CHAPTER 76

Nonepileptic seizure: paroxysmal events of psychogenic origin

10.56238/pacfdnsv1-076

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ABSTRACT
This article deals with non-epileptic seizures in paroxysmal events of psychogenic origin. It discusses the difficulties that health professionals, responsible for diagnosis, have when dealing with individuals who present epileptic signs and symptoms, but which are not related to epilepsy. In this context, the general aim is to investigate how the process of diagnosis of non-epileptic Psychogenic Crisis (PNES) takes place. To this end, the methodological procedure reported the use of bibliographic research through data collection of published articles that cover and portray the theme directed to clinical practice, thus, academic publications were analyzed, selected those of interest, and through observation, the data were analyzed to gather the knowledge produced on the subject. After the research, it was concluded that health teams must know the characteristics, diagnosis, and treatment of a PNES so that when facing any apparent occurrence, the individual's life history is investigated in detail and the individual is referred to video-electroencephalography to correctly rule out or confirm the investigation and offer a resolutive treatment.

Keywords: Psychogenic, non-epileptic seizure; Epilepsy; Video-Electroencephalography; Traumatic events

1 INTRODUCTION

The Psychogenic Nonepileptic Seizure - PNES is determined by episodes of sudden or gradual alteration of behavior, movement, sensation, or consciousness, like the convulsion, non-fictitious that are presented through the motor, sensory and psychological expressions, which in turn are not caused by irregular epileptic discharges, but which are related to probable mental suffering. From this, the possibility of confusion in the diagnosis is common, since the lack of in-depth investigations by professionals and incomplete information about the patient, referring to their symptoms, hinder the diagnosis.

The NECP was named by neurologists of the contemporary age, soon after the insertion of the video-electroencephalogram (EEG) in epilepsies centers. From this milestone, around 1964, Liske and Forster originated the term pseudo-convulsions, which would also mean such events without alterations equal to that of epilepsy, which could be observed through the EEG (Liske & Forster, 1964; Goodwin & Gross, 1979). Consequently, different words have emerged, however, the most used in a scientific way are "psychogenic non-epileptic seizures", and "dissociation", which are seen as defense methods that help the user to deal with traumas, so the NECP also understands that traumatic situations generate mental dissociation.

Above all, tremors, movements of push-ups and extensions, absence of responses, fainting, and tonic posture, are reflexes of a PNES, with a remarkable change in the level of consciousness, however,

which does not portray abnormality in the EEG. There is also relativity and variations in the personality profiles of each individual with the crisis, which, in addition to the difficulties they face in dealing with their daily problems, have a greater tendency to suffer from anxiety, depression, disorders, and post-traumas.

Despite the possibility of confusion in the diagnoses, there are several ways to differentiate epilepsy from NECP, as it is also possible that the individual is diagnosed with both types of seizures, which makes it more challenging to reach a reliable conclusion about the case. However, the main causes that differ are based on the duration of the episodes and the outcome of the EEG, in which the appropriate treatment for PNES requires follow-up and therapy, thus avoiding the pharmacological indication, to contribute to the quality of life and to completely cease crises.

Therefore, the discovery of PNES is a challenge, since there are not many studies in this area about what is its precise diagnosis, to differentiate it from other epilepsies. In addition to similar symptoms that may lead some specialists to a reliable non-detection, such a crisis affects about 20% to 30% of patients seen in epilepsy centers, which demonstrates the importance of being investigated (Lanzillotti et al., 2021).

A misdiagnosis induces the administration of anticonvulsants in the in-hospital environment and the indication for daily household consumption, which can cause, consequently, the appearance of damage to the patient. Given that anticonvulsants do not treat PNES, because it requires treatment with attention focused on the mental state of the patient, to be able to face and deal with daily problems.

Thus, academic studies are necessary, because they generate data and highlight alerts for the possible consequences that trigger the PNES and the most common difficulties in diagnosing it. The differential in the correct diagnosis and treatment can generate a better quality of life for patients. However, they are information that helps in the search to train professionals who should guide the family and the patient properly about the subject, reassure and resolve the issue, to alleviate the apprehension and feeling of disability in the face of facts, signs, and symptoms.

This article is based on the following problem: What difficulties do the health professionals responsible for the diagnosis have when dealing with individuals who present epileptic signs and symptoms, but which in turn are not related to epilepsy? Based on this, this research has a general objective to investigate how the process of diagnosis of PNES takes place. In continuity, the specific objectives are to identify the characteristics of the PNES, to write how the diagnosis occurs, to highlight what differs from epilepsy, and to analyze the forms of treatments for patients with NET.

