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Neurological soft signs in antisocial men and relation with psychopathy

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ABSTRACT

Neurological soft signs (NSS) were studied in some axis-I disorders like schizophrenia, obsessive compulsive disorder, bipolar disorder, alcohol and substance abuse disorder. Aim of this study is detection of neurological soft signs in antisocial personality disorder and relation of these signs with psychopathy. The study was included 41 antisocial men and 41 healthy control subjects. Sociodemographic form, neurological evaluation scale and Hare psychopathy checklist was applied to the antisocial subjects, whereas sociodemographic form and neurological evaluation scale were applied to the controls. Antisocial men exhibited significiantly more NSS in total score and subgroups scales ($p < 0.05$). It was shown that there was a significant association with psychopathy scores and NSS sequencing complex motor tasks ($r=0.309$; $p=0.049$) and NSS other tests subgroup scores ($r=0.328$; $p=0.037$). Similar relation was also observed in comparison between psychopathy subgroups. NSS accepted as being endophenotypes in schizophrenia, were also detected in antisocial group significantly more than controls in our study. Significant relationship between psychopathy and NSS may also hint the role of genetic mechanisms in personality development, though new extended studies with larger sample size are needed for clarification of this relationship.

1. Introduction

Studies of neurological deficits in psychiatric illness have increased in recent years. Some of these studies especially interested of neurological soft signs (NSS) (Lindberg et al., 2004; Bombin et al., 2005; Aksoy-poyraz et al., 2011). Neurological soft signs are characterized by abnormalities in motor, sensory, and integrative functions (Cuesta et al., 2002). Rather than obvious signs, NSS are not localized to a specific region in brain (Rossi et al., 1990). These nonlife-threatening, anatomically nonspecific signs are regarded as evidence of a central nervous system defect, resulting in considerable sociopsychological dysfunction (Quitkin et al., 1976). Both genetic and environmental factors, such as intrauterine and perinatal trauma, appear to be involved in the development of NSS (Lindberg et al., 2004). As well-documented in schizophrenia (Bombin et al., 2005; Aksoy-poyraz et al., 2011), high NSS scores were also reported in obsessive compulsive disorder, alcohol dependence, substance use disorder and bipolar disorder (Bolton et al., 1998; Keenan et al., 1997; Goswami et al., 2006; Salama et al., 2008; Baş et al., 2014).

During the last decade there has been growing evidence of brain dysfunction in severe aggressive behavior. As a symptom, aggression overlaps a number of psychiatric disorders (Moeller et al., 2001), but it is commonly associated- with personality disorders, in particular antisocial (ASP) and borderline personality disorders (Virkkunen et al., 1994, 1996; Lindberg et al., 2004). Quitkin et al. (1976) described so-called sociopaths, characterized by impulsive and antisocial behavior, as having an increased prevalence of NSS. Patients suffering from borderline personality disorder alone or with comorbid antisocial personality disorder and with a history of aggression have been reported to have higher total scores of NSS than patients with no history of violence (Stein et al., 1993; Lindberg et al., 2004). Lindberg et al. (2004) found that homicidal (criminal) men with ASP subjects had higher total NSS scores than those of healthy controls but not significantly differed from patients with schizophrenia. Also, Assadi et al. (2007) reported that NSS were significantly increased in offenders compared to healthy subjects. Offenders with repeated misdemeanors had higher rates of neurological signs than those with a single felony (Assadi et al., 2007).

Psychopathy is described as a different concept than ASP. Psychopathy is referred as beingto have relation with recurrent

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offensive behavior and aggression (Reidy et al., 2007) like ASP. Hare (1991) stated that psychopathy is related with disordered regulation and process of emotional responses. Although 75% of offenders are ASP according to DSM IV, only one in four of the offenders are psychopath as Hare's checklist. But these rates may differ in each country (Hare, 2003; Reid and Gacono, 2000; Weber et al., 2008).

It was reported association between NSS and children with oppositional defiant disorder and conduct disorder problems, particularly when the symptoms were relatively persistent (Pine et al., 1997). As known, ASP is always preceded by the manifestation of conduct disorder before the age of 15 years. These findings suggested that NSS may be associated with developmental impairment in ASP. There were few studies investigating NSS in ASP (Lindberg et al., 2004; Assadi et al., 2007) reporting higher NSS scores in offenders. However, these few studies represent some restrictions, as low sample size, heterogenous groups (comorbid psychiatric disorders) and comorbid alcohol use.

The main purpose of this study was to compare neurological soft signs between ASP and healthy comparison subjects. Our primary hypothesis was that ASP without any psychiatric disorder would possess more subtle neurological deficits than healthy controls. Second hypothesis was to investigate whether psychopathy level increase NSS scores or not. To our knowledge, this is the first study to asses the relationship between psychopathy and NSS scores of ASP.

