Nonepileptic Seizures: A Neurologist’s Perspective

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Nonepileptic Seizures

- Terminology: “nonepileptic seizures” (NES) is the preferred term
- Two subcategories
  - Physiologic
  - Psychogenic

Anachronistic, Pejorative Terms

- Hysteroepilepsy
- Hysterical seizure
- Pseudoseizure
- Pseudoepileptic seizure
- Nonepileptic pseudoseizure
- Hysterical epilepsy
- Epileptic attack disorder

Physiologic NES

- Sleep disorders
- Nonepileptic myoclonus
- Syncope
- TIAs
- Paroxysmal movement disorders
- Non-toxic organic hallucinosis
- Paroxysmal endocrine disorders
- Paroxysm of neurological insults

Ravi S&M. Seizure. 2003
Pediatric Physiologic NES

- Syncope – breath holding spells
- Nonepileptic myoclonus – benign myoclonus of infancy, neonatal hyperexplexia
- Sleep disorders – night terrors
- Paroxysmal movement disorders – Spasmus nutans, GE reflux – Sandifers, alternating hemiplegia, infantile masturbation, shuddering attacks, paroxysmal choreoathetosis

Matteick ME. Epilepsia. 1991
Derry CP. Arch Neurol. 2004

Psychogenic NES

- Undifferentiated somatoform disorder
- Factitious disorder
- Somatization disorder
- Malingering
- Panic disorders
- Reinforced disorders
- Conversion disorder
- Hypochondriasis
- Depersonalization disorder
- Psychotic disorder
- Dissociative disturbances

Cost of Psychological NES

- Lifetime cost estimated $100,000 for tests, procedures, medications
- $100-900 million per year in medical treatment
- Aggressive treatment resulting in comorbidity
- 50% get disability = rate for epilepsy

Lafrance WC. 2000

Epidemiology of NES

- True prevalence unknown
- 20% of epilepsy unit admissions
- 5% of an outpatient epilepsy clinic
- This spectrum of disorders is common
- It is a heterogeneous population
- It is very costly to society to provide care for this diagnostic group
- NES can remain undiagnosed for many years
- Repeated studies in adults demonstrate a fairly consistent 4:1 female to male ratio for psychogenic NES
- Pediatric patients have a 2:1 female to male ratio
Coexistence of NES and Epileptic Seizures

- Various epilepsy centers have reported different rates
- Most tertiary centers grant a 20% coexistence
- No formal epidemiologic study has been done
- Proposed NIH study for randomized treatment evaluation

NES: % Mixed or Pure

A precise description of event(s) of concern by patient and/or caretakers is vital.

Ictal Characteristics: Tonic-Clonic Resembling Events

1. Out of phase UE and LE, Voc
2. Out of phase UE, LE and pelvic thrusting, no rigidity
3. Out of phase UE and LE, pelvic thrusting
4. No rigidity and pelvic thrusting
### Ictal Duration

TC Mean=70 s  
NNE Mean=134 s

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- TC: Epilepsy control (n=25)
- NES (n=25)

### Ictal Characteristics

- There are suggestive features to differentiate NES from atypical epileptic seizures
- Atypical epileptic seizures tend to:
  - Be brief
  - Be frequent
  - Have a rapid recovery

Geyer SD. Neurol. 2000

### Semiology and NES

- 96% eye closure through events compared to epileptic events having eyes open at onset
  - 96% NES of 97% epileptic events
  - 95% sensitivity and specificity
- Pelvic thrusting, bicycling, opisthotonus can be seen in frontal seizures

Chung SS, et al. 2006; Groppel G. 2000; Betts T. 1992

### Recording one nonepileptic seizure

is not sufficient for a definitive diagnosis.
Inducing nonepileptic seizures can be misleading and may be unethical.

