

Araştırma / Original article**Mood and personality changes in the patients undergone coronary angiography**Ali İrfan GÜL,¹ Hüseyin EDE,² İsa ARDAHANLI,² Ghaniya DAAR³**ABSTRACT**

Objective: Changes in health status and psychopathology can cause alterations in some personality traits. The aim of this study is to search the change of major personality characteristics, anxiety and depression levels before and after coronary angiography application in the patients who were undergone elective diagnostic coronary angiography first time in their life. **Methods:** Thirty four male and 22 female who admitted to cardiology polyclinic due to chest pain and in whom elective diagnostic coronary angiography was indicated were included in the study. To these patients, Hospital Anxiety and Depression Scale (HADS) and Eysenck Personality Questionnaire-Revised Short Form (EPQ-RSF) were applied just before and two weeks after the coronary angiography test. Obtained data in points before and after angiography were compared statistically. **Results:** Fifty six patients were included, 22 of them were female. 26 of all didn't have any pathology which necessiated medical treatment while 30 patients were diagnosed to have coronary artery disease (CAD). The preangiography points of the patients without coronary artery disease (n=26) from HADS anxiety subquestionnaire and EPQ-RSF neuroticism subquestionnaire were found to be statistically higher than those of the patients with coronary artery disease (n=30) while points from EPQ-RSF extraversion subquestionnaire were statistically higher in patients with CAD. In respect to the questionnaire given two weeks after coronary angiography; EPQ-RSF extraversion subquestionnaire points of the patients without CAD were statitically higher while HADS anxiety subquestionnaire and EPQ-RSF neuroticism subquestionnaire points of the patients with CAD were found to be statitically higher compared to the other group. **Conclusion:** According to the results obtained, the complaints of significant number of patients undergone coronary angiography were composed of psychosomatically originated psychopathologies in reality. And also this study showed that psychiatric disorders such as anxiety and depression increased together with appearance of neurotic personality traits when the people learned impairment in their health status. (*Anatolian Journal of Psychiatry* 2015; 16(4):276-283)

Key words: anxiety, coronary angiography, depression, extraversion, neuroticism

Koroner anjiyoda mizaç ve kişilik değişiklikleri**ÖZET**

Amaç: Sağlık durumundaki değişimler ve psikopatoloji bazı kişilik özelliklerinin değişmesine neden olabilir. Bu çalışmanın amacı, elektif koşullarda ilk kez tanısal koroner anjiyografi yapılan hastalarda, anjiyografiden önce ve sonra anksiyete, depresyon düzeylerindeki ve majör kişilik özelliklerindeki değişimleri araştırmaktır. **Yöntem:** Göğüs ağrısı nedeniyle kardiyoloji polikliniğine başvuran ve elektif tanısal koroner anjiyografi endikasyonu konulan ve çalışmaya koşullarına uyan 34 erkek ve 22 kadın hasta çalışmaya alınmıştır. Bu hastalara koroner anjiyografi yapılmadan hemen önce ve iki hafta sonra Hastane Anksiyete Depresyon Ölçeği (HADÖ) ve Eysenck Kişilik Ölçeği-gözden geçirilmiş kısa formu (EPQ-RSF) verilmiştir. Elde edilen anjiyografi öncesinde ve anjiyografi sonrasındaki istatistiksel olarak karşılaştırılmıştır. **Bulgular:** Çalışmaya alınan 34 erkek, 22 kadın toplam 56 hastadan 26'sında koroner anjiyografi sonucunda tedavi gerektiren bir patoloji saptanmamışken, 30 hastada koroner arter hastalığı saptanmış-

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tır. Koroner anjiyografiden hemen önce verilen ölçeklerde patoloji saptanmayan 26 hastada HADS anksiyete alt ölçeği puanları ve EPQ-RSF nevrotizm alt ölçeği puanları koroner patoloji saptanan 30 hastaya göre istatistiksel olarak anlamlı düzeyde daha yüksek bulunmuştur. EPQ-RSF dışa dönüklük alt ölçeği puanları ise koroner patolojili hastalarda istatistiksel olarak anlamlı düzeyde daha yüksek bulunmuştur. Koroner anjiyografiden iki hafta sonra verilen ölçeklerde ise, patoloji saptanmayan 26 hastada EPQ-RSF dışa dönüklük alt ölçek puanları istatistiksel olarak daha yüksek bulunurken, patoloji saptanan 30 hastada HADS anksiyete ve depresyon alt ölçek puanları ile EPQ-RSF nevrotizm alt ölçek puanları istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur. **Sonuç:** Elde edilen sonuçlar koroner anjiyografi yapılan hastalardan önemli bir kısmının aslında psikofizyolojik kökenli psikopatolojilerden oluştuğunu göstermektedir. Ayrıca bu çalışma, insanların sağlık durumlarındaki bozulmayı öğrendiklerinde anksiyete, depresyon gibi psikiyatrik bozuklukların arttığını ve birlikte nevrotik kişilik özelliklerinin ortaya çıktığını gösteren bir çalışmadır. (Anadolu Psikiyatri Derg 2015; 16(4):276-283)

