The Pediatric Psychologist’s Role in Differential Diagnosis: Vocal-Cord Dysfunction Presenting as Asthma

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Presented the case of an 11-year-old boy with vocal-cord dysfunction (VCD) as an example of a rare clinical phenomenon that may result in clinical and systemic challenges for the pediatric psychologist. VCD presents as highly similar to asthma, yet is best treated with speech therapy and psychosocial intervention. The physical symptomatology of VCD and its conceptualization as a psychosomatic disorder are described. Difficulties inherent in integrating psychological factors into medical case formulation are discussed, and possible pitfalls and strategies are delineated.

KEY WORDS: vocal-cord dysfunction; asthma; consultation-liaison; case study.

Patients whose symptoms are unresponsive to conventional medical approaches provide a great challenge for medical and psychosocial care providers. Initially, the treatment team may exhaust the realm of potential underlying or comorbid medical conditions by ordering multiple consultations and auxiliary evaluations. If these fail to clarify the disease picture, the medical care providers may consider the possibilities of nonadherence to medication regimens, malingering, or deliberate induction of symptoms as potential explanations for the clinical presentation. How staff address these concerns within the team and with the family can have a pivotal impact on treatment alliance and subsequent patient care.

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We present the case of an 11-year-old boy with vocal-cord dysfunction (VCD), a relatively rare disorder that appears strikingly similar to asthma but is responsive only to speech therapy and psychotherapy. The present case serves to illustrate the systemic difficulties that may arise when addressing staff, patient, and family concerns during a period of differential diagnosis between malingering, nonadherence, and rare clinical phenomena; and outlines the role a pediatric psychologist can play in facilitating optimal treatment when the etiology and treatment course of the disease is uncertain.

**CASE PRESENTATION**

*History of Presenting Problem*

An 11-year-old white male diagnosed with asthma was referred to the Psychiatric Consultation and Liaison Service of an urban children’s hospital due to continued asthma symptoms despite intensive medical intervention. The current exacerbation had been triggered by a sudden change in weather (i.e., a drop from moderate to near-freezing temperatures). The child, whom we will call “Billy,” had persistent inspiratory and expiratory wheezing that did not remit with inhalant therapy at home. Billy’s mother reported a sharp decrease in his measured peak flow volume in the 24 hours prior to medical consultation. Billy’s mother brought him to the Emergency Department of the local children’s hospital on the recommendation of the family pediatrician. Billy was evaluated and treated in the Emergency Department for approximately 3 hours, but despite the administration of intravenous corticosteroids and multiple bronchodilators, his symptoms (bilateral inspiratory and expiratory wheezing and chest tightness) remained unchanged. Continuous pulse oximetry revealed blood gases in the normal range. Billy was then admitted to the hospital for inpatient treatment.

A retrospective review of Billy’s medical chart revealed diagnosis of asthma at age 8, and four hospitalizations within the previous 9 months. His wheezing episodes, with the exception of the one described here, had all been triggered by either exercise or exposure to chemical fumes, and did not resolve in response to inhaled and nebulized medications. During two admissions, Billy had been transferred to the Pediatric Intensive Care Unit, where intravenous steroid therapy was administered. Chart review indicated that despite persistent wheezing, Billy’s blood gases were within normal limits on every occasion. It was consistently noted that during these episodes Billy reported feeling as if his “throat was closing.” Staff often noted that Billy remained “stoic” and did not appear to be distressed during these episodes.
Psychosocial History

Family history indicated that Billy lived with his mother, stepfather, and two younger siblings. Billy's mother reported that he was consistently a good student and was generally well liked by his peers. He was involved in a number of extracurricular activities, and was reportedly worried that he would miss several karate classes if hospitalized. In general, although Billy's anxiety increased during acute exacerbations when medications failed to relieve his symptoms, he typically shared his fears only with his mother. At the time of psychological consultation, both Billy and his mother reported high levels of distress regarding his wheezing and the failure of medical treatment to reduce symptoms.

