Depression, cortisol and somatoform dissociative symptoms

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Abstract

OBJECTIVE: According to recent findings neuroendocrine response related to dissociative symptoms is related to dysregulation of the hypothalamus-pituitary-adrenal (HPA) axis but HPA axis functioning as related to dissociation is only partially understood.
METHOD: With the aim to test the relationship between basal serum cortisol and dissociative symptoms measured as somatoform and psychic dissociation we performed clinical testing and biochemical analysis in 30 inpatients with diagnosis of unipolar depression (mean age 41.46, SD=13.68).
RESULTS: The results show that cortisol as an index of HPA axis functioning manifests significant relationship to somatoform dissociative symptoms (r=-0.40; p=0.014).
CONCLUSIONS: The result indicates relationship between HPA-axis reactivity and somatoform dissociative symptoms in unipolar depressive patients and suggests that somatoform dissociation presents a defense mechanism related to a passive coping response.

ORIGINAL ARTICLE

INTRODUCTION

At the beginning of psychoanalysis Freud began his project on scientific psychopathology with the purpose to find brain mechanisms related to cognitive functions that constitute normal and abnormal mental processes (Ellenberger, 1970; Rofe, 2008). Freud elaborated the theory of the unconscious based on apriori postulate that unconscious mind is biological in nature and proposed conceptual identity connecting mind and brain within his neurological theory. His collaboration with Joseph Breuer uncovered new development in psychology and provided new conceptual framework for understanding of the mind-body problem in which mental and somatic factors are closely connected and understood as different aspects of a unity (Ellenberger, 1970; Breuer

and Freud, 1895; Briquet, 1859, Mace, 1992). The same concept simultaneously developed Pierre Janet, who conceptualized pathological conditions observed in conversion phenomena as a consequence of dissociative reaction, which can lead to psychopathological as well as somatoform symptoms (Janet, 1890; Ellenberger, 1970; Nijenhuis, 2000; Putnam, 1997; Sar, 2006; Bob, 2003a,b), caused by profound changes in affective state, memory and sense of identity in response to stress (Saxe et al., 2002). In this context the concept of somatoform dissociation was proposed (Nijenhuis, 2000; Nijenhuis et al., 1996, 1998). Recent data suggest that somatoform dissociation is related to somatosensory amplification that likely reflects some aspects of long-latency cognitive processing (Nakao and Barsky, 2007) associated with unsufficiently processed information that is not congruent with conscious cognitive scheme. Typical symptoms are motor inhibition or loss of motor control, gastrointestinal symptoms, dissociative seizures, painful symptoms, alterations in perception or alterations in sensation of pain (analgesia, kinesthetic anesthesia) (Brown and Trimble, 2000; Kuyk et al., 1999) such as unability to register pain or painful affect during traumatic event (Butler et al., 1996; Saxe et al., 2002). Typical physiological reactions to traumatic stress are disturbances of self-regulatory systems such as HPA axis resulting in hyperarousal, tachycardia or other symptoms of autonomic nervous system instability (Newport and Nemeroff, 2000; Teicher et al., 2003; Read et al., 2001). HPA axis is functionally closely related to neuroendocrinological balance, control hormonal levels, energetic metabolism, neuroimmunomodulation and disturbances of memory during stress reaction (Payne *et al*., 2006; Umegaki *et a*l., 2006; Newport and Nemeroff, 2000; Plotsky *et al*., 1998; Putnam, 1997; Teicher *et al*. 2003; Bob *et al*., 2007a,b,c,d; Fisar and Raboch, 2008). According to neurodevelopmental research are most serious disturbances of HPA axis caused by traumatic events such as childhood abuse or neglect in the first years of life and often have long-term impact on emotional, behavioral, cognitive, social and physiological functions physiological functions and vice versa love and social care also may influence these functions and improve dissociative disturbances (Teicher *et al*. 2003; Read *et al*., 2001; Esch and Stefano 2007; Stefano and Esch, 2007; Bob, 2007a,b). With respect to findings that traumatic stress typically is associated with dissociation and dysregulation of the HPA axis, a possible relationship of dissociation to indices of the HPA axis was previously reported (De Bellis et al., 1994; Lemieux and Coe, 1995; Simeon et al., 2001, 2007a,b; Giesbrecht et al., 2007; Bob et al., 2007b). To our knowledge and according to PubMed search, there is not any study examining the relationship between somatoform dissociation and indices of HPA axis functioning such as cortisol. In this context the aim of the present study is to perform examination of stress-related disturbances of HPA axis functioning indexed by basal serum cortisol and test its relationship to somatoform dissociative symptoms, psychic dissociative symptoms and level of depression.

