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Research article

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The relationship between blood pressure regulation and alexithymia variability in newly diagnosed essential hypertension patients

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Ethics Committee of Bilecik Provincial Health Directorate, 15.04.2020 (Number: 2020/016). All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

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No conflict of interest was declared by the authors.

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Abstract

Background/Aim: Blood pressure disorder can accompany mood and various psychosomatic disorders. One of the signs of emotional disorganization is alexithymia, which is defined as the impaired ability to experience and express emotions. The relationship of hypertension (HT) with alexithymia is well known, but few studies show the change in alexithymia status after blood pressure regulation. Our study aimed to evaluate the level of alexithymia caused by optimal medical treatment in newly diagnosed essential HT patients.

Methods: Fifty-six essential HT patients (33 males, 23 females) diagnosed with 24-hour ambulatory blood pressure monitoring were included in this cross-sectional study. All participants filled the Toronto Alexithymia Scale (TAS-20) during diagnosis and when blood pressure was regulated with treatment.

Results: The mean age of the study group was 50.7 (9.9) years. There were twenty-three (41.1%) females. As expected, the systolic and diastolic blood pressure values were significantly lower after treatment (144.41 (9.11) / 89.42 (9.31) mmHg vs. 122.75 (7.27) /74.96 (3.18) mmHg, $P<0.001$ for both). While TAS-DIF (difficulty identifying feelings) and TAS-EOT (externally oriented thinking) did not significantly change after treatment, a significant decrease was observed in TAS-DDF (difficulty describing feelings) (14.29 (3.51) vs 12.57 (3.06), $P<0.01$). Total TAS score, TAS-20, was also significantly decreased after treatment (55.67 (8.82) vs 52.35 (7.71), $P=0.036$).

Conclusion: Our findings show that TAS-DDF, one of the subscales of alexithymia, can be improved by regulating blood pressure. We think that psychiatric and emotional states should be evaluated in the follow-up of HT. It is also essential to increase the awareness of patients about coping with stress and stress management.

Keywords: Alexithymia, Essential hypertension, Blood pressure regulation, Toronto Alexithymia Scale

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Introduction

Hypertension (HT) is a global, common health problem that affects approximately 1.13 billion people [1]. It is a significant cause of mortality and morbidity due to its direct and indirect cardiovascular and neurovascular complications [2]. Etiologically, it is examined in two main groups. Essential (primary) HT is the most common cause and constitutes 95% of the cases [3]. The others are secondary causes. The etiology of essential hypertension is multifactorial. Many studies showed that negative psychological conditions both increase blood pressure and cause newly diagnosed hypertension [4-6]. These include anger, anxiety, depression, acute stress, the effect of negative emotions, and Type D personality, such as many psychiatric conditions [7, 8]. In such psychiatric problems, disorders in the autonomic nervous system assume a part in the pathogenesis of HT. There is also alexithymia among the psychological dimensions investigated in connection with HT [9-11].

Alexithymia is a versatile and transdiagnostic condition characterized by a complex and externally oriented way of thinking and recognizing and distinguishing emotions. It has a prevalence of 7-10% in the general population [12, 13]. Numerous studies investigated the relationship between HT and alexithymia with different results. Some authors reported a significant relationship, others reported a mild one, while a small number of studies reported none [14-16]. The auscultatory technique traditionally used in blood pressure assessment can yield incorrect results in psychosomatic cases and show an instant value. Ambulatory blood pressure monitoring (ABPM) enabled 24-hour blood pressure measurement and recognition of white coat HT and masked HT [17].

Our study aimed to compare the pre-treatment and post-treatment alexithymia levels in patients with a newly diagnosed HT with ABPM.

Materials and methods

Study population

The data of sixty-five patients with newly diagnosed HT between the ages of 18-65 years who visited the cardiology and nephrology outpatient clinics between March 2020 and June 2020 were reviewed. Patients diagnosed with HT for the first time with ABPM who received two months of medical therapy and had regulated blood pressure in control visits met the inclusion criteria. Control blood pressure analysis was performed with 24-hour ABPM. Nine patients were excluded from the study because optimal blood pressure values could not be achieved. In total, 56 patients were included in this cross-sectional study. TAS scale was filled by all participants at the time of HT diagnosis and after antihypertensive treatment for at least two months.

