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Original Article

## Functional Neurological Symptom Disorders in a Pediatric Emergency Room: Diagnostic Accuracy, Features, and Outcome



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## ABSTRACT

**BACKGROUND:** In children, functional neurological symptom disorders are frequently the basis for presentation for emergency care. Pediatric epidemiological and outcome data remain scarce. **OBJECTIVE:** Assess diagnostic accuracy of trainee's first impression in our pediatric emergency room; describe manner of presentation, demographic data, socioeconomic impact, and clinical outcomes, including parental satisfaction. **METHODS:** (1) More than 1 year, psychiatry consultations for neurology patients with a functional neurological symptom disorder were retrospectively reviewed. (2) For 3 months, all children whose emergency room presentation suggested the diagnosis were prospectively collected. (3) Three to six months after prospective collection, families completed a structured telephone interview on outcome measures. **RESULTS:** Twenty-seven patients were retrospectively assessed; 31 patients were prospectively collected. Trainees' accurately predicted the diagnosis in 93% (retrospective) and 94% (prospective) cohorts. Mixed presentations were most common (usually sensory-motor changes, e.g. weakness and/or paresthesias). Associated stressors were mundane and ubiquitous, rarely severe. Families were substantially affected, reporting mean symptom duration 7.4 (standard error of the mean  $\pm$  1.33) weeks, missing 22.4 (standard error of the mean  $\pm$  5.47) days of school, and 8.3 (standard error of the mean  $\pm$  2.88) of parental workdays (prospective cohort). At follow-up, 78% were symptom free. Parental dissatisfaction was rare, attributed to poor rapport and/or insufficient information conveyed. **CONCLUSIONS:** Trainees' clinical impression was accurate in predicting a later diagnosis of functional neurological symptom disorder. Extraordinary life stressors are not required to trigger the disorder in children. Although prognosis is favorable, families incur substantial economic burden and negative educational impact. Improving recognition and appropriately communicating the diagnosis may speed access to treatment and potentially reduce the disability and cost of this disorder.

**Keywords:** functional neurological disorders, somatoform disorders, conversion disorder, medical education, emergency  
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## Introduction

Somatic complaints without a medical explanation are encountered frequently in pediatric primary care clinics (15% to 50%),<sup>1-3</sup> placing considerable demands on time and resources.<sup>4</sup> There is considerable variation regarding nomenclature for these symptoms. Terms based on presumed etiology (psychogenic and hysteria) are problematic as they imply a purely psychiatric process and may be perceived as dismissive or insensitive.<sup>5-7</sup> Others have argued for the use of "dissociative states." This term

suggests a specific but unproven mechanism related to a lack of integration of actions and motivations.<sup>5</sup> “Medically unexplained” is accurate but implies diagnostic uncertainty, suggesting the need for continued diagnostic testing.<sup>6</sup> Historically, the Diagnostic and Statistical Manual of Mental Disorders (DSM) classified these symptoms as somatoform disorders. DSM-5 proposes the category of somatic symptom disorders with the synonymous terms “conversion disorder” and “functional neurological symptom disorder” to describe this condition.<sup>5,8</sup> We adhered to this current nomenclature because it implies a mechanism (changes in brain function) without claiming a particular etiology.<sup>5</sup>

This study grew from the authors’ perception that children with functional neurological symptom disorder frequently present to the emergency room and use substantial health care resources, but little epidemiological or outcome data exist to guide management. The published frequency of this disorder in childhood varies widely, from 1-4:100,000 in the United Kingdom and Australia<sup>4,9</sup> to 1:1,000 in Germany.<sup>10</sup> In contrast, it makes up a sizeable fraction of consults for neurologists. Across diverse types of clinics—general neurology,<sup>11</sup> epilepsy,<sup>12</sup> neuromuscular, and movement disorders<sup>13</sup>—functional neurological complaints represent 5-20% of patient visits. Of adults admitted to neurology inpatient units, 9% are later found to have a functional etiology.<sup>14</sup> Functional neurological symptom disorder represents 15% of pediatric psychiatry visits (in urban India<sup>15</sup>), but no comparable data exist for other populations. It is unknown how frequently children present for subspecialty or emergency room care, making it difficult to develop management and treatment plans specifically geared toward these settings.

For any disorder, understanding the local demographics, risk factors, manner of presentation, and prognosis is fundamental to establishing effective treatment programs. Improved institutional information about children with functional neurological symptom disorder may speed diagnosis and referral for appropriate mental health treatment.