2 METHODOLOGY

The bibliographic research methodology was chosen for the development of this study, with data collection of published articles that covered and portrayed the theme directed to clinical practice, to analyze the publications of interest, select, observe, describe, and classify data to gather the knowledge produced

on the subject. The articles were selected with support in consultation with the databases of the *National Library of Medicine* (*Medline*/via PubMed).

Bibliographic or qualitative research is developed through studies and annotations resulting from existing research described in books, articles, magazines, theses, and others. The description becomes the basis of the themes that will be researched and, thus, the researcher performs the analysis and study through the collaboration of past authors. According to Minayo (2014):

> The qualitative method is what applies to the study of history, relationships, representations, beliefs, perceptions, and opinions, products of the interpretations that humans make about how they live, build their artifacts, and themselves, feel, and think. (Minayo, 2014, p. 57)

Therefore, bibliographic research aims to clarify the problem through references exposed in books, articles, dissertations, and theses, in which we seek to understand and verify the existing cooperations of the past and current on the subject. Thus, the methodology infiltrates as a scientific strategy, the analysis, which comes from separating the parts and emphasizing the most important ones. Analogous to this, Boccato (2006) exposes that:

> Bibliographic research seeks to solve a problem (hypothesis) through published theoretical references, analyzing and discussing the various scientific contributions. This type of research will provide support for the knowledge about what was researched, how and under what approach and/or perspectives the subject presented in the scientific literature was treated. For this, it is of paramount importance that the researcher performs systematic planning of the research process, comprising from the thematic definition, through the logical construction of the work to the decision of its form of communication and dissemination. (Boccato, 2006, p. 266)

Thus, bibliographic research, brought subsidies for knowledge about THE PNES, outlined as the subject is presented in the scientific literature. Systematic planning of this research process was also carried out, comprising the definition of this theme, its logical construction, and, finally, the forms of communication and dissemination. This said, after data collection, they were systematized, establishing relevant and necessary relationships for the critical analysis and discussion of this relationship, based on theories concerning.

The article in question comes from bibliographic research and made use of a narrative review analyzing theoretical materials, starting from in-depth readings about non-epileptic Psychogenic crises. Through the studies, a holistic view of the subject was obtained, which culminated in this writing. It emphasizes that the analyses went beyond quick readings, there was a deepening in the interpretation of the writings studied for evaluation as a method of inclusion and exclusion, to support production, as shown in chart 1:

Table 1: Inclusion and Exclusion Methods.

Inclusion Method	Exclusion Method
Articles that address clearly and objectively non-epileptic psychogenic crisis;	Articles that, despite addressing the subject, do not have the purpose of the research;
Articles published in the last 5 years to update the subject and articles published more than 5 years ago to associate the theme with the present;	Articles that have access restrictions;
Articles addressing the diagnosis and treatment of non-epileptic psychogenic crisis and differing from epilepsy;	Articles that do not have titration related to the theme Non-Epileptic Psychogenic Crisis.
Articles are published and available in full in scientific databases.	

Source: Authors.

Therefore, the records and the union of the most important information of the texts read, evaluated, and selected occurred, so that they could be supported by writing. Qualitative research, in which the readings performed, and the compiled data went through interpretation and reflexive and subjective inference of the researcher that culminated in the results described during the text, as well as in response to the research problem.

3 DEFINITION AND CHARACTERISTICS OF C RISE PSYCHOGENIC AND EPILEPTIC

There are two types of episodes of non-epileptic seizures, non-epileptic physiological convulsion, and non-epileptic psychogenic seizure. When it comes to the physiological issue, it means the epileptic event itself is caused by a paroxysmal systemic dismemberment, such as hypoglycemia, migraine aura, intoxications, disorders, and transient ischemic attacks. However, the non-epileptic psychogenic convulsion has no connection with brain activities but is caused due to some suffering or mental matter (Jr et al., 2013).

Therefore, PNES are called situations in which the individual has through the body manifestations that portray epileptic seizures, but which are not related to activity linked to epilepsy. Therefore, although any age may be affected by such a crisis, the index has a frequent focus on females aged 20 to 30 years (Jr et al., 2013).

It is possible to restrict the PNES to four prototypes in an etiological manner. The first is based on Freud's assumptions (Breuer & Freud, 1893-1895), having a statement that the PNES manifests itself physically due to emotional stress. The second prototype is conceived by Moore and Baker (1997), which analyzed that, the PNES is the result of learned behavior and operating conditioning, that is, the relationship between behavior and its consequence.

