

Original Article

The association between Type D personality and major cardiovascular adverse events in acute coronary syndrome patients

Akif Arslan¹, Kadir Demirci², Bahriye Arslan³, Mehmet Akgonul², Fatih Kahraman¹, Fatih Aksoy⁴

¹Department of Cardiology, Faculty of Medicine, Suleyman Demirel University, Isparta, Turkey; ²Department of Psychiatry, Faculty of Medicine, Suleyman Demirel University, Isparta, Turkey; ³Department of Family Medicine, Faculty of Medicine, Suleyman Demirel University, Isparta, Turkey; ⁴Department of Cardiology, Dinar State Hospital, Afyonkarahisar, Turkey

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Abstract: Background: Type D (distressed) personality is characterized by a combination of negative affectivity and social inhibition. There are divergent results on the association between Type D personality and cardiovascular events. We aimed to assess the association between Type D personality and in-hospital major adverse cardiovascular event (MACE) in Turkish patients presenting with acute coronary syndrome. Methods: One hundred consecutive patients admitted to a coronary care unit with the diagnosis of acute coronary syndrome were included in the study. Type D personality was evaluated with the Turkish version of the 14-item Type D Scale. Results: Seventy eight patients were male, the mean age of subjects were 61.7 ± 11.9 years old. The prevalence of type D personality was 45%. Presence of MACE was independently associated with type D personality (OR: 10.817, 95% CI: 1.765-66.301, $P = 0.01$), presence of STEMI (OR: 7.860, 95% CI: 1.588-38.900, $P = 0.012$) and low LVEF (OR: 7.842, 95% CI: 1.557-39.501, $P = 0.013$). Conclusion: Type D personality is an independent risk factor for MACE in acute coronary syndrome patients.

Keywords: Type D personality, cardiovascular adverse events, acute coronary syndrome

Introduction

It has been shown that hypertension, hyperglycemia, hyperlipidemia, smoking, older age, obesity, male sex and physical inactivity are traditional risk factors for coronary artery diseases (CAD) [1, 2]. Additionally, behavioral risk factors such as presence of Type A personality have been shown to be associated with an increased risk for the development of CAD [3]. In recent years a new personality trait has been defined which is called Type D (distressed) personality and is characterized by a combination of negative affectivity (NA) and social inhibition (SI). NA is expressed as a tendency to experience negative emotions such as anxiety, depression, anger, irritation, and hostility. SI is expressed as the tendency to inhibit self-expression [4].

There are conflicting results on the association between Type D personality and cardiovascular

events. Previous studies investigating the relationship between Type D personality and major adverse cardiovascular events (MACE) in CAD patients have shown contradictory results [5-10].

There is no data on Type D personality and cardiovascular adverse events in the Turkish population. Therefore, in this study, we aimed to assess the association between Type D personality and in-hospital MACE in Turkish patients presenting with acute coronary syndrome (ACS).

Materials and methods

Patients

One hundred consecutive patients admitted to a coronary care unit with the diagnosis of ACS were included in the study. All patients were treated according to current published guidelines for ACS [11, 12]. Patients with life-threat-

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Table 1. Baseline demographic and clinical characteristics

Variable	Type D (n = 45)	Non-Type D (n = 55)	P
Age, years	60.2±13.6	62.9±10.4	0.260
Female, gender	14 (31.1)	8 (14.5)	0.047
Marital status (married)	42 (93.3)	54 (98.1)	0.218
Higher Education	11 (24.4)	9 (16.3)	0.315
Smoking	22 (48.9)	20 (36.4)	0.207
Diabetes mellitus	15 (33.3)	19 (34.5)	0.899
Hypertension	22 (48.9)	21 (38.2)	0.282
Hyperlipidemia	6 (13.3)	14 (25.5)	0.132
History of CAD	35 (77.8)	15 (27.3)	<0.001
HDL Cholesterol (mg/dL)	39.5±10.7	40.7±10.2	0.588
LDL Cholesterol (mg/dL)	111.8±34.9	101.2±37.7	0.152
Triglycerides (mg/dL)	125 (101-181)	139 (98-183)	0.868
Low LVEF (<40%)	7 (15.6)	10 (18.1)	0.728
Clinical Presentation (STEMI)	15 (33.3)	20 (36.3)	0.752
Multi-vessel disease	25 (55.6)	25 (45.5)	0.315
MACE	9 (20)	3 (5.5)	0.026

Note: Values are stated mean ± SD or median (Inter-quartile range (IQR) of 25%-75% percentiles) for numeric variables, n (%) for categorical variables. CAD: Coronary artery disease, HDL: High density lipoprotein, LDL: Low density lipoprotein, LVEF: Left ventricular ejection fraction, MACE: Major adverse cardiac event, STEMI: ST elevated myocardial infarction.

