



Dramatic presentations in psychogenic nonepileptic seizures

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ABSTRACT

Purpose: The aim of this study was to investigate the frequency of dramatic presentations of psychogenic nonepileptic seizures (PNES) (i.e., urine incontinence and ictal injury) and to characterize the patients' historical risk factors that may be associated with such dramatic manifestations.

Methods: In this retrospective database study, all patients with PNES, who were investigated at Shiraz Comprehensive Epilepsy Center at Shiraz University of Medical Sciences, from 2008 until 2018, were studied.

Results: 259 patients with PNES-only were studied. Thirty-one patients (12%) reported experiencing urinary incontinence. Seventy-five patients (29%) reported having a bodily injury. The associated injuries were as follows: lacerations (35; 13.5%), tongue biting (32; 12%), fractures (5; 2%), burns (2; 1%), and dental injuries (1; 0.5%). Fifty-seven (67%) patients with one of these features and 91 patients (53%) without any of these features were taking antiepileptic drugs; the difference was significant ($p = 0.03$).

Conclusion: Patients with PNES may frequently present with dramatic features including, ictal injury or urinary incontinence, and as a result are at great risk of receiving wrong diagnosis and unnecessary treatments.

1. Introduction

Psychogenic nonepileptic seizures (PNES) comprise of paroxysmal changes in responsiveness, movements, or behavior that seemingly look like epileptic seizures, but lack a neurobiological origin similar to epileptic seizures and are not associated with electrophysiological epileptic changes [1]. The differential diagnoses of PNES include epileptic seizures, movement disorders, and some other paroxysmal events, such as syncope. Epilepsy and PNES have a variety of distinguishing symptoms and signs. For instance, patients with PNES frequently show asynchronous limb movements, intermittent shaking movements, side-to-side head movements, and pelvic movements; however, none of these is pathognomonic to PNES [2,3]. On the other hand, urine incontinence and ictal injury are often associated with epileptic seizures; however, these are not pathognomonic to epileptic seizures either [3,4]. The aim of this study was to investigate the frequency of these dramatic presentations (i.e., urine incontinence and ictal injury) among patients with PNES and to characterize the patients' historical risk factors that may be associated with such dramatic manifestations.

2. Methods and materials

In this retrospective database study, all patients with PNES, who were diagnosed at Shiraz Comprehensive Epilepsy Center at Shiraz University of Medical Sciences, from 2008 until 2018, were investigated. The diagnosis of PNES was made by the epileptologist through a careful clinical assessment and documented by ictal recording during video-EEG monitoring. We always make a diagnosis of PNES if a detailed clinical history is compatible with the diagnosis; events (seizures) are witnessed by the epileptologist, showing semiology typical of PNES while on video-EEG monitoring; and finally, no epileptiform activity is detected immediately before, during or after the attack that has been captured on ictal video-EEG recording. We also always obtain a detailed clinical history in order to investigate the existence of concomitant epileptic seizures in patients (e.g., presence of other seizure types, different from what we have captured during their video-EEG monitoring, if their description is compatible with epileptic seizures). We review the recorded EEG carefully to search for any possible epileptiform discharges. Patients with concomitant epilepsy, abnormal EEG (e.g., ictal or interictal epileptiform discharges), or incomplete data were not included.

The epileptologist examined and interviewed all the patients and if

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¹ The authors conducted the statistical analyses.

they agreed to share their information in the database, it was used in this study. All the data were kept confidential through codes. Age, gender, age at seizure onset, seizure semiology (including urine incontinence and ictal injury), seizure frequency, factors potentially predisposing to PNES [history of physical abuse (corporal punishment or any physical injury resulted from aggressive behavior towards the patient), sexual abuse, child abuse (neglect or physical abuse), academic failure, head injury, and family history of seizures], and video-EEG recording of all patients were registered routinely. Demographic variables and relevant clinical variables were summarized descriptively to characterize the study population. Initially, we performed univariate analyses using Pearson Chi-square, Mann-Whitney, Kolmogorov-Smirnov, and t-test. Variables that were significant ($p < 0.05$) were assessed in a logistic regression. Odds ratio (OR) and 95% confidence interval (CI) were calculated. P value less than 0.05 was considered as significant. This study was conducted with the approval by Shiraz University of Medical Sciences Review Board.