Consequently, the other two more up-to-date prototypes have returned to the dissociation mechanisms. Thus, Bowman (2006) reported that the PNES succeeds dissociative memories or assignments of the mind instituted by traumatic issues. According to Baslet (2011), PNES is due to an acute dissociative response to intimidation or a condition of high arousal, and even then, no prototype was found that portrays all but partially explains the crisis.

However, after THE PNES, there is a change in automatic responses that are seen as involuntary and unwanted but are motivated by the experiences of users who recall the seizures. That is, healthy

individuals can deal with negative emotions from day to day, while those who have a psychogenic crisis show abnormality in the face of emotional triggers and produce behavioral responses that portray seizure-like attacks.

4 DIAGNOSIS OF PSYCHOGENIC NONEPILEPTIC SEIZURE

In both medical and psychiatric investigations, there is reason to suspect PNES when the patient's life history involves psychological mechanisms. Therefore, for psychiatry, there are some ways to define the crisis, *such as the DSM (Diagnostic and Statistical Manual of Mental Disorders*) - IV and the ICD (International Code of Diseases) - 10/11, which characterize conversion and dissociative disorders and, the DSM - 5 that discusses functional neurological pathologies (Lanzillotti et al., 2021).

In fact, patients tend to have other symptoms, such as depression, anxiety, and especially trauma and posttraumatic stress disorder. Thus, the diagnosis of PNES is indispensable, since its non-identification can cause harm to the user through the high doses of anticonvulsant drugs administered in the act in which epilepsy is suspected. A priori, epilepsy, and PNEShave several different signs and symptoms, as shown on the following table 2 (Anzellotti et al., 2020):

Table 2: Differences between Non-Epileptic Psychogenic Crisis and Epileptic Seizure.

Manifestations	**Psychogenic Nonepileptic Seizure**	**Epileptic Seizure**
Aura	Less frequent	More frequent
Duration of ictal events	>10 minutes	<70 seconds (<2 minutes for tonic-clonic seizures)
Seizure patterns	Non-stereotyped spatial patterns, less organized, variables, movement, and range of motion	Stereotyped and organized progression
Clinical discoveries	Asynchronous movements of the limbs, out-of-phase clonic activity, rhythmic agitation movements with episodes of inactivity, lateral movements of the head, pelvic movements, dystonic, body posture, eye closure during the event	Bilateral adduction and external rotations of the limbs followed by tonic extension of all four limbs, production of spasmodic clonic movements before ictal displacement
Vocalization	Present not only at the beginning of the event, but it can also oscillate, persist and be present, with different intensities of tone, throughout the course of the ictal episode	At the beginning of seizures
Subjective symptoms	Less frequent	More frequent
Urinary incontinence	Less frequent	More frequent
Occurrence at night	Less frequent	More frequent
Ictal self-injury	Less frequent	More frequent

Source: Prepared by Anzellotti et al., (2020), adapted by the author.

The discovery of PNES can arise through the association of data, such as individual history, EEG analyses, and home videos. For a given diagnosis, four statements are suggested, which can be considered possible, probable, clinically established, or documented (Anzellotti et al., 2020):

– **Possible PNES**: cases in which a witness or patient reports ictal events, and interictal EEG is normal. An abnormal interictal EEG may also be consistent with a diagnosis of possible PNES.
– **Probable PNES**: cases in which ictal events with a semiological indication of PNES are witnessed by a specialist physician or evaluated by video-EEG recording that also do not indicate ictal epileptiform activity. Situations in which observation of the onset of the ictal episode is missing or the evaluation is made by a physician who has no experience in ictal evaluations make the PNES "probable".
– **clinically established PNES**: cases in which an epilepsy specialist witnesses episodes and semiotic and objective findings are compatible with PNES. This includes situations in which, for example, there is resistance to eye-opening, interaction with the patient during the episode is possible, as it maintains some level of consciousness and partial responsiveness, or the ictal episode ceases as the doctor convinces the patient to interrupt him. No epileptiform activity in interictal or ictal EEG can be found.
– **CPNE documented**: cases in which the diagnosis produced by an epilepsy specialist taking into account the typical semiology of PNES and no Epileptiform activity related to EEG is found at any stage of the ictal event, or before and after it. (Anzellotti et al., 2020, p. 8)

Approximately 10% of individuals who have PNES also have epilepsy, which makes diagnosis difficult (Labiner et al., 2010). Therefore, what is sought in patients who have both diagnoses are psychiatric comorbidities that relate to epilepsy, the occurrence of a seizure, in which the PNES follows, and the appearance of symptoms in people who are recovering from epilepsy to draw the attention of the caregiver (Kutlubaev et al., 2018). Despite the difficult discovery and few studies on the double diagnosis, the same should be considered when individuals with epilepsy present unexpected types of seizures focused on characteristics and frequencies (Anzellotti et al., 2020).

