Yonsei Medical Journal
Vol. 45, No. 1, pp. 145 - 149, 2004

Tourette's Syndrome Manifests as Chronic Persistent Cough

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Tourette's syndrome (TS) is a neuropsychiatric disorder characterized by the presence of involuntary motor and phonic tics. Phonic tics can mimic respiratory system disorders such as asthma, and upper and lower respiratory system infections. We report on twins with chronic persistent cough (CPC): one of whom was followed as an asthmatic for a year and the other was diagnosed with recurrent respiratory tract infection. A careful history and neurologic assessment suggested that TS might be responsible for the first twin's symptoms but that the second one was probably in early TS. All the symptoms of the first patient diagnosed as TS showed a complete improvement with pharmacological treatment in two weeks. Since the history of CPC may in reality be TS, we recommend that TS should be considered in the differential diagnosis of pediatric CPC.

Key Words: Tourette's syndrome, chronic persistent cough

INTRODUCTION

Although coughing can lead to discomforts, it is a healthy reflex that serves to sustain the normal function of the respiratory tract. Chronic persistent cough (CPC) is defined as a cough lasting more than three weeks. Children with CPC are commonly seen in the general pediatric practice as well as by a variety of specialist. For example, more than a third of referred patients to chest experts have CPC.[1] The initial differential diagnosis of a child with CPC includes sinusitis, gastro-esophageal reflux, infectious and anatomic pulmonary etiologies, and asthma.[2] Chest and sinus x-rays, thoracic computed tomography, esophageal pH/manometry, and testing for tuberculosis and asthma are usually recommended early in the evaluation of CPC. CPC is accepted as psychogenic cough, when all of its known causes have been ruled out.[3]

Tourette's syndrome (TS) is a neuropsychiatric disorder characterized by the cardinal features of fluctuating involuntary motor and phonic tics. Tics usually begin in middle to late childhood with motor tics usually preceding phonic tics. Some of the involuntary phonic tics may include coughing, grunting, and wheezing.[4] These symptoms may easily be confused with the symptoms associated with the disorders causing CPC. We report the presentation of two twins with a phonic tic that was erroneously interpreted as asthma and recurrent respiratory tract infection, but whose symptoms actually resulted from TS.

CASE REPORT

An 8-year-old boy was the 2600-g product of an uncomplicated, term twins pregnancy and was born without difficulty by spontaneous vaginal delivery. His development and school performance were reported as normal. His parents were unrelated and there was no known family history of tic disorder, tremor or parkinsonism. The boy presented with a 2-year history of nonproductive CPC with an evident laryngeal component (guttural sound) which subsided at night but was never completely lost. This cough was characterized with continuous throat clearing and occurred at an interval ranging from every 5-10 seconds to every minute. The voice quality never changed. Detailed examination revealed that he

Received February 13, 2003
Accepted June 11, 2003

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also had an approximate 3-year history of involuntary movements such as eye blinking, shoulder and arm shrugs, and mouth opening. He never had obsessive-compulsive behavior, attention deficit disorder or coprolalia. His health report card, showed that he had used almost all of the available oral antibiotics and symptomatic medications in the market due to his persistent history of upper and lower respiratory tract infections. He was diagnosed as having asthma one year previously and had been intermittently treated with inhaled budesonide (400 μg/day). However his complaints never decreased or showed any sign of improvement in spite of all the medications. The patient and his family lived in great social discomfort because of these symptoms.

Throughout our interview and examination, he exhibited rapid, involuntary movements including eye blinking, shoulder shrugs, mouth opening, lip-licking, facial grimaces, and pulling at clothes. Coughing, sniffing and throat clearing accompanied most of these movements. During these attacks, he had no impairment of consciousness, color change, or urinary incontinence. Although he wanted to prevent coughing and these movements, he was unable to suppress them. His respiratory exam was clear to auscultation. The remainder of his exam was unremarkable. Rhinoscopy, indirect laryngoscopy, chest and sinus radiograms, routine biochemical and hematological tests, nasal smear examination, and forced spirometry showed no abnormal findings. Laboratory tests in terms of streptococcal infections yielded negative results. Serum copper, ceruloplasmin and 24-hour urinary copper levels were with in the normal limits. Routine electroencephalogram and MRI of the brain revealed no abnormalities. His diagnosis was consistent with TS according to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-IV).[5] He was started on haloperidol (1 mg/d). After a week on this therapy, the motor tics disappeared, and the cough and throat clearing were reduced considerably. At the end of the second week, the vocal tics also disappeared totally. After a 3-month treatment, haloperidol was reduced and subsequently withdrawn. No treatment complication was seen. One year follow-up showed normal neurologic examination with no symptom. After this point the patient discontinued follow-up.

