High prevalence of posttraumatic stress in patients with primary hypertension ☆,☆☆

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ABSTRACT

Objective: Posttraumatic stress disorder (PTSD) is associated with a higher rate of arterial hypertension. However, data about prevalence rates of PTSD in patients suffering from arterial hypertension as well as the relation to blood pressure (BP) control are lacking.
Methods: We recruited 145 patients with primary hypertension from March to November 2012 at the cardiologic outpatient clinic at Ulm University Medical Center. Symptoms of PTSD (assessed with the Posttraumatic Diagnostic Scale), perceived stress (Perceived Stress Scale; Trier Inventory for Chronic Stress), depression and anxiety (Hospital Anxiety and Depression Scale) were assessed by self-report. Office BP was measured and medical data were collected.
Results: Criteria for a full PTSD syndrome were met by 13 patients (9%). Posttraumatic stress was higher in the group of patients with controlled ($M=10.9$, S.D.$=9.8$) than in those with uncontrolled hypertension ($M=3.9$, S.D.$=5.4$; $P<.001$). In linear regression, only status of hypertension control ($beta=.39$, $P<.001$) predicted posttraumatic stress significantly, even after controlling for important cofactors.
Conclusions: PTSD is highly prevalent in hypertensive patients, especially in those with controlled hypertension. An explaining mechanism could be the higher use of health care by patients suffering from PTSD. The mental needs of these patients should be focused in addition to the well-established somatic care.

1. Introduction

About 30–45% of the adult population [1] suffer from arterial hypertension, which represents a major cardiovascular risk factor and accounts for 9.4 million deaths every year worldwide [2]. Primary hypertension accounts for 95% of all cases of hypertension [3]. It is diagnosed in patients in whom secondary causes such as pheochromocytoma, renovascular disease, renal failure and aldosteronism cannot be detected. Although the synonymous names essential and idiopathic hypertension suggest that its causes are unknown, factors determining the onset of this disease such as obesity or salt sensitivity [4] next to genetic burden and psychosocial factors [5] have been shown. Out of these, chronic stress, depression and anxiety have been proved to increase the risk of hypertension [6–8].

An emerging psychosocial factor is posttraumatic stress disorder (PTSD). Epidemiological studies show in a representative US sample an odds ratio (OR) for hypertension of 2.8 in participants with PTSD compared to participants without mental illness [9]. A representative German study found an OR of 3.5 for hypertension in participants with PTSD compared to participants without [10]. In a prospective study of US guard members, multiple combat exposures showed an OR of 1.33 for newly developed hypertension compared to noncombat deployers [11].

PTSD arises in the aftermath of traumatic events. It can be seen as a multidimensional episodic stress syndrome with reduced stress tolerance capacities [12]. An increased cardiovascular reactivity to traumatic triggers and an exaggerated startle response are part of diagnostic criteria [13]. Indeed, studies exploring PTSD have repeatedly found an autonomic imbalance with heightened sympathetic and diminished vagal tone [14], which contributes to the development of hypertension [15]. Besides this pathophysiological pathway, hypertension is maintained by adverse health behavior and nonadherence to medication that have been associated with PTSD [16,17]. Furthermore, the presence of PTSD is related to a greater number of physician-rated health problems as well as more symptoms of somatization [18].

Due to these considerations, one might expect an increased prevalence of PTSD in hypertensive patients. As identification rates of PTSD

are still low [19], it would be desirable to sensitize professionals working in primary care to identify risk patients who need a psychiatric or psychosomatic consultation. However, studies on the prevalence of PTSD in patients with treated hypertension as well as on the relation between blood pressure (BP) control and posttraumatic stress are lacking.

Therefore, the aim of our observational study is to determine the load of posttraumatic stress in a group of regularly checked hypertensive patients. Our hypothesis is that these patients have a high load of posttraumatic stress. In further analyses, we want to investigate if the load of posttraumatic stress differs between patients with controlled and uncontrolled hypertension.

2. Methods

2.1. Study sample

Patients at the outpatient clinic of the Department of Cardiology at Ulm University hospital were consecutively screened for potential study eligibility from March to November 2012. The study protocol was approved by the local ethics committee.

Inclusion criteria were diagnosis of primary hypertension treated with at least one antihypertensive drug. Exclusion criteria were a diagnosis of secondary hypertension, untreated hypothyroidism or hyperthyroidism, ejection fraction of <35%, severe valvular stenosis or insufficiency and end-stage renal disease due to their effects on BP. Patients with cognitive deficits following stroke, current alcohol or drug abuse, current psychosis, dementia and age over 80 years, as well as patients with insufficient knowledge of the German language, were also excluded.

