



Seizure semiology in males with psychogenic nonepileptic seizures is associated with somatic complaints



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ABSTRACT

Aims: Psychopathology has been studied in patients with epileptic or psychogenic non-epileptic seizures in the context of diagnosis and treatment. Unfortunately, most PNES studies include few males and do not consider possible gender differences, making findings less generalizable to males with PNES. In this study we specifically compare males with PNES to females with PNES and to males with epilepsy.

Methods: Males with PNES ($n = 58$), males with epilepsy ($n = 86$), females with PNES ($n = 147$), and females with ES ($n = 142$) were evaluated on an inpatient epilepsy monitoring unit. Self-reported objective measures of psychopathology, demographics, and PNES seizure semiology were compared.

Results: Personality Assessment Inventory profiles revealed marked differences, particularly in somatic symptoms, between PNES and epilepsy. Females with PNES had higher levels of physiological depressive symptoms but lower antisocial features. Males with PNES who had clinically significant elevations on the somatic complaints scale were much more likely to have motor seizures while females with PNES classified similarly were equally likely to have either motor or non-motor events.

Conclusion: Gender difference in PNES seizure semiology was associated with whether or not clinically significant somatic symptoms were present; males with elevated somatic symptoms were much more likely to have motor PNES. However, we did not find evidence of greater psychopathology in males with PNES compared to females with PNES. Gender differences in the behavioral manifestation of PNES in the context of presence or absence of somatization may have implications for diagnosis and treatment.

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1. Introduction

Psychogenic non-epileptic seizures (PNES) are paroxysmal events that mimic epileptic seizures (ES) but have psychological rather than neurological underpinnings and may be treatable with behavioral therapies (Dickinson and Loooper, 2012). Although a careful clinical history and consideration of the behavioral components of the events (i.e. semiology) may increase confidence of a PNES diagnosis, video electroencephalography (vEEG) is the “gold standard” (Thomas et al., 2013). Given the complexity of this condition, psychological and neuropsychological testing may be coupled with vEEG (Dickinson and Loooper, 2012; Walker, 2000). Given that the prevalence rate of PNES is three times higher in females than males, (Binder and Salinsky, 2007) most studies consist mainly of females, which could potentially affect diagnostic and treatment

decisions (Dworetzky et al., 2005; Oto et al., 2005). In addition, less is known regarding symptoms, including self-reported mood and personality characteristics, in males with PNES.

The importance of specifically investigating males with PNES was recently suggested in a study which found it more difficult to identify probable PNES in males in the clinic and more difficult to confirm the diagnosis with vEEG (Noe et al., 2012). Moreover, males with PNES may have slightly different psychiatric symptoms than females including endorsement of different depressive symptoms (Asmussen et al., 2009) or poorer overall emotional adjustment (Holmes et al., 2001). In contrast, the semiology of the events does not seem to differ between males and females even though predictors of PNES and patient characteristics may be dissimilar (Dworetzky et al., 2005; Oto et al., 2005; Thomas et al., 2013).

Although we previously demonstrated differences in self-reported depressive symptoms in patients with either ES or PNES (Asmussen et al., 2009) the present study was carried out to extend these findings with a much larger sample of males with PNES, as well as analyze additional mood and personality characteristics in the context of seizure semiology. Furthermore, in that prior

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work has suggested that somatic symptoms are particularly useful in identifying likely cases of PNES, (Hill and Gale, 2011b) we decided to specifically focus on how these self-reported symptoms might relate to gender differences in the behavioral manifestation of PNES. The aim of the current study was to (1) investigate self-reported psychiatric symptoms and personality traits in males with PNES in comparison to males with epilepsy and females with PNES in a larger sample, (2) determine if there are any differences in seizure semiology between the PNES males and females for those patients with and without clinical elevations on psychological testing and (3) compare the semiology of the events between males and females with PNES.

2. Material and methods

2.1. Subjects

With approval of the institutional review board, all patients in this study were evaluated on the inpatient epilepsy monitoring unit at St. Joseph's Hospital and Medical Center in Phoenix, Arizona. Psychological measures were typically completed on the day of admission prior to diagnosis, which was established by the attending neurologist via vEEG and clinical history. Those without clear vEEG diagnostic examinations, incomplete testing, or mixed etiology (e.g. both PNES and epilepsy) were excluded from the study. After these exclusions there were a total of 62 males with PNES, 158 females with PNES, 95 males with ES, and 165 females with ES. We then excluded patients whose scores on any of the Personality Assessment Inventory validity scales suggested an invalid profile (Morey, 1991, 2003). Specifically, we identified invalid profiles as those with elevations on the inconsistency scale (ICN $T \geq 73$), the infrequency scale (INF $T \geq 75$), the positive impression management scale (PIM $T \geq 68$) and the negative impression management scale (NIM $T \geq 92$). Thus, our final sample included 58 males with PNES, 147 females with PNES, 86 males with ES, and 142 females with ES. Demographic information is presented in Table 1.

