
Functional Neurological Disorders: It Is All in the Head

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Abstract

The stressful events in a child's life may not always be expressed in words, but rather in physical symptoms. This form of "body language" may be an alternative method of communicating stress. Psychological factors are frequently the cause of functional neurological disorders such as headaches, psychogenic nonepileptic seizures, motor conversion disorders, and tic disorders. Organic or pathophysiologic causes for the physical symptoms must always be explored. However, failure to recognize the impact of psychological factors on the symptoms may delay effective treatment and expose the child to unnecessary medications, diagnoses, and labeling, with potentially untoward side effects. There may also be significant costs for extensive laboratory testing, imaging studies, and referrals that may not be required when an accurate diagnosis of a functional neurological problem has been established. Treatment strategies for somatoform neurological symptoms are often multimodal and quite different from neurological problems with a physiological cause.

Keywords

Psychogenic neurological disorders • Nonepileptic seizures • Psychogenic seizures • Pseudoseizures • Conversion disorder • Tic disorder • Tourette syndrome • Stress headaches • Psychosomatic headaches

Background: Literature Review

There are several theories that have been proposed to explain the onset and continued expression of psychogenic neurological symptoms. One expla-

nation is that the threatening emotions are repressed or suppressed inwardly and expressed symbolically through physical symptoms. The psychosomatic symptoms become a metaphor for the interpersonal conflicts and emotions experienced by the child [1].

Another view is that the child learns a "sick role" that is reinforced by the attention he receives from family and friends. The child may have unconsciously learned to imitate the symptoms of another.

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It is not surprising for a child of a parent with migraines to complain of headaches when stressed or desiring to avoid an activity. The physical symptom serves an important function and gain for the child. It provides an acceptable excuse for avoidance. The avoidance in turn reduces the child's anxiety. This view of the social learning theory is based on modeling and social reinforcement [2].

A third proposed explanation for psychosomatic neurological disorders is known as the stress-coping model [3]. This is conceptualized as what happens physiologically and psychologically when the demands placed on the individual exceeds the child's resources to cope. The child's coping mechanisms are overwhelmed and insufficient to successfully manage the stressful situations of his life.

The interaction of mind, body, and spirit underlie psychogenic disorders. This integration of the physiological, psychological, and socio-cultural factors that impact somatic symptoms is known as the biopsychosocial model. The stressors that precipitate, maintain, or aggravate somatic complaints may be environmental, physical, or emotional [4].

Headaches

Headache is a common condition among children and adolescents and can result in considerable distress, pain, and functional disability. The prevalence of migraine headache has reported to vary from as low as 1.2 % in the preschool years to as high as 23 % among high school adolescents [5].

A Finnish study matched 96 children with headaches to controls. Migraine headaches were diagnosed in 58; the remaining 38 had tension-type headaches. The researchers found that children with headaches were more often extremely sensitive to pain. These children were more likely to become stressed with physical examinations, immunizations, and blood sampling than the controls. The mothers of children with tension-type headaches reported more sensitivity to pain than the mothers of children with migraine headaches. In this study, children with tension headaches had a more stressful family environment than children with migraines [6].

In a study by Ekstrand et al., the presence of psychiatric disorders reduced the likelihood of neurological disease among neurology referrals, particularly those with headaches [7]. This would suggest that when individuals with psychiatric issues have neurological symptoms that a psychosomatic cause should be considered. Patients with recurrent pain without organic etiology reported significantly higher life stress than patients with organic findings [8].

In a French study, children were asked to draw a picture of their headaches. When children had tension headaches rather than migraines, their drawings demonstrated more squeezing, tightness, and compression. Fifty-seven percent of the children who had headaches diagnosed as "other (than migraine or tension)" had somatoform disorders [9].

Chronic daily headache (CDH) is a term used to describe when a child has a headache for at least 15 days/month for over 3 months without any underlying organic pathology. This has been shown to represent 60 % of cases in pediatric specialty clinics. Young people frequently have comorbid symptoms including dizziness, sleep disturbance, fatigue, problems with concentration, anxiety, frustration, and sad mood. Additional pain symptoms such as abdominal, neck, back, and diffuse muscle and joint pain also may be expressed [10].