Treatment Course

Billy's private pediatrician served as the attending physician during his hospitalization. General medical care was provided by pediatric house staff, who consulted specialists (e.g., pulmonary medicine, child psychiatry, speech pathology) as needed. As a result, Billy's care was not managed by an integrated team but by multiple health care professionals working in parallel.

Billy's inpatient treatment consisted of an intensive medication regimen of intravenous corticosteroids, inhaled bronchodilators, and respiratory treatments. He remained on this regimen for 3 days with no improvement in chest tightness or wheezing symptoms. At this point, due to the refractory course of the illness and the family's apparent distress, the medical team requested psychological consultation to assess the possible role of psychogenic factors.

The consultant from Pediatric Psychology proposed brief relaxation training to help Billy cope with his subjective distress regarding his symptoms. When asked to draw a picture of his lungs, Billy illustrated his upper airway as a long tube comprising donut-shaped muscles that had "tightened up" and were inhibiting the passage of air into his lungs. This image was incorporated into relaxation training, and an audiocassette was made of the procedure to facilitate practice. During the next few days, Billy reported some improvement in subjective distress following relaxation, but noted that his physical symptoms had not improved.

Despite Billy's continued lack of response to treatment, intravenous corticosteroids were discontinued, and oral steroids were initiated on the 4th day of hospitalization. The Pediatric Pulmonary service noted that Billy's wheezing was heard primarily in the upper airway, and was loudest near the trachea. Fluoroscopy of the upper airway revealed no evidence of physical anomaly. Further, nursing staff noted there was no evidence of wheezing symptoms upon auscultation while sleeping. Blood gases remained in the normal range.
On the 5th morning of hospitalization, fumes from a cleaning fluid used by the housekeeping staff triggered an acute exacerbation. Billy began wheezing loudly, and reported feeling as though his throat were closing. He and his mother reported feeling increasingly distressed that medical treatment was not alleviating his symptoms. The pulmonary physician met with the family to review treatment concerns, and questioned whether Billy might be inducing symptoms in order to avoid school and have increased contact with his mother. Billy cried during this meeting, and his mother was angered by the physician’s comments.

On the 9th day of hospitalization Billy developed dysphagia, and consequently had difficulty swallowing solid foods. He reported feeling as if his throat had “closed up.” The medical record revealed he had lost approximately 5 pounds since admission. A speech pathology consult was obtained, which resulted in further evaluation of potential laryngeal abnormality. No evidence of any physical anomaly was found. Pediatric psychology developed a behavioral program to encourage Billy to accept solid foods and increase his caloric intake. He responded positively to setting behavioral goals for mealtimes and quickly progressed from accepting only liquids and purees to solid foods, returning to his normal diet within 3 days.

**Case Formulation**

This child’s clinical presentation is consistent with a diagnosis of VCD. The key presenting feature is a history of upper airway wheezing and throat tightness, often diagnosed as asthma, that has been unresponsive to intensive medical treatment. VCD is caused by paradoxical adduction of the vocal cords. As distinguished from those with pure asthma, patients with VCD typically have blood gases in the normal range during severe wheezing episodes. Emotional factors are thought to precipitate episodes. In the present case, the child had a history of asthma, which led to treatment of his VCD symptoms with asthma medications. Although no initial emotional precipitants were identified, the failure of medication to relieve the child’s symptoms while in the hospital increased his distress, which likely exacerbated his wheezing.

**Intervention**

The diagnostic formulation was reviewed individually with the pediatric house staff, the pulmonary service, and the speech pathologist. After considering the prior case history and current presentation, all were in agreement with the VCD diagnosis, and this formulation and information regarding the disorder was then presented to the family by the pediatric psychologist. Billy’s symptoms
improved significantly, a steroid taper was begun, and he was discharged the next day.