METHODS

Subjects

For empirical examination of suggested hypothesis assessment of basal serum cortisol during rest conditions was performed in 30 inpatients with unipolar depression. The patients have diagnosis of unipolar depressive disorder (i.e. patients with recurrent depression or depressive period) in relapse without posttraumatic stress disorder (PTSD) and other comorbid diagnoses confirmed according to DSM IV criteria by clinical interview (American Psychiatric Association, 1994). With the purpose to re-examine diagnosis and exclude PTSD or other comorbidities all the patients were also screened using structured psychiatric interview M.I.N.I. version 5.0.0 (Sheehan *et al*., 1998). The patients were treated only by SSRI antidepressants in usual recommended doses according psychiatric guidelines. Exclusion criteria were organic illnesses involving the central nervous system, psychotic disorders, PTSD, bipolar disorder, alcohol and/or drug abuse, any form of epilepsy and mental retardation (IQ Raven higher than 90), neuroendocrine and metabolic disorders, any hormonal or antipsychotic medication, triclic antidepressant, methyldopa, prednisolone and cimetidine medication, ECT or rTMS therapy and pregnancy or lactation in women. The patients were 9 males and 21 females in average age 41.46±13.68 (age range 30-60) predominantly with high-school education. All the patients gave written informed consent and the clinical study was approved by university ethical committee.

Psychometric measures

Somatoform dissociative symptoms were assessed using the 20-item self-reported somatoform dissociation questionnaire SDQ-20 (Nijenhuis et al., 1996). Somatoform dissociative symptoms represent alterations in sensations of pain (analgesia, kinesthetic anesthesia), alterations of perception, loss of motor control, gastrointestinal symptoms, etc. Subjects indicate the degree of their experience on 5-point Likert scale. We have used the Czech version of the SDQ-20 that displays high reliability and internal consistency (Cronbach's alpha 0.91, test-retest reliability after week 0.90).

Psychic dissociative symptoms were assessed by Dissociative Experiences Scale (DES) (Bernstein and Putnam, 1986). DES represents 28 items self-reported questionnaire examining main dissociative phenomena such as absorption, amnesia, depersonalization, derealization, reality distortion, and others. Subjects indicate a degree of their experience on the continuum from 0% to 100%. In the present study we have used the Czech version of the DES that similarly as original English version displays high reliability and internal consistency

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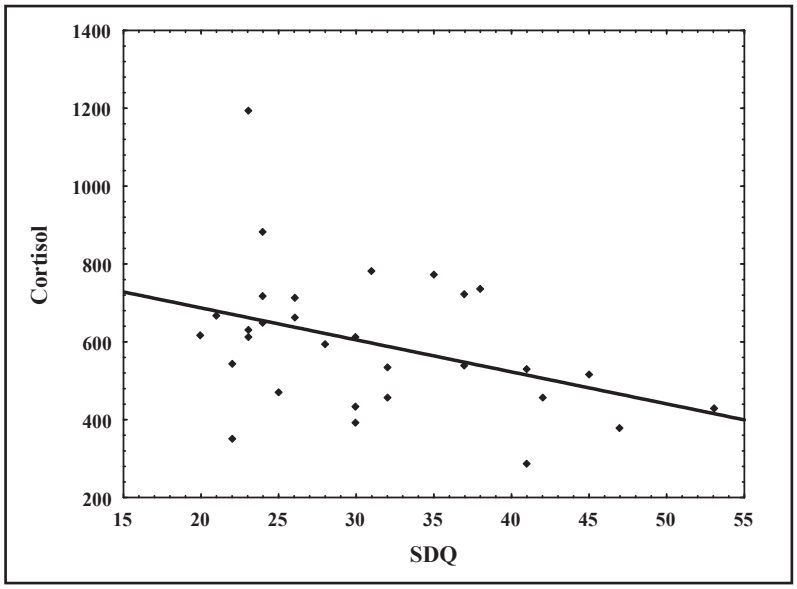

Figure.1. Dependency graph between SDQ-20 and cortisol serum levels *[nmol/l]* (r=-0.40, p=0.014).

