Epilepsy & Behavior Case Reports 2 (2014) 60–63

Contents lists available at ScienceDirect

Epilepsy & Behavior Case Reports

journal homepage: www.elsevier.com/locate/ebcr

Case Report

The diagnostic and therapeutic challenge of nonepileptic seizures: An interdisciplinary approach

Shirley Ferguson Rayport *[,1,2], Carolyn A. Schell [2,3]

Medical College of Ohio (currently University of Toledo), Toledo, OH, USA

ARTICLE INFO

Article history:
Received 4 March 2014
Received in revised form 15 March 2014
Accepted 25 March 2014
Available online 22 April 2014

Keywords:
Nonepileptic seizures
Phenomenological approach
Interdisciplinary team methodology
Individualized, tailor-made treatment

ABSTRACT

Nonepileptic seizures were recognized in antiquity, but their diagnosis continues to be challenging in the present day. The diagnosis of seizures as nonepileptic has been based on associated physical conditions, social factors, laboratory findings, or psychological test findings. Pitfalls remain in the use of electroencephalography. We present several case studies of representative etiologies that demonstrate the value and the need for an interdisciplinary approach focusing on the individual, in the present, in all current dimensions, with careful consideration of seizure phenomena, physical explanations for symptoms, and psychodynamic profile in order to make the diagnosis and formulate successful treatment. This interdisciplinary approach provides a more comprehensive understanding of nonepileptic seizures and, more often, leads to successful outcome.

1. Introduction

Recognized in antiquity, uncertainties about both the diagnosis and treatment of nonepileptic seizures (NESs) continue to this day [1–5]. The term NES refers to a "wide variety of disorders that are mistaken for epilepsy but which are due to causes other than abnormal discharges in the brain" [6]. Over the last decades, investigators have sought related conditions or factors to substantiate a diagnosis of NES. Their methodology has been to compare patients with epileptic seizures (ESs) and those with NESs in regard to physical, psychiatric, psychosocial, psychological, and/or laboratory findings [7–13]. These factors are of questionable value since they are distant from the interface of the epileptic-like phenomena and the probable etiology of the NES that may be due to either the neurological or psychodynamic state in each patient.

Electroencephalography (EEG) contributes greatly to accurate differentiation. However, since the ES is an intermittent phenomenon, a negative tracing may occur in a patient with epilepsy and, therefore, would not necessarily differentiate ESs from NESs. Electroencephalography misinterpretations [14] are not uncommon in patients with undiagnosed NES [15]. Video electroencephalography (VEEG), thought to provide the gold standard for making a correct diagnosis of ES, has limitations [14]. This procedure is not available everywhere [16,17] and is expensive [14,18,19]. In practice, it is usually reserved for the patient with intractable partial epilepsy to obtain a more accurate definition of the site of the seizure focus.

Many current investigators attempt to utilize and evaluate a specific treatment modality, such as pharmacotherapy or cognitive behavioral therapy, for every patient with a diagnosis of NES [7,20]. At a well-regarded workshop on treatment of NESs in 2005, the authors concluded that, "validated treatments and controlled trials are lacking" [21]. Through case reports of successful treatment of NESs in an interdisciplinary epilepsy program, now informed by significant temporal perspective, we highlight the possibility of more accurate diagnosis and, subsequently, more successful treatment of NESs, as well as recognition of brain-driven seizures, previously portrayed as nonepileptic, when neuropsychiatric epileptological exploration is joined with neurological and neurological surgery evaluations. Rather than seeking a single treatment for NESs, we support an interdisciplinary case-oriented approach in which the evaluation and subsequent treatment of each patient is provided by a team of specialists – a neurologist, a neurosurgeon, and a neuropsychiatrist – who see each patient at each clinic visit and in long-term follow-up.

2. Material and methods

We have addressed the challenge of diagnostic uncertainty by utilizing an interdisciplinary approach that focuses on the vicissitudes of the patient's history [22,23]. Recognizing the crossover of neurologic and psychiatric domains, this requires the joint efforts of a behavioral neurologist/neurosurgeon and a neuropsychiatrist in formulating the diagnosis. The neurological/neurosurgical and neuropsychiatric

* Corresponding author at: The University of Toledo-College of Medicine and Life Sciences, Department of Psychiatry, MS #1193, 3000 Arlington Avenue, Toledo, OH 43614-2598, USA. Tel.: +1 419 874 3194; fax: +1 419 383 8183.