Psychosocial factors are not only the leading cause of headache in children when there is no organic pathology but also can significantly increase the frequency and intensity of symptoms when there is a physical cause for the headaches. There may be issues relating to school such as bullying, social isolation, learning disabilities, or pressure to excel. Family conflicts, child abuse, problems with personal relationships, grief, and loss may contribute to symptoms and complicate management. Drug and alcohol use not only by the child but also by the family must also be explored. Sleep and eating disorders should be considered.

When the cause of functional symptoms is psychosocial, analgesics are most often ineffective. Overuse of over-the-counter analgesics have a high potential for rebound and should be avoided.

The cause of headaches perhaps most feared by parent and child alike is increased intracranial pressure from a space occupying lesion. The comprehensive medical examination for the child with headache must include examination of the skull, brain, sinuses, teeth, eyes, ears, and cervical spine. Intracranial pressure, temporomandibular joint, cranial nerves, along with the supraorbital and occipital nerves must be evaluated [3, 11].

Nonepileptic Seizures

Nonepileptic seizures (NES) are paroxysmal behavioral events or disturbances in consciousness that resemble epileptic seizures (ES) but are not caused by epileptiform discharges in the brain. Because NES resemble ES, children are frequently misdiagnosed and inappropriately treated resulting in significant morbidity. NES are common: 10–20 % of children referred to epilepsy centers actually have NES [12].

The largest group of patients with NES have psychogenic seizures. Tonic or clonic movements, tremors, twitching, shaking, unusual postures, altered emotions and sensations, disturbances in consciousness, syncope, eye flickering, vocalizations, myoclonic jerking, or pelvic thrusting may be a response to a variety of emotional stresses. The child has no conscious awareness of the motivation behind this unique behavioral event [13, 14].

Although the NES seizures are involuntary, the seizures often serve a purpose. The seizures may allow the child to escape something unpleasant. The behavior may evoke sympathy from the parent or teacher or make the child feel more special than a sibling. Some psychogenic seizures are a manifestation of posttraumatic stress disorder (PTSD) and may represent a defense mechanism to handle physical, sexual, or emotional abuse. Some psychogenic seizures represent a conversion disorder or a behavioral (e.g., autistic) disorder rather than a real seizure. In a conversion disorder (see below), psychological stress is expressed as a physical disorder with family dynamics a frequent contributing factor.

The motor movements are caused by subconscious processes responding to psychological conflict.

Another type of NES is termed pseudoseizure, which comes from the Greek meaning of false. These seizures are a manifestation of malingering. The seizures are intentionally faked for secondary gain. Due to the seizure, the child may get out of doing something he prefers to avoid or get more attention from friends or family. In adults, financial gain from a law suit or obtaining disability benefits may be the motivating factor. The child is well aware of the intention, motivation, and secondary gain from the seizures [15].

A study by Wyllie et al. examined the psychiatric features of children and adolescents with NES. The study did not distinguish between psychogenic and pseudoseizures. They concluded that major mood disorders and severe environmental stress, especially sexual abuse, are common among children and adolescents with NES. There was a subgroup of children with NES who had less severe psychiatric problems and moderate psychosocial stressors [16]. Pakalnis et al. looked at the psychiatric and other risk factors of children who had repetitive psychogenic seizures severe enough to mimic status epilepticus. All episodes of nonepileptic status epilepticus were preceded by acutely stressful situations. Anxiety and affective disorders were the most common comorbid psychiatric diagnosis [17].

An absence of relevant psychological factors was found in only 5 % of the 185 patients with NES studied by Moore and Baker. The most common psychological factors associated with NES in this study include: anxiety or stress, physical abuse, significant bereavement, family dysfunctioning, relationship problems, depression, and sexual abuse [18].

The major difficulty in making a correct diagnosis is distinguishing psychosomatic illness from seizures with an organic etiology. In a study of 43 children and adolescents with NES, nine were found to have an abnormal neurological past history. There was a family history of epilepsy in 34.9 % and often children have watched other family members' seizures. Neuropsychological testing done on 22 cases failed to show major abnormalities. Most cases, however, demonstrated significant personal and family distress [19].