Requirements for Definitive NES Diagnosis

- Definitive video-EEG recording: video-EEG makes clear distinction which events are epilepsy or NES
- Multiple ictal events characteristic of the event(s) of concern have been recorded and it is clear which are nonepileptic and which are epileptic

Kiasa DW, Ann Neurol. 1988
Trojaborg W. Clin Electroenceph. 1992

Ictal Characteristics: Prolactin Elevation

- Epileptic TC and PC seizures most reliably elevate prolactin levels at approximately 20-minutes post start of the event, but
  - NES with any nipple manipulation in females can also elevate prolactin
  - Convulsive syncope can elevate prolactin and have associated automatisms
  - Not all PC seizures consistently elevate prolactin
  - Psychotropics can elevate prolactin, including the newer agents

Requirements for Definitive NES Diagnosis (cont’d)

- A careful review of the patient’s history has transpired, and it is clearly documented whether there is or is not a history of epileptic events. Based on this information and the ictal/interictal video-EEG recording, a decision can be made to discontinue AEDs for pure NES, or continue usually only one AED because coexistent epilepsy is present

Trimble M, Neurol Clin. 1986; Shen W. Neurol. 1990
Requirements for Definitive NES Diagnosis (cont’d)

- A complete psychological, social, and psychiatric assessment and a definitive DSM-IV diagnosis have been made.
- The full team (epileptologist, psychologist, social worker, nurses, neuropsychologist, +/- consulting psychiatrist) is in agreement with the diagnosis(es).
- Determine who will be present and how the diagnosis will be presented to the patient, +/- family or significant other.

Psychosocial Characteristics

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<th>Less than 55 years</th>
<th>Older than 55 years</th>
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<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Healthy</td>
<td>Health problems</td>
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<tr>
<td>Sexual abuse</td>
<td>Less sexual abuse</td>
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<tr>
<td>History of fibromyalgia or chronic pain</td>
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Neuropsychological and Psychological Epidemiology of NES in Adults

- Male to female ratio: <80%
- Age at onset: 20's
- FSIQ ≥ 92 (average, but low, ~ 25 percentile)
- ? Neuropsychology: statistically significant lower function
- ? Role of depression, other emotional, affective factors
- ? Role of previous neuro insult
  - 80% by patient
  - 46% by physician

Neuropsychology and Psychology of NES in Adults

- MMPI:
  - 1, 2 and 3 scales evaluated (Conversion V)
  - ≤73% hit rate
- QUOLIE and Washington Psychosocial Inventory
  - Not much help in differentiating epilepsy from NES (but lower scores for both)
- PAI
  - Somatoform results, not specific

Dunley M. Neurol. 1996

Rember M. Neurol. 2002
Cognitive and Psychosocial Functioning of the Pediatric NES Patient

- Sample sizes are small
- Male to female ratio: approximately 1:2
- Comorbid epilepsy diagnosis
  - This conference = 22-38%
  - Previous studies = 16-23%
- In NES
  - Below average IQ: not uncommon
  - School problems >50%
  - History of sexual abuse = 13-31%

Cognitive and Psychosocial Functioning of the Pediatric NES Patient (cont’d)

- One or more stressors = 78-94%
- Common stressors identified
  - Marital discord
  - Parental psychopathology/ETOH
  - Parent-child conflict
  - Learning/attention problems
  - Lack of adequate peer support

Cognitive and Psychosocial Functioning of the Pediatric NES Patient (cont’d)

- Assessment and treatment of the child should be viewed differently from that in adults, taking into consideration
  - Family dynamics
  - Parental functioning
  - Environmental issues (ie, school)
  - Relationship with peers and emphasizing
    - Mind-body connection
    - Meaning of the symptoms for patient/family

Generalized Tonic-Clonic

- 17 year-old from Somalia
- Lives with cousins
- Presented to the ED after “GTC” (witnessed, bit tongue)
  - MRI abnormal
Psychiatric Aspects of NES

