



Ictal injury in psychogenic non-epileptic seizures



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ABSTRACT

Purpose: Whilst ictal injuries in psychogenic non-epileptic seizures (PNES) have been reported previously, very few studies have described the spectrum of ictal injuries in these patients. In the current study, we tried to determine the spectrum of reported ictal injuries associated with PNES and to investigate the possible associated risk factors.

Methods: All patients with PNES were recruited prospectively in the outpatient epilepsy clinic at Shiraz University of Medical Sciences, between 2008 and 2013. The diagnosis was made by clinical assessment and ictal video-EEG recordings. We asked all patients and their caregivers about history of any minor (e.g., tongue biting, bruises, and lacerations) or major (e.g., burns and fractures) physical injuries associated with their seizures, since their disease started. Clinical variables, factors potentially predisposing to PNES and video-EEG recordings of all patients were analyzed.

Results: Two hundred and eleven patients were studied. Sixty-five patients (30.8%) reported injuries with one or more of their attacks. The most common type of reported injury was tongue biting. Lacerations, bruises, limb fractures, dental injury, and burn were also reported.

Conclusion: PNES commonly produce physical injuries. Despite the shibboleth that injuries rarely occur during PNES, mild injuries commonly happen and even severe injuries such as fractures and burns are not uncommonly reported in these patients. Patients with more dramatic seizure manifestations (e.g., urinary incontinence) were more likely to report ictal injuries.

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1. Introduction

Patients with epilepsy often have seizures with impairment of consciousness and abnormal uncontrolled movements. As a consequence, physical injuries are common in patients with epilepsy.^{1–4} Psychogenic non-epileptic seizures (PNES) consist of paroxysmal changes in responsiveness, movements, feelings, or behavior that are similar to epileptic seizures, but do not have a neurological origin and are not associated with epileptic EEG changes.^{5–8} Ictal injury, particularly tongue biting, has been reported in patients with PNES, as these may occur in epileptic seizures.⁹ However, physical injuries, particularly severe ones, might be considered strongly supportive of a presumptive diagnosis of epilepsy rather than PNES.

Few studies have described the spectrum of ictal injuries in patients with PNES. In the present report, we determined the spectrum of ictal injuries due to PNES. We also investigated the possible risk factors for ictal injury in these patients.

2. Materials and methods

In this prospective study, all patients with PNES were evaluated at the outpatient epilepsy clinic at Shiraz University of Medical Sciences, from September 2008 to June 2013. The diagnosis was made by clinical assessment and ictal recording during a 2-h video-EEG monitoring with 10–20 system electrodes and additional T1 and T2 electrodes. A typical event was recorded with no abnormal EEG correlate and behavior consistent with PNES. We routinely perform verbal suggestion to induce PNES in all patients during video-EEG recording. Toward the end of the video-EEG recording session, we inform the patient that we must see the seizures to ascertain the diagnosis for treatment purposes. At the time of interpretation of the video-EEG monitoring, we review the video with the relatives or the caregivers to verify that habitual seizures were recorded. The behavioral characteristics of PNES were

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ascertained both by an interview of patients and witnesses and by reviewing the recorded video-EEG monitoring. We asked all patients and their caregivers about history of any minor (e.g., tongue biting, bruises, and lacerations) or major (e.g., burns and fractures) physical injuries caused by seizures since their disease started. We always obtain a detailed clinical history to investigate for the possibility of a concomitant epileptic disorder in patients with PNES (i.e., presence of other seizure types, different from what we captured during the video-EEG monitoring, if the description is compatible with epileptic seizures). We also review the recorded EEG carefully to search for any interictal or ictal epileptiform discharges.

An epileptologist interviewed all patients. If they agreed to share their information, they were included in the study. All personal data were kept confidential through codes. Demographic variables (age, gender, education, age at seizure onset), clinical variables (seizure semiology and ictal injury), factors potentially predisposing to PNES (history of physical, emotional or sexual abuse, academic failure, head injury, any medical comorbidities, and family history of epilepsy), and video-EEG recording results were registered for all patients. All variables were summarized descriptively to characterize the study population. Pearson Chi-Square, Fisher's Exact test, Kolmogorov–Smirnov, Shapiro–Wilk, and Mann–Whitney *U* test were used for statistical analyses. A *P* value <0.05 was considered as significant. Subsequently, a binary logistic regression was performed on variables that were significant in univariate analyses (*P* < 0.05) to correlate all the significant independent variables with the dependent variable (i.e., ictal injury). This study was conducted with the approval by Shiraz University of Medical Sciences Review Board.

