

ELECTRODERMAL BIOFEEDBACK IN TREATING PSYCHOGENIC NONEPILEPTIC SEIZURES

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Abstract: Psychogenic nonepileptic seizures are operationally defined as episodes of altered movement very like epileptic seizures, but associated with psychological problems and not with ictal discharges. Children with psychogenic nonepileptic seizure (PNS) could be categorized either under somatoform in the ICD-10 or conversion disorders in DMS-IV.

The history, psychometric evaluation and therapeutic approach concerning nonepileptic psychogenic seizures in a 13-year-old girl are presented and discussed.

The novelty of the treatment is the electrodermal (EDR) biofeedback procedure combined with cognitive-behavioral therapy.

We inferred that biofeedback for PNE in pediatric patients is highly cost-effective, discriminative for the actual level of stress and gives good therapeutic results through enhancing self awareness and relaxation, when used in combination with standard psychometric and psychotherapeutic methods.

The stabilization of the hypersensitivity, lower neurotic tendencies and emotional maturation were obtained after 10 sessions of EDR biofeedback, each with the duration of 45 minutes/day. Mean value of EDR before treatment was 4919 (\pm 145.5) and the last value obtained with training showed a mean value of 5400.8 (\pm 147.9) $\mu\Omega$.

The following controls showed no more attacks, stabilization of the neurotic tendencies, progression of the maturational process and good academic results.

Key words: nonepileptic seizures, children, psychometric evaluation, biofeedback.

Introduction

Psychogenic nonepileptic seizures can be operationally defined as episodes of altered movement very like epileptic seizures, but associated with psychological problems and not with ictal electrical discharges. These seizures can be provoked by suggestion or be the expression of psychosocial distress [1].

There are two types of nonepileptic seizures according to the Epilepsy Foundation (EF): physiologic or psychogenic.

A *physiologic* nonepileptic seizure may be caused by a number of conditions that can trigger seizures. According to the EF they include: changes in heart rhythm; sudden drops in blood pressure; very low blood sugar; sleep disorders and movement disorders.

A *psychogenic* nonepileptic seizure appears to be caused by emotional trauma or excessive stress.

In the general population the incidence or prevalence of psychogenic nonepileptic seizures is unknown, but some neurological centers have reported an incidence of 1.5–33/100.000. [2].

Although psychogenic nonepileptic seizures are not a rare condition, the diagnosis is usually late, and three quarters of patients are still initially treated with anticonvulsant. The rate of patients with psychogenic nonepileptic seizures misdiagnosed as epilepsy has been found to be around 5% in seizure patients treated by primary care physicians [3].

The distinction of psychogenic nonepileptic seizures from real epilepsy is very important, especially in children, because of the negative influence of the antiepileptic drugs on their psychological problems, risk of drug toxicity and negative influence to cognitive development. This has significant effects on the patient's quality of life. [4].

Paroxysmal nonepileptic seizures (PNS) are frequently encountered in children and adolescents; however, there is little information concerning the relative frequency of various types of these disorders. The manifestation of psychogenic nonepileptic seizures below 10 years of age is unusual, but high seizure frequency, worsening with antiepileptic drugs, multiple unexplained physical symptoms, and sexual or physical abuse in the history can be useful in the diagnostics. However, the most important investigation in the diagnosis of psychogenic nonepileptic seizures is the observation of the attack.

The diagnosis can be suspected on the basis of the history. Several red flags are useful in clinical practice and should raise the suspicion that seizures may be psychogenic rather than epileptic:

- a) Approximately 80% of patients with PNS have been treated with drugs before the correct diagnosis is made.

- b) Resistance or worsening with antiepileptic drugs can be the first clue and is usually the reason for referral to the epilepsy center.
- c) The presence of specific triggers that are unusual for epilepsy can be suggestive of PNS, and this should be specifically asked during history taking. For example, emotional triggers such as "stress" or "becoming upset" are commonly reported in PNS. Other triggers that suggest PNS may include pain, certain movements, sounds, and lights, especially if they are alleged to consistently trigger a "seizure."
- d) The circumstances in which attacks occur can be very helpful. Like other psychogenic symptoms, PNS usually occur in the presence of an "audience", and occurrence in the physician's office or the waiting room is suggestive of PNS. Similarly, PNS usually do not occur during sleep.
- e) Detailed description of the spells often includes characteristics that are inconsistent with epileptic seizures. In particular, some characteristics of the motor (i.e. convulsive) phenomena are associated with PNS.
- f) The past medical history can be useful. Although this has not been documented, coexisting poorly defined and probably psychogenic conditions, such as fibromyalgia, chronic pain, or chronic fatigue, are associated with psychogenic symptoms. The psychosocial history with evidence of maladaptive behavior or associated psychiatric diagnoses should raise the suspicion of PNS.

By contrast to the above, certain symptoms, when present, argue in favor of epileptic seizures. These include significant injury. In particular, tongue-biting is highly specific to generalized tonic-clonic seizures and a helpful sign when present.

