**Summary**

Psychogenic non-epileptic seizures (PNES) represent a relatively frequent challenge for clinicians. While they resemble epileptic seizures, they are not the consequence of paroxysmal electrical discharges in the brain, but are related to psychological triggers in vulnerable subjects. Gold standard of PNES diagnosis remains the recording of a typical event under video-EEG. PNES recognition is not only important in order to offer an appropriate treatment to the patient, which should include a multidisciplinary approach by psychiatrists and neurologists, but also, especially in the acute phase, to avoid a potentially harmful escalation of pharmacological treatment.

**Epileptologie 2016; 33: 50 – 54**

**Key words:** PNES, dissociative disorder, conversion disorder, psychiatrist

**Nichtepileptische, psychogene Anfälle aus der Neurologenperspektive**


**Schlüsselwörter:** PNES, dissoziative Anfälle, Konversionsstörung, Diagnose, Psychiater

**Andrea O. Rossetti**
Service de Neurologie, CHUV, Lausanne

**Crises non-épileptiques psychogènes depuis une perspective neurologique**

Les crises non-épileptiques psychogènes représentent un défi relativement fréquent pour les neurologues. Si d'une part ces manifestations ressemblent à des crises épileptiques, elles ne sont pas dues à des décharges neuronales paroxystiques, mais sont liées à des facteurs déclencheurs d'ordre psychologique survenant chez des sujets vulnérables. Le gold-standard pour le diagnostic des crises non-épileptiques psychogènes est l'enregistrement d'un événement typique sous vidéo-EEG. L'identification de patients avec crises non-épileptiques psychogènes est non seulement important pour offrir aux malades un traitement approprié (idéalement par une approche interdisciplinaire avec psychiatre et neurologue), mais aussi afin d'éviter une surenchère médicamenteuse qui peut se révéler dangereuse, particulièrement dans la phase aiguë.

**Mots clés :** Trouble dissociatif, trouble somatoforme, trouble de conversion, diagnostic, psychiatre

**Why are psychogenic non-epileptic seizures important?**

Psychogenic non-epileptic seizures (PNES) are defined as paroxysmal disorders that clinically resemble epileptic seizures, but occur without epilepsy-specific changes on the EEG, together with a psychological substrate [1]. Furthermore, PNES patients, as opposed to subjects with convulsive seizures, do not show any meaningful elevation of muscle CK or lactate [2], and as opposed to patients after an organic syncope or seizure, do not have any modification in serum prolactine.

PNES patients are not rare, especially for epileptologists or for neurologists working in a hospital. Up to 20% of patients with PNES may present a "status", meaning that their attacks are prolonged over several minutes to hours [3]; and a considerable proportion of patients treated in the intensive care unit for suspected status epilepticus may finally receive a diagnosis of PNES [2]. This may lead to potentially inappropriate treatments, as up to 60% of patients are treated with antiepileptic drugs (AEDs), which do not prevent PNES episodes [4], and an escalation to an intensive care
admission and tracheal intubation may induce a non negligible morbidity and mortality of iatrogenic origin. These patients may have a history or show signs of other non-organic disorders [5]. Finally, PNES patients show a higher yearly mortality rate as compared to matched controls [6]. For all these reasons, the ability to recognize PNES is of utmost importance for the wellbeing of patients.

**Epidemiology**

Table 1 gives an overview of estimations of PNES incidence, while the prevalence has been estimated at 2-33/100’000 population [7]. These numbers represent about 1/15, respectively 1/100 of the epilepsy incidence and prevalence; however, a considerable proportion of PNES patients may go unrecognized, as it is relatively common to diagnose patients several years (up to 20) after symptom onset [8]. In all studies, there is a prevalence of women. This is especially true for middle-aged patients. Table 2 summarizes data regarding comorbidity with epilepsy, which seems to oscillate between 10 and 20%. A consistent proportion of PNES patients, thus, may have concomitant epileptic attacks; in the experience of the author, however, patients can report in most cases the difference between these two entities.

**Causes**

The classical psychodynamic theory explains PNES as part of dissociative or somatoform disorders as an unconscious development of a somatic symptom that reduces an inner tension in patients with some sort of unsolved psychological conflicts. In fact, virtually all patients with PNES exhibit a strong psychiatric comorbidity, mostly in terms of anxio-depressive disorders, but also regarding personality disorders (particularly, narcissistic or histrionic, but also unstable personalities such as borderline) [1, 9]. As stated above, other signs and symptoms of dissociative disorders are not infrequent, both as concomitant diagnoses, and as occurrences in the patient’s history.