Table 2. Comparison of patients with and without MACE during hospitalization

Variable	With MACE (n = 12)	Without MACE (n = 88)	P
Age, years	63.6±15.8	61.5±11.5	0.568
Female, gender	4 (33.3)	18 (20.5)	0.312
Marital status (married)	11 (91.7)	85 (96.5)	0.414
Higher Education	3 (25)	17 (19.3)	0.644
Smoking	5 (41.7)	37 (42)	0.980
Diabetes mellitus	2 (16.7)	32 (34.6)	0.177
Hypertension	5 (41.7)	38 (43.2)	0.921
Hyperlipidemia	0 (0)	20 (22.7)	0.065
History of CAD	9 (75)	41 (46.6)	0.065
HDL Cholesterol (mg/dL)	37.5±7.7	40.5±10.7	0.357
LDL Cholesterol (mg/dL)	111.0±34.5	105.3±37.2	0.619
Triglycerides (mg/dL)	133 (98-184)	131 (100-183)	0.878
Low LVEF (<40%)	6 (50)	11 (12.5)	0.001
Clinical Presentation (STEMI)	9 (75)	26 (29.5)	0.002
Multi-vessel disease	6 (50)	44 (50)	1.000
Type D Personality	9 (75)	36 (40.9)	0.026

Note: Values are stated mean ± SD or median (Inter-quartile range (IQR) of 25%-75% percentiles) for numeric variables, n (%) for categorical variables. CAD: Coronary artery disease, HDL: High density lipoprotein, LDL: Low density lipoprotein, LVEF: Left ventricular ejection fraction, MACE: Major adverse cardiac event, STEMI: ST elevated myocardial infarction.

ening comorbid non-cardiac disease, major psychiatric disorders, cancer and poor cognitive functions were excluded from the study. Each patient signed an informed consent form, and the study was approved by the local medical ethics committee.

The patients' data including age, gender, risk factors for coronary artery disease (hypertension, diabetes mellitus, hyperlipidemia and smoking) and previous medical history were recorded. Echocardiographic examination and coronary angiography were performed in each patient. Re-infarction, stent thrombosis, stroke, heart failure, serious ventricular arrhythmias and cardiovascular mortality were defined as MACE in the present study.

Type D scale

Type D personality, SI and NA were evaluated with the Turkish version of the 14-item Type D Scale (DS-14) [13]. The scale has 14 items in total, 7 for SI and 7 for NA. The items were answered using a 5-point Likert scale ranging from 0 to 4 (0 = false, 1 = rather false, 2 = neutral, 3 = rather true, 4 = true). Scores were calculated separately for two subgroups of Type D personality. A cutoff of 10 on SI and NA subscales were used to classify subjects as Type D (SI≥10 and NA≥10).

Statistical analyses

SPSS version 16.0 software package program was used in the statistical analyses of the study. Categorical variables were expressed as frequency (%) and compared with the χ^2 test. A Kolmogorov-Smirnov test was used to test the distribution of numeric variables, and those with normal

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Table 3. Multivariate predictors of MACE

Variables	OR	95% CI	P
Type D Personality	10.817	1.765 to 66.301	0.010
Low LVEF (<40%)	7.842	1.557 to 39.501	0.013
STEMI	7.860	1.588 to 38.900	0.012

LVEF: Left ventricular ejection fraction, MACE: Major adverse cardiac event, STEMI: ST elevated myocardial infarction.

distribution were expressed as mean \pm standard deviation and were compared with the Student's t-test. Data without normal distribution were expressed as median (Inter-quartile range (IQR) of 25%-75% percentiles) and were compared with the Mann-Whitney U test. In all statistical analyses, *p* values <0.05 were considered as statistically significant. In the comparison of patients with or without MACE, variables yielding a *p* value <0.05 were included in a multivariate logistic regression analysis.