Anahtar sözcükler: Koroner anjiyografi, anksiyete, depresyon, nevrotizm, dışa dönüklük

INTRODUCTION

Chest pain is very frequently encountered complaint in clinical practice. Two third of female patients and one third of male patients who were undergone coronary angiography (CAG) first time in their life due to chest pain were found to have normal or near normal coronary arteries.¹ However, CAG is very useful diagnostic tool for coronary artery disease. Coronary artery disease is one of the main causes of mortality and morbidity in population.²⁻⁴

In a recent prospective epidemiologic study, it was shown that mortality and depression were found to be correlated to each other in patients with coronary artery disease (CAD).⁵ It was reported that the prevalence of major depression was 17% to 27% among the patients with CAD (coronary artery disease),^{6,7} that of depressive signs was 20% to 45%.^{8,9} It was reported that depression can be independent predictor of mortality among patients with acute coronary myocardial infarction.¹⁰ There is also new epidemiologic study saying that depression or anxiety can predict prevalence of CAD in healthy population.¹¹

The effect of depression on prognosis in patients with CAD has been shown but that of anxiety is not clear yet.¹² In a recent meta-analysis, it was found that 26% of anxious patients had complaints related to CAD and they had 48% of cardiac death risk.¹³ Although there was highly common comorbidity profile between depression and anxiety, the role of anxiety in CAD was not well studied.¹⁴ Especially in some studies reported high frequency of CAD prevalence in anxiety disorders as common as depressive disorders.¹⁵

There have been conflicting results in respect to determining psychologic predictors of CAD. Although preliminary studies found that type-A behavior such as hostile attitude, overly controlling,

competitiveness, feeling of hastiness had an independent effect on CAD frequency, following studies either couldn't repeated similar findings or contradictory results.¹⁶ But in very recent studies, cardiac disease, poor quality of life and mortality were found to be related to 'distressed or type-D' personality composed of negative affectivity and social inhibition.¹⁷⁻²⁰

There are several stability and change types of personality. Personality and stability in social environment are mutually determined. The relation of personality characteristics in individuals and character profile of individuals can change over time. Some change types can be related to health status in different times of life with different style. Major changes in normal life such as marriage, employment etc. are also important. Such changes can affect personality characteristics which also effect health status.²¹

The aim of our study was to determine major personality characteristics, anxiety and depression levels of the patients undergone diagnostic coronary angiography first time in their life before the procedure and to search the amount of changes in major personality characteristics, anxiety and depression levels after the procedure.

METHODS

All the voluntary participants included were informed about the study in accordance with the Declaration of Helsinki. The permission from Ethics Committee for Non-invasive Clinical Trials of Bozok University Faculty of Medicine was obtained for the study (Decision Number 112).

Sampling

Between March 2013 and November 2013, 60 patients applied to Cardiology Department of Bozok University Faculty of Medicine with chest pain complaint in an outpatient setting were con-

considered for the study and all of the patients were indicated to have elective diagnostic coronary angiography. Four of them were excluded from the study since they experienced coronary angiography previously. Other exclusion criteria were pregnancy, presence of previously diagnosed CAD, chronic renal failure, patients under treatment due to psychiatric disease. The study group included 22 female and 34 male. The patients had range of age between 31 and 76 years and average age of 54.7 ± 10.6 years.

Data collection and questionnaires

Demographic Information Form: This form was developed by study researchers to collect demographic data such as age, gender, educational and marital status and medical records related to presence of hyperlipidemia, diabetes mellitus, hypertension, alcohol and cigarette smoking.

