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Comparing of Efficacy of Different Self-Assessment Anxiety Scales for Predicting Radial Artery Spasm During Coronary Interventions

Koroner Girişimlerde Radiyal Arter Spazmını Öngördürmede Farklı Anksiyete Öz-Değerlendirme Ölçeklerinin Etkinliğinin Karşılaştırılması

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ABSTRACT Objective: Radial artery spasm (RAS), is a major drawback for the routine use of radial access during coronary interventions and anxiety is a well-documented predictor of RAS. In this study, we aimed to assess the relationship between RAS and level of anxiety (LOA) which was quantified with different scales. **Material and Methods:** 123 consecutive patients scheduled for elective coronary angiography were enrolled. Demographic and procedural relevant features were noted, and then, patients were asked to fill three anxiety scales; Beck Anxiety Inventory (BAI), Spielberger State Anxiety Inventory (SSAI) and Spielberger Trait Anxiety Inventory (STAI). Clinical RAS was accepted to exist if 2 or more of predefined clinical features had been met. **Results:** RAS was observed in 20 patients (16.3%). In the RAS (+) group, the frequency of female gender, low body mass index, total procedure time, and procedures carried out with more than one puncture attempts were significantly higher, whereas smokers were less. BAI and SSAI scores of RAS (+) group were significantly higher. According to the pre-defined cut-off values of all abovementioned scales, only SSAI based comparison revealed the higher frequency of patients with considerable LOA in RAS(+) group (%, 45 vs 75, p=0.013). When regression analyses were performed, total procedure time (HR: 2.96, 95% CI=0.96-9.11; p=0.032) and having an SSAI score over 40 (HR: 2.49, 95% CI=1.09–5.71; p=0.024) were designated as independent predictors of RAS. **Conclusion**:Anxiety is a considerable risk factor for RAS occurrence but the testing method of LOA also matters. Regarding our results, SSAI was an accurate one for anticipating RAS.

Keywords: Anxiety; coronary angiography; radial artery; test anxiety scale

ÖZET Amaç: Radiyal arter spazmı (RAS), bu yolun koroner girişimler sırasında rutin kullanımını kısıtlayan en önemli etkenlerden biridir ve anksiyete RAS için belgelenmiş bir risk belirtecidir. Bu çalışmada, RAS ile farklı ökçeklerle değerlendirilen anksiyete düzeyi arasındaki ilişkinin araştırılması hedeflenmiştir. **Gereç ve Yöntemler:** Planlı elektif koroner anjiyografi yapılacak 123 ardışık hasta çalışmaya dahil edildi. Hastaların demografik ve işlemle ilişkili özellikleri not edildi. Hastalardan üç farklı anksiyete ölçeğini doldurmaları istendi. Bunlar: Beck Anksiyete Ölçeği (BAÖ), Spielberger State Anksiyete Ölçeği (SSAÖ) and Spielberger Trait Anksiyete Ölçeği (STAÖ). Önceden belirlenmiş klinik özelliklerden en az 2 tanesi gözlendiğinde, RAS olduğu kabul edildi. **Bulgular:** RAS, 20 hastada (%16,3) gözlendi. RAS (+) grupta, kadın cinsiyet, düşük beden kitle endeksi ve birden çok kez ponksiyon yapılarak gerçekleştirilen işlemlerin sıklığına ek olarak toplam işlem süresi daha fazlayken; sigara içenlerin oranı daha düşüktü. RAS (+) grubun, BAÖ ve SSAÖ skorları anlamlı olarak yüksekti. Yukarıda adı geçen tüm ölçekler için daha önceden belirlenmiş eşik değerler baz alındığında; sadece SSAÖ'ne göre belirgin anksiyetesi olan hastaların sıklığı RAS (+) grupta daha fazlaydı (%45 ve 75, p=0,013). Regresyon analizi sonuçlarına göre, toplam işlem zamanı (HR: 2,96, %95 GA=0,96-9,11; p=0,032) ve SSAÖ skorunun 40 ve üzerinde olması (HR: 2,49, %95 GA=1,09–5,71; p=0,024) RAS için bağımsız prediktör olarak belirlendi. **Sonuç:** Anksiyete, RAS için kaydadeğer bir risk belirteci olmakla birlikte, ölçüm yöntemi de ciddi önem arz etmektedir. Sonuçlarımıza göre, RAS öngördürme bakımından SSAÖ'nin tutarlı bir yöntem olduğu tespit edilmiştir.