3. Results

During the study period, 259 patients with PNES-only had the inclusion criteria and were studied. Thirty-one patients (12%) reported experiencing urinary incontinence with their attacks. Seventy-five patients (29%) reported having a bodily injury with their attacks. The associated injuries were as follows: lacerations (35; 13.5%), tongue biting (32; 12%), fractures (5; 2%), burns (2; 1%), and dental injuries (1; 0.5%). Eighty-five patients (33%) had one or both (in 20 patients) of these dramatic features with their seizures. One hundred forty-eight patients (57%) were taking antiepileptic drugs (AEDs). Fifty-seven (67%) patients with one of these features and 91 patients (53%) without any of these features were taking AEDs; the difference was significant ($p = 0.03$).

Seizure-related urinary incontinence was associated with ictal injury, history of sexual abuse, duration of the condition, and taking AEDs in univariate analyses (Table 1). We then performed a logistic regression analysis, assessing these four variables. The model, that was generated by logistic regression analysis, was significant ($p = 0.0001$) and could predict the possibility of seizure-related urinary incontinence in 88% of the patients. Within the model, ictal injury and taking AEDs retained their significance (Table 2).

Seizure-related injury was associated with multiple variables, including age, duration of PNES, having aura, loss of responsiveness,

Table 1

Factors associated with psychogenic nonepileptic seizure related urinary incontinence in univariate analyses.

	Having seizure-related urinary incontinence (31 patients)	No seizure-related urinary incontinence (228 patients)	P value	Total population (259 patients)
Sex ratio (Female: Male)	19: 12	146: 82	0.8	165: 94
Age (years)	29 ± 9	29 ± 10	0.9	29 ± 10
Age at onset (years)	22 ± 9	25 ± 10	0.1	24 ± 10
Duration of the condition (years)	6.9 ± 8.6	4.3 ± 6.6	0.04	4.5 ± 6.8
Aura	20 (65%)	153 (67%)	0.8	173 (67%)
Loss of responsiveness	29 (94%)	192 (84%)	0.2	221 (85%)
Ictal Injury	20 (65%)	55 (24%)	0.0001	75 (29%)
Generalized motor seizures	28 (90%)	195 (86%)	0.7	223 (86%)
Akinetic seizures	2 (6%)	26 (11%)	0.5	28 (11%)
Nocturnal seizures	14 (45%)	74 (32%)	0.2	88 (34%)
Taking antiepileptic drugs	25 (81%)	123 (54%)	0.003	148 (57%)
Seizure frequency per month	14 ± 15	37 ± 70	0.07	34 ± 67
History of head injury	2 (6%)	10 (4%)	0.6	12 (5%)
Family history of seizures	10 (32%)	66 (29%)	0.8	76 (29%)
History of physical abuse	7 (23%)	25 (11%)	0.08	32 (12%)
History of childhood abuse	5 (16%)	19 (8%)	0.1	24 (9%)
History of sexual abuse	6 (19%)	16 (7%)	0.03	22 (9%)
Dysfunctional family	11 (35%)	78 (34%)	1	89 (34%)
Academic failure	5 (16%)	13 (6%)	0.053	18 (7%)
Medical comorbidities	7 (23%)	57 (25%)	1	64 (25%)

There were few missing data in some cells.

Table 2

Factors associated with psychogenic nonepileptic seizure related urinary incontinence in logistic regression analysis.

Variable	Odds ratio	95% confidence interval	P value
Taking antiepileptic drugs	3.652	2.165-11.460	0.01
Ictal injury	4.981	2.401-11.927	0.0001
Duration of PNES before diagnosis	1.020	0.967-1.076	0.4
History of sexual abuse	2.502	0.743-8.431	0.1

PNES: psychogenic nonepileptic seizures.