Eysenck Personality Questionnaire Revised Short Form (EPQ-RSF): This self-evaluation questionnaire is developed in accordance with Eysenck personality theory to measure neuroticism, extraversion and psychoticism aspects of the personality. It can be applied to different psychiatric groups and healthy population to measure personality profile. It consists of 24 articles totally and has 4 subquestionnaires per which are composed of 6 articles individually. These subquestionnaires measure neuroticism, extroversion, psychoticism and lie items. Participants are asked for to answer the each article in a serial manner as giving answer of either 'yes' or 'no'. 'Yes' (1) and 'no' (0) points are summed up to obtain total score of 0 to 6 for each subquestionnaire. Cut-off scoring was not calculated in this study but can be done for comparative studies. This questionnaire was improved by Leslie et al.²² It was translated and adapted to Turkish population by Karanci et al.²³

Hospital Anxiety and Depression Scale (HADS): It is a self-evaluation test used to measure anxiety and depression risk, level and severity in a person; it is filled by one's own and composed of 14 articles totally. It enables quaternary Likert type scale measurement. 1, 3, 5, 6, 8, 10, 11 and 13th articles show decrease in severity and scoring is done as 3, 2, 1 and 0. Other articles are scored as 0, 1, 2 and 3. Seven articles (odd numbered) represent anxiety subscale and seven articles (even numbered) represent depression subscale. Total points of each subscale are obtained by summing point of each article specific to related subscale accordingly. The scale was developed by Zigmond and

Snaith.²⁴ It was translated and adapted to Turkish population by Aydemir et al.²⁵

Implementation

Diagnostic coronary angiography was indicated for symptomatic patients who had class III typical angina according to Canadian Cardiovascular Society classification for last two months or had segmentary wall motion abnormality on echocardiography examination or were detected to have ischemia findings on exercise electrocardiographic test or myocardial perfusion scintigraphy. To these patients, HADS and EPQ-RSF were given just before coronary angiography. Coronary angiography was applied to all patients in same manner at morning after overnight fasting via right femoral artery by using Seldinger method. Low osmolar non-ionic iohexal solution was used as contrast agent for imaging. According to CAG result, all patients had been treated along with current guidelines for percutaneous coronary intervention or coronary surgery. All patients were divided into the group with normal coronary arteries (group normal) and the group with any coronary artery lesion (group lesion). The group with lesion were further classified into three subgroup, medical treatment group included patients with any lesion of <50% narrowing in any coronary arteries of right, left anterior descending or left circumflex and offered medical follow-up. PCI (percutaneous interventions) group was consisted of patients undergone percutaneous coronary intervention and surgery group was formed by the ones referred for coronary surgery.

All patients were called for control visit two weeks later after coronary angiography. HADS and EPQ-RSF questionnaires were reapplied. The scores obtained before and after CAG were used to compare them statistically.

Statistical analysis

Statistical analysis was carried out by using SPSS 17 (SPSS Inc., Chicago, IL, US) version. Descriptive data were expressed in average $\pm$ standard deviation and median values. Variables related to pre-CAG and post-CAG HADS and EPQ-RSF were analysed by using Mann-Whitney U test for comparison of patients with coronary artery pathology and without coronary artery pathology. Data related to subgroups were analysed by the help of Wilcoxon test.

RESULTS

The group with normal coronary arteries had 26

Table 1. Demographic data of coronary angiography all groups

	Normal coronary (n=26)	Coronary obstruction medical treatment (n=8)	PCI treatment (n=11)	Coronary by-pass (n=11)
Gender				
Male	14	5	6	9
Female	12	3	5	2
Mean age	53.09±12.82	53.42±7.45	57.55±7.85	56.66±9.68
HL- Yes	4	3	6	2
No	22	5	5	9
DM- Yes	10	3	8	4
No	16	5	3	7
HT- Yes	15	5	7	9
No	11	3	4	2
Alcohol- Yes	3	3	1	4
No	23	5	10	7
Smoking- Yes	9	3	2	3
No	17	5	9	8

HL: Hyperlipidemia, DM: Diabetes mellitus, HT: Hypertension, PCI: Percutaneous intervention

Table 2. Statistical comparison of both groups before coronary angiography.

	without pathology (n=26)	with pathology (n=30)	Test	p
HADS-Anxiety (Mean±SD)	11.42±4.66	7.16±4.20	z=-2.95	<0.01
Median	10.00	7.00		
HADS-Depression (Mean±SD)	9.52±4.43	7.40±3.90	z=-1.50	0.132
Median	9.00	8.00		
EPQ-Neuroticism (Mean±SD)	4.66±1.31	2.64±1.55	z=-3.90	<0.001
Median	5.00	3.00		
EPQ-Extraversion (Mean±SD)	2.80±1.12	3.80±1.44	z=-2.51	<0.05
Median	3.00	4.00		
EPQ-Psychoticism (Mean±SD)	2.33±0.79	2.16±1.06	z=-0.46	0.641
Median	2.00	2.00		

patients with 12 female and 14 male. Average age of them was 53.1±12.8 years. That of medical treatment group consisted of five male and three women was 53.4±7.5 years. PCI group was composed of six male and five female with average age of 57.6±7.9. In surgery group, there were nine male and two female patients with average age of 56.7±9.7 years (Table 1).