Laboratory studies are useful only in excluding metabolic or toxic causes of seizures (e.g. hyponatremia, hypoglycemia, and drugs). Prolactin and creatine kinase (CK) levels rise after generalized tonic-clonic seizures and not after other types of episodes. However, sensitivity is too low to be of any practical value. Because of its low sensitivity, routine EEG is not helpful in confirming a diagnosis of PNE. The presence of repeated normal EEG findings, especially in the light of frequent attacks and resistance to medications, can be viewed as a red flag. Ambulatory EEG increasingly used is cost effective, and can contribute to the diagnosis by recording the habitual episode and documenting the absence of EEG changes. However, because of the difficulties in conveying this diagnosis, it should always be confirmed by EEG-video monitoring.

Studies using cluster analysis suggest several types of psychogenic nonepileptic seizures from the semiologic point of view. The commonest semio-

logy comprises limbs, neck and trunk movement, tremor or atonia, where consciousness appears impaired. [5, 6, 7].

Otherwise, non-specific EEG changes are found in 18% of the patients with psychogenic seizures and in 10% of age-matched healthy controls. This causes a difficulty in the distinction from epileptic patients. [8].

Differential diagnosis of paroxysmal neurological disorders is wide: syncope, transient ischemic attacks in adults, migraine, narcolepsy, parasomnia, paroxysmal vertigo, hypoglycemias etc. [9].

Children with psychogenic nonepileptic seizure could be categorized in the ICD-10 under somatoform or conversion disorders in DMS-IV. [10, 11]. Conversion disorder was seen in children > 5 years old and its frequency increased with age, becoming the most common type of PNS among adolescents. In adolescents, conversion disorder was more common in females, whereas males predominated in the school-aged group.

The mainstay of treatment is psychological, where the conflict or trauma can be identified and discussed with the patient. Both psychoanalytical approaches and some variant of cognitive behavioral therapy can be useful. The therapy comprises also identification of stressors and presentation of alternative ways of addressing problems in the social environment interacting with personal vulnerability

Medication may be indicated for associated depression or anxiety disorders. It was proposed that stress management techniques such as relaxation exercises or biofeedback may also be of benefit [12, 13]. However, the results obtained by alpha EEG biofeedback training are controversial [14].

Our starting hypothesis is that, instead of neurofeedback, EDR biofeedback could be a better modality for treating PNS.

Method

In September 2004 we hospitalized a 13 year-old-girl because she several times manifested some bizarre attacks with trembling, excitement, fixed eyes, a feeling of pressure on the chest, parallel with headache on the right side. The attacks were treated in the local hospital with i.v. glucose and Apaurin. In the last week she three times manifested the same type of attacks and she was transported to the neurological service at the Pediatric Clinic.

The out-patient assessment concerning EEG, ocular and laboratory examinations suggested possible epileptic seizure and Carbamazepin therapy was prescribed. The seizures reappeared more frequently, with the same characteristics, and hospitalization was indicated.

The neurological examination and the revised EEG monitoring were normal and the patient was transmitted to the psychophysiological department.

The treatment we chose was exclusion of the antiepileptic drug and behavior-cognitive therapy followed by electrodermal (EDR) biofeedback.

Biofeedback is a method of learning to control one's bodily and mental functions with the aid of a visual or auditory display of one's own brain waves, blood pressure, muscle tension or electrodermal response. For EDR biofeedback we use the Inner Tuner Expert System (licensed by Ultramind, London). EDR is influenced by one pathway through the hypothalamic and limbic structures via the pyramidal tract and it is an essential part of the inferential chain linking brain to body and mind to brain. Our previous experience with EDR biofeedback therapy in children manifesting somatoform or stress-related symptoms was very satisfactory [15, 18]. The EDR biofeedback teaches children relaxation procedures and it is useful for tension-relief.

Results

The detailed anamnesis clarified nonspecific nonepileptic type of "attacks", reappearing only at home and related to the family psychological situation. The interpersonal relationship in the family comprised great animosity, frequent quarrels, threatening between the grand-father and the mother of the child, followed by attacks the same night after them.

The psychological evaluation of the girl showed: an extrovert, intelligent, hypersensitive girl in A-3 M-3-4 and P-3 stages of puberty, with accentuated neurotic tendencies obtaining for the Eysenck Personality Inventory (EPQ): N score 17; E score 16, P score 9 and L score 8. The stress-related electrodermal response (low electrical resistance and high conductivity) and normal score on the Beck depression questionnaire were suggestive of somatoform disorder. The MMPI profile obtained was characteristic of a hysterical personality (high peak on Hy scale). (Fig. 1)

The profile obtained for MMPI, in addition to EPQ and the history, confirms that the manifestation was related to psychosocial condition on the basis of the hypersensitive personality of the girl and maladaptation to the actual situation.