Table 3

Factors associated with psychogenic nonepileptic seizure related injury in univariate analyses.

	Having seizure-related injury (75 patients)	No seizure-related injury (184 patients)	P value
Sex ratio (Female: Male)	43: 32	122: 62	0.2
Age (years)	31 ± 10	28 ± 10	0.01
Age at onset (years)	25 ± 10	24 ± 10	0.5
Duration of the condition (years)	6.3 ± 8	3.8 ± 6.2	0.009
Aura	43 (57%)	130 (71%)	0.04
Loss of responsiveness	72 (96%)	149 (81%)	0.002
Urinary incontinence	20 (65%)	11 (6%)	0.0001
Generalized motor seizures	67 (89%)	156 (85%)	0.5
Akinetic seizures	5 (7%)	23 (13%)	0.1
Nocturnal seizures	36 (48%)	52 (28%)	0.006
Taking antiepileptic drugs	48 (64%)	100 (54%)	0.1
Seizure frequency per month	27 ± 51	38 ± 72	0.2
History of head injury	5 (7%)	7 (4%)	0.3
Family history of seizures	28 (37%)	48 (26%)	0.09
History of physical abuse	18 (24%)	14 (8%)	0.001
History of childhood abuse	12 (16%)	12 (7%)	0.03
History of sexual abuse	8 (11%)	14 (8%)	0.4
Dysfunctional family	36 (48%)	53 (29%)	0.004
Academic failure	4 (5%)	14 (8%)	0.6
Medical comorbidities	20 (27%)	44 (24%)	0.7

There were few missing data in some cells.

nocturnal seizures, urinary incontinence, history of physical abuse, history of childhood abuse, and having dysfunctional family, in

Table 4
Factors associated with psychogenic nonepileptic seizure related injury in logistic regression analysis.

Variable	Odds ratio	95% confidence interval	P value
Urinary incontinence	5.122	2.105-12.461	0.0001
Loss of responsiveness with seizures	5.378	1.446-19.997	0.01
Duration of PNES before diagnosis	1.015	0.967-1.064	0.5
Age	1.033	0.998-1.070	0.06
Aura	0.671	0.352-1.279	0.2
Nocturnal seizures	1.491	0.783-2.840	0.2
History of physical abuse	2.588	1.000-6.697	0.05
History of childhood abuse	1.609	0.578-4.481	0.3
Having dysfunctional family	1.743	0.901-3.373	0.09

PNES: psychogenic nonepileptic seizures.

univariate analyses (Table 3). We then performed a logistic regression analysis, assessing these variables. The model, that was generated by logistic regression analysis, was significant ($p = 0.0001$) and could predict the possibility of seizure-related injury in 77% of the patients. Within the model, loss of responsiveness with seizures and urinary incontinence retained their significance (Table 4).

4. Discussion

In this study, we observed that one-third of patients with PNES-only reported having dramatic features (i.e., urinary incontinence and / or bodily injury) with their attacks. Reporting these dramatic features may be mistakenly associated with epileptic seizures and may lead to misdiagnosis and mismanagement in practice. More than half of our patients were taking AEDs and those who reported any of these dramatic features were more likely to be receiving AEDs (mistakenly). Healthcare professionals, who are taking care of patients with paroxysmal events, should be aware that while epilepsy and PNES have a variety of distinguishing symptoms and signs, none is pathognomonic to either diagnosis. The correct diagnosis of PNES vs. epilepsy may be based on different combinations of data including, patient history, witness reports, clinician observations, and ictal and interictal EEG and ictal video recordings [5]. In order to make a documented diagnosis, history should be compatible with the diagnosis of PNES; events should be witnessed by a clinician experienced in making the diagnosis of paroxysmal events, showing semiology typical of PNES while on video-EEG monitoring; and finally, no epileptiform activity should be detected immediately before, during or after the attack that was captured on ictal video-EEG recording [5,6].