There are historical and clinical clues that should help the clinician distinguish between NES and ES. NES may be suspected when there is a history of psychiatric illness, panic attacks, PTSD, suicidal ideation, and depression. Organic cerebral dysfunction following a brain injury may result in compromised adaptive abilities and subsequent onset of NES. A history of physical or sexual abuse may also increase the suspicion of NES. Antiepileptic drugs (AEDs) can facilitate NES. Therefore, if a child with ES has an increase in seizure frequency or a change in the seizure type when a new AED has been instituted despite therapeutic levels, NES should be considered in addition to ES. Due to the exquisite sensitivity of the temporolimbic structures, especially the amygdala, to hormonal balance, the onset of menarche during adolescence can influence NES [13].

Some of the distinguishing clinical characteristics of NES include longer duration with gradual onset, and dramatic movements associated with unresponsiveness but without clear loss of consciousness. NES tend to have out of phase motor activity without incontinence, injury, or postictal confusion. Hyperventilation and weeping may occur with NES. On EEG, there will be muscle artifact, but no ictal build-up or postictal slowing. Unlike ES, there will be no rise in prolactin postictally [13, 14].

An added diagnostic conundrum is frontal lobe epilepsy, which frequently presents in the first or second decade of life with no abnormal EEG or radiographic findings. Thus, identifying the key clinical characteristics of frontal lobe seizures is probably the best diagnostic tool. The motor activity may be frenetic, semipurposeful movement, pelvic thrusting, or tonic-clonic. The patient having a frontal lobe seizure may yell, grunt, or shout obscenities. The level of consciousness may range from full conscious awareness to complete loss of consciousness with rapid return to baseline. Frontal lobe epilepsy usually occurs while the patient is sleeping, may be associated with leg restlessness, and often occurs in clusters. There is an increased risk of status epilepticus with frontal lobe epilepsy, so an accurate diagnosis is important [20, 21]. Complicating the diagnosis even

further, an Indian study suggests that children with ES are more likely to manifest NES [22].

The gold standard for diagnosing NES is continuous video EEG monitoring with close circuit television to compare and contrast the clinical and EEG features of the videotaped events. A single normal EEG tracing cannot rule out seizures. An MRI, Positron Emission Tomography (PET), Single-Photon Emission Computed Tomography (SPECT), psychological evaluation, and neuropsychological testing are all part of the evaluation.

Conversion Disorders

When there is an alteration or loss of physical functioning that appears to be a physical disorder in the absence of an organic etiology, a conversion disorder is highly probable. For example, a child may report that he is unable to see after viewing something horrific. The conversion reaction acts as a protective defense mechanism. The sensory and motor dysfunctions can encompass any nervous system activity that is to some degree under voluntary control and may be an expression of some psychological need or conflict [23, 24]. The symptoms may present as motor paralysis, weakness, blindness, NES, swallowing difficulties, gait disturbance, intractable coughing, or sneezing. Typically, the symptoms do not follow an anatomical nerve distribution nor do the actions fit the symptoms such as a child with a complaint of blindness who does not bump into things. When multiple symptoms are present, it is more suggestive of a somatization disorder.

Although “la belle indifference” is classically associated with conversion symptoms and may be a useful diagnostic sign, it is not a common feature, and the majority of patients with conversion symptoms are in fact upset by them [25].

In a review of over 100 cases of conversion reactions in children, Maloney found that a majority of children came from homes where depression and conflict were present. Almost universally the onset of symptoms was associated with familial stress. Three quarters of the families had difficulty with emotional expression and communication [26].

A Dutch study found a history of physical/sexual abuse in patients with conversion disorders more often than in matched comparison patients [27].

In a Swedish study, children with motor conversion disorders were compared to age- and sex-matched patients with motor symptoms due to a neurological disorder. They found depression, the presence of a personality disorder, and also poor schooling to be significantly associated with motor conversion disorder. Low levels of affection and warmth during childhood along with perceived parental rejection was higher in the group with conversion symptoms. In contrast to other studies, they did not find the history of childhood physical or sexual abuse to be more associated with conversion disorders [28].

Maisami and Freeman demonstrated success in treating children with conversion reactions when child psychiatry and pediatric neurology worked together in the evaluation and treatment. The underlying stress was identified and the treatment emphasized health rather than disease [29]. In a study by Pehlivanurk and Unal, 85 % of children with conversion disorders were symptom free at a 4-year follow-up. A favorable prognosis is associated with early diagnosis and good premorbid adjustment [30]. Crimlisk found that patients who presented with sensory symptoms tended to have better outcomes than those who presented with weakness [31].