Out of the 2291 screened patients, inclusion criteria were met by 1079 patients (47%). Out of these, 563 met exclusion criteria, resulting in 516 (48%) potentially eligible patients. Of those, 151 patients (29%) could not be contacted, while the remaining 365 patients were informed about our study protocol. A total of 154 patients (42%) declined to participate. From the remaining 211 patients, written informed consent was obtained. Fifty-six patients did not return the questionnaires, and another 10 patients turned out to meet exclusion criteria after chart. Thus, $N = 145$ patients (40% of the contacted patients) remained for final analysis.

Patients participating in the study versus those who declined showed no significant differences in sex, age, systolic blood pressure (SBP), diastolic blood pressure (DBP), hypertension control, number of prescribed antihypertensive agents, number of diagnoses, occurrence of cardiovascular risk factors and coronary artery disease (CAD) comorbidity.

2.2. Assessment of medical data

Data collected from medical charts contained diagnoses, cardiovascular risk factors (hyperlipidemia, diabetes, current smoking), medication, BP and blood values (thyroid-stimulating hormone, sodium, potassium). The number of antihypertensive drugs was counted as the number of different antihypertensive agents taken by the patients. We did not consider dosage of drugs, as data for equivalent dosages are available only within the same class of agents and there is no common consensus how to compare between different classes.

BP was measured by an automatic device using an oscillometric method to measure brachial BP with a maximum deviation of cuff pressure measurement of 3 mmHg (boso-medicus; Bosch+Sohn, Jungingen, Germany). First measurement was taken sequentially on both arms in a sitting position after 3–5 min at rest. A second measurement was taken at the arm with the higher value at least 5 min apart. Office BP was calculated as the mean of these two sequential BP measurements. Controlled hypertension was assigned if office BP values were lower than 140 mmHg (SBP) and 90 mmHg (DBP). BP measurements and definition of controlled hypertension were in

accordance with European Society of Cardiology guidelines for arterial hypertension [1].

2.3. Assessment of PTSD

Self-reported PTSD was assessed using the validated German version of the Posttraumatic Stress Diagnostic Scale [Posttraumatic Diagnostic Scale (PDS)] [20,21]. A short checklist identifies potential traumatizing events experienced by the respondent. Criteria for PTSD according to Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition are assessed by 17 questions about trauma-related symptoms that the patient may have experienced in the last 4 weeks, covering the symptom clusters of reexperiencing, avoidance, psychic numbing and hyperarousal. These items are rated on a four-point Likert scale (0=not at all; 3=often) and summed up, yielding a total score ranging from 0 to 51. There are several scoring rules for this questionnaire. According to Ehring [22], a cutoff of 18 identifies true PTSD cases with a sensitivity of 0.82 and a specificity of 0.89, which seems to be equivalent to symptom cluster rules that showed a sensitivity of 0.87 and a specificity of 0.78. Due to easier handling, we decided to apply the cutoff of 18 and classified patients who reported at least one traumatic event and reached a total score of at least 18 as patients with "PTSD". "Trauma, no PTSD" refers to patients who experienced at least one traumatic event, but had PTSD score lower than 18. All patients reporting no traumatic event on the PDS checklist were classified as having "no trauma", independent of their PTSD scores. Three missing values were accepted for calculation of PTSD score. Eight cases could not be assigned to these groups as PTSD scores were missing though a trauma was reported. With a Cronbach's alpha of .922, internal consistency of the PDS scale within our study was excellent.

2.4. Assessment of psychometric data

Depressive and anxious symptoms were assessed using the German version of the Hospital Anxiety and Depression Scale (HADS-D and HADS-A) [23,24]. The HADS was specifically developed for patients with somatic disease. Seven items on each scale are rated on a three-point Likert scale and summed up, resulting in a range from 0 to 21 with higher scores indicating greater severity of symptoms. Internal consistency of the depression and anxiety subscales within our study was satisfying with a Cronbach's alpha of .857 and .829, respectively.

Perceived stress representing the degree to which subjects evaluate their lives as stressful in the last month was measured with the German version of the 14-item Perceived Stress Scale (PSS) [25], a widely used and validated self-report instrument. The 14 items are scored from 0 (never) to 4 (very often) and summed to yield a total score between 0 and 56. Higher scores reflect greater perceived stress. Cronbach's alpha of .882 showed a high internal consistency within our study.

Chronic stress was assessed with the 12-item screening subscale of the Trier Inventory for the Assessment of chronic stress TICS-SSCS [26]. Participants rate the frequency of self-perceived stress in the last 3 months from 0 (never) to 4 (very often). The score was summed up yielding a total score between 0 and 48 points. Internal consistency of the scale was high with a Cronbach's alpha of .903.

2.5. Assessment of socioeconomic data

Partner status was assessed by the question if patients had no partner, inconstant partners, a constant partner with whom they were not married or a married partner. Living with a constant married or unmarried partner was defined as "living in partnership". Job qualification was assessed by the question if patients were in training, had finished apprenticeship, in university or advanced college or had no training qualification. Finished university or advanced college was defined as "academic job qualification".