Pre-CAG HADS and EPQ-RSF scores of the group normal (n=26) and the group lesion (n=30) were compared statistically. HADS anxiety subscale scores of the group normal were found to be statistically higher (z=-2.95, p<0.01). Similarly, EPQ-RSF neuroticism subquestionnaire scores of the group normal (n=26) were statistically higher than the group lesion (n=30) (z=-3.90, p<0.001). EPQ-RSF-Extraversion scores

of the group lesion were statistically higher (z=-2.51, p<0.05), all other scores of both groups were similar statistically (Table 2).

Two weeks after the CAG, all questionnaires were reapplied and the results of the group normal and group lesion were compared to each other. HADS anxiety subscale scores (z=-4.55, p<0.001), HADS depression subscale scores (z=-1.50, p<0.001) and EPQ-RSF neuroticism subquestionnaire scores (z=-5.51, p<0.001) of the group lesion (n=30) were significantly much higher than the group normal. But EPQ-RSF extraversion subquestionnaire scores were found to be significantly higher in the group normal (z=-4.02, p<0.001) (Table 3).

Pre-CAG and post-CAG HADS, EPQ-RSF

Table 3. Statistical comparison of both groups after coronary angiography

	without pathology (n=26)	with pathology (n=30)	Test	p
HADS-Anxiety (Mean±SD)	5.47±3.02	12.88±4.79	z=-4.55	<0.001
Median	6.00	14.00		
HADS-Depression (Mean±SD)	3.71±3.08	12.04±4.17	z=-1.50	<0.001
Median	2.00	13.00		
EPQ-Neuroticism (Mean±SD)	1.90±1.33	5.32±0.94	z=-5.51	<0.001
Median	2.00	6.00		
EPQ-Extraversion (Mean±SD)	4.09±1.04	2.64±0.95	z=-4.02	<0.001
Median	4.00	2.00		
EPQ-Psychoticism (Mean±SD)	2.19±0.74	2.24±0.77	z=-0.57	0.568
Median	2.00	2.00		

Table 4. Comparison of persons without coronary pathology before and after coronary angiography

	without pathology		Test	p
	pre-angiography (n=26)	post-angiography (n=26)		
HADS-Anxiety (Mean±SD)	11.42±4.66	5.47±3.02	z=-3.92 ^a	<0.001
Median	10.00	3.00		
HADS-Depression (Mean±SD)	9.52±4.43	3.72±3.08	z=-3.81 ^a	<0.001
Median	9.00	1.00		
EPQ-Neuroticism (Mean±SD)	4.66±1.31	1.90±1.33	z=-4.00 ^a	<0.001
Median	5.00	2.00		
EPQ-Extraversion (Mean±SD)	2.80±1.12	4.09±1.04	z=-3.22 ^b	<0.001
Median	3.00	4.00		
EPQ-Psychoticism (Mean±SD)	2.33±0.79	2.19±0.74	z=-0.71 ^a	0.47
Median	2.00	2.00		

a. Based on positive ranks, b. Based on negative ranks

Table 5. Comparison of persons with coronary pathology before and after coronary angiography

	with pathology		Test	p
	pre-angiography (n=30)	post-angiography (n=30)		
HADS- Anxiety (Mean±SD)	7.16±4.20	12.88±4.79	z=-4.00 ^a	<0.001
Median	7.00	14.00		
HADS-Depression (Mean±SD)	7.40±3.90	12.04±4.17	z=-3.82 ^a	<0.001
Median	8.00	13.00		
EPQ-Neuroticism (Mean±SD)	2.64±1.55	5.32±0.94	z=-4.40 ^a	<0.001
Median	3.00	6.00		
EPQ-Extraversion (Mean±SD)	3.80±1.44	2.64±0.95	z=-3.36 ^b	<0.001
Median	4.00	2.00		
EPQ-Psychoticism (Mean±SD)	2.16±1.06	2.24±0.77	z=-0.26	0.79
Median	2.00	2.00		

a. Based on positive ranks, b. Based on negative ranks

scores of the group normal (n=26) were compared to each other. Pre-CAG HADS anxiety subscale scores (z=-3.92, p<0.001), pre-CAG HADS depression subscale scores (z=-3.81, p<0.001) and pre-CAG EPQ-RSF neuroticism

subquestionnaire scores (z=-4.00, p<0.001) of the group normal (n=26) were significantly higher than those of post-CAG scores respectively. But after they learned that they didn't have any illness, in other words post-CAG EPQ-RSF

extraversion scores were significantly higher than that of pre-CAG scores ($z=-3.22$, $p<0.001$) (Table 4).