Urinary incontinence may occur in association with both epileptic seizures and PNES. A pooled analysis of data from the literature showed that urinary incontinence has no value in the differential diagnosis between epileptic seizures and PNES [7]. Therefore, this event should not be used as a marker of epilepsy in patients with paroxysmal events and seizures. Reporting urinary incontinence with attacks in patients with PNES-only was strongly associated with receiving AEDs in our study (OR: 3.6); this should be considered as a warning for healthcare professionals, who are taking care of patients with paroxysmal events. Again, do not use attack-related urinary incontinence as a marker of epilepsy in patients with paroxysmal events and seizures.

Physical injuries associated with seizures are common in patients with epilepsy; however, severe injuries rarely occur in patients with epileptic seizures other than tonic-clonic seizures [8]. In this study, we observed that physical injuries were also commonly reported by patients with PNES and similar to that in patients with epilepsy most of these injuries were mild; though severe injuries (e.g., fractures and burns) may also happen. In spite of the higher frequency of seizure-related injuries in patients with epilepsy compared with that in patients with PNES [8,9], the presence of ictal injuries, even severe injuries such

as fractures and burns, cannot distinguish between epileptic seizures and PNES. This statement often contrasts with what many physicians believe [9,10]. Some authors have tried to identify the significance of specific types of injury (e.g., lateral tongue biting) and concluded that lateral tongue biting, but not ‘any’ tongue biting, has diagnostic significance in distinguishing epileptic seizures from PNES, supporting the diagnosis of epileptic seizures [9]. However, in our experience, one should not rely on any manifestation including lateral tongue biting to distinguish between epileptic and nonepileptic seizures with confidence. The diagnosis of PNES requires careful integration of a detailed clinical history and other information (particularly, a video-EEG monitoring) and should never be driven by any single clinical sign or symptom alone [4,11]. In this study, we also found a model to predict who may experience injury during psychogenic seizures. Within this model that was generated by regression analysis, urinary incontinence (OR: 5) and loss of responsiveness (OR: 5) were strong predictors of ictal injury. This means that patients with more dramatic presentations of PNES (e.g., urinary incontinence) more likely report ictal injury. The reasons behind these findings need to be explored in future international studies. Positive family history of seizures was not associated with ictal injury in our study and, therefore, the high rate of ictal injury in patients with PNES could not be explained by a learning process driven by experience with epilepsy in others.

In conclusion, patients with PNES may frequently present with dramatic features including, ictal injury and urinary incontinence, and as a result are at great risk of receiving wrong diagnosis and unnecessary treatments [12]. Physicians involved in the management of patients with seizures and paroxysmal events should be aware of this risk and prescribe an AED only after making a definite diagnosis of epilepsy in a patient with a paroxysmal event. Ironically, in one study, 47% of the patients with PNES reported complete or partial remission of their attacks after receiving AEDs [13]. A favorable response to AEDs may be mistakenly interpreted as supporting a diagnosis of epilepsy, which may be associated with diagnostic delay. Healthcare professionals should bear in mind that patients with PNES may be vulnerable to placebo effects [13].

This study opens the door to more research on the significance of seizure semiology. Are these dramatic presentations (i.e., ictal injury and urinary incontinence) associated with more severe underlying psychopathology or worse prognosis? There is some suggestion that altered responsiveness during PNES could be associated with lower emotional resilience or ability to tolerate emotions [14].

This study has some limitations including its retrospective design and lack of some important data such as psychiatric comorbidities of the patients. In addition, the “dramatic semiological features” are based on self-report (with no inquiry from their medical records) and we did not capture any of these features during the video-EEG recordings.

Contributions

Ali A. Asadi-Pooya, M.D.: Study design, data collection, statistical analysis, manuscript preparation. Zahra Bahrami, M.D., Data collection, manuscript preparation.

Conflict of interest

Ali A. Asadi-Pooya, M.D.: Honoraria from Cobel Daruo; Royalty: Oxford University Press (Book publication). Zahra Bahrami, M.D.: none.

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