The diagnosis of conversion disorder can be a clinical challenge. Making the diagnosis early in the course of the presentation can reduce the child and family's anxiety and reduce the need for costly and unnecessary tests. A thorough physical examination and a careful psychiatric history are essential to screen for comorbid psychiatric illness. The history should include the onset and nature of symptoms and the presence of stressors. Establishing rapport while eliciting the history is very important. The therapeutic relationship between the clinician and the child and family will help them understand and better accept the diagnosis. It is not uncommon for children to be unable to verbally express the psychological factors that are stimulating their symptoms. Their body is expressing it for them [32].

With the advances in neuroimaging techniques, it has been possible to study the neural basis of conversion disorders. Using PET scans, two researchers showed a change in cerebral blood flow in patients with the conversion symptom of hemiparesis: increased cerebral blood flow in the right anterior cingulate and right orbitofrontal cortex; and deactivation of the left dorsolateral prefrontal cortex [33]. Another study using SPECT scanning showed reduced blood flow in the thalamus and basal ganglia contralateral to the deficit, which resolved when the symptoms ceased [34]. This suggests an emotional modulation of motor processes in the striato-thalamo-cortical circuits. It is postulated that emotional stressors inhibit these pathways, which impairs motor readiness and the quality of voluntary movements. Thus, reducing the child's subjective distress may be the most effective treatment for conversion disorders.

Tics and Tourette

Tics are readily observable involuntary sudden, rapid, repetitive, or nonrhythmic stereotypic movements or vocalizations. This neuropsychiatric disorder may also have a variety of concomitant psychopathologies including obsessive compulsive disorder (OCD), attention deficit/hyperactivity disorder (ADHD), learning difficulties, and sleeping abnormalities [35]. There are no laboratory tests for tics and diagnosis is based solely on the history and clinical examination. Tics may be simple, complex, transient, or chronic. Although it is essential for researchers to separate chronic tic disorder from Tourette, which includes both motor and phonic tics, in practice, it has little relevance for outcome or treatment.

A neurological basis for tics with pathophysiologic involvement of several different neurotransmitters has been described. Further, genetic abnormalities that predispose to Tourette Syndrome have been identified [36, 37]. However, it is well recognized that stress and anxiety may exacerbate tic symptoms. It can be challenging to distinguish between tics and behavioral

symptoms [38]. Depending on the study, the frequency of aggression and explosive outbursts of patients with Tourette has been reported to vary from 26 to 75 % [39]. In a study of school aged children in the UK, tics occurred in 65 % of the students with emotional and behavioral difficulties, 24 % of the students with learning difficulties, and in none of the normal children [40]. In a study by Mason, teachers rated children with tics as having more emotional and conduct disorders [41]. The anger dysregulation and outbursts of physical or verbal violence in about 25 % of the clinically referred youth with Tourette may result from disordered impulse control or anxiety disorder. Children with tic disorders have a chronic, socially disabling, and stigmatizing disease. It is not uncommon that they are bullied, which can result in the development of anxiety and depression [42–44].

Jankovic in his description of the phenomenology of tics describes them as both semivoluntary and involuntary and both suppressible and suggestible. Tics do not happen by choice. Yet, with psychological effort, they can be partially controlled or they may be triggered by suggestion. Tics increase under stress and will decrease with distraction and concentration [45, 46]. Children describe the premonitory urge that precede tics and a capacity for brief periods to suppress them [47, 48].

For the clinician, making the diagnosis of a tic disorder includes observation; a review of the developmental, medical, and family history; onset, description and course of tics; and any co-occurring conditions. Identifying Tourette or a tic disorder is a clinical diagnosis based on the enduring presence of motor tic and in the case of Tourette an additional vocal tic. An essential step toward appropriate and effective treatment is determining the degree to which the symptoms are exacerbated by stress, anxiety, or depression. Impaired adaptive functioning may be related to the tic disorder or to the presence of comorbidities such as ADHD, OCD, learning disabilities (LD), and other behavioral difficulties. It is important to ascertain what psychosocial stressors exist for the child and explore the impact of the symptoms on family members, educational success, and peer relationships. Medical management without psychological support is doomed to failure.