[1] Professor Emerita of Neuropsychiatry
[2] Comprehensive Epilepsy Center
[3] Former Nurse Coordinator

http://dx.doi.org/10.1016/j.ebcr.2014.03.004

clinicians follow patients longitudinally, comparing evaluations after each clinic session. In addition, the same group participates in the VEEG monitoring and Wada testing, with sharing of observations after each session.

This interdisciplinary approach maintains a focus on the individual patient's seizure history, present manifestations, neurological findings, and related psychodynamics, rather than on a diagnostic entity, leading to a treatment approach that reliably achieves cessation of NESs.

3. Results

Through representative case examples, we illustrate the power of the interdisciplinary approach to NESs, highlighting the varied etiology of NESs, including pathophysiologic, psychopathologic, or ESs mistakenly characterized as NESs. Each case describes a possible diagnosis, neurological or psychiatric. Discerning the etiology determines the course of treatment. One or two cases are presented in each category.

3.1. NESs thought to be epileptic in an individual with clear 'seizure'-related psychodynamics

A 34-year-old man was referred to the Comprehensive Epilepsy Center for epilepsy surgery because of focal seizures, which were unresponsive to antiepileptic drugs (AEDs). Neuropsychiatric history revealed that the first seizure had occurred 4–5 years previously when the patient, then 30, was in a hospital recovery room, after undergoing minor surgery. The patient described his episodes as follows: "I start shivering and shaking. Then, I feel lightheaded, I have a headache, and, my stomach hurts. I go into it real deeply and I don't remember. Afterwards, I have a worn out feeling." He often loses time at work or goes to an emergency room.

The neurologist found that the 'seizure' manifestations were not consonant with a brain-driven condition, either on clinical observation or on EEG recording. The neuropsychiatrist obtained the following history: While his father was away in the service, the patient came home from school one day to find his mother and his three-year-old brother dead, as the result of a gas leak. His father returned, and, after a time, remarried. The patient had a poor relationship with his stepmother and was neglected. He had an early memory of difficulty: "I had to grab the railing to get into the classroom." His father was an excessive drinker who never paid his son sufficient attention. The patient's wife corroborated this evidence of blatant emotional deprivation and emphasized that through the years, even when the patient was ill, the family was never present. For example, "They were not there, even when he had to undergo surgery." The patient's marriage of 10 years was satisfactory, except for a lack of children. Seven years previously, the couple had lost a child at eight months gestation as a result of placenta previa. There was no subsequent pregnancy as the wife considered herself then too old to have a child. Recently, there had been the threat of loss of his job, after 16 years of employment.

The diagnosis reached by the neurologist and the neuropsychiatrist was NES. The neurologist had found the attacks unsustainable as neurologic events. The neuropsychiatrist had established a convincing psychodynamic profile with attacks occurring in response to major stress, which revived long-standing feelings of deprivation. The neurologist maintained contact with the patient while discontinuing antiepileptic medication, and the patient was well established in a psychotherapeutic relationship. The psychotherapy, which the patient had never received but long needed, addressed the emergent psychopathology. In addition to individual help, it was suggested that the couple be seen together for counseling, in regard to loss of the child and the patient's emotional needs. Over a period of months, the NES ceased, and the patient was able to recognize and resolve his long-standing feelings of anger and need for understanding. He achieved a more positive outlook. His wife, after becoming involved in the therapy, was able to serve more actively as the supportive figure he had always needed.

3.2. NESs misdiagnosed as epilepsy due to a subtle developmental disorder

A 26-year-old single man was admitted to the hospital because of an episode at work. He had become angry and anxious, and, then, disorganized and intemperate; his behavior led to dismissal and, shortly thereafter, admission to the hospital.

In regard to history, the patient stated that one year previously, he had been considered 'epileptic' and was given AEDs. He described his seizures as consisting of jerking movements in his right hand and arm. The neurologist elicited a history of increasing difficulty with ordinary tasks and, on examination, evidence of cognitive dysfunction. The patient was diagnosed as having degenerative brain disease, and a brain biopsy was considered. The neuropsychiatrist obtained a history of learning difficulties from childhood. Examination revealed impairments of higher functions causing him to fail on several occasions when he would be promoted at work but was unable to cope with new responsibilities. The neuropsychiatrist made a diagnosis of NES, with subtle developmental disorder (not degenerative brain disease).

The neurologist and neuropsychiatrist worked together — the neurologist discontinuing AEDs and the neuropsychiatrist initiating supportive psychotherapy, with reassurance, education about the seizures, and guidance to appropriate work, with the assistance of the team vocational counselor. Brain biopsy was definitely not indicated. The patient remained in psychotherapy for a few months, until the seizures ceased, and he became established in a suitable work situation and felt confident enough to proceed on his own. After discharge, he was encouraged to contact the therapist if any problems should arise.