Results

One hundred subjects were included in the study (mean age 61.7 \pm 11.9 years old, 78 male [78%]). Thirty five (35%) of the patients had ST elevated myocardial infarction (STEMI) and 65 (65%) had non-ST elevated ACS.

Forty five patients (45%) showed type D personality. The prevalence of Type D personality was higher in women compared to men (31.1% vs. 14.5%, *P* = 0.047). History of CAD was higher in Type D patients than those non-Type D patients (*P*<0.001). Furthermore, the prevalence of MACE was higher in Type D patients than those non-Type D patients (*P* = 0.026). All other demographic and clinical characteristics were similar (all *p* values >0.05) in Type D and non-Type D patients (**Table 1**).

MACE developed in 12 patients during hospitalization (8 = heart failure, 1 = ventricular fibrillation, 1 = death, 1 = stent thrombosis, 1 = cerebrovascular accident). Low left ventricular ejection fraction (LVEF <40%) was higher in the MACE group than the non-MACE group (50% vs. 12.5%, *P* = 0.001, **Table 2**). The prevalence of STEMI (75% vs. 29.5%, *P* = 0.002) and the prevalence of Type D personality (75% vs. 40.9%, *P* = 0.026) was significantly higher in the MACE group than the non-MACE group (**Table 2**). Other demographic and clinical characteristics were similar in both groups (all *p* values >0.05, **Table 2**).

In the comparison of patients with or without MACE, variables (Type D personality, EF and STEMI) yielding a *p* value <0.05 were included in a multivariate logistic regression analysis. Presence of MACE was independently associated with Type D personality (OR: 10.817, 95% CI: 1.765-66.301, *P* = 0.01), STEMI (OR: 7.860, 95% CI: 1.588-38.900, *P* = 0.012) and low LVEF (OR: 7.842, 95% CI: 1.557-39.501, *P* = 0.013) (**Table 3**).

Discussion

The aim of the present study was to assess the association between Type D personality and in-hospital MACE in ACS patients. The prevalence of Type D personality was detected in 45% of ACS patients; this value is higher than the prevalence of Type D personality in the general population [14-16], but similar to CAD patients [14, 17]. In the current study, the prevalence of Type D personality was slightly higher in women than in men. This has also been shown in one previous study [18] but is contrary to the data shown in other studies [10, 19, 20]. Additionally, unlike data shown in previous studies [10, 14, 21] we have observed that the prevalence of Type D personality was higher in patients with a history of CAD.

In the current study, the incidence of MACE was significantly higher in Type D ACS patients. This data is corroborated by several previous studies [7-9, 22], but is opposite to the data shown in one study [10]. Additionally, we have observed that the presence of MACE was independently associated with Type D personality, STEMI and low LVEF.

Traditional cardiovascular risk factor such as hypertension, diabetes mellitus, hyperlipidemia and smoking were not associated with MACEs in our study as was also reported by Pedersen, et al [23] and Konishi, et al [24]. Moreover, Pedersen, et al [23] did not report any association between multivessel coronary artery disease and MACE, which is supported by our study but is in contrast to the data reported by Konishi, et al [24]. We thought that these differences might be related to the small sample size of the present study. In two previous studies that evaluated patients undergoing percutaneous coronary intervention, Type D personality was associated with adverse clinical events, similar to the observations of the current study [23, 25].

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Low LVEF is an important determinant of adverse clinical events in cardiac patients. In our study low LVEF was independently associated with MACE, as also shown previously [24, 26-28]. Additionally, the presence of ST elevation in ACS patients at admission was associated with a worse clinical outcome compared to non-ST elevated patients. This has also been shown in previous studies [28-30].

Conclusion

We have shown in this study that Type D personality is an independent risk factor for MACE in ACS patients. We recommend that routine DS-14 test may be useful for the follow-up of ACS patients and according to the test results the patients may need to be monitored more closely. Large scale randomized trials are needed to further support this recommendation.

Disclosure of conflict of interest

None.

Address correspondence to: Akif Arslan, Department of Cardiology, Faculty of Medicine, Suleyman Demirel University, Isparta, Turkey. E-mail: dr.aki-farslan@hotmail.com

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