Furthermore, for the proper diagnosis, it is ideal to use the expanded monitoring of the EEG (which provides the recording of the differential between the voltage between brain sites during a given time) at the time of the crisis. However, some seizures do not show irregularities in due course, during the monitoring of the EEG, or there may also be concealment of information by movements, which makes it difficult to distinguish between epilepsy and PNES(Davis, 2004).

When this occurs, it is necessary to have an analysis of data such as the history of the individual, narration of those who witnessed the fact, clinical investigations, and ictal EEG (during the crisis) and interictal (the period between convulsions) (Davis, 2004). One means that helps in the diagnosis of PNES is the home video, when recorded by a family member the occurrence of the crisis, since it makes possible the investigation and search for signs that differentiate it from epilepsy, and that characterize the non-epileptic crisis.

In summary, a reliable diagnosis is made when the patient's life history is adaptable to PNES, signs, and symptoms establish an association with PNES when evaluated and correlated with EEG and crises do not have rhythmic patterns in all phases (before, during, and after the event). A significant standard, which represents 85% of the right for the PNES, is the so-called "2 s", when at least two EEGs are performed to show normal results, in the company of two episodes of seizures every seven days and resistance to two antiepileptic drugs (Cuthill & Espie, 2005).

5 FORMS OF TREATMENT FOR PSYCHOGENIC NONEPILEPTIC SEIZURE SUFFERERS

In the scope of care and analysis aimed at THE PNES, due to the lack of research on appropriate decision-making, the referral of patients when received in basic and hospital care is performed to address specialists in epileptic seizures. Above all, treatment through drugs is not indicated, since the PNES does not respond to medication and does not cause direct sequelae, thus being treated through verbal and behavioral interferences.

Pharmacological treatment (antidepressants and anxiolytics) can occur when there are other complications and diagnoses besides PNES since individuals with such a crisis are susceptible to having other types of disorders, anxiety and/or depression, thus, there is the prescription of medications for better control of symptoms. In continuity, mental treatment turns to several types of therapies, such as cognitive, psychodynamic, interpersonal, hypnotherapy and family analysis, in addition to the need for monitoring and monitoring (Jungilligens et al., 2021). If left untreated, NECP can weaken the brain system and thus reestablish stress incitations, making them constant, which can result in a chronic clinical problem with difficult restoration (Kozlowska et al., 2018).

To Toffa et al. (2020), "Regardless of the level of certainty in the diagnosis of PNES, it is important to later refer the patient for epileptic and neuropsychiatric follow-up." In fact, referral to specialists facilitates discovery and more easily promotes the investigation of associated epilepsy to treatment as soon as possible.

After diagnosis, treatment can be divided into three parts. The first stage is focused on the communication of discovery. Empathic and positive dialogue can be performed with the patient in the presence of family members as a method for better understanding. The article " psychogenic nonepileptic seizures in children and adolescents: Part II – explanations to families, treatment and group outcomes", describes an example of the physician's approach to the family and a patient named Mary (Kozlowska et al., 2018):

> You must be very relieved that Mary doesn't have epileptic seizures and that she doesn't have any unpleasant brain disease. Mary has non-epileptic seizures, which are caused by stress. There's been a lot of research on these types of seizures in the last 10 years. Now researchers have some very good hypotheses about what may be happening. It seems that the brain is very sensitive to the effects of stress. Now, when I say "stress," I mean any event that the body finds stressful – illness, injury, or emotional distress caused by stressful life events or trauma. Now, in Mary's case, it seems that [the stressors left in family history] have activated her stress system – including stress systems in

> her brain. We know that your stress system is activated because your body is signaling this in several ways: [identify stress-related symptoms suffered by the child, such as pain, increased respiratory rate, increased heart rate]. Looks like Mary's stress system's been turned on, but it's not shutting down as it should. Nonepileptic seizures are just another type of stress symptom. Mary is also a girl, and she is post-pubertal. All of these stress-related disorders are more common in girls because female sex hormones also activate the stress system. (Kozlowska et al., 2018, p. 166)