Anahtar Kelimeler: Anksiyete; anksiyete değerlendirme ölçeği; koroner anjiyografi; radiyal arter

Radial artery has widely been used as a default access site for coronary angiography (CAG) and other interventional procedures at recent decades due to its favorable properties like lower vascular complication rates, increased patient comfort and reduced length of hospital stay.[1-5] However, performing a smooth procedure necessitates operator

experience, particularly on issues like avoiding repeated punctures, selecting the proper catheters for cannulating coronary ostia, and manipulating them in the aorta.[2-4] Aside from the requirement for a certain time interval to complete the learning curve, radial artery spasm (RAS) constitutes a major drawback for choosing radial access as the default technique for the operators.[3,4] In association with these two factors, the risk of procedural failure in transradial interventions is higher as compared to transfemoral route.[6] Procedural failure subsequently leads to access site crossover (mostly to femoral artery) which may increase the incidence and severity of vascular injury in addition to adversities like prolongation of the procedure, increased costs and patient demoralization.[6,7]

RAS was reported to occur in 4-20% of transradial procedures and main pathophysiologic mechanism underlying this condition is increased Alpha-1 adrenoreceptor density and endothelial dysfunction.[4,8-10] Female gender, low body mass index (BMI), hypertension, low radial artery diameter, increased caliper and number of catheters used, repetitive puncture attempts and anxiety are well-determined risk factors for occurrence of RAS.[4,6-8]

Anxiety is the sensation of apprehension in response to a partially identified or unspecified stimulus.[11,12] It acts as a trigger for sympathetic system activation which may explain its relationship with RAS.[10,11,13] Anxiety disorders are considerably prevalent among patients with coronary artery disease (CAD) with rates up to 20%.[14,15] Not only the disease state but also the procedures performed for diagnosis and treatment of CAD may induce anxiety due to several reasons like under-recognition of the technical aspects of the procedure, uncertainty about the disease course and treatment options including surgery, and fear of unpredictable pain and potential complications.[11,13-16]

Although association of anxiety state with CAD, CAG and percutaneous interventions, and even RAS was determined, different self-assessment scales had not been comparatively tested for anticipating RAS occurrence. Here we aimed to demonstrate the relationship between RAS and level of anxiety (LOA) -which was quantified with three different tools- along with other conventional risk factors.

MATERIAL AND METHODS

STUDY QUALIFICATION AND PATIENT SELECTION

This study was conducted in a referral cardiology center (performing over three thousand coronary procedures in a year). 123 of 211 candidates scheduled for elective CAG were recruited. Patients whose systolic blood pressure was over 200 mmHg and below 90 mmHg, and individuals with significant peripheral arterial disease (PAD) and those with insufficient palmar circulation (negative Allen test) were excluded. Additionally, patients incapable of reading or perceiving self-assessment scales due to lack of education or altered mental status and eventually those who were subjected to unsuitable peri-procedural conditions (administration of parenteral sedo-analgesia before reaching the end-point, additional diagnostic and therapeutic procedures performed, primary failure due to unsuccessful puncture and secondary failure due to factors other than (RAS) were not involved. Incomplete forms were not taken into consideration either. All procedures were performed by experienced radial operators who have considerable accomplishment rates. Informed consent was received from all participants. This study conformed to the principles of Declaration of Helsinki and was approved by the Istanbul Medipol University ethics committee (07/03/2018, No. 181).

SELF-ASSESSMENT SCALES AND MEASURES OF LOA

Participants were instructed to fill Beck Anxiety (BAI), Spielberger State Anxiety (SSAI), and Spielberger Trait Anxiety Inventories (STAI) before the elective procedure. SSAI and STAI are complementary tests investigating the instantaneous and common state of anxiety/calmness, worry/confidence etc., respectively.[14,17] 40 items should be replied in total for a valid test result. Responses for the SSAI are expressed as 1) not at all, 2) somewhat, 3) moderately so, and 4) very much so. Responses

for the STAI are expressed as 1) almost never, 2) sometimes, 3) often, and 4) almost always. Scores are summed up to obtain total scores, however, scoring should be inverted for items questioning the absence of anxiety (19 items of the 40). For both scales, predefined cut-off values -which had been tested among CAD group in relevant studies- were used.[15,17] Scores over 40 for SSAI and 45 for STAI were accepted as indicators of significant anxiety.