In recent years, some attention has been directed towards identifications of biological markers in this clinical context; all studies have been conducted interictally. Decreased metabolism in the anterior cingulate cortex (a key location for integration of the self) and in the right pericentral cortical regions (subtending orientation in space and movement control) has been identified with PET [10]. A functional MRI study suggested that PNES patients show stronger connectivity values between areas involved in emotion (insula), executive control (inferior frontal gyrus and parietal cortex), and movement (precentral sulcus) [11], suggesting a sort of short circuit facilitating dissociative manifestations, while high-density EEG studies detected a disconnection of the frontal regions, whose extent correlated with the density of PNES attacks over time [12, 13]. A follow-up analysis showed in addition a decrease in connectivity between basal ganglia and several cortical regions, suggesting a correlate of attenuation of the effect of potentially disturbing mental representations [8].

**Semiology and differentiation from epileptic seizures**

As with epileptic seizures, the great inter- (and at times intra-) individual variability of symptoms justifies some classification attempts. One relatively straightfor-

<table>
<thead>
<tr>
<th>Table 1: Yearly incidence of psychogenic non-epileptic seizures (PNES)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
</tr>
<tr>
<td>Iceland</td>
</tr>
<tr>
<td>Ohio (USA)</td>
</tr>
<tr>
<td>Scotland</td>
</tr>
</tbody>
</table>
ward approach categorizes motor episodes into three main groups: overt motor manifestations (resembling generalized convulsive seizures), subtle motor manifestations (resembling temporal lobe seizures), and atonic manifestations (resembling syncope) [20, 21]. Interestingly, it has been shown that younger patients tend to present significantly less often with overt motor episodes as compared to adults [22].

Surveys among neurologists illustrated that PNES diagnosis solely based upon semiology has a sensitivity and specificity of 80 - 85% [23], while the interrater agreement seems moderate for PNES and substantial for epileptic seizures [24]. Clinical items that help in differentiating PNES from epileptic seizures are given in Table 3. It is important to underscore that no sign bears a 100% specificity and that at first glance “bizarre” clinical manifestation may well occur in patients having an epileptic seizure, especially if originating from the frontal lobe.

### Diagnosis and differential diagnosis

Given the aforementioned limitations, the gold standard relies in capturing a typical clinical event during EEG recording [25]. The sensitivity of an ambulatory extended EEG is about 50 - 65% [26, 19, 27], and may be increased during long-term video-EEG. Provocation methods may include strong verbal suggestion, intermittent photic stimulation, hyperventilation, placing a tuning fork on the forehead, and hand compression over the temporal regions [28]; these are all non-invasive and may further improve the sensitivity of the recording. A debate exists regarding the use of a nocebo, particularly injection of physiological saline under suggestion [29, 30]. It is the opinion of this author that nocebo has its place if other maneuvers do not allow an attack induction. However, it is of greatest importance how to verbally reinforce the injection: stating that “the liquid will induce an epileptic seizure” is not only incorrect but also deceives the patient; conversely, saying that “the diluted salt may induce a characteristic attack that will enable a correct diagnosis” is both well accepted and potentially very helpful.

Differential diagnoses with physiological disorders include, in the order of frequency (but in an incomplete listing): syncope, (frontal lobe) seizures, migraine with aura, movement disorders (such as tremor, hemiballismus, chorea, and even limb shaking heralding an ischemic stroke), as well as non REM and REM parasomnias.

### What to do

Once a patient has been diagnosed with PNES, it is important that the neurologist, most optimally within an interdisciplinary approach with the liaison psychiatrist, explains it to the patient and the relatives. The stepwise technique is to first listen to the patient’s considerations and representations, then to underscore that the attacks are not due to epilepsy, and finally to bring the keyword “functional disorder”. This allows on the one side to reassure the patient that his/her condition has a name, and on the other side to offer a mechanistically-based explanation (“the function of

<table>
<thead>
<tr>
<th>Location</th>
<th>Cohort</th>
<th>Proportion</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iceland</td>
<td>population</td>
<td>50%</td>
<td>[14]</td>
</tr>
<tr>
<td>Ohio (USA)</td>
<td>population</td>
<td>20%</td>
<td>[15]</td>
</tr>
<tr>
<td>Florida (USA)</td>
<td>hospital</td>
<td>9%</td>
<td>[17]</td>
</tr>
<tr>
<td>Shiraz (Iran)</td>
<td>hospital</td>
<td>16%</td>
<td>[18]</td>
</tr>
<tr>
<td>Lausanne (CH)</td>
<td>hospital</td>
<td>22%</td>
<td>[19]</td>
</tr>
</tbody>
</table>
the brain is at times impaired, but restorable"). At this point, questions should be answered and the possibility of a psychogenic trigger mentioned, in accordance with the receptivity and the level of understating of the patient [31]. Further appointments may be needed, and looking together with the family at the recorded, typical episode can be of considerable help. It has been shown that the mere explanation of a PNES diagnosis drastically reduces the emergency visits and may contribute to a better quality of life [32].