We excluded those with the following criteria:

- Antihypertensive drug use in the last six months
- Known coronary artery disease and myocardial infarction
- Heart failure (LVEF <50%)
- Valvular heart disease (moderate or severe)
- Systemic and secondary HT
- Diabetes mellitus (Types 1 and 2)
- Chronic renal failure (GFR <60 ml / min)
- Chronic pulmonary disease (COPD, asthma, etc.)
- Pulmonary HT (sPAB > 25 mmHg)
- Hemoglobin <11 gr / dL
- Active infection
- Atrial fibrillation
- Neurological and psychiatric disorders
- Patients in which blood pressure could not be regulated with medical therapy.

General assessment and laboratory measurements

A complete physical examination was performed on all participants included in the study, a detailed medical history was obtained, and the findings were recorded. Patients' demographic information, sociocultural levels, lifestyles, medical and psychiatric information were collected through face-to-face interviews. Participants' blood pressure was measured using the traditional auscultatory technique in the initial assessment. Measurements were obtained from both arms with the feet touching the ground, after at least 15 minutes of rest. Height, weight, and waist circumference were measured. Body mass index (BMI) was calculated using the formula [weight (kg) / height (m^2)].

After 12 hours of fasting, venous blood samples were obtained from all participants for a complete blood count and biochemical analysis. A urine sample was obtained for complete urinalysis. The biochemical analysis included fasting blood glucose, kidney function tests, liver function tests, lipid profiles, thyroid hormones, albumin, protein, and serum electrolytes. Protein, glucose, leukocyte, and urine crystals were analyzed in the urine. Renal and color Doppler ultrasound were performed on all participants to investigate secondary HT. Conventional echocardiographic evaluation was conducted in the entire study group in the left lateral decubitus position. Suprasternal imaging was performed to investigate the presence of aortic coarctation. EPIQ 7 echocardiography device (Philips, Amsterdam, the Netherlands) was used for echocardiographic evaluations.

Ambulatory blood pressure monitoring

Ambulatory blood pressure measurements were performed with a measuring device (GE CardioSoft Tonoport V) that conformed to the ESC / ESH guideline criteria. It was measured every half hour during the day and every hour at night. Standard device settings were used between 08:00-22:00 for daytime measurements and between 22:00-08:00 for night measurements. Blood pressure values were evaluated according to the ESC / ESR guidelines. The diagnostic threshold for hypertension was a mean value of ≥130 / 80 mmHg for 24 hours, 135/85 mmHg during the day, and 120/70 at night [17]. In the comparison of nighttime systolic blood pressure (SBP) and/or diastolic blood pressure (DBP) measurements with daytime averages, those with> 10% nocturnal drops were defined as dipper, and 10% or fewer declines were defined as non-dippers.

Toronto Alexithymia Scale

Toronto Alexithymia Scale (TAS) is a Likert-type self-assessment scale consisting of twenty items, scored between 1 and 5 (1=never, 5=always), used to evaluate the level of alexithymia of the individual [18]. Items 4, 5, 10, 18, and 19 are scored in reverse. The scale consists of three subscales:

Difficulty identifying feelings (DIF), difficulty describing feelings (DDF), and externally oriented thinking (EOT).

- TAS DIF: The difficulty identifying feelings sub-scale consists of seven items (1, 3, 6, 7, 9, 13, and 14) is defined as difficulty in identifying emotions and distinguishing them from bodily sensations that accompany emotional arousal.
- TAS DDF: The difficulty describing feelings subscale consists of five items (items 2, 4, 11, 12, and 17) and is defined as difficulty conveying emotions to others.
- TAS EOT: The externally oriented thinking subscale consists of eight items (items 5, 8, 10, 15, 16, 18, 19, and 20). The presence of an extrovert cognitive structure is defined as the weakness of introverted thinking and imagination power.