The parent's evaluation showed a highly neurotic, dominant mother who intended to separate her own family from the grand-father's influence. She used the "attacks" of the girl as evidence of the bad influence of the grand-parent on the girl. Induced by the misinterpretation of the behavior of the grand-father, the girl accepted being the instrument of the rivalry and the dominance of her mother over the father who was more flexible and sensitive to his own father.

The stabilization of the hypersensitivity, lower neurotic tendencies and emotional maturation were obtained after 10 sessions of EDR biofeedback, each with the duration of 45 minutes/day. The mean value of EDR before treatment was $4919 (\pm 145.5)$ and the last value obtained with training show a mean value of $5400.8 (\pm 147.9)\mu\Omega$.

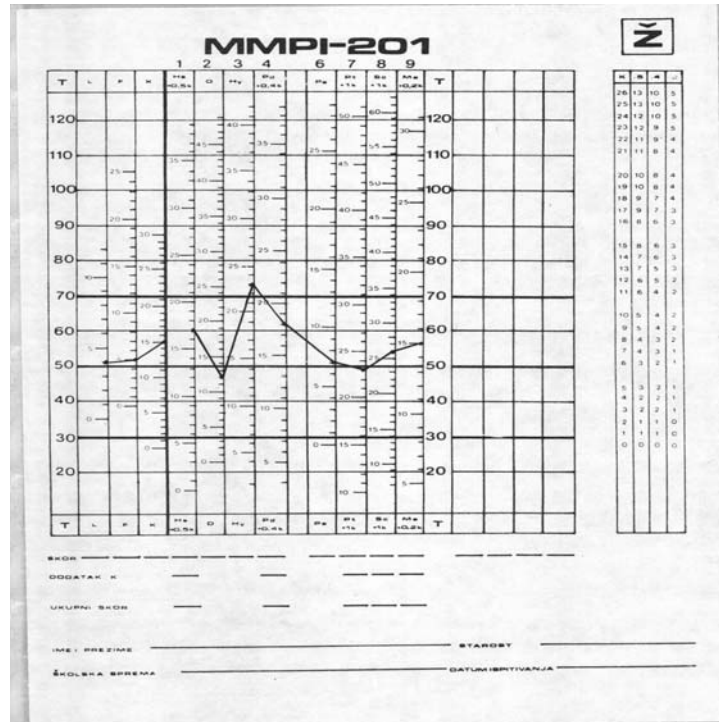


Figure 1 – MMPI profile obtained from our patient

The hospitalization was short (10 days) without the reappearance of any attack. The girl became aware of the actual situation and accepted our explanation about her attacks and followed the suggestion about relaxation procedures at home. The following controls showed no more attacks, stabilization of the neurotic tendencies, progression of the maturational process and good academic results.

Conclusion

In pediatric practice, certain nonspecific "attacks" are common. The misdiagnosis of epilepsy usually indicates the prescription of antiepileptic drugs,

which could deteriorate the child's development, cognitive abilities and quality of life.

The psychogenic nonepileptic seizures should be taken into account when nonspecific "attacks" in school children and adolescents are present. The history, the psychological evaluation, normal neurological state and normal EEG could support the diagnosis of PNS.

As we pointed out the main treatment of PNS should be psychological. The specific in our therapeutic approach is EDR biofeedback. The obtained result is very encouraging.

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Резиме

ЕЛЕКТРОДЕРМАЛЕН БИОФИДБЕК ВО ТРЕТМАНОТ НА ПСИХОГЕНИ НЕЕПИЛЕПТИЧКИ КОНВУЛЗИИ

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Психогените неепилептични конвулзии (ПНК) се дефинираат како епизоди на движења слични како кај епилепсијата, но се асоцирани со психосоцијален стрес и без иктални празнења. Психогените неепилептични конвулзии (ПНК) кај децата се класифицираат како соматоформни по ICD-10 или како конверзивни растројства според DMS-IV.

Прикажани и дискутирани се историјата на болеста, психометричката евалуација, како и терапискиот приод при неепилептични психогени конвулзии кај 13-годишно девојче.

Новина во третманот е употребата на електродермална (ЕДР) биофидбек процедура комбинирана со когнитивно-бихевиорална терапија.

Нагласуваме дека биофидбекот во педијатријата има висок cost-benefit, овозможува добра дискриминативност на актуелното ниво на стрес и добри терапевтски резултати преку подобрување на самосвесноста и релак-

сацијата, кога се комбинира со стандардните психометриски и психотераписки методи, при што се избегнуваат какви било лекови.

Стабилизација на хиперсензитивноста, невротичните тенденции како и емоционална матурација се постигнати по 10 сесии на ЕДР биофидбек, секоја во траење од 45 минути дневно. Средните вредности на ЕДР пред третманот беа $4919 (\pm 145.5)$, додека последната средна вредност изнесува $5400.8 (\pm 147.9) \mu\Omega$.

Следните контроли покажаа немање на конвулзии, стабилизирање на невротичноста, емоционална матурација како и добри академски резултати.

Клучни зборови: неепилептички конвулзии, детство, психометриска проценка, биофидбек.