2.2. Measures

The Psychological Assessment Inventory (PAI) is a personality measure, which has been shown to be reliable and valid in identifying psychiatric symptoms (Morey, 1991). The PAI has also been shown to be reliable and valid in patients with neurologic conditions (Busse et al., 2014). It has been found to be useful in both PNES and ES samples (Hill and Gale, 2011b; Mason et al., 2000; Thompson et al., 2010). The PAI is a self-report measure consisting of 344 items that includes 11 clinical scales, four validity scales, five treatment scales, and two interpersonal scales, which only requires a 4th grade reading level (Morey, 1991). For the present study we limited our evaluation to the following clinical scales, and their subscales, Somatic Complaints (SOM), Anxiety (ANX), Depression

(DEP), Borderline Features (BOR), and Antisocial Features (ANT). We also included two of the treatment scales, Suicidal Ideation (SUI) and Stress (STR). PAI scales and subscales were scored and reported per the manual in standardized T-scores with a mean of 50 and a standard deviation of 10 with higher scores reflecting increased psychopathology. Separate normative data are used for males and females (Morey, 1991). The Beck Depression Inventory-second edition (BDI-II) is a 21-item self-report measure of depression based on DSM-IV criteria for depressive disorders, which has been shown to be both reliable and valid for the use of identifying individuals with depressive symptoms (Beck et al., 1996). Finally, the observed seizures in those patients with PNES were categorized into semiological subgroups based on two models. First, we utilized the four-group classification model as described by Griffith et al. (2007) which includes the following categories: subjective, catatonic, minor motor and major motor. Patients with more than one seizure type were categorized according to the most frequent type (i.e. >60%). Second, we also used a simple two-group model (motor and non-motor) which we found useful when comparing neuropsychological function in patients with PNES (Hill and Gale, 2011a).

2.3. Statistical analysis

Statistical analyses were carried out with IBM SPSS 21.0 (IBM Corp., Armonk, New York). Chi-square, *t*-tests, and MANOVA were used to make comparisons between groups on demographic and PAI variables. In addition, a logistic regression was carried out in the males with PNES to determine if the PAI SOM scale could predict seizure semiology.

3. Results

3.1. Demographics

As indicated in Table 1, there were no group differences in years of education, handedness, or ethnicity. However, the males with epilepsy were younger than the males with PNES and both males and females with epilepsy had earlier age of seizure onset than males and females with PNES resulting in more years with a seizure disorder.

3.2. Psychiatric and personality differences

A MANOVA comparing all patients with PNES to all patients with epilepsy on psychometric measures was statistically significant, $F(23,409)=9.854$, $p<0.001$ (Table 2). Although most of the PAI scales were different between groups, it should be pointed out that a clinical elevation on the PAI is defined as a score that is ≥ 70 which is two standard deviations above the mean for the control sample. Therefore, only the Somatic Complaints scale and

Table 1
Demographics for groups.

Demographic	PNES males (n = 58)	PNES females (n = 147)	ES males (n = 86)	ES females (n = 142)	F/χ^2	p
Age	42.9 (13.6)	38.8 (12.3)	36.6 (12.3)	38.5 (14.0)	2.73	.043
Education	12.8 (2.1)	13.1 (2.5)	13.2 (2.2)	13.6 (2.4)	2.00	.113
Handedness (right)	52 (89.7%)	133 (90.5%)	70 (84.3%)	123 (87.2%)	3.38	.759
Ethnicity					4.63	.865
Caucasian	51 (91.1%)	116 (85.3%)	68 (88.3%)	113 (85.6%)		
Hispanic	3 (5.4%)	13 (9.6%)	6 (7.8%)	13 (9.8%)		
African American	1 (1.8%)	6 (4.4%)	2 (2.6%)	6 (4.5%)		
Other	1 (1.8%)	1 (0.7%)	1 (1.3%)	0 (0.0%)		
Age at onset	33.8 (17.6)	30.6 (14.8)	18.3 (14.4)	19.7 (14.6)	24.98	.000
Years of seizures	9.2 (13.0)	8.4 (10.6)	18.2 (12.5)	19.6 (15.3)	23.49	.000

Note. Sample size is smaller for reported ethnicity due to missing data.

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