How to Make the Diagnosis of a Functional Neurological Disorder

Rickert and Jay developed an interview strategy to approach the evaluation of a child with symptoms that may be consistent with a psychosomatic disorder. Their approach can be remembered by the acronym SAFE (severity, affect, family, and environment) [49].

Severity: When assessing the severity of the symptoms, both the child's description and the manner in which they are communicated are important. A detailed description with a lot of imagery may indicate that the child's symptoms are a coping strategy for emotional distress and worry in the child's life. For the child, having a headache may provide an acceptable excuse for avoiding stressors. Determining the acute, recurrent, or chronic nature of the symptoms is also important.

A functional etiology for symptoms is more likely when there are multiple complaints inconsistent with pathophysiologic principles. When the time and location of symptoms is vague and highly variable or clearly associated with stressors, an organic cause is less likely. Although the emotional distress that can be the stimulus for psychosomatic neurological symptoms can interfere with restorative sleep, the functional symptom itself rarely wakes one from sleep. When there is an underlying organic pathology for the child's symptoms, specific measures such as anticonvulsants for seizures or analgesics for headaches may bring relief. When the symptoms are functional, they are rarely relieved by conventional measures other than by rest and time. Frequently, the child or parent may report "nothing works."

Affect: The next step is to assess how the child and parent have adapted to the child's symptoms. The child with functional neurological symptoms may seem nonchalant and unconcerned that his disabling illness has resulted in an altered lifestyle, school absences, and even bed rest. The patient's flattened affect may represent depression.

It is also important for the evaluating clinician to recognize his or her own affect or gut reaction

to the child, family, and the presenting symptoms. Past experience and a gut feeling may enhance or distort clinical judgment. It is possible and not-uncommon that a child can present with both functional neurological symptoms and have underlying disease.

Family: The expression of a functional neurological symptom may be the expression of a larger family problem. It is easy to recognize a dysfunctional family when immature parents, psychosocial chaos, drugs, alcohol, mental illness, criminality, abuse, and contentious parents are involved. Sometimes, the stress experienced by the child within the family may be more covert. The parent may be over involved in the life of their child, e.g., by pushing the child to overachieve academically, musically, or athletically. Conversely, the parent may be physically or emotionally unavailable to the child and the somatic complaint may be a way for the child to garner attention.

A parent may also model functional symptoms. In that family constellation, having a physical illness may be more acceptable than displaying emotional or behavioral symptoms. The parent may be unwilling to accept the possibility that the symptom may be due to family stressors.

Another significant factor is the role of the family in the secondary gain of the symptom for the family. Perhaps having a “sick” child allows the parent to remain at home, provides distraction from marital issues, or is related to a financial or legal gain. An absent parent may become more involved when their child has neurological symptoms.

How the family responds to the child’s symptoms is very important for the clinician to assess. When the family makes too much fuss over the somatic disorder or views a situation as considerably worse than it actually is, the symptom may escalate. This can result in giving the child’s neurological symptom too much power within the family. The child may become absorbed in the symptom, making it part of his or her persona. When the family is overly concerned and focused on the somatic complaint, the child may fear that whatever is wrong is life threatening. Conversely, the child’s symptoms also may exacerbate and

persist when the family ignores the complaints or tells the child that it is being faked.

Environment: Functional neurological symptoms also may be triggered by stressors in the child’s environment outside of the family. Stressors at school, with peers, and in the community need to be assessed. When the onset of symptoms happens before or at school, but does not interfere with socializing with peers, school avoidance may contribute to functional symptoms. When symptoms result in not being involved with peers, depression, peer ridicule, and teasing may be significant factors. The relationship between community-related events and the illness should also be explored. Some children may dislike taking music lessons, recreational activities, or athletic competition and their functional symptom is an acceptable means of avoidance. Even musically or athletically gifted children may develop performance-related psychosomatic complaints. Psychogenic neurological problems may also arise following natural disasters or human tragedies (see Chap. 17).

When the complex interaction between the child’s emotional and physical state are imbalanced and psychogenic neurological symptoms result, a multidisciplinary team approach to diagnosis and treatment is the most effective. Unnecessary tests, medications, and ineffective treatments can be avoided. The initiating stressors and perpetuating factors can be explored and an effective treatment plan that recognizes the functional nature of the symptoms can be developed [29].