(Cronbach's alpha 0.92, test-retest reliability after week 0.91).

For the assessment of depressive symptoms was used Beck depression inventory BDI-II (Beck, 1996) that represents 21-items questionnaire for assessing depression (Cronbach's alpha 0.89, test-retest reliability after week 0.85). Subjects indicate degree of their experience on 4-point Likert scale.

Neuroendocrine measures

For biochemical assessment, the blood samples of 5ml volumes were collected in rest conditions according to common procedures at the time from 7:30 to 8 a.m. in laboratory of Psychiatry department. The blood samples were carefully transferred (about 10 minutes) in icebox at the temperature of 4°C to university biochemical department and immediately centrifuged at the temperature of 4°C. After that cortisol serum levels have been assessed in biochemical laboratory according to common analytical procedures.

Cortisol serum levels were assessed by technique of chemiluminiscent immunoassay (CLIA) using analysator ADVIA (Centaur Bayer). The intra- and interassay coefficients of variance were 2.9 and 12.2%.

Statistical methods

Statistical evaluation for results of serum cortisol and psychometric measures included common methods of descriptive and inferential statistics. For quantitative assessment means and standard deviations, and for description of functional relationship Pearson product-moment correlation for independent samples were used. For the statistical evaluation the software package Statistica version 6 was used.

RESULTS

Results of the present study confirm relationship between cortisol as an index of HPA-axis reactivity and somatoform dissociative symptoms in the depressive patients. Main result represents significant Pearson product-moment correlation between somatoform dissociative symptoms measured by SDQ-20 and serum cortisol (r=-0.40, p=0.014) (Fig. 1). Other correlations between cortisol and psychometric measures i.e. correlations of cortisol with DES (r=-0.19, p=0.157) or with BDI-II (r=0.06, p=0.376) were not statistically significant.

Significant relationships indicate also Pearson product-moment correlations for psychometric measures of dissociation, symptoms of traumatic stress and depressive symptoms. Significant correlations were found between SDQ-20 and BDI (r=0.49, p=0.003) and between DES and BDI-II (r=0.26, p=0.08). Significant relationship was also found between DES and SDQ-20 (r=0.67, p=0.00003).

DISCUSSION

The results of this study similarly as previous studies (Simeon et al., 2001, 2007) indicate relationship between HPA-axis reactivity and dissociative symptoms. The present study in depressive patients shows close relationship among HPA axis functioning indexed by cortisol and somatoform dissociative symptoms. The relationship between SDQ-20 and basal serum cortisol (r=-0.40, p=0.014) is according to PubMed search the first finding documenting this relationship.

In the study by Simeon et al. (2007b) basal level of cortisol did not display significant relationship to psychological dissociation measured by DES, which sug-

gests that the construct of somatoform dissociation used in the present study could be more sensitive to measurable physiological changes related to dissociation. Recent findings in both animals and humans indicate, that cortisol levels reflect not only emotional arousal but also active defensive or antiarousal intrapsychic mechanisms that should be conceptualized in psychological perspective as a balance between opposing intrapsychic forces (Mason *et al*., 2001). These intrapsychic forces relate to excitatory and inhibitory influences and are experienced as engagement that represent active emotional response with high cortisol levels, and disengagement (e.g. avoidance, withdrawal or denial) related to passive defense with low cortisol levels (Mason *et al*., 2001; Rotenberg *et al*., 2007). These findings suggest that the cortisol decrease related to somatoform dissociation reflects typical vulnerability to mental stress exposure that emerges as disengagement.

In summary, results of the present study together with recent findings indicate that HPA axis plays a central role in neuroendocrinological consequences of traumatic stress in association with somatoform dissociation. This suggests significant merit for future research in larger samples of patients that could help to find more specific criteria for dissociation related neuroendocrine disturbances in various psychiatric diagnoses.

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