The BAI is a measure of anxiety focusing on somatic symptoms and it helps to discriminate between anxiety and depression. This tool is comprised of 21 items. Respondents indicate how intense they experienced each symptom over the past week. Responses are rated on a 4-point Likert scale and range from 0 (not at all) to 3 (severely). A score of 19 or higher represents moderate to severe anxiety.[17]

PROCEDURAL CHARACTERISTICS

Demographic characteristics of the participants including social features (marriage and occupational status, level of education), common risk factors for CAD and RAS (hypertension, diabetes mellitus, smoking), presence of heart failure were asked and noted. Particular medications that might be associated with the clinical end-point (beta blockers, calcium channel blockers, angiotensin converting enzyme inhibitors, angiotensin receptor blockers, nitrates, alfa blockers and statins) were particularly questioned. Body mass index (BMI), and body surface area (BSA) were calculated.

Procedures were performed preferably from the wrist of non-dominant side. Area was disinfected and prilocaine was locally infiltrated for anesthesia. Radial artery was punctured with a 21 G needle. A 6F sheath (Radifocus® Introducer II, Terumo Corporation, Leuven, Belgium) was inserted with Seldinger method, thereafter. Subsequently, a vasodilatory cocktail (50 U/kg unfractional heparin and 100 mcg nitroglycerin) was administered through the sheath. The number of puncture attempts (one or more), largest catheter size (5F or 6F) and total procedure time (TPT) were noted during the procedure. If more than two catheters were required to complete imaging, it was also specified.

Presence of clinical RAS was verified, if two of the five following conditions were observed at least.[9,10]

- Constant forearm pain
- Pain caused by catheter manipulation
- Severe pain during sheath retrieval
- Marked resistance against catheter manipulation, pushing or pulling
- Marked resistance against sheath retrieval

In 2 procedures catheters could not be advanced due to significant RAS. However, both procedures could be completed after administrating intraarterial additional doses of nitroglycerin and reducing the catheter size. A closure device was used for postprocedural hemostasis (Sunmed™, TR Closure Device, Sunny Medical, Shenzen, China). It was placed over the access site and immediately inflated after the procedure. Pressure was gradually decreased and the device was removed in 2 hours.

STATISTICAL ANALYSES

Statistical analyses were conducted using SPSS (version 17.0, SPSS Inc., Chicago, IL, USA). Statistical significance was defined as a p value < 0.05 for all comparisons. Data were expressed as mean ± standard deviation for continuous variables and percentage for categorical variables. Shapiro-Wilk test was used to test for normal distribution. Continuous variables were compared using Student's t-test for independent samples that showed normal distribution, while the Mann-Whitney U test was used for non-normally distributed samples. Chi-square test was used to analyze the associations of the categorical variables between groups. The results of the analyses were shown on separate graphs with the corresponding Pearson Chi-square and p values.

Receiver operating characteristic (ROC) analysis was also performed for each of the anxiety scores (BAI, SSAI, and STAI) for prediction of radial spasm during coronary angiography. Results of

the ROC analysis were expressed as area under the curve (AOC), standard error (SD), p value and 95% confidence intervals (CI) along with a graphical demonstration. ROC curves for each score is demonstrated on a single graphic for demonstrative purposes.

Univariate and multivariate logistic regression analyses were performed in order to define the independent predictors of radial spasm during coronary angiography. Statistically significant ($p<0.1$) variables in the univariate analysis were tested in the multivariate model. Female gender, BMI < 25 kg/m², non-smoker status, >1 puncture attempts, procedure time, BAI score (continuous variable), SSAI score (continuous variable), and SSAI score ≥40 (categorical variable) were the independent variables, whereas the radial spasm was the dependent variable of the model. Results of the regression analyses were expressed as the p value and hazards ratio (HR) in confidence interval of 95% and demonstrated with a table.

