NONEPILEPTIC SEIZURE (NES)

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1. Core Definition

A **Nonepileptic Seizure (NES)** refers to an event that clinically resembles a true epileptic seizure, involving paroxysmal changes in behavior, movement, or consciousness, but which is fundamentally distinct from epilepsy because it is not caused by abnormal, synchronous, and excessive electrical discharges within the cerebral cortex. The definitive feature distinguishing NES from epilepsy is the absence of ictal electrographic changes identifiable on an electroencephalogram (EEG) concurrent with the physical manifestation of the event. NES represents a broad category of clinical occurrences that mimic the motor or sensory symptoms of epilepsy, leading to significant diagnostic confusion and potential mismanagement if the underlying etiology is not correctly identified. Given the superficial resemblance to true seizures, these events often prompt urgent neurological assessment, highlighting the critical importance of accurate differential diagnosis in clinical practice. The term NES encompasses a range of causes, which are primarily categorized as either physiologic (related to systemic physical dysfunction) or psychogenic (related to psychological or psychiatric factors).

Historically, nonepileptic seizures were often referred to by terms such as **pseudoseizures** or **pseudoepilepsy**. While these terms captured the mimetic nature of the events, their usage is now largely discouraged within the modern medical community due to their inherent connotations of falsehood or deception, which can contribute to stigmatization and misunderstanding among patients and caregivers. The preferred nomenclature, Nonepileptic Seizure or Nonepileptic Event, is recognized by authoritative bodies, including the Epilepsy Foundation, as being more neutral and clinically accurate. Understanding NES requires moving beyond the simple observation of motor symptoms and delving into the underlying pathophysiology or psychological mechanism responsible for the event, which may range from cardiovascular issues like syncope to profound psychological distress.

2. Etymology and Historical Development

The recognition of seizure-like events that were not rooted in identifiable brain pathology has a long and complex history, deeply intertwined with the evolution of psychiatry and neurology. Many phenomena now classified as **Psychogenic Nonepileptic Seizures (PNES)** were historically grouped under the concept of hysteria, a term used extensively from ancient Greek times through the late 19th century to describe a myriad of unexplained physical symptoms, often presumed to be linked to psychological distress or conversion reactions. Influential figures like Jean-Martin Charcot and Sigmund Freud studied these conversion symptoms, observing patients who

displayed dramatic seizure-like episodes that lacked the typical neurological markers associated with epilepsy. This historical perspective demonstrates that clinicians have long struggled to categorize and treat these ambiguous events, often oscillating between purely organic and purely psychological explanations.

The transition from terms like "hysterical seizures" to "pseudoseizures" and finally to the contemporary **Nonepileptic Seizure** reflects a maturation in diagnostic methodology, driven largely by the advancement of objective neurophysiological tools, particularly the electroencephalogram (EEG) and, subsequently, Video-EEG monitoring. The term "pseudoseizure," popularized throughout the mid-20th century, signified an acknowledgment that these were events 'false' to the definition of epilepsy. However, its replacement by NES was critical in emphasizing that the symptoms experienced by the patient are genuinely distressing and involuntary, irrespective of their cause. This evolution in terminology has helped shift the clinical focus from questioning the patient's sincerity to accurately identifying the distinct etiology, whether physical or psychological, to provide appropriate evidence-based treatment.

3. Classification and Etiology

Nonepileptic seizures are functionally categorized based on their underlying cause, which dictates the appropriate diagnostic and therapeutic approach. According to major neurological and psychiatric organizations, NES events generally fall into two primary categories: Physiologic and Psychogenic. The distinction between these categories is vital for patient prognosis and management, as treatment for one category will be ineffective or potentially harmful for the other. A thorough diagnostic workup is therefore mandatory to delineate the precise etiology, ensuring that the patient receives targeted care rather than ineffective antiepileptic drugs (AEDs), which are commonly prescribed when misdiagnosis occurs.

The first category, **Physiologic Nonepileptic Seizures (P-NES)**, includes events that are rooted in demonstrable, non-epileptic physiologic disturbances of the body. These events mimic seizures but are caused by systemic dysfunction affecting cerebral perfusion or metabolism. Common examples include various forms of syncope (fainting), which can cause brief episodes of tonic-clonic movements due to temporary cerebral hypoxia; transient ischemic attacks (TIAs), which are mini-strokes causing focal neurological deficits; cardiac arrhythmias leading to temporary loss of consciousness; and profound metabolic disturbances such as severe hypoglycemia or electrolyte imbalances. While these conditions are physical, the resulting event is nonepileptic because it does not originate from primary cortical irritability but rather from secondary systemic failure impacting brain function. Treating P-NES requires addressing the underlying systemic medical condition, such as managing cardiac health or correcting metabolic disturbances.