- Incidence of seizures in conversion - 17%
- Hx of sexual abuse of general population
  - F = 20-27%
  - M = 3.5-16%
  - Overall = 11.7%
- Serious abuse
  - F = 4.5%
  - M = 0.6%
- "Paroxysmal somatization"

Psychiatric Aspects of NES (cont'd)

- Bowman  N = 58 NES
  - 35 F = 65% child abuse + adult trauma
  - 23 M = 35% repressed anger + life stress
- Alpers (Dissociative Experiences Scale)
  - Derealization scale elevated
  - Depersonalization
- Barry (Hypnosis in NES)
  - 100% specific
  - 74% sensitive
  - Depression – past or present 60%

Treatment Consensus (cont'd)

- Establishing trust in the therapeutic relationship is critical, especially in light of the destabilizing effects of previous abuse and previous trauma
- Financing this therapy is an issue, especially since it is long-term
- An analogy is presented for comparison with NES: consider an interesting correlate between NES and addiction and codependency, which may provide insight regarding relationships, coping mechanisms, difficulties dealing with unbearable emotions, and a perspective on therapeutic intervention
Neurological Aspects

- Humility is prudent
- Epilepsy and NES can coexist – 30%
- Not all unusual epileptic events are frontal
- There are suggestive features to differentiate atypical epileptic seizures from NES
  - Brief
  - Frequent
  - Rapid recovery

Telling the Patient

- Presentation is as nonjudgmental and supportive as possible
- Expected reaction to the presentation of the diagnosis is discussed and planned for (suicide risk, denial, "flight to health")
- Aftercare is arranged with an identified therapist who clearly understands the diagnosis and a smooth transition is organized
- Treatment takes time; give the patient aegis

Presentation of Diagnosis to Patient

- Real events
- Release of psychic pressure
- Triggers are stress and depression
- Get better
- Will not be abandoned
- Multidisciplinary team

Treatment of NES
Gowers (1881)

"Cold water over the head is often successful if applied freely; in severe attacks a moderate quantity only excites redoubled violence, while a second gallon is more effectual than the first."


Gowers (1881)

"A much more convenient and effectual remedy than water is strong faradization to the skin, applied almost anywhere it will commonly quickly stop the attack."


Treatment Consensus

• NES are treatable
• NES are easier to treat than epilepsy
• The diagnosis needs to be confirmed and there is a need to rule out coexisting disorders
• It is important to present diagnosis to the patient in a supportive, matter-of-fact fashion
• Therapy needs to be directed to the underlying cause: this includes appropriate treatment for depression, anxiety, psychosis, and appropriate, directed psychotherapy for issues of fear, rage, apathy and/or guilt

Patient Reactions to Diagnosis

• "I thought so" – real relief
• Calm before the storm
• Disbelief but interested in exploring
• Frank denial
• Hostility and anger

This is why you need a team approach for diagnosis and treatment
### Prognosis

- Children/adolescents 81% free within 3 years
- Adults 29-45% free within 5 years
  - Multidisciplinary team 50% free within 1 year
- Improved outcome: social support; treatment through epilepsy center; young age; duration less than one year; motivation
- Negative outcome: >two years of symptoms; neurological and/or psychiatric disease

### NES Summary

- The universe of physiologic NES is large
- This is a heterogeneous population
- Children offer a unique challenge – especially in the early years
- For psychogenic NES the ratio of male to female is ~ 1:4 in adults and ~ 1:2 in children
- This disorder is common, yet the prevalence is unknown

### NES Summary (cont'd)

- Any recurrent, stereotyped, inappropriate event may be a seizure
- Video-EEG is needed to record multiple events
- An integrated, multidisciplinary approach is preferred
- Humility is prudent

### NES Summary (cont'd)

- It is very costly to society to provide care for this population
- Research in this area is embryonic, especially in the pediatric population
- We need directed research to study subgroups for
  - Prevention
  - Treatment
  - Prognosis