Billy was seen for outpatient treatment by a pediatric psychologist twice during the following 2 weeks. Billy and his mother reported feeling significantly less distressed, and noted that his symptoms had remitted completely by the 2nd day following discharge. During the first outpatient session, he was taught to use the “relaxed throat breathing” exercises developed at the National Jewish Center for Immunology and Respiratory Medicine (Blager, Gay, & Wood, 1988). This technique (ideally taught by a speech therapist) involves teaching the child to breathe while relaxing the throat muscles and resting the tongue on the floor of the mouth.

During the second session, a discussion of the relationship between stress and VCD symptoms was initiated. Both Billy and his mother were encouraged to identify potential stressors which may have contributed to Billy’s VCD episodes. They easily generated a list of possible precipitants, including academic and peer relationships stressors. New coping strategies were outlined, such as discussing stressors with family members and using relaxation techniques.

**DISCUSSION**

This case serves to illustrate many of the potential hazards that may impede accurate diagnosis and treatment of rare clinical phenomena. These pitfalls are most likely to occur when medical diagnosis is uncertain, such as during a protracted diagnostic period, or in the absence of definitive physiologic etiology. Avoiding such pitfalls can be difficult in an “independent functions” model of consultation (Roberts, 1986), in which staff are not members of a multidisciplinary team. In such cases, each health professional may only have a good understanding of a discrete piece of the diagnostic evidence which can hamper efforts to arrive at an integrated case formulation.

Vocal-cord dysfunction provides a striking example of the interaction between physical and psychological factors. A description of the physical symptoms of VCD, its conceptual evolution, and current treatment is presented. The current case of VCD is also used to illustrate the role that a pediatric psychologist plays in identifying areas of patient psychological health and vulnerability, and in modeling the integration of health factors, psychological issues, and developmental concerns for medical and nursing staff.

*Vocal-Cord Dysfunction*

Many cases of VCD have been documented over the past two decades (e.g., Downing, Braman, Fox, & Corrao, 1982; Meltzer et al., 1991; Patterson,
Schatz, & Horton, 1974). Early reports referred to the disorder by a variety of different names, including Munchausen's stridor (Patterson et al., 1974), functional inspiratory stridor (Rogers, 1980), functional upper airway obstruction (Appleblatt & Baker, 1981), factitious asthma (Downing et al., 1982), emotional laryngeal wheezing (Rodenstein, Francis, & Stanescu, 1983), and paradoxical vocal-cord adduction (Stillwell, Marsh, Yeaman, Nicholls, & Henried, 1987).

A seminal article in the New England Journal of Medicine suggested that the syndrome be referred to as “Vocal-cord dysfunction presenting as asthma” (Christopher et al., 1983), which has been abbreviated to “Vocal-cord dysfunction” in recent reports (Brugman & Newman, 1993; Goldman & Muers, 1991; Jensen & Stillwell, 1995).

Most VCD patients have a diagnosis of asthma and have not responded to pharmacologic interventions, including bronchodilators and steroids. Episodic, recurrent wheezing and dyspnea are the most common clinical features. Patients often report feelings of tightness in the throat and/or upper airways, and wheezing can often be heard over the upper chest and throat on auscultation. Unlike patients with asthma, those with VCD rarely report nighttime awakening secondary to their symptoms (Brugman & Newman, 1993). Due to the unresponsiveness of their symptoms to asthma medications, patients often present to the Emergency Department with persistent wheezing and considerable psychological distress. Because the clinical presentation of VCD is not well recognized and its symptoms mimic severe, intractable asthma, VCD patients may be unnecessarily tracheotomized or intubated (e.g., Appleblatt & Baker, 1981; Christopher et al., 1983; Heiser, Kahn, & Schmidt, 1989; Kellman & Leopold, 1982).