Participants are asked to mark one of the options, such as never, rarely, sometimes, often, and always. A high score indicates increased alexithymia. In the Turkish version used in this study, the cut-off score was 59 to identify individuals with alexithymia [19]. Scores are interpreted as follows: <50 points: No alexithymia, 51-60 points: Possible alexithymia, > 61 points: Definite alexithymia.

Statistical analysis

In the statistical analysis of the data, numerical variables were expressed as arithmetic mean (standard deviation) and categorical variables as percentages. The one-sample Kolmogorov–Smirnov test was used to determine whether the numerical variables showed a normal distribution. For assessing differences between groups, the Student t-test was used for normally distributed parameters, while the Mann-Whitney U test was used for non-normally distributed parameters. Spearman's correlation test was used to evaluate the existence of a linear relationship between non-normally distributed parameters. The presence of a linear relationship between normally distributed parameters was assessed with Pearson's correlation test. $P<0.05$ showed statistical significance. IBM SPSS for Windows (Version 22.0. Armonk, NY: IBM Corp.) was used for data analysis.

Ethics

After informing all participants about the study, a written informed consent form was obtained from those who volunteered to participate. The study was conducted according to the principles of the Helsinki Declaration. Local ethics committee approval was received for this study from Bilecik Provincial Health Directorate (No: 2020/016).

Results

The study included a total of 56 individuals, 23 females (41.1%) and 33 (58.9%) males. The mean age of the study group was 50.7 (9.9) years. Among all, 76.8% were married. The intermediate education level was 7.3 (4.2) years. Most patients resided in the city center (62.5%). The number of people working in a specific profession for at least the last six months was 44 (78.6%), while 12 (21.4) individuals were unemployed. The mean BMI of the participants was 28.3 (4.6) kg/m^2. The TAS-20 scale scores of 16 (28.6%) subjects were ≥61, those of 18 subjects (32.1%) were between 50-61, and those of 22 subjects (39.3%) were below 50 before the treatment. The demographic, anthropometric, and sociocultural information of the patients is presented in Table 1.

Table 1: Demographic, anthropological, lifestyle and psychological variables

Variables	Study group (56) Mean (SD)	n	%
Age (years)	50.7 (9.9)		
Gender	Female	23	41.1
	Male	33	58.9
Height (cm)	169 (12.6)		
Weight (kg)	76 (11. 6)		
BMI (kg / m^2)	28.3 (4.6)		
Smoking	User	21	37.5
	Not user	35	62.5
Marital status	Married	43	76.8
	Single	13	23.2
Education level	Literate	6	10.7
(Mean: 7.3 (4.2) years)	Primary education	25	44.6
	High school	18	32.2
	University	7	12.5
Living place	Rural	8	14.2
	County	13	23.3
	Province	35	62.5
Working Status	Working	44	78.6
	Not working	12	21.4
TAS-20 point	≥ 61	16	28.6
	50 – 60	18	32.1
	≤ 50	22	39.3

SD: Standard deviation, BMI: Body mass index, TAS-20: Toronto Alexithymia Scale- 20

The SBP and DBP values significantly decreased in the post-treatment group (144.41 (9.11) / 89.42 (9.31) vs 122.75 (7.27) / 74.96 (3.18), $P<0.001$ for both) compared to pre-treatment. While there was no significant difference for TAS-DIF (19.30 (5.49) vs. 18.14 (4.49), $P=0.215$) and TAS-EOT (22.09 (3.44) vs. 21.64 (3.75), $P=0.514$) in TAS scale evaluation, significant decreases were observed in TAS-DDF (14.29 (3.51) vs 12.57 (3.06), $P<0.01$) and TAS 20 with treatment (55.67 (8.82) vs. 52.35 (7.71), $P=0.05$). Pre-treatment and post-treatment mean blood pressure and TAS scale comparisons are shown in Table 2.