Treatment

The prognosis for children with functional neurological symptoms that are diagnosed promptly generally is favorable. When the symptoms are misdiagnosed, the condition can become chronic, effective treatment is delayed, and the underlying stress is ignored. In such a setting, the prognosis is far less promising. For the clinician, the child’s treatment begins with nonjudgmental acceptance of the child regardless of the nature of his or her functional neurological symptoms.

For many parents and some children, it is easier to accept a physical explanation for neurological symptoms. This is especially true when a parent is the source of much of the child's stress. There may also be the fear that an ominous physical cause may be overlooked and perhaps more testing should be done. The child and the family need an understandable explanation, reassurance, and support.

The clinician can assist the family in arranging counseling for the child, which can incorporate cognitive and behavioral therapies (see Chap. 19), psychological resiliency, and training, if needed, and skills to help them in social situations. Family counseling may also be beneficial. Parenting classes and discipline training can help the parent recognize that the underlying purpose of discipline is to instill a sense of self-control and responsibility for one's behavior.

It is important to involve the schools in the treatment plan. Teachers, coaches, and school nurses must demonstrate acceptance and appropriate management of the child's symptoms. There needs to be open and ongoing communication between school, home, and the multidisciplinary clinician team. It is necessary to explore and mitigate the amount of stress the child experiences at school, e.g., safety concerns, bullies, teasing, learning disabilities, and too much pressure to perform.

Rather than focusing on the functional disorder, the clinician, family, and school should look at the whole child, especially his or her talents, skills, and interests. For the child, recognizing his or her own strengths can help develop self-esteem that may ultimately lead to self-mastery over symptoms.

Given the modest response of most pharmacotherapies for functional neurologic disorders, the considerable side-effect profile, and the fact that the most significant and bothersome symptoms are usually triggered by stress, it is important that the child with functional symptoms or symptoms with an organic basis that are exacerbated by stress be taught relaxation skills such as with breathing, hypnosis (Chap. 21) and self-regulation strategies such as biofeedback (Chap. 20).

Case Studies

Case 1: Tic Disorder

SC was a 17-year-old with Tourette Syndrome that began at age 12. He also experienced anxiety and attention deficit hyperactivity disorder. He had significant motor and vocal tics which exacerbated when he began his high school years at a boarding school. His polypharmacy included medications for anxiety, tics, and attention-deficit disorder. As he settled into school and made new friends, his tics improved. Now in his senior year, he was accepted into his first choice college. His tic frequency has escalated significantly.

Questions

1. What is the most likely cause of the exacerbation in his symptoms of Tourette?
 - (a) Noncompliance with prescription medications
 - (b) Change in medication
 - (c) Anxiety about transition to college
 - (d) Self-medicating with drugs and alcohol
 - (e) ADHD medication
2. In addition to ADHD and anxiety, all of the following are often comorbidities of tic disorders EXCEPT:
 - (a) Learning disability
 - (b) Obsessive-compulsive disorder
 - (c) Impulsivity
 - (d) Dissociative identity disorder
 - (e) Emotional lability
3. What is the most appropriate therapy for this patient?
 - (a) Hypnosis
 - (b) Increase his medication
 - (c) Cognitive behavioral therapy (CBT)
 - (d) (a) and (c)
 - (e) (a), (b), and (c)

Answers

1. (c): Anxiety about transition to college Over the course of his 4 years at boarding school, SC had developed a great group of friends who accepted his tics and even explained his

behavior to curious new students. SC was very anxious about the upcoming transition to college and was worried that he would have to explain his Tourette to everyone. There were no new medications or change to his pharmacotherapy. There is no evidence (group data) that motor tics or vocal tics change in frequency or severity during maintenance therapy. SC was not drinking or smoking.

2. (d): Learning disability, obsessive compulsive disorder, impulsivity, and emotional lability are all comorbidities of tic disorders.
3. (d): Hypnosis can provide SC with self-regulatory strategies to help him better manage his tics. CBT can be an effective therapy for symptom-based diagnoses integrating behavior therapy with cognitive therapy.