RESULTS

RAS was observed in 20 patients (16.3%). Patients were grouped into two, regarding occurrence of RAS. Baseline features of the entire population and these subgroups were displayed in (Table 1). Most of these demographic features were comparable among groups. Exceptions were higher frequency of females (%, 36 vs 60, p=0.044), non-smokers (%,

TABLE 1: Comparison of the baseline demographic and clinical features of the study population according to the presence of radial spasm during coronary angiography procedure.

Variable	Overall (n= 123)	RAS (-) (n= 103)	RAS (+) (n= 20)	p value
Age (years)	59.2 ± 10.1	59.5 ± 9.8	57.9 ± 11.4	0.496
Female gender, n (%)	49 (40%)	37 (36%)	12 (60%)	0.044
BMI (kg/m²)	30.2 ± 5.7	30.5 ± 5.6	29.1 ± 6.4	0.141
BMI < 25 kg/m²	19 (15%)	13 (12%)	6 (30%)	0.049
BSA (/m²)	1.92 ± 0.18	1.92 ± 0.17	1.89 ± 0.20	0.529
Hypertension, n (%)	79 (64%)	63 (61%)	16 (80%)	0.266
Diabetes Mellitus, n (%)	42 (34%)	37 (36%)	5 (25%)	0.565
Hyperlipidemia, n (%)	44 (36%)	35 (34%)	9 (45%)	0.347
Heart Failure, n (%)	7 (6%)	5 (5%)	2 (10%)	0.363
Smoking, n (%)	35 (29%)	33 (32%)	2 (10%)	0.046
Being married, n (%)	116 (94%)	98 (95%)	18 (90%)	0.363
Level of Education, n (%)				0.314
Primary	95 (77%)	82 (80%)	13 (65%)	
High School	18 (15%)	13 (12%)	5 (25%)	
License	10 (8%)	8 (8%)	2 (10%)	
Occupation, n (%)				0.634
None	79 (64%)	67 (65%)	13 (65%)	
Office work	6 (4%)	4 (4%)	2 (10%)	
Physical work	11 (9%)	10 (10%)	1 (5%)	
Others	26 (21%)	22 (21%)	4 (20%)	
Medication, n (%)				
Beta-blocker	50 (41%)	45 (44%)	5 (25%)	0.119
RAAS-blocker	66 (54%)	54 (52%)	12 (60%)	0.534
CCB	27 (22%)	22 (21%)	5 (25%)	0.719
Nitrate	5 (4%)	4 (4%)	1 (5%)	0.314
Alpha-blocker	3 (2%)	2 (2%)	1 (5%)	0.530
Statin	31 (25%)	27 (26%)	4 (20%)	0.270

BMI: Body mass index; **BSA:** Body surface area; **CCB:** Calcium channel blocker; **RAAS:** Renin-angiotensin-aldosterone system; **RAS:** Radial artery spasm.

68 vs 90, p=0.046), and subjects with a BMI < 25 kg/m² (%, 12 vs 30, p=0.049) in RAS (+) group.

With respect to operational data, TPT (mins, 23.41±10.05 vs. 30.25±10.00, p=0.010) and frequency of the procedures carried out with >1 arterial puncture attempts (%, 8 vs 15; p=0.041) were significantly higher in RAS (+) group. Size and number of the catheters were not found to be associated with RAS. All these parameters were displayed in (Table 2).

In RAS (+) group, mean values of BAI and SSAI scores, and frequency of patients with significant anxiety were higher (Figure 1 and Table 3). These comparisons did not yield a statistical significance for STAI between study groups (Table 3).

Variables, which had been determined to be significantly different between groups were tested in the univariate regression analysis for prediction of RAS occurrence. Among these eight variables (female gender, having a BMI < 25 kg/m², not smoking, TPT, more than one puncture attempts, BAI score, SSAI score, and SSAI score≥40) female gender, not smoking, TPT, SSAI score, and SSAI score≥40 were significantly related with RAS, hence re-tested in multivariate regression model. Eventually, TPT and having an SSAI score ≥40 were established as independent predictors of RAS. Results of these analyses were expressed as beta coefficient, p-value, hazard ratio and 95% confidence intervals in (Table 4).