The other twin also had a 4-month history of cough and throat clearing, without any motor tics, but was lighter in weight. During his examination, he did not show any motor tics. His lungs were clear to auscultation. All other initial physical and neurological exams were normal. He also underwent the same diagnostic procedures as his brother and no abnormalities were found. His symptoms suggested presumed early TS. Interestingly, the complaints of this second twin were completely resolved without any treatment in two weeks, the same as for his brother.

DISCUSSION

The differential diagnosis of a child with CPC is broad and detailed assessment is mandatory. Infectious, allergic and neoplastic pulmonary etiologies, and gastro-esophageal reflux are commonly considered in a child with CPC.[1-3] Such children are frequently treated presumptively with antibiotics, anti-tussive, bronchodilators, anti-reflux regimens and a variety of therapy regimens for asthma.[6-8] Both of these twins were evaluated by multiple physicians due to CPC and repeatedly received a lot of antibiotics and symptomatic medications for a variety of presumptive diagnoses. Even the first twin had previously been diagnosed with asthma and had received steroids. All the treatment regimens previously administered to the twins had failed to produce any improvement of CPC. Because TS is rarely considered in the differential diagnosis of a child with CPC, the diagnosis of these twins had been overlooked for a long time before they were seen by the pediatric neurologist in our clinic. The most prominent feature of the first case was that he was misdiagnosed as having asthma along with upper and lower respiratory infections by pediatricians during his follow-up. Although TS is easily diagnosed on clinical grounds, the most important cause of the delayed diagnosis of our case was that the previous physicians did not interpret the vocal tics as related to CPC and that they ignored the motor tics.

Tics are defined as rapid, sudden, purposeless,

repeteitive, nonrhythmic, stereotyped movements (motor tics) or vocalizations (phonic or vocal tics) and occur at irregular intervals.[4] Tics are classified as either simple or complex and they can also be classified according to the speed of motor movement such as clonic, dystonic and tonic tics.[9] They can be divided as TS, chronic motor, or vocal tic disorders, and transient tic disorders. TS is a neuropsychiatric disorder characterized by chronic motor and vocal tics that wax and wane in time and severity with onset before aged 18 years, providing that they last for more than a year, with any symptom-free period not exceeding 3 months and intoxication, drug usage and central nervous system disease all rulled out. Table 1 depicts the various tics seen in TS.[9] Chronic tic disorder should be considered when one motor or vocal tics presented uniquely. The term 'transient tic disorder' is used if they last for at least a month but no longer than a year.[10] The first twin clearly met the diagnostic criteria for TS according to the DSM-IV listed in Table 2, whereas the second one might have presumed early TS.[5]

The prevalence of TS is between 5-30 per 10,000 children, or roughly one case per 1,000 males, and one per 10,000 females.[4,9] The average age of onset is six or seven years, ranging from 2 to 15 years.[11] It has been reported in all ethnic groups. Symptoms typically increase until adolescence, and then decrease gradually. Although unpredictable, TS may remit fully. However, this syndrome may lead to severe disability in adults, but not a cognitive function disorder. The onset of vocal tics is approximately 1 to 2 years after the onset of motor tics.[4] Patients with TS are often associated with behavioural disorders such as obsessive-compulsive disorder (25 to 40% of patients), attention-deficit hyperactivity disorder (about 50% of patients), and cognitive disorders (25 to 30% of patients).[9,12] Other symptoms such as coprolalia, copropraxia, and echolalia occur in only 30% of patients with TS.[13] Our case had no such comorbid conditions, which could contribute to additional disability and management difficulties of the disorder.[4]

TS usually begins with simple motor tics and progresses to vocal tics and more complex motor tics. Although most cases show simultaneously multiple tics, it has a fluctuating clinic course, with one tic appearing and typically being replaced by another.[4] The presence of some conditions often leads to an increase in frequency and severity of tics, such as anxiety, stress, exposure to heat, excitement, relaxation after physical exertion, and fatigue, and the use of steroids, caffeine, dopaminergic drugs, and central nervous system stimulants, particularly cocaine.[14] Tics are usually significantly reduced by alcohol, or nicotine or