Case 2: Nonepileptic Seizures

BF suffered a traumatic brain injury when he was physically abused by his mother's boyfriend at age 6. He subsequently developed a partial seizure disorder, which was well controlled on an AED. When his mother was incarcerated on drug charges, his grandmother became his legal guardian. At age 12, he had his first seizure in 4 years. His AED was changed. Two months later, he had what appeared to be a tonic-clonic grand mal seizure. His mother was scheduled to be released from prison that week. His AED was increased, but the tonic-clonic seizures continued sporadically.

Questions

1. What might suggest that the new seizure was an NES?
 - (a) Psychosocial stress
 - (b) Change in seizure type
 - (c) PTSD
 - (d) No improvement on AEDs
 - (e) All of the above
2. Characteristics of NES include all of the following EXCEPT:
 - (a) Rise in prolactin level
 - (b) Gradual onset
 - (c) No clear loss of consciousness
 - (d) No incontinence
 - (e) No postictal confusion

3. Which of the following will provide the most definitive evidence that this new seizure is nonepileptic?

- (a) Video EEG
- (b) CT scan
- (c) MRI
- (d) EEG
- (e) Spinal tap

Answers

1. (e): All are historical clues that might lead the clinician to suspect NES
2. (a): Prolactin levels rise after epileptic seizures. The remaining choices are all clinical clues that suggest NES
3. (a): Video EEG is considered the gold standard for diagnosing NES. In the absence of clinical seizure activity, a normal EEG does not exclude the possibility of ES or NES.

Case 3: Headaches

JJ was just 9 years old when her mother died of cancer. Her father was still serving at least 10 more years of a prison sentence, so she and her two younger brothers moved in with her paternal grandparents in another state. The grandparents were poor, older, not in good health and overwhelmed by the addition of three children to their home. JJ had mild mental retardation, microcephaly, obesity, enuresis, and encopresis. One of the brothers had attention deficit hyperactivity disorder and both were on the autism spectrum.

During JJ's teenage years, her grandparents separated and her grandmother's health deteriorated. In addition to the expectation that she maintain her attendance at school, JJ was expected to do the cooking, cleaning, laundry, and care for her grandmother. Her brothers were of little help and she argued continually with one of her brothers. JJ had few friends, school was a struggle, and she had little time for pleasurable pursuits. JJ became depressed and experienced daily headaches that with a flat affect she described as a 10 on the 0–10 pain scale with zero being no pain and 10 the worst pain in the world that she can imagine. Her headaches were unresponsive to OTC analgesics. With the amount of

psychosocial stress in her life, a psychogenic headache was the obvious diagnosis.

Questions

1. Although psychogenic headaches is the likeliest primary diagnosis, what else needs to be considered?
 - (a) Sinusitis
 - (b) Increased intracranial pressure
 - (c) TMJ dysfunction
 - (d) Migraine Headache
 - (e) All of the above
2. What possible reason could explain the lack of response to OTC analgesics?
 - (a) She had a bacterial sinusitis
 - (b) Ongoing psychosocial stress
 - (c) Depression
 - (d) Rebound from overuse of acetaminophen
 - (e) All of the above
3. What is an appropriate next step in this patient's management?
 - (a) Involve social services
 - (b) Teach JJ self-regulation strategies
 - (c) Mental health counseling
 - (d) Improve support systems
 - (e) All of the above

Answers

1. (e): All need to be considered in the differential diagnosis. Surprisingly, a CT revealed extensive sinusitis. Her headaches improved somewhat after antibiotic therapy, but did not resolve.
2. (e): All are possible explanations for her lack of response to OTC analgesics.
3. (e): Multiple agencies and services are often necessary when the child's psychosocial issues are significant.

Conclusions

When the complex interaction between the child's emotional and physical state is imbalanced, psychogenic neurological symptoms may result. When stressed, children may develop functional symptoms or the expression of a true organic condition may change or exacerbate.

The frequency of headaches for the child with migraines may increase. The child with epileptic seizures may additionally develop nonepileptic seizures. The child may convert their psychologic stress into sensory or motor dysfunction. Tics can certainly be exacerbated in response to stress. Medications used to control seizures and tic disorders have significant side effects. Medical and pharmacologic management without an accurate diagnosis and understanding of the functional basis of the symptoms likely will have little benefit and may actually cause harm.

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