On medical examination, patients with VCD typically exhibit inspiratory and/or expiratory wheezing that is heard loudest over the larynx. Pulmonary function testing may be difficult to complete during the acute phase of symptoms, and the results of such testing are likely to be normal before and after each episode (Rodenstein et al., 1983). Arterial blood gases and the alveolar-arterial tension difference are usually normal, in contrast to typical findings obtained during an acute asthma exacerbation (Goldman & Muers, 1991). Although diagnosis is often made on clinical presentation, fiberoptic laryngoscopy during an acute episode provides the most definitive diagnosis (Selner, Staudenmayer, Koepke, Harvey, & Christopher, 1987). During a typical episode of wheezing, adduction of the vocal cords results in narrowing of the glottis to a diamond-shaped chink (Christopher et al., 1983), which presents as laryngeal wheezing.

Because the literature regarding VCD consists exclusively of case reports, estimates of prevalence are nonexistent. VCD in adults was initially conceptualized as a psychosomatic disorder (Christopher et al., 1983), possibly representing unexpressed family conflicts, psychiatric difficulties, or evidence of sexual abuse (see Tajchman & Gitterman, 1996, for a review). Some research suggests that stress may play a role in pediatric VCD, but that children with VCD...
do not typically present with clear psychopathology (Brugman & Newman, 1993).

Appropriate treatment for VCD begins with accurate diagnosis, and subsequent education of child, family, and all care providers regarding the syndrome and treatment options. If possible, information regarding VCD should be presented jointly to the family by a physician and mental health professional, to allow for an integrated conceptualization of physical and emotional factors contributing to symptom presentation. The central treatment recommendations include speech therapy to reduce tension in the extrinsic laryngeal musculature, and supportive psychotherapy to explore precipitants of VCD and provide relaxation training (Brugman & Newman, 1993).

Medical and Psychological Approaches to Case Formulation

As in many traditional consultation-liaison services, the mental health providers in the present case were contacted as independent consultants and were not part of an integrated multidisciplinary team. In such a system, pediatric psychologists often receive referrals from physicians to assess for, or even rule out, psychological factors contributing to illness. These referrals are often made when the medical staff have searched for quantifiable etiology for physical symptoms and have been unable to make sense of the current symptom presentation. Within the framework of a medical model, disease conditions are most often considered present or absent (e.g., Was the strep culture positive?). Physicians utilize a method of convergent problem solving (Stabler, 1988) in which the possibilities for symptom etiology are gradually eliminated until the “answer” is found.

This medical approach to diagnosis and case conceptualization works well in differentiating disease conditions, although quickly becomes problematic when considering the impact of psychological factors on disease course. Such an approach tends to initially ignore variables that are not medically quantifiable (Stabler, 1988). Psychosocial and developmental factors may be overlooked, or left as a diagnosis of exclusion. When considered, psychological factors are deemed to be a separate category of explanation. This formulation is antithetical to the pediatric psychologist’s integrative view of medical, psychological, and developmental issues as concurrently present and interactive. Physical symptoms of illness cannot be disentangled from a patient’s perception of them, response to them, or consequent adaptation. By the same token, psychological factors cannot be discounted entirely as contributors to physical symptomatology. In other words, a more appropriate question is how are psychological factors affecting the disease course, and given this information, how can we best treat the symptoms and facilitate adaptation?

Considering psychological factors as primary in illness after ruling out all
obvious physiologic causes can have negative repercussions for case management. First, there is the potential for rare medical conditions to be overlooked. Second, a patient's clinical presentation may be complicated by comorbid conditions. As in the case presented here, asthma and VCD may co-occur, resulting in a complex interplay of precipitants and resulting symptomatology. Finally, considering psychological factors as etiologic may change the frame of reference for interpreting patient behavior. Patients in this situation are facing the uncertainty of their medical diagnosis, the lack of efficacy of current treatment, and staff frustration at being unable to provide relief of symptoms. As staff begin to consider potential patient causes for lack of treatment efficacy such as non-adherence and malingering, these views may be communicated directly or indirectly to the patient, which in turn may be counterproductive to the treatment alliance.