The second and perhaps more commonly studied category is **Psychogenic Nonepileptic**

Seizures (PNES). These events are classified as a type of conversion disorder or functional neurological symptom disorder within the psychiatric framework, wherein psychological distress, conflict, or trauma is expressed through physical, neurological symptoms resembling epileptic seizures. PNES is not voluntary malingering; rather, patients genuinely experience these disruptive episodes. The etiology of PNES is complex and often involves a history of psychological trauma, post-traumatic stress disorder (PTSD), anxiety disorders, or personality disorders. Unlike P-NES, the mechanism is not a failure of circulation or metabolism but rather a breakdown in psychological regulation manifesting somatically. The characteristics of PNES often include asynchronous limb movements, pelvic thrusting, eyes tightly closed, and fluctuation or waxing and waning of symptoms, features less common in genuine epileptic seizures.

4. Clinical Presentation and Diagnosis

The clinical presentation of NES, particularly PNES, often provides the initial clues that differentiate it from true epilepsy, although significant overlap exists, necessitating careful observation. Epileptic seizures typically follow a predictable, stereotyped pattern unique to the individual, often starting and ending abruptly, and frequently resulting in post-ictal confusion or exhaustion (a refractory period). Conversely, PNES events are frequently characterized by features inconsistent with organic seizure activity. These may include asynchronous, side-to-side head movements, irregular or fluctuating tremor, prolonged duration (sometimes lasting minutes or even hours), and typically, the patient keeps their eyes closed tightly or resists eye opening, a finding extremely rare in tonic-clonic epilepsy. Furthermore, PNES often occurs during times of stress or in the presence of an audience, whereas epileptic seizures are often situationally independent.

The diagnostic gold standard for definitively differentiating NES from epilepsy is **Video-EEG monitoring**. This procedure simultaneously records the patient's physical manifestations (via video) and their brain electrical activity (via EEG) during a typical event. If a seizure-like event is captured on video and the concurrent EEG tracing shows no ictal epileptiform discharge (i.e., the brain activity remains normal or reflects non-specific artifacts like movement or muscle tension), the diagnosis of NES is confirmed. This objective evidence is crucial because misdiagnosis of epilepsy--when the patient actually has NES--can lead to unnecessary and potentially harmful treatment with antiepileptic drugs (AEDs), which carry side effects and financial costs, without addressing the true underlying psychological or physiological problem. Studies indicate that up to 20-30% of patients referred to epilepsy centers for intractable seizures are ultimately diagnosed with PNES, underscoring the severity of the diagnostic challenge.

5. Differential Diagnosis and Comparison to Epilepsy

A rigorous differential diagnosis is essential for the effective management of seizure-like events, requiring the treating physician to systematically exclude epilepsy before confirming an NES

diagnosis. The primary distinction rests on the neurophysiological origin. Epilepsy is a disorder of the nervous system characterized by an enduring predisposition to generate epileptic seizures, stemming from intrinsic cortical hyperexcitability. NES, however, originates from processes entirely outside of primary electrical cortical dysfunction. For instance, a generalized tonic-clonic epileptic seizure involves a period of stiffening (tonic) followed by rhythmic jerking (clonic), often associated with immediate loss of consciousness and subsequent confusion lasting minutes to hours. This is reliably correlated with characteristic high-amplitude spike-and-wave patterns on the EEG.

In contrast, PNES often presents with motor behaviors that do not strictly adhere to the neuroanatomical progression typical of epilepsy. PNES movements tend to be variable, non-rhythmic, and often involve resisting passive movement. Furthermore, while epileptic seizures are often followed by a period of profound fatigue, amnesia, and disorientation, patients recovering from PNES often show immediate alertness, awareness of their surroundings, and rapid recovery, although they may report intense emotional distress. Another key differentiator is the response to typical seizure triggers: whereas flashing lights or sleep deprivation might trigger epilepsy, PNES is often triggered by emotionally charged or stressful situations. The clinical skill lies in observing subtle behavioral cues and integrating them with the objective evidence provided by EEG monitoring to avoid the common pitfall of misattributing functional or systemic events to an underlying epileptic disorder.