2. Methods

2.1. Participants

Samples of ASP were selected from the offenders who examined by forensic psychiatrists of Turkish Institute of Forensic Medicine. 41 men between the age of 18–60 with ASP included in this study. The subjects met the DSM IV criteria for ASP (American Psychiatric Association, 1994) and this diagnosis was regarded as the primary one by the senior forensic psychiatrist using the data. Exclusion criteria for all participants included active substance abuse or dependence, mental retardation, and history of neurological disease or clinically significant head injury. Also patients having co-morbid psychiatric illness were excluded. Most of the participants (87.8%) were imprisoned. The healthy controls consisted of 41 age – and gender-matched volunteers from hospital staff with no history of psychiatric, neurological disorder and alcohol and substance dependence.

2.2. Procedures and materials

Participants were informed that the study was confidential, anonymous, and voluntary. All participants gave informed consent after complete description of the study. The project was conducted in accordance with the Declaration of Helsinki, Finland, and was approved by the ethical committee at Istanbul University, Cerrahpaşa Medical Faculty. All participants were evaluated with semi-structured interview form and neurological evaluation scale. Also, ASP group was evaluated with Hare Psychopathy Checklist (PCL-R) and forensic file information.

The Neurological Evaluation Scale (NES) is a 26-item instrument designed to measure NSS in schizophrenia (Buchanan and Heinrichs, 1989). Evaluators administer the scale based on the original scoring instructions, and items are scored 0 (no abnormality), 1 (mild but definite impairment), or 2 (marked impairment). Two items –the suck and snout reflexes– are scored 0 (absent) or 2 (present). Fourteen items are assessed bilaterally, and right and left scores were summed for bilateral items. The possible ranges of these total scores were 0–76. Conceptually based subscales also were calculated: sensory integration, motor coordination, and sequencing of complex motor tasks, other NSS including items such as abnormalities in eye movements, convergence, gaze impersistence, short term memory test (5 and 10 min), glabella, snout, grasping and sucking reflexes (Buchanan and Heinrichs, 1989).

Psychopathy was assessed with the PCL-R (Hare, 1991). The PCL-R is a 20-item clinical rating scale that measures interpersonal, affective, and socially deviant features of psychopathy. Total score of PCL-R is between 0 and 40. Above 30 points was defined as cutting score for North American offenders, however it was 25 for European offenders (Martens, 2000; Grisso et al., 2005). Because of unconsensus for cut-point, in this study cut-point was accepted as 25 point. It is regarded as high psychopathy for higher points, and low psychopathy for lowers (Grisso et al., 2005).

2.3. Data analysis

Differences between ASP and normal comparisons were tested using chi-square or Fisher's exact tests for categorical measures, student's *t* test and Mann-Whitney *U* test or analysis of co-variance (ANCOVA) for continuous measures. Mann-Whitney *U* test was performed for direct comparison of independent variables. Spearman correlation co-efficient for ordinal sample analysis and Pearson correlation co-efficient for parametric sample analysis was used. Year of education, marital status and jop-hopping were entered as covariates to control for their potentially confounding effects. Jop-hopping was entered in ANCOVA rather than occupation status because most of ASP participant's were detainee. The statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS), version 20. Statistical significance was established as $p < 0.05$.

3. Results

3.1. Sample characteristics

There was not a significant difference across groups in terms of age (ASP 30.8 years, S.D. 8.8 vs. controls 30.2 S.D. 7.6). All participants were male. The educational level of ASP group was significantly lower than healthy controls (antisocials 6.8 S.D. 2.3 vs. controls 9.8 S.D. 2.4; $p=0.0001$). Antisocials had significiantly more job-hopping history than controls ($x^2=41.419$; $df=1$; $p=0.0001$). Socio-demographics of antisocial and control group is given in Table 1.

3.2. Neurological soft signs

Table 2 shows comparison of Neurological soft signs (NSS) between groups. It was found that NSS subscales and total scores were significantly differed between ASP group and healthy controls ($p < 0.001$). Mean scores of Total NSS scores (12.8 ± 6.5; $2,3 \pm 2.07$) and NSS sensory integration (0.8 ± 1.8;0.46 ± 0.74), NSS motor coordination (0.9 ± 1.2; 0.02 ± 0.15), NSS sequencing complex motor tasks (1.09 ± 1.2; 0.41 ± 0.66), NSS other tests (7.9 ± 3.8; 1.4 ± 1.6) were significianly higher in antisocials than healthy controls.

3.3. Hare psychopathy checklist

Hare Psychopathy Checklist (PCL-R) was used only in antisocial group. Mean psychopathy score was 29.9 (min 10; max 36). According to PCL-R, antisocials above 25 cut off-point was 80.5% ($n=33$) regarded as high psychopath, and under 25 cut-point was