**Integrating Psychological Factors in Case Formulation**

Once specific psychological and/or developmental factors have been identified as contributing to symptom presentation, this information may be integrated into the case conceptualization. If the psychologist is a member of a multidisciplinary team, this may be done at a team meeting. The task of integrating psychological factors into case formulation is more difficult if the psychologist is serving as an independent consultant, for it involves either coordinating a meeting of multiple providers, or reframing the case formulation to key team members individually.

At this point, the pediatric psychologist must be sensitive to common misinterpretations that can be made by treatment providers. The first of these misconceptions is to assume that, in the face of uncertain disease etiology, the psychological factors identified must then be causal. As in the case presented here, patient and parent may develop considerable anxiety in the face of few medical findings and poor symptom control. It is likely that this agitation and anxiety exacerbated the child's symptoms of VCD, resulting in further distress. As a result, he sought more comfort from his mother. Although this behavior was adaptive and developmentally appropriate, it was seen by some staff as evidence of excessive enmeshment in the parent-child relationship. This view resulted in the medical staff's conceptualization of VCD symptoms as factitious asthma, produced in order to maintain closeness to the parent and avoid school.

Further, it is critical that the medical staff be made aware that the identification of psychological factors, even as precipitants, does not by necessity imply that the symptom production is volitional. Because VCD typically presents as highly similar to asthma, and yet is unresponsive to typical medical interventions, medical staff who are unaware of the phenomenon may entertain hypothe-
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ses of malingering or nonadherence to the medication regimen to explain the symptom pattern. Early reports of this syndrome reflect that practitioners initially considered this to be a form of factitious illness. In an early case report describing symptoms of VCD, Patterson et al. (1974) concluded the symptom presentation is a result of the patient “imitating the appearance of laryngeal obstruction,” and suggested the disorder be named “Munchausen’s stridor.” Similarly, a series of three cases reported by Downing et al. (1982) described clinical signs and symptoms suggestive of VCD, including respiratory distress, wheezing heard loudest over the neck, and normal blood gases. Despite little evidence of patients’ attempts to produce wheezing, the authors concluded that symptoms were self-induced. Subsequent research findings indicate that it is unlikely that patients can voluntarily produce symptoms of VCD, and when asked to do so their laryngeal function is different than that evidenced during symptomatic periods, and similar to that produced by patients with asthma when asked to produce a wheeze (Christopher et al., 1983).

Particularly in cases where disease etiology is unclear, it is important to carefully assess whether malingering or illness exaggeration is present. Clinical impressions suggest that it is not unusual for latency-aged children to exaggerate physical symptoms when ill to obtain additional attention and other secondary gains. It is therefore incumbent upon the pediatric psychologist to carefully assess whether these behaviors appear to be causal in the production of physical symptoms rather than a developmental or interpersonal adaptation to the illness itself. Even when psychological factors are seen as central causes of symptom presentation, it is critical to determine the extent to which the child and family are aware of this link, and how much the behavior is under the child’s conscious control, to target interventions for medical and emotional adaptation.

CONCLUSION

A pediatric psychologist serves multiple roles when acting as a consultant. When the etiology of disease is unclear, it is critical to support the medical staff’s persistent efforts and consequent frustration at being unable to clarify the diagnostic picture. As a mental health professional serving the family, it is equally important to acknowledge the stress and anxiety which can result from lack of treatment efficacy. As specialists in child development and the psychosocial aspects of illness, pediatric psychologists can provide useful information to staff and parents regarding the range of appropriate developmental responses to the stress of illness. Most important, pediatric psychologists are uniquely qualified to model the integration of medical, psychological, and developmental issues in case formulation and treatment planning. Ultimately, such an approach can bene-
fit the child and family by facilitating their understanding of, and adaptation to, the physical illness.

REFERENCES