In fact, the body's defense responses are anticipated by changes in arousal. Thus, NECP can be triggered by sudden elevation in cortical excitation, which leads to a functional suspension (dissociation) of brain areas that act together (Kozlowska et al., 2018). Based on this, the article " psychogenic nonepileptic seizures in children and adolescents: Part II – explanations to families, treatment and group outcomes" also highlights explanations if the family wants to understand the subject more accurately (Kozlowska et al., 2018):

> The younger parts of the brain (the cortex) are very sensitive to stress and can be disrupted by stress and stress hormones (catecholamines and endogenous opioids). When brain function is disrupted, the parts of the brain that process excitation and emotions – emotion processing regions – become hyperactive, and seem to disrupt motor-sensory programs and cause all sorts of strange motor and sensory symptoms. In Mary's case, she has [describe all the motor and sensory functional symptoms suffered by the child]. Sometimes when there are sudden increases in arousal, the stressed brain is pushed to the limit of its ability. When this happens, the older parts of the brain (the brain stem), which are usually controlled by the cortex, can get out of control, in which case Mary may have a non-epileptic seizure. We know you've never heard of non-epileptic seizures before, but we see children and adolescents with non-epileptic seizures all the time. We saw some children who introduced themselves as Mary. There are many different names for these non-epileptic seizures, so I'm going to write them all down for you. Please be careful if you search for them on the Internet, because adults with this condition do not care very well while children do very well – so you do not want to read things on the Internet that do not apply to Mary. To treat Mary, we'll need to help her learn how to deal with stress and how to better regulate her body and brain's response to stress. This can be difficult at first, and even adults find it difficult to do. But we've had a lot of success with the kids, and we're also going to need to work with your family and Mary's school to try and manage the complicated problems you've raised. (Kozlowska et al., 2018, p. 166)

In sequence, the second part is linked to acute therapeutic intervention, such as psychiatric analyses, which should be considered that only 5% of patients do not have disorders and stressors (Witgert et al., 2005). Based on the treatment strategy, anticonvulsant drugs should also be discontinued unless the individual has had beneficial effects on use.

Therefore, the final part turns to the measures of long-term interventions, which include psychotherapy and drugs for other psychological comorbidities. Among psychotherapy and cognitive-behavioral therapy, the last mentioned has more efficacy (Mayor et al., 2010). In addition to these, psychodynamic therapy can also contribute significantly to the treatment of NECP.

6 CONCLUSION

In fact, it is evident that the convulsive crisis can be confused with the psychogenic crisis due to the similarities between them. Thus, despite the chance of an individual being affected by both, there may be the transfer of erroneous diagnosis and treatment, which can cause serious damage to the carrier, such as adverse effects of anticonvulsant drugs, continuity of events, and impaired quality of life.

Above all, health teams must know decision-making and times when they should suspect PNES. Thus, given any apparent occurrence, it is the professional's role to seek to investigate in detail the individual's life history and refer him to the performance of the EEG, to correctly discard or confirm the diagnosis and offer a resolutive treatment.

Depression, anxiety, trauma, and posttraumatic stress disorder can monitor or trigger PNES. Therefore, when the crisis occurs, family members must observe the duration and frequency, in addition to looking for mental comorbidities and situations of the suffering in the daily life of the patient, to help him to deal with such problems.

It is believed that when performing this research, it was possible to expose through this article relevant questions of analysis regarding the signs and symptoms, diagnosis, and treatment of NEPC. Therefore, the resolution of the problem happens when the crisis is identified and treated appropriately, thus, there may be the formation of a bond between patient and family members when reviewing possible traumas and improved attempts to overcome them, ease and knowledge in the decision-making of family members in the face of episodes, reduction of expenses, the better quality of life and engagement in the individual's social environment, and also, the possibility of discontinuity of epileptic episodes of psychogenic origin.

It is understood that the writing of this article may contribute to health professionals, patients, and family members, so that they can understand PNES, as an emotional disease that lacks in-depth analysis with the multidisciplinary team to be diagnosed. In the same way, it is necessary for follow-ups that meet the difficulties experienced by patients.

Bringing this theme to discussion through qualitative and bibliographic research provides knowledge about the PNES and demystifies erroneous understanding of the diagnosis. In addition to promoting other scientific productions on the subject, making this theme more discussed and contributing to the improvement of the lives of patients who have the PNES.

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