Overall scores for BAI and SSAI, and frequency of individuals with significant anxiety, which was specified in accordance with pre-defined cut-off values (BAI≥19 and SSAI≥40), were higher in female patients (%, 57 vs 32, p=0.009 and 69 vs 36, p<0.001, respectively). STAI scores of females were significantly higher but the distribution of significant anxiety presence was comparable between genders. Comparison of mean values of anxiety scores in males and females were displayed in (Figure 2). Smoking habit, marriage and occupa-

TABLE 2: Comparison of the procedural characteristics of the study population according to the presence of radial spasm during coronary angiography procedure.

Variable	Overall (n= 123)	RAS (-) (n= 103)	RAS (+) (n= 20)	p value
TPT (min)	24.52 ± 11.02	23.41 ± 10.05	30.25 ± 10.00	0.010
Puncture attempts*, n (%)	11 (9%)	8 (8%)	3 (15%)	0.041
Catheter size, n (%)				0.303
5 F	102 (83%)	87 (85%)	15 (75%)	
6 F	21 (20%)	16 (15%)	5 (25%)	
Catheters used (>2), n (%)	16 (13%)	12 (11%)	4 (20%)	0.310

RAS: Radial artery spasm; **TPT:** Total procedure time. *, More than 1 puncture attempts.

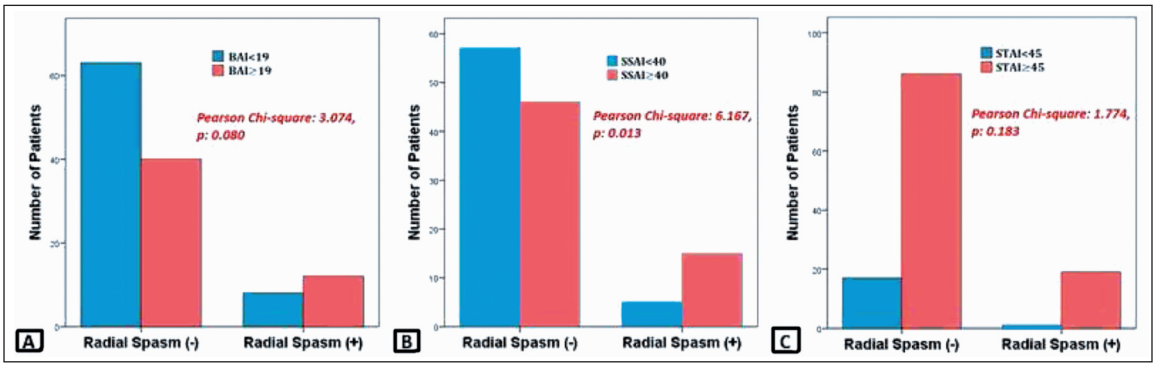

FIGURE 1: Distribution of patients with significant anxiety according to pre-defined values of self-assessment scales in study groups.
BAI: Beck Anxiety Inventory; **SSAI:** Spielberger State-Anxiety Inventory; **STAI:** Spielberger Trait-Anxiety Inventory.

TABLE 3: Comparison of the anxiety scores of the study population according to the presence of radial spasm during coronary angiography procedure.

Variable	Overall (n= 123)	RAS (-) (n= 103)	RAS (+) (n= 20)	p value
BAI score	16.2 ± 12.1	15.1 ± 11.5	22.3 ± 13.6	0.013
BAI score ≥19,* n (%)	52 (42%)	40 (39%)	12 (60%)	0.080
SSAI score	39.4 ± 9.6	38.6 ± 9.3	43.4 ± 10.6	0.041
SSAI score ≥ 40,* n (%)	61 (50%)	46 (45%)	15 (75%)	0.013
STAI score	45.9 ± 6.4	45.7 ± 6.3	46.6 ± 6.8	0.563
STAI score ≥ 45,* n (%)	105 (85%)	86 (84%)	19 (95%)	0.183

BAI: Beck Anxiety Inventory; **RAS:** Radial artery spasm; **SSAI:** Spielberger State Anxiety Inventory; **STAI:** Spielberger Trait Anxiety Inventory. *, Reflects significant anxiety.

