.0–6.0)	0.119
Neuroticism score	4.0 (3.0–5.0)	3.0 (1.7–5.0)	3.0 (2.0–5.0)	0.277

Data shown as median (25th and 75th percentile). NSTEMI: Non-ST elevation myocardial infarction; STEMI: ST elevation myocardial infarction; USAP: Unstable angina pectoris.

and 75th percentile: 3.0–5.0) vs 3.0 (25th and 75th percentile: 2.0–4.0); p=0.039]. However, there was no statistically significant difference between the groups in terms of extraversion score (p=0.350) (Table 3).

According to the analysis performed based on the diagnosis of the patients, the median psychoticism score was found to be 1.0 (25th and 75th percentile: 1.0–2.0) among patients with USAP, 0.5 (25th and 75th percentile: 0.0–1.0) among patients with STEMI, and 1.0 (25th and 75th percentile: 0.0–1.0) among patients with NSTEMI (p=0.004). No significant difference was found between the diagnosis groups in the extraversion, lie, or neuroticism scale scores (Table 4).

DISCUSSION

It was found in this study that patients younger than 45 years of age who presented with ACS and had normal/noncritical CAD according to angiography findings had higher psychoticism scores on the EPQ-RSF. Those patients with GS <20 were found to have a higher psychoticism score. Furthermore, a significant negative relationship was found between psychoticism and GS.

The results of recent studies make one think that

the psychosocial factor may also play a role in the pathogenesis of CAD.^[9,10] The association between the psychosocial factors and CAD is explained through its direct effect on the immune system and coagulation system as well as its secondary effect on personality type. The mechanisms suggested for the direct interaction are explained as follows: the psychological state affects the coagulation system, which in turn leads to platelet activation. Increased sympathetic activation elevates the heart rate, blood pressure, and increases arrhythmia and causes endothelial dysfunction and coronary vasospasm.^[11–14] Defined as the development of myocardial infarction after major psychological trauma despite having normal coronary arteries, Takotsubo syndrome is a good example of the direct effect of psychosocial factors.^[15] Furthermore, psychosocial factors such as depression, anxiety, hostility, and social loneliness increase the CAD risk directly by both activating the central nervous system, and indirectly by increasing the risk of smoking potential.^[16]

The findings of studies exploring the association between personality type and CAD are controversial. The Framingham Heart Study reported that type A personality was an independent risk factor for the development of CAD.^[17] The key characteristics of

type A personality include being busy, having a sense of urgency, being enthusiastic, strict, perfectionist, self-confident, nervous, angry, punctual, competitive, and persistent. However, recent studies have reported different findings and argued that CAD was only associated with more a specific component of type A personality: hostility. Another study reported that people with a high sense of hostility were found to have restenosis after angioplasty.^[18] In a study including young patients, hostility and a sense of urgency, components of type A personality, were found to be associated with coronary artery classification.^[2] Yosimasa et al. used GS to determine the prevalence of CAD, but did not find an association between type A personality and GS. Nevertheless, enthusiasm and competitiveness, which are also components of type A personality, were found to have a positive correlation with GS, whereas self-confidence and perfectionism had a negative relationship.^[19]

Recent studies have reported that type D personality, the key components of which are negative affectivity and social inhibition, was associated with the presence and severity of CAD. The key characteristics of such individuals are similar to those of depressed patients: they are anxious, hopeless, angry, worried, and socially incapable.^[20,21] The incidence of CAD is higher among individuals who have a poor social network.^[22] Moreover, it was reported that disease progression was higher among those individuals who had CAD and also had poor social support.^[23] Denollet et al. found that mortality was 4 times higher in 6–10-year follow-up among patients with CAD who had type D personality.^[24] Another study reported that the level of tumor necrosis factor alpha, which is one of the independent predictors of mortality among patients with chronic heart failure, was higher among patients with type D personality characteristics.^[25]

The EPQ was first introduced in 1964 and has been amended over time. A short form was devised and is now more commonly used. The questionnaire consists of neuroticism-stability, extraversion-introversion, psychotism, and lie scales. Every personality type in this questionnaire has both positive and negative aspects, and none is superior to another. One who has a high neuroticism score in this questionnaire is more anxious, depressive, nervous, inhibited, excessively sentimental, and has low self-confidence. People in this group are more prone to display anxiety, fear, de-

pression, low self-respect, and emotional behaviors. One who has a high psychotism score is more anti-social, aggressive, unconfident, unable to show empathy, insensitive to other people, and non-conformist. People with a high lie score try to simulate. People with a high extraversion score are social, gregarious, do not like to be alone, and are less reliable.^[6,7,26] The criteria of the Eysenck questionnaire overlap identically with the type A, type B, or type D personality; however, it can be suggested that type D personality is more closely related to neuroticism, while type A seems to be more closely related to psychotism when the key characteristics are considered.

There are a limited number of studies that explore the relationship between personality characteristics based on the EPQ and the presence and prevalence of CAD. Güll et al. used the EPQ in their study to explore the association between coronary angiography findings and personality traits. They included 56 patients in the study, and found that the neuroticism score was higher among patients who did not have CAD, while those who had a pathology had a higher extraversion score. Although the psychotism score was higher among those who did not have CAD, it was not statistically significant.^[27] Arslan et al. found that patients who had myocardial infarction had higher levels of reward dependence, sensitivity to others, and anger, compared with healthy volunteers. According to that study, patients who had myocardial infarction tried to satisfy others, and this was a serious source of stress and anger in the long term.^[28] In our study, which had a larger number of patients, a significant negative relationship was found between prevalent CAD and psychotism score, while such an association was not found with the other scales. Moreover, when the severity of CAD was evaluated with GS, a negative relationship was found between GS and psychotism score.

The number of patients in our study was relatively small, and we did not have data related to the period before the emergence of CAD. Since our study does not include follow-up, the effect of the findings on prognosis could not be assessed. Assessment of life events and psychopathology are limitations of our work.

Conclusion

It is important to take psychosocial factors into account as potential risk factors for the development of CAD among young patients with a view to achieving complete cardiac rehabilitation.

Conflict-of-interest: None declared.

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