3.3. NESs due to a headache syndrome

A 25-year-old male patient was referred to the Comprehensive Epilepsy Center for treatment of 'temporal lobe seizures.' The patient stated that several years previously, he started to have aggressive outbursts, attacking people or things. Both the neurologist and the neuropsychiatrist determined that his aggressive behavior clearly occurred in response to severe unilateral headache, with eye pain and tearing. A diagnosis of cluster headache was established. A thorough history obtained by both disciplines led to the correct diagnosis of a treatable condition and abandonment of the diagnosis of epilepsy. The neurologist initiated pharmacotherapy of the headaches. Over a number of months, the headaches were eliminated, as well as the aggressive outbursts.

3.4.1. Epileptic seizures thought to be NESs (first case)

A 53-year-old woman was referred for evaluation of her 20-year history of symptoms, of which she had been told that, "It's all in your head." She had remained protected, isolated, and unfulfilled in her personal life. The pattern of her episodes was described by the patient and by family members. At the beginning of an episode, she would experience "a funny feeling in my stomach. I cringe and fold my arms over my stomach and I rock." Subsequently, out of contact, she may undress inappropriately, grab people, pull their hair, or bite someone's hand and cry: "help me, help me." On recovery of awareness, she has some confusion, including recognition of her whereabouts. The neurologist and neuropsychiatrist, both familiar with seizure patterns, recognized the manifestations of brain-driven seizure activity, consistent with a temporal lobe seizure pattern. Video electroencephalography confirmed the clinical impression with EEG findings of a focus in the right mesial temporal lobe.

Treatment began with a trial of AEDs. After failure of several drugs, the case was reviewed by the neurosurgeon who recommended excision of the epileptogenic focus. During neurosurgery, intraoperative electrocorticography further confirmed the site of the focus, which was excised. Neuropsychiatric support was provided during the trial of AEDs and during and after surgery. Interdisciplinary follow-up continued over the years, as is usual in the epilepsy program, as she transitioned

from the life of a patient to that of a seizure-free, healthy individual, now able to gain confidence and become involved in normal activity and relationships, achieving competitive employment and a more satisfactory marital relationship.

3.4.2. Epileptic seizures thought to be NESs (second case)

A 44-year-old man, working in a sheltered family business, had been engaged for 11 years in psychoanalytic therapy for screaming episodes, interpreted as his only mode of coping with a domineering wife. Since therapy had not made a change in his symptomatology, and his life was very restricted, his therapist finally recommended a fresh evaluation. Because of his history of brain surgery for an abscess during adolescence, his psychoanalyst referred him to an epilepsy center.

Our neuropsychiatric evaluation revealed that shortly after his brain surgery, his mother died. As an only child, he would repeatedly be left alone at night when his grieving father, thinking his child had retired, would not return from meeting with supportive friends until after midnight. The child, unable to sleep, would remain at the window, wondering if he had been abandoned. When the boy would see his father returning, he would run, with relief, to his bed. As an adult, the patient sought treatment for periods of screaming of which he was unaware. An episode was observed in which he displayed a precise enactment of terror, which would obviously be frightening to anyone who observed him. He strode around the room with arms elevated in a threatening manner and had a facial expression of terror, all accompanied by bloodcurdling screams. Later, on inquiry, he was able to report his usual aura, a feeling of "awesome terror." These episodes were thus demonstrated as expressions of the repeated experience with feelings of terror that the patient had experienced in reality earlier in his life, following the brain abscess and the death of his mother.

Scalp EEG demonstrated epileptic discharges in the right temporal lobe. The neurologist, neurosurgeon, and neuropsychiatrist agreed with a diagnosis of temporal lobe epilepsy, and a trial of AEDs ensued, which was unsuccessful. Long-term monitoring after stereotactic implantation of depth electrodes then achieved precise definition of the epileptic focus in the right anterior mesial temporal lobe.

After excision of the epileptic focus, there was complete cessation of the seizures. He became involved in the epilepsy program interdisciplinary follow-up. With support of the neuropsychiatrist, during a two- to three-year period, he was able to leave his sheltered job in the family setting and became involved in employment in the community. He developed a more satisfactory marital relationship, better able to cope with his wife's unchanged personality.