Table 2: Comparison of pre-treatment and post-treatment 24-hour ABPM blood pressure values and TAS scale

Variables	Pre-treatment Mean (SD)	Post-treatment Mean (SD)	*P*-value
SBP (mmHg)	144.41 (9.11)	122.75 (7.27)	<0.001
DBP (mmHg)	89.42 (9.31)	74.96 (3.18)	<0.001
TAS-DIF	19.30 (5.49)	18.14 (4.49)	0.215
TAS-DDF	14.29 (3.51)	12.57 (3.06)	0.01
TAS-EOT	22.09 (3.44)	21.64 (3.75)	0.514
TAS-20	55.67 (8.82)	52.35 (7.71)	0.05

SBP: systolic blood pressure, DBP: diastolic blood pressure, TAS: Toronto Alexithymia Scale, DIF: difficulty identifying feelings, DDF: difficulty describing feeling, EOT: externally oriented thinking

Discussion

We showed that the level of TAS-DDF and the total TAS-20 score significantly decreased by providing blood pressure regulation with medical treatment in newly diagnosed essential HT patients. The primary goal of this study was to investigate the association between hypertension and alexithymia, considering drug therapy and focusing on other aspects of hypertension.

While psychosomatic studies on hypertension focus particularly on anxiety, anger, and negative emotional reactions, the number of studies conducted to evaluate the relationship between emotions that are not consciously recognized is limited [6, 20, 21]. In our study, the relationship between blood pressure regulation and the level of alexithymia, which is a personality concept, was evaluated. Several previous studies report a strong relationship between HT and alexithymia. In the studies of Todarello et al. [15] and Grabe et al. [9], alexithymia was an independent risk factor for HT. We got similar results on the

total TAS-20 scale. These studies differed from ours in that only the total alexithymia level was evaluated.

On the other hand, we included three different subscales of alexithymia in our study and found that TAS-DDF was also associated with high blood pressure. We consider this an important finding. Significant differences among TAS-20 subscales emphasize the importance of the dimensional character of alexithymia and further strengthen the need for factor-based approaches in alexithymia research. Another different and superior aspect of our study was that 24-hour ABMP was used instead of the general auscultatory technique in HT. In this way, masked HT and white coat HT were largely excluded. Again, in an old study conducted in 1999, emotional improvements were observed in treated HT patients [14]. In this study, the TAS-20 scale, which is the previous version of the current TAS-26 scale, was used. We used the current version and the Turkish version [19].

In the literature, the incidence of alexithymia, which is around 10%, is reported to increase up to 55-65% among HT patients [22-24]. In our study, the probable and exact rate of alexithymia was around 60% in newly diagnosed patients who had not yet started antihypertensive drugs. The actual and possible percentage of alexithymia was close to that in the literature.

Alexithymia was associated with physiological conditions that can lead to medical diseases [25, 26). It was reported that the level of alexithymia is higher in some chronic, autoimmune and systemic diseases compared to the average population [27-29]. A larger study investigating the relationship between alexithymia and metabolic syndrome (MetS) reported that the rate of alexithymia was significantly higher in patients with MetS. In this study, it was significantly associated with waist circumference, triglycerides, and HT [30]. In a recent study, hypertensive patients were more alexithymic than normotensive participants, similar to other studies [10]. However, treated hypertensive patients were more alexithymic than normal and untreated patients. In our study, we found that blood pressure regulation reduces alexithymia. We think that the different results may be due to the socio-cultural differences of the patient populations. The anxiety of having a chronic illness and its psychological dimension may have various consequences for societies. The person feels safe by being treated or, on the contrary, having a chronic disease and the necessity to receive long-term medical treatment and the expected lifestyle change may affect the level of alexithymia differently.

The study has some limitations. The first and main limitation of the study was the few numbers of participants and the relatively short follow-up time. Another limitation was that the research was conducted in a single center.

Conclusions

Our findings further back the hypothesis that alexithymia is linked with hypertension. TAS-DDF, one of the different dimensions of alexithymia, seems to be the most important feature that explains this connection. In many chronic diseases such as HT, alexithymia is more common than in the normal population. Still, we showed that this rate can be reduced with blood pressure regulation after optimal treatment. In the follow-up and treatment of HT, we think that the psychiatric conditions of the patients should also be investigated, psychological support should be obtained when necessary and this should be a part of the treatment. There is a need for future studies on the subject with larger populations and longer follow-up periods.

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