One faces methodological challenges when diagnosing functional neurological symptom disorder in childhood, e.g., the lack of developmentally appropriate diagnostic interviews; the necessity to seek out and integrate multiple sources of information<sup>4</sup>; the perceived need to “exclude” organic causes<sup>16,17</sup>; and physician and/or family discomfort with the diagnosis. By describing diagnostic accuracy, demographic characteristics, phenomenology of presentation, management practices and clinical outcomes, we hope to facilitate faster diagnoses and improved outcomes in this poorly understood childhood disorder.

## Patients and Methods

Our Institutional Review Board approved this study as a quality improvement project and waived the need for patient consent. We assessed two distinct patient cohorts, one retrospectively and one prospectively collected. We set a low bar for inclusion in our prospectively collected data set (the clinical impression of a trainee) and a high bar for inclusion in our retrospective data set (the final diagnosis by supervising clinicians). To determine diagnostic accuracy of neurology trainees, we compared the initial diagnostic impression of trainees with the final diagnosis of neurology and psychiatry attending physicians. Six months

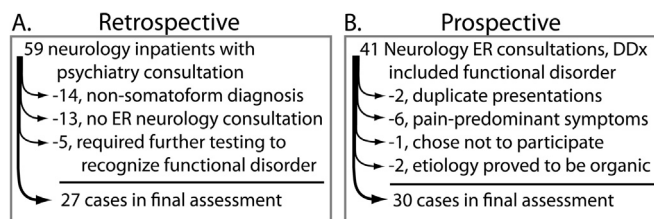
after final case collection, all cases were reviewed to ensure that no other diagnosis could better explain the presenting symptoms.

The retrospective cohort was a subset of all inpatient psychiatry consultations observed at Boston Children’s Hospital, a 395-bed tertiary medical center, from spring 2010 to spring 2011. Patients were included when diagnosed with functional neurological symptom disorder by both neurology and psychiatry supervising clinicians. To determine accuracy, we reviewed neurology emergency room consultations to ascertain whether trainees considered a functional neurological disorder. Stringent criteria were established before conducting this review; the trainee must have used one of the following words and/or phrases in the assessment and/or plan: somatoform, psychogenic, functional, nonorganic, conversion disorder, nonepileptic seizure, or astasia-abasia. Such statements in other parts of the note, documentation of functional examination findings, or later inclusion of functional neurological symptom disorder by attending physicians were insufficient to meet threshold.

The prospective cohort was accrued consecutively >12 weeks (October 2012–January 2013). We requested that neurology trainees log emergency room cases in which functional neurological symptom disorder was suspected in the differential diagnosis (Fig 1). To assess diagnostic accuracy in the prospective cohort, residents’ initial diagnostic impressions were compared with the final diagnosis of neurology and psychiatry attending physicians (in the emergency room; following admission; at outpatient follow-up; or during inpatient psychiatric stay). For patients with extramural neurologists, we contacted those providers to determine their final diagnosis. For patients who had both neurology and psychiatry visits, the diagnostic impression of psychiatry was also assessed.

Data collected in the prospective series included demographics, nature of symptoms, preexisting medical and/or psychiatric diagnoses, reported stressors, diagnostic procedures performed (computed tomography, magnetic resonance imaging, electroencephalography [EEG], or lumbar puncture), and mental health-related interventions. Patients were assigned to functional neurological symptom disorder subgroups based on DSM-5 criteria<sup>8</sup> to determine manner of presentation.

Clinical outcome and parental satisfaction in the prospective series were determined by a structured telephone interview (Appendix 1) administered to families and patients in combination with chart review. Patients were contacted between 3 and 6 months after initial presentation in the emergency department (mean, 22 weeks; range, 13–37). Follow-up data included duration of residual symptoms, total number of emergency room visits, missed school days and parental days of work, alleviating factors, presence of and satisfaction with outpatient mental health providers, and additional tests done outside the initial hospital visit. Families rated their satisfaction with the neurology consultation in a Likert-scale and suggested improvements.



**FIGURE 1.**

Patient ascertainment and selection. (A) Retrospective: Exclusion criteria included presentation for nonfunctional psychiatric signs (e.g. psychosis), patients without antecedent neurology ER consultation, and patients whose functional neurological signs were identified only by subsequent (post-ER) testing. (B) Prospective: Where second presentations during the study period were present, only the first presentation was used for analysis. Exclusion criteria included patients with pain as the primary symptom (e.g., headaches) and refusal to participate. Patients with an organic diagnosis were excluded for demographic, prognostic, and treatment data, but retained in calculations for assessing diagnostic accuracy. ER = Emergency room; DDX = Differential diagnosis.

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