Table 1. A Review of the Most Common Tics in Tourette's Syndrome[9]

Simple tics	
Motor tics	*Phonic or vocal tics*
Eye blinking	Throat-clearing
Shoulder jerking	Barking
Head turning	Sniffing
Mouth opening	Grunting
Facial grimacing	Snorting
Lip-licking	Hiccupping
Complex tics	
Motor tics	*Phonic or vocal tics*
Flapping arms	Echolalia
Adjusting or picking at clothing	Coprolalia
Complex touching movements	Animal sounds
Jumping or skipping	Talking to oneself
Self-injurious behaviors	Prosodic changes

Table 2. Diagnostic Criteria for Tourette's Syndrome[5]*

1. A variety of multiple motor tics
2. Phonic or vocal ticks
3. Gradual evolution of course, changing pattern of tics
4. Distress or impairment related to this syndrome
5. Onset under age 18.
6. Not more than three consecutive months without tics
7. No tic-producing drugs (e.g. , stimulants)
8. No tic-producing disorders (e.g., Huntington's chorea and postviral encephalitis)

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especially when the patient is focused on an activity.[4] Unlike other movement disorders, tics may persist during light stages of sleep; however, they may subside at night.[9] Although our case exhibited a decrease in frequency and severity of clinic symptoms during sleep, they never disappeared completely.

Although the exact etiology of TS is unknown, it is accepted to be multifactorial.[9] It is considered that the cause of tics in TS is due to three abnormalities in the central nervous system: the abnormal neurophysiology of the basal ganglia-frontal cortex pathways, the lack of inhibition in the frontal-subcortical motor circuits, and the abnormal regulation of neurotransmitters, particularly dopamine supersensitivity.[4,9,11]

While it is clear that genetic factors play an important role in the etiology of TS, environmental factors may also affect the risk, severity and course of the entity.[4] The presence of genetic factors is about 75%, and in 25% of cases both parents are affected.[15] Several previous reports reveal that monozygotic twins have a concordance rate of about 60% for TS, whereas dizygotic twins about 10%.[9] The genetic transmission of TS is still controversial4. Although the gene locus of TS has yet to be fully estimated, the loci on chromosomes 2p11, 8q22 and 7q31 have shown promise as the location for the susceptibility gene for TS.[15,16] All these conditions reflect the largely unknown association between TS and genetic factors. Although the results are conflicting, tics may precipitate or exacerbate in children after bouts of pharyngitis or otitis media with group A β-hemolytic streptococci.[17]

Currently, there is no standard and curable treatment course for TS. The most commonly used medications for this disorder are haloperidol, pimozide, clonidine, fluoxetine, baclofen, clomipramine, botox, and risperidone.[4,9,10] With all medications, the natural fluctuation of manifestations of TS makes it difficult to evaluate effectiveness. For many clients with mild-to-moderate manifestations, medications may not be necessary. These cases may be managed with reassurance and education of parents, teachers and peers. Pharmacological treatment is indicated if tics lead to prominent physical discomfort or debilitation. The alpha-agonists, including clonidine and guanfacine, appear as first-line pharmacologic agents, because of their efficacy in controlling tics and their safety in children, even with long-term use.[4,9] Although haloperidol is the most effective drug in controlling tics, and its onset of action is faster than that of the alpha-agonists, this drug should be used only in severe or refractory cases due to its potential unwanted effects such as tardive dyskinesia and neuroleptic malignant syndrome.[7] Because the alpha-agonists are unavailable in Turkey, we used haloperidol in our patient. Fortunately, no treatment complications were observed in our patient.

In conclusion, TS manifests as CPC in children. Classic symptoms including coprolalia and echolalia may not be seen. Phonic tics such as coughing, clearing the throat, snorting, and sniffing may be confused with respiratory system disorders. We, therefore, would like to point out that TS

should also be considered in children with CPC, especially in cases that have proved resistant to treatment. This may help prevent both the extensive, unnecessary laboratory studies and the potential unwanted effects of the drugs which are presumptively given to these patients.

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