4. Discussion/conclusion

The cases presented highlight the value of an interdisciplinary approach to the diagnosis and treatment of NESs. As the cases show, errors may occur in making a diagnosis of ESs when the patient has NESs and vice versa. The cases illustrate possible mechanisms and underlying, precipitating factors for NESs. For example, the patient may have a subtle developmental disorder, a pain syndrome, or unresolved psychic trauma. The patient with ESs, erroneously diagnosed with NESs, may show in his seizures content reflecting past emotional trauma. Thus, significant emotional content does not resolve the differential diagnosis, since psychodynamic material may occur in epileptic seizures, as well as in NESs.

Correct diagnosis may be achieved by an interdisciplinary approach including evaluation of the 'seizure' manifestations by obtaining a thorough clinical history, neurologic and psychiatric; observing seizure manifestations; and reviewing EEG data. Once a correct diagnosis is achieved, the disciplines must continue to work together to develop and carry out an individualized treatment program for each patient.

Dilemmas exist for the physician and for the patient. The physician who makes a diagnosis of NES may find that communication of the diagnosis results in an impasse. If the physician believes that the patient has NESs, he may inform the patient that he does not have epilepsy and recommend that the patient seek psychiatric treatment, relying on the patient to follow the advice. The patient may be puzzled by his predicament, not believing that "it is all in my head," nor wish to become a psychiatric patient and, therefore, does not follow the recommendation. Often no provision is made for longitudinal follow-up [24].

If, on the other hand, the patient is told that he has epilepsy, when the correct diagnosis is NESs, he is propelled into a new and stigmatizing psychosocial world. When AEDs are increased, and the seizures do not come under control, he may suffer from the adverse effects of the drugs. Of course, it is known that ESs may be intractable. Therefore, failure to respond to antiseizure medication does not provide adequate evidence for a diagnosis of NESs, nor does relevant psychodynamic material rule out ESs.

Failure to make a correct diagnosis is costly for both the patient and the health-care system [21]. The patient, labeled as having epilepsy, remains symptomatic, exposed to the adverse effects of AEDs, and is unable to pursue a satisfactory way of life in terms of work and social interaction [25,26]. The patient said to have NESs does not receive treatment that could resolve his problem. The effect of misdiagnosis is reflected in financial terms as repeated office visits, tests, and drug therapy are continued without resolution of the condition [18,26,27].

Our interdisciplinary approach of study and treatment consists of continuous evaluation and communication of findings and opinions between neurologic and psychiatric disciplines, with a collaborative approach maintained until the patient is established in the corrective therapeutic mode.

An interdisciplinary study of the patient with possible NESs may lead to a neurological or psychiatric diagnosis of seizure-like events. Recognition of a precise trigger for the 'epileptic' event should be sought. Successful treatment depends upon rigor in diagnosis. Patients referred with a diagnosis of NESs may instead have ESs. With an interdisciplinary approach, the outcome, either freedom from NESs or correct treatment of ESs, allows for normalization of the patient's life, bringing relief to the patient and, secondarily, gratification to the physician. Conjoined participation of a neuropsychiatrist working longitudinally with the neurologist and neurological surgeon made these differentiations and correct diagnoses possible, leading to more successful treatment outcomes, both as regards seizure occurrence and quality of life.

Insofar as this is a qualitative study, using case examples as illustration to support the aim of pointing out the difficulty in reaching the correct diagnosis of NES, the number of cases is small, and EEG detail was only provided as necessary to clarify the case.

This work is consistent with the *Epilepsy & Behavior Case Reports*' guidelines for ethical publication.

Conflict of interest

The authors have no conflict of interest in the publication of this paper.

Acknowledgments

The authors wish to acknowledge the other members of the Comprehensive Epilepsy Center, the late Mark Rayport, MDCM, PhD, and the late W Stephen Corrie, MD for their neurosurgical, neurological, and electroencephalographic input, making this paper possible. We also thank Stephen Rayport, MD, PhD for advice and discussion during the course of writing this manuscript.

References

[1] Hippocrates: on the sacred disease. The genuine works of Hippocrates. Translated from the Greek by Francis Adams. Baltimore: The Williams and Wilkins Company; 1939.
[2] Hippocrates: diseases of women 1. Translated by Ann Ellis Hanson. Signs 1975;1(2):567–84.