It is extremely important that neurologists remain involved on a long-term basis during psychiatric treatment, which represents the mainstay of the therapeutic approach, in order to offer a somatic frame [31], and to guarantee a timely recognition of other dissociative manifestations, which may develop in as much as 25% of patients [5].

 Disclosure:
Dr Rossetti received unrestricted research grants from Sage Therapeutics and UCB Pharma over the last 3 years.

References
3. Dworetzky BA, Mortati KA, Rossetti AO et al. Clinical characteristics of psychogenic nonepileptic seizure status in the long-term monitoring unit. Epilepsy Behav 2006; 9: 335-338

Table 3: Clinical signs in psychogenic non-epileptic seizures and epileptic seizures (modified after La France Curr Opin Neurol 2008)

<table>
<thead>
<tr>
<th>Sign</th>
<th>Psychogenic non-epileptic seizure</th>
<th>Epileptic seizure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed eyes, resistance to opening (ictally)</td>
<td>Highly specific</td>
<td>Exceptional</td>
</tr>
<tr>
<td>Asymmetrical, wandering, and crescendo-decrescendo movements</td>
<td>Highly specific</td>
<td>Rare (frontal lobe seizures)</td>
</tr>
<tr>
<td>Pelvic thrusting</td>
<td>Highly specific</td>
<td>Rare (frontal lobe seizures)</td>
</tr>
<tr>
<td>Lateral tongue bite</td>
<td>Extremely uncommon</td>
<td>Highly specific (generalized convulsion)</td>
</tr>
<tr>
<td>Teddy bear in the bed</td>
<td>Very specific in adults</td>
<td>Exceptional in adults</td>
</tr>
<tr>
<td>Avoiding gaze contact (postictally)</td>
<td>Relatively frequent</td>
<td>Exceptional</td>
</tr>
<tr>
<td>Ictal weeping</td>
<td>Relatively common</td>
<td>Exceptional</td>
</tr>
<tr>
<td>Postictal stertorous breathing</td>
<td>Exceptional</td>
<td>Very common after generalized convulsion</td>
</tr>
<tr>
<td>Postictal whispering</td>
<td>Highly specific</td>
<td>Exceptional</td>
</tr>
<tr>
<td>Self injury</td>
<td>May occur</td>
<td>May occur</td>
</tr>
<tr>
<td>Urine incontinence</td>
<td>May occur</td>
<td>May occur</td>
</tr>
</tbody>
</table>
16. Duncan R, Razvi S, Mulhern S. Newly presenting psychogenic nonepileptic seizures: incidence, population characteristics, and early outcome from a prospective audit of a first seizure clinic. Epilepsy Behav 2011; 20: 308-311
17. Benbadis SR, Agrawal V, Tatum WOt. How many patients with psychogenic nonepileptic seizures also have epilepsy? Epilepsy 2001; 57: 915-917
20. Griffith NM, Szaflikarski JP, Schefft BK et al. Relationship between semiology of psychogenic nonepileptic seizures and Minnesota Multiphasic Personality Inventory Profile. Epilepsy Behav 2007; 11: 105-111
23. Seneviratne U, Rajendran D, Brusco M, Phan TG. How good are we at diagnosing seizures based on semiology? Epilepsia 2012; 53: e63-66
29. Benbadis SR. Provocative techniques should be used for the diagnosis of psychogenic nonepileptic seizures. Epilepsy Behav 2009; 15: 106-109; discussion 115-108
30. Leeman BA. Provocative techniques should not be used for the diagnosis of psychogenic nonepileptic seizures. Epilepsy Behav 2009; 15: 110-114; discussion 115-118
32. Razvi S, Mulhern S, Duncan R. Newly diagnosed psychogenic nonepileptic seizures: health care demand prior to and following diagnosis at a first seizure clinic. Epilepsy Behav 2012; 23: 7-9

Address for correspondence:
PD Dr Andrea O. Rossetti
Service de Neurologie, BH 07
CHUV
CH 1011 Lausanne
Tel. 021 314 11 90
Fax 021 314 12 90
andrea/rossetti@chuv.ch