3. Results

Two hundred and eleven patients were studied. One hundred and forty-one (66.8%) were female and 70 (33.2%) were male. Sixty-five patients (30.8%) reported injury with one or more attacks and 146 patients (69.2%) did not report any injury since their seizures started. The most common type of injury was tongue biting, reported by 28 patients (13.2%). Face, scalp, or limb lacerations were reported by 21 patients (9.9%); bruises by 14 patients (6.6%); fractures (leg fractures in two, nose fracture in one and pelvic fracture in another patient) by four patients (1.8%); dental injury by one (0.4%) and burned hand by one patient (0.4%). Four patients reported more than one type of injury. Demographic characteristics of patients with PNES and with ictal injury and those without injury are summarized and compared in Table 1. Clinical characteristics and semiology of patients with PNES with ictal injury and those without injury are summarized and compared in Table 2. Factors potentially predisposing to PNES in patients with injury and those without injury are summarized and compared in Table 3.

The frequency of violent shaking movements (*P* = 0.04), nocturnal seizures (*P* = 0.008), urinary incontinence (*P* = 0.0001), postictal state (*P* = 0.01), and history of physical abuse (*P* = 0.01) was statistically significantly higher and the duration of the

disease before reaching a correct diagnosis was significantly longer (*P* = 0.01) in patients with ictal injury compared with those patients with PNES who did not have injury. The full model containing all the above predictors was statistically significant ($\chi^2 = 41.78$; *P* < 0.0001), indicating that the model was able to distinguish between PNES patients who report ictal injury and the others. The model correctly classified 69.2% of the patients. Within the model the following features were associated with ictal injury: urinary incontinence (*P* < 0.0001, Odds Ratio = 7.03, 95% confidence interval = 2.62–18.8), violent shaking movements (*P* = 0.07, Odds Ratio = 1.83, 95% confidence interval = 0.94–3.56), history of physical abuse (*P* = 0.08, Odds Ratio = 2.24, 95% confidence interval = 0.88–5.7), duration of the disease before reaching to a correct diagnosis (*P* = 0.09, Odds Ratio = 0.96, 95% confidence interval = 0.92–1.01), nocturnal seizures (*P* = 0.14, Odds Ratio = 1.64, 95% confidence interval = 0.84–3.21), and postictal state (*P* = 0.13, Odds Ratio = 2.09, 95% confidence interval = 0.79–5.56).

4. Discussion

Physical injuries from seizures are common in patients with epilepsy; however, most of these injuries are mild. Severe injuries rarely occur in patients with epileptic seizures other than generalized tonic-clonic seizures.⁴ In the present study, we observed that physical injuries are also common in patients with PNES. About one-third of the patients with PNES reported injury during one or more of their attacks. Similar to epileptic seizures, severe injuries rarely occurred in patients with PNES; however, injuries such as fractures and burns were observed. Although the frequency of tongue biting and other injuries is significantly lower in PNES than epilepsy,^{4,9} the presence of ictal injuries cannot distinguish between epileptic seizures and PNES. This contrasts with what many physicians believe.^{9,10} The problem becomes more complicated when we consider that psychogenic non-epileptic seizures are relatively common at epilepsy clinics.^{11,12} Previously, authors have tried to determine the significance of specific types of injury (i.e., lateral tongue biting), either reported by patients or observed in the video-EEG monitoring units, 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 cannot rely on lateral tongue biting to distinguish between epileptic and non-epileptic attacks with certainty. The diagnosis of PNES requires careful integration of a detailed history and other clinical information (particularly, a video-EEG monitoring) and should never be driven by any single clinical sign or symptom alone.^{9,13}

In this study, we found a model to predict who may report injury during psychogenic seizures. Patients who report ictal urinary incontinence had an odds ratio of more than seven to one for reporting ictal injury during their PNES. Patients who reported violent shaking movements during their seizures or had history of physical abuse showed a non-significant trend to report ictal injury. These findings could be translated into a model, which predicts that patients with more unusual and unexpected

Table 1
Demographic characteristics of PNES patients with ictal injury and those without injury.^a

Demographic variable	With injury	Without injury	<i>P</i> value
Gender (female/male)	39/26 (1.5:1)	102/44 (2.3:1)	0.1
Age at referral (mean ± standard deviation)	30.1 ± 8.8	28 ± 10.1	0.06
Age of onset (mean ± standard deviation)	23.1 ± 9.1	23.2 ± 10.7	0.5
Education (some/diploma/university/missing) ^b	36/20/6/3	71/33/30/12	0.1
Marital status (single/married/divorced/widowed)	23/39/2/1	72/69/3/2	0.3

^a Some data were missing.

^b "Some" means less than 11 years of education; diploma means 11–12 years of education.

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