[3] Trimble MR. Hysteria and other non-epileptic convulsions. In: Reynolds EH, Trimble MR, editors. Epilepsy and psychiatry. Edinburgh: Churchill Livingstone; 1981. p. 92–112.
[4] Willis T. An essay of the pathology of the brain and nervous stock in which convulsive diseases are treated. (Transl. Pordage S). Dring, Leigh & Harper; 1684.
[5] Haas LF. Hans Berger (1874–1941), Richard Caton (1842–1926), and electroencephalography. J Neurol Neurosurg Psychiatry 2003;74:9.
[6] Krumholz A. Nonepileptic seizures: diagnosis and management. Neurology 1999;53:76–83.
[7] Mellers JDC. The approach to patients with "non-epileptic seizures". Postgrad Med J 2005;81:498–504.
[8] de Wet CJ, Mellers JD, Gardner WN, Toone BK. Pseudoseizures and asthma. J Neurol Neurosurg Psychiatry 2003;74:639–41.
[9] Marquez AV, Farias ST, Apperson M, Koopmans S, Jorgensen J, Shatzel A, et al. Psychogenic nonepileptic seizures are associated with an increased risk of obesity. Epilepsy Behav 2004;5:88–93.
[10] Roy A. Hysterical fits previously diagnosed as epilepsy. Psychology 1977;7:271–3.
[11] Dikel TN, Fennell EB, Gilmore RL. Posttraumatic stress disorder, dissociation, and sexual abuse history in epileptic and nonepileptic seizure patients. Epilepsy Behav 2003;4:644–50.
[12] Drane DL, Williamson DJ, Stroup ES, Holmes MD, Jung M, Koerner E, et al. Cognitive impairment is not equal in patients with epileptic and psychogenic nonepileptic seizures. Epilepsia 2006;47:1879–86.
[13] Chen DK, So YT, Fisher RS. Use of serum prolactin in diagnosing epileptic seizures: report of the Therapeutic and Technology Assessment Subcommittee of the American Academy of Neurology. Neurology 2005;65:668–75.
[14] Syed TU, LaFrance Jr WC, Kahriman ES, Hasan SN, Rajasekaran V, Gulati D, et al. Can semiology predict psychogenic nonepileptic seizures? Ann Neurol 2011;69:997–1004.
[15] de Timary P, Fouchet P, Sylin M, Indriets JP, de Barsy T, Lefebvre A, et al. Nonepileptic seizures: delayed diagnosis in patients presenting with electroencephalographic (EEG) or clinical signs of epileptic seizures. Seizure 2002;11:193–7.
[16] Schwabe M, Howell SJ, Reuber M. Differential diagnosis of seizure disorders: a conversation analytic approach. Soc Sci Med 2007;65:712–24.
[17] Wagner MT, Wymer JH, Topping KB, Pritchard PB. Use of the Personality Assessment Inventory as an efficacious and cost-effective diagnostic tool for nonepileptic seizures. Epilepsy Behav 2005;7:301–4.
[18] Martin RC, Gilliam FG, Kilgore M, Faught E, Kuzniecky R. Improved health care resource utilization following video-EEG-confirmed diagnosis of nonepileptic psychogenic seizures. Seizure 1998;7:385–90.
[19] Reuber M, Elger CE. Psychogenic nonepileptic seizures: review and update. Epilepsy Behav 2003;4:205–16.
[20] Baslet G. Psychogenic nonepileptic seizures: a treatment review. What have we learned since the beginning of the millennium? Neuropsychiatr Dis Treat 2012;8:585–98.
[21] LaFrance WC, Barry JJ. Update on treatments of psychological nonepileptic seizures. Epilepsy Behav 2005;7:364–74.
[22] Ferguson SM, Rayport M. A multidimensional approach to the understanding and management of behavior disturbance in epilepsy. In: Howells JG, editor. Modern perspectives in clinical psychiatry. New York: Brunner/Mazel; 1988. p. 302–30.
[23] Rayport M, Ferguson SM. Psychosis of epilepsy: an integrated approach. In: Ettinger A, Kanner A, editors. Psychiatric issues in epilepsy: a practical guide to their diagnosis and management. Baltimore: Williams & Wilkins; 2001. p. 73–94.
[24] LaFrance Jr WC, Devinsky O. The treatment of nonepileptic seizures: historical perspectives and future directions. Epilepsia 2004;45:15–21.
[25] Riley TL, Brannon WL. Recognition of pseudoseizures. J Fam Pract 1980;10:213–20.
[26] Brown RJ, Syed TU, Benbadis S, LaFrance W, Reuber M. Psychogenic nonepileptic seizures. Epilepsy Behav 2011;22:85–93.
[27] Reuber M, Fernandez G, Bauer J, Helmstaedter C, Elger CE. Diagnostic delay in psychogenic nonepileptic seizures. Neurology 2002;58:493–5.