TABLE 4: Univariate and multivariate logistic regression analyses to determine the independent predictors of radial spasm during diagnostic coronary angiography.

		Univariate Analysis	
Variable	**Hazard Ratio**	**95% Confidence Interval**	**p value**
Female gender	1.216	0.481–3.075	0.089
BMI < 25 kg/m²	0.998	0.987–1.010	0.197
Non-smoker	1.009	0.991–1.028	0.039
>1 puncture attempts	0.980	0.966–0.994	0.332
TPT	4.083	1.709–9.759	0.021
BAI score	0.725	0.270–1.949	0.254
SSAI score	2.545	1.052–6.160	0.023
SSAI score ≥ 40	3.130	1.169–8.380	0.012
		Multivariate Analysis	
	Hazard Ratio	**95% Confidence Interval**	**p value**
Female gender	1.033	1.012–1.054	0.272
Non-smoker	1.116	0.816–1.416	0.134
TPT	2.955	0.958–9.108	0.032
SSAI score	1.040	1.023–1.057	0.114
SSAI score ≥ 40	2.491	1.086 – 5.714	0.024

BAI: Beck Anxiety Inventory; **BMI:** Body meass index; **SSAI,** Spielberger State Anxiety Inventory; **STAI:** Spielberger Trait Anxiety Inventory; **TPT:** Total procedure time.

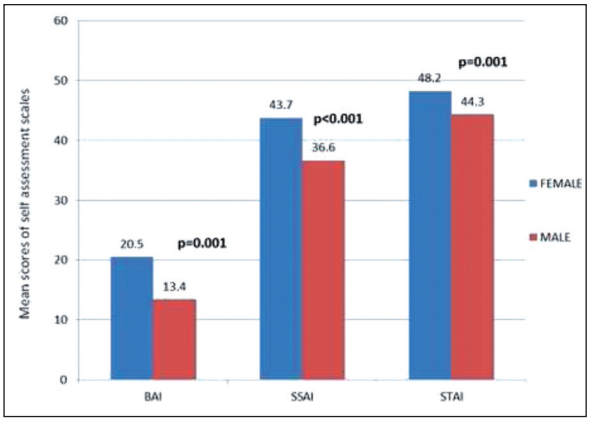

FIGURE 2: Comparison of mean scores of self-assessment scales in male and female patients. **BAI:** Beck Anxiety Inventory; **SSAI:** Spielberger State-Anxiety Inventory; **STAI:** Spielberger Trait-Anxiety Inventory.

tional status, and level of education were not found to be related with LOA.

DISCUSSION

Reduction of vascular complications, length of hospital stay and costs are major benefits of selecting transradial approach for coronary interventions. These benefits are particularly pronounced in high-risk populations like patients with acute coronary syndromes.[1,2] However, higher rates of procedural failure cause an unwillingness in health care professionals against routine utilization of radial route.[1,6]

RAS is a common reason for secondary procedural failure.[4,6] The exact incidence of RAS is undetermined mainly due to controversies about definition and diagnosis of the event.[7] The term clinical RAS was used in several studies, which relied on resistance against manipulation or removal of sheath and catheters or presence of severe pain during these maneuvers.[4,7,9,10] We also used these criteria to identify the event.

Female gender, low BMI, diabetes mellitus, hypertension, advanced age, low caliber radial artery, and anxiety are well-established patient-related factors for RAS occurrence.[4,7,9,10] Just as smoking is known to be closely related with endothelial dysfunction, so is the RAS. However, smoking was found to be inversely related with RAS in an FMD study performed by Deftereos et al. which is in analogy to our data.[18,19] They explained this phenomenon with a "smoking paradox" and reported that the relationship was not consistent after necessary adjustments.[18] Anxiety was also shown to be in close association with abnormal blood flow patterns based on endothelial dysfunction, which most probably exhibits its role in RAS pathophysiology.[9,10,20,21] Periprocedural anxiety is a frequent condition both in conventional and computed tomography CAG.[11-13,16,22] Although ambivalent results had been obtained in several studies, patients feel more apprehension instantly before the procedure, which remains high at the early postoperative period but decreases gradually in a few months.[11,13,16,23] According to findings of the studies performed by Delewi et al. (VAS was used) and Ozdemir et al. (Hospital Anxiety-Depression Scale, SSAI, and STAI were used), LOA even increases after the procedure in patients without significant coronary artery lesions. This is probably due to the perception of being misdiagnosed and not having a curable disease state.[11,16] Regardless of the results of CAG, the perception of health and quality of life are impaired in this population.[22] Post-operative LOA and relationship of LOA with coronary lesions were not addressed as outcomes in our study.