Pre-CAG and post-CAG HADS, EPQ-RSF scores of the patients with any coronary artery lesion ($n=30$) were compared to each other. After they learned that they had coronary artery disease, in other words post-CAG HADS anxiety subscale scores ($z=-4.00$, $p<0.001$), post-CAG HADS depression subscale scores ($z=-3.82$, $p<0.001$) and post-CAG EPQ-RSF neuroticism subquestionnaire scores ($z=-4.40$, $p<0.001$) of the group lesion ($n=30$) were significantly higher than those of pre-CAG scores respectively. But pre-CAG EPQ-RSF extraversion scores were significantly higher than that of post-CAG scores ($z=-3.36$, $p<0.001$) (Table 5).

DISCUSSION

The first finding of this study was that anxiety level and neurotic personality traits derived from subquestionnaires applied just before coronary angiography was significantly higher among the patients without coronary artery pathology. Probable reason for this finding may be a psychiatric disorder or neurotic personality traits which made the patient think that he/she had any cardiac disease. Health-related anxiety or hypochondriasis is very common situations seen in both primary (0.80-3.05%) and secondary (4.2-10.0%) health facilities. And generally less than half of the cases can be successfully extinguished after proper treatment. It is not surprising that the people with health-related anxiety experience unnecessary tests in an outpatient setting more than others.²⁶ Health-related anxiety is characterized with excessive deal of probability of developing severe illness now or in future.²⁷ That is why high-cost diagnostic test applications are frequently seen among this population. In this population, other psychiatric diseases such as anxiety and panic disorders can also exist. The presence of neuroticism in high frequency among these patients verifies our hypothesis. According to Eysenck, the people with neuroticism and extraversion have tendency toward anxiety disorders.²⁸ In our study, two weeks after coronary angiography, anxiety and depression level decreased, neuroticism was reduced and extraversion level increased. It can be due to learning that they were free of any cardiac illness. Neuroticism also act a part in other important problems closely related to psychological distress such as physical health problems and low subjective well-being.^{28,29} Learning they didn't have any

cardiac disease after diagnostic coronary angiography can improve their low subjective well-being and it causes decrease in neuroticism and increase in extraversion.

Second important finding of this study is conversion of pre-CAG (pre-coronary angiography) anxiety, depression levels and personality traits such as neuroticism and extraversion two weeks after the coronary angiography among patients with coronary pathology. In these patients, pre-CAG extraversion scores were statistically higher than post-CAG ones. These patients didn't have any idea about presence of coronary heart disease. So they have low level of anxiety and depression. This findings were supported in the literature.³⁰ Neuroticism, one of common personality disorder has very strong relation to common mental disorders such as mood disorders especially anxiety and substance abuse.²⁴⁻³¹ In psychometric tests applied to the patients with coronary artery lesion two weeks after CAG, anxiety, depression and neuroticism were increased statistically in significant degree. The reason for this could be the development of some psychopathologies in some patients who learned presence of coronary heart disease. Freedland et al. found the ratio of recurrent major depressive disorder among patients with newly diagnosed coronary heart disease as 44%.³² In one meta-analysis, 7 studies out of 11 showed that depression had significantly important relation with increased risk of coronary artery disease.³³ In another study, the patients who experienced coronary angiography due to stable angina and had non-obstructive coronary artery disease were found to have significantly more frequent persistent angina in long term compared to the patients with obstructive coronary artery disease.³⁴ And this study found first time in the literature that the patients with persistent angina had depression three times more, anxiety two times more than patients without persistent angina in long term.³⁴ In another study, patients with stable coronary artery disease had increased widespread anxiety disorder and post-traumatic stress disorder which have highly overlapping common comorbidities with depressive disorders.³⁵

The most important feature of this study is its prospective nature in design and also it searched major personality changes such as neuroticism and extraversion along with depression and anxiety which differed it from the other studies. In this study, we showed that major personality traits had very close relation to physical well-

being, health status and psychopathologies. Additionally it revealed the importance of implementation of multidisciplinary approaches before and after diagnostic interventions.

There were also some limiting aspects of the study. One of them is less number of patients involved. However, it is important that the psychometric tests performed pre-CAG and post-CAG. Will mood and personality changes continue beyond two weeks after coronary angiography in patients with normal coronary

arteries? Although levels of depression and anxiety were measured by the related scales, the most important limitation to this study was to leave out psychiatric aspect of the patients undiagnosed which in turn directly effected the results of Eysenck Personality Questionnaire-Revised Short Form (EPQ-RSF). We believe that changes in personality properties known to be more stable throughout life is situational. To answer this question, the patients should be followed for long term.

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