6. Treatment and Management

The successful management of NES hinges entirely upon accurate diagnosis and subsequent etiology-specific treatment. Given the dual classification, treatment protocols must diverge significantly between physiologic and psychogenic causes. For **Physiologic Nonepileptic Seizures (P-NES)**, the management strategy is purely medical: identifying and treating the underlying physical cause. If the events are due to syncope, treatment focuses on cardiovascular function; if due to a TIA, management involves stroke prevention protocols; and if metabolic, corrective measures (e.g., glucose regulation in diabetes) are implemented. Crucially, these patients require no psychological intervention for the seizures themselves, but rather focused medical and neurological care.

For patients diagnosed with **Psychogenic Nonepileptic Seizures (PNES)**, the primary treatment modality is psychological and psychiatric, not neurological. The first and most vital step is providing compassionate yet firm feedback to the patient regarding the diagnosis, emphasizing that the events are real but their origin is psychological, not electrical. Continuation of unnecessary antiepileptic medication must be halted carefully. The established effective treatment for PNES is psychological intervention, most notably Cognitive Behavioral Therapy (CBT), specifically adapted for functional neurological disorders. CBT aims to help the patient understand the link between stress, emotion, and their physical symptoms, teaching them emotional regulation skills and coping

strategies to mitigate the conversion of psychological distress into seizure-like episodes. Adjunctive treatments, such as trauma-focused therapies or psychodynamic psychotherapy, may also be necessary, especially where underlying trauma is implicated in the etiology of the PNES.

7. Significance and Impact

The existence and prevalence of nonepileptic seizures carry profound significance for individual patients and the broader healthcare system. For the patient, a diagnosis of NES, particularly PNES, can be a double-edged sword: relief that they do not have epilepsy is often coupled with skepticism, confusion, or even shame regarding the psychological nature of their symptoms. The journey to correct diagnosis is often protracted, leading to years of unnecessary medication, repeated emergency room visits, and significant functional impairment, impacting employment, education, and social relationships. Effective management, however, can lead to substantial improvement in quality of life once appropriate psychological treatment is initiated and embraced.

On a systemic level, NES imposes a substantial burden on healthcare resources. Misdiagnosis leads to inappropriate prescribing of expensive and potentially harmful AEDs, unnecessary invasive procedures, and prolonged hospitalization for monitoring. Furthermore, the misdiagnosed population consumes significant neurological resources that could otherwise be dedicated to treating true epilepsy patients. Raising awareness among emergency room physicians, general practitioners, and even general neurologists about the clinical features of NES and the availability of Video-EEG monitoring is essential for improving diagnostic speed and efficiency. The diagnosis of NES serves as a critical bridge between neurology and psychiatry, highlighting the necessity of integrated, multidisciplinary care models for complex somatoform disorders.

8. Debates and Criticisms

Despite significant advancements in diagnosis, the field surrounding NES, particularly PNES, remains subject to academic and clinical debate, primarily concerning nomenclature and stigma. One ongoing discussion revolves around the ideal terminology. While "Nonepileptic Seizure" (NES) is broadly accepted, some clinicians advocate for the term "Functional Seizures" to align PNES with the broader category of Functional Neurological Symptom Disorder (FNSD), emphasizing that the brain is structurally intact but functionally impaired. This debate is driven by the desire to reduce the perceived psychological judgment associated with terms like "psychogenic," which can lead patients to feel dismissed or accused of faking their symptoms.

A second significant criticism centers on the ethical challenges associated with the diagnostic process. Since the definitive diagnosis of PNES often requires triggering an event during Video-EEG monitoring (sometimes through suggestion or placebo), ethical concerns regarding patient manipulation and informed consent must be carefully managed. Clinicians must ensure that

patients fully understand the nature of the diagnostic testing and the potential for suggestion. Furthermore, criticisms persist regarding the accessibility and effectiveness of subsequent psychological treatment. Because PNES falls between specialties, patients often face barriers transitioning from neurological care to specialized psychological treatment, leading to delays in receiving the most effective therapy and contributing to persistent symptomology despite a definitive diagnosis. Addressing these structural barriers and ensuring sensitive communication are key challenges for future clinical practice in this area.

Further Reading

Epilepsy Foundation: Nonepileptic Seizures (NES)
Wikipedia: Psychogenic non-epileptic seizures (PNES)
National Library of Medicine (NCBI): The Diagnosis and Treatment of Psychogenic Nonepileptic Seizures (Review)