In addition to abovementioned issues, anxiety has a negative impact on CAD course, not only by impairing quality of life but also resulting in worse outcomes.[11,15,23-25] However, according to a meta-analysis, psychological interventions targeting stress or emotional disorders, did not reduce total mortality or repeated revascularisation rates in CAD patients.[26] Moryś et al. reported that clinically significant anxiety symptoms exist approximately in 38% of their sample population comprising stable CAD patients. They compared five different scales including SSAI and STAI for measuring LOA and no statistical differences were observed between them.[14] In our population according to BAI and SSAI scoring systems, rates were slightly higher (42 and 50%, respectively)

Ercan et al. investigated the relationship between RAS and anxiety. They used Hamilton Anxiety Scale for quantification. They concluded that RAS was significantly correlated with anxiety score and female gender.[10] Deftereos et al. denoted that administration of fentanyl and midazolam combination before coronary intervention significantly reduced RAS.[8] Another study failed to demonstrate that routine administration of midazolam could reduce RAS. The authors only found female gender as a predictor for RAS occurrence.[27] Raut et al. reported a case that a severe RAS could only be relieved by administration of intravenous propofol where midazolam and opioids failed.[28] In our study, RAS occurred more frequently in female patients, but it could not be established as an independent predictor. Female patients also expressed higher LOA according to BAI and SSAI questionnaires, and in entire sample population, having significant anxiety regarding SSAI scale was an independent predictor of RAS. Our participants did not receive any medication targeting anxiety before the procedure. Additionally, low body mass index, more than one radial artery puncture attempts, being non-smoker and longer TPT were other features which had been observed significantly higher in RAS+ subjects.

Aside from gender differences, age and level of education were also designated as factors affecting LOA in patients undergoing CAG.[11,13] Patients with advanced age and lower level of education experienced higher LOA, but this relationship could not be confirmed in our study.

CONCLUSION

In this study three scales quantifying LOA were investigated by means of accuracy for predicting RAS occurrence. BAI and SSAI scores were significantly higher in RAS (+) group of our sample population and significant anxiety indicated by SSAI (onsidering pre-defined cut-off values) was an independent predictor for RAS occurrence.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Mehmet Onur Omaygenç, Ersin İbişoğlu, İbrahim Oğuz Karaca, Ürun Özer;* ***Design:*** *Mehmet Onur Omaygenç, İbrahim Oğuz Karaca, Ürun Özer, Beytullah Çakal, Hacı Murat Güneş;* ***Control/Supervision:*** *Derya Özden Omaygenç, Ersin İbişoğlu, Mehmet Onur Omaygenç, Ürun Özer,* ***Data Collection and/or Processing:*** *Mehmet Onur Omaygenç, Derya Özden Omaygenç, Ersin İbişoğlu, Oktay Olmuşçelik, Hacı Murat Güneş, Beytullah Çakal;* ***Analysis and/or Interpretation:*** *Mehmet Onur Omaygenç, Bilal Boztosun, Derya Özden Omaygenç, İbrahim Oğuz Karaca;* ***Literature Review:*** *Hacı Murat Güneş, Oktay Olmuşçelik, Beytullah Çakal, Derya Özden Omaygenç, Mehmet Onur Omaygenç;* ***Writing the Article:*** *Mehmet Onur Omaygenç, Derya Özden Omaygenç;* ***Critical Review:*** *Bilal Boztosun, İbrahim Oğuz Karaca;* ***References and Fundings:*** *Bilal Boztosun;* ***Materials:*** *Mehmet Onur Omaygenç.*

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