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Tourette Syndrome: A General Pediatrician's 35-Year Experience at a Single Center With Follow-up in Adulthood

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Abstract

A retrospective analysis of a 35-year single-center experience with pediatric tics and Tourette syndrome was conducted. 482 charts from 1972 to 2007 were reviewed. Follow-up surveys were mailed to last known address and 83 patients responded (17%). Response rate was affected by long interval from last visit; contact information was often incorrect as it was the address of the patient as a child. Males constituted 84%. Mean tic onset was 6.6 years. At first visit, 83% had multiple motor tics and >50% had comorbidities. 44% required only 1 visit and 90% less than 12 visits. Follow-up showed positive clinical and social outcomes in 73/83 survey responses. Of those indicating a poor outcome, mean educational level was lower and attention deficit/hyperactivity disorder and learning disabilities were significantly higher. Access to knowledgeable caregivers was a problem for adult patients. A shortage of specialists may in part be addressed by interested general pediatricians.

Keywords

Tourette syndrome, tics, outcome

Introduction

Tourette syndrome (TS) is a complex neuropsychiatric condition encompassing patients with multiple motor tics and at least 1 vocal tic. Onset is before 18 years, with at least 1 year of persistent symptoms.[1] Beyond this core definition, the clinical burden is often highly influenced by the accompanying comorbid conditions which may change over time. More than 80% of patients have significant improvement in tics by adulthood,[2] but many continue with significant suffering from comorbid conditions such as obsessive compulsive disorder (OCD), attention deficit/hyperactivity disorder (ADHD),[3] oppositional defiant disorder (ODD), learning disabilities,[4] mood disorder, and others.[2] A significant minority continue with lifelong tics that typically do not progressively worsen. The etiology appears to have both genetic and environmental influences, and males are much more frequently affected.[5] Treatment with a variety of pharmacologic agents may lessen tic severity, and some nonpharmacologic treatments have also been shown to be helpful.[6,7] Educational and social supports are pillars of treatment.

In this disorder, symptoms often evolve over time, and few studies follow patients from childhood to adult outcome. As public awareness has changed, patients present to a variety of medical providers for evaluation. This study retrospectively examines the 35-year practice of a general academic pediatrician with a special interest in tic disorders, including TS. The retrospective portion of the study details the presentation and course of 482 patients followed at a single center from 1972 to 2007. The prospective portion of the study attempted to contact the same patients in adulthood and inquired about their clinical, educational, financial, and social outcome. Correlation with the pediatric presentation in respondents was made. Access to care during adulthood was also investigated.

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The unique features of a general pediatric practitioner specializing in the treatment of TS are discussed. A description of the practice demographics, longitudinal care of patients, and what types of treatments were employed over time is described.

Methods

A database kept by a single provider from 1972 to 2007 was used to form the study group. From this list, 728 patients were identified. 619 of these patients met criteria of being older than 18 years by August 2013. Surveys were mailed to 619 patients. Four individuals requested to be removed from the study. Surveys were forwarded if returned with a forwarding address. A total of 133 surveys were returned with no forwarding address and these patients were excluded from the study as there was no potential of contacting the patient. Two patients were subsequently excluded as chart data were insufficient for review. A total of 482 charts were reviewed.

All variables were summarized using means, medians, and standard deviations for continuous variables and frequencies and percentages for categorical variables. Year of presentation was categorized as 1972-1985, 1986-2000, and 2001 or later. Categorical variables of interest were compared by years of presentation using a chi-square test or an exact version of this test if small cell counts violated the assumptions of the asymptotic test. For continuous variables, an analysis of variance or Kruskal–Wallis test was used to test for mean or median differences by the years of presentation depending on the distribution of the variable. SAS statistical software version 9.3 (SAS Institute, Cary, NC) was used for all analyses.

A 17-question questionnaire was mailed along with a summary letter of explanation and a letter inviting the patients to participate in the study (Appendix A, http://clp.sagepub.com/content/by/supplemental-data). The survey portion asked questions about educational attainment, marital status, financial stability, persistence of tics into adulthood, treatment for TS in adulthood, and helpful supports both in childhood and adulthood. An open-ended question at the end of the survey invited any comments from the participant regarding their personal experiences. Eighty-three patients responded to the survey for a response rate of 17%. Response rate was affected by the length of time elapsed between visit and survey as well as the difficulty with obtaining current contact information. The contact information available on most patients was their address as a child. Because the study was done retrospectively, no attempt was made to keep demographic information current over the long study time.

The Penn State College of Medicine Institutional Review Board reviewed and approved the study.

Results

A total of 482 charts met the criteria for inclusion (age >18 years by August 1, 2013; first visit for tics or TS between 1972 and 2007, single provider general pediatrician CMB). Eighty-three patients responded to the survey for a response rate of 17%.

Practice Description

One provider, a board-certified academic general pediatrician with special interest in tics and TS, saw the patients during this time period. The average number of visits per patient was 4.6 with a maximum of 42 visits. 210 patients (43.6%) were seen only once. In all, 75.1% of patients had 5 visits or less; 90% of patients had 12 visits or less (Table 1). Data on referral source were available for 78% of cases; of these, 17.7% were self-referred and 82.3% were physician referred to the practice. The patients were seen in an outpatient clinic center at a university medical center. The practice volume grew with time; 34 patients were seen between 1972 and 1985; 279 patients between 1986 and 2000 and 168 patients seen between 2000 and 2007. Analysis of the age of patient at presentation was viewed over the 35-year time period looking for any trends of earlier or later presentation to the clinic over time. The only significant difference was found in the average age at presentation between 1986 and 2000 versus 2001 or later. Patients in the most recent time period presented at a mean age of 10.7 years whereas those in 1986-2000 presented at 9.1 years ($P < .001$).

Patient Description From Chart Survey

The average age of presentation to the clinic was 9.8 years; 15.6% were female and 84.4% were male. Age of tic onset ranged from <1 year to 15 years, with a mean of 6.6 years (Table 1).

Overall, 95.7% of charts listed a presenting symptom. Of these, 57.2% presented with head and neck tics, 2.9% presented with limb tics only, and 39.9% presented with head, neck, and limb involvement. No vocal tic was mentioned in 24.7% of charts, single phonic tic in 21.2% and multiple phonic tics in 54.2%. Coprolalia was noted in 10.8% of charts reviewed. An overall prevalence of any severe tics noted at presentation or in follow-up visits was noted at 16.0%. Severe tics included coprolalia, copropraxia, echolalia, echopraxia, and a category for other severe tics not specifically described.

Table 1. Characteristics of Patients From Chart Review (N = 482) Between 1972 and 2007.

Characteristic	n (%) or Mean ± SD
Age of tic onset (years)	6.6 ± 3.2
Age first seen (years)	9.8 ± 3.1
Gender	
Male	406 (84.4)
Female	75 (15.6)
Presenting symptoms (not mutually exclusive)	
Multiple motor tics	402 (83.4)
Multiple vocal tics	261 (54.2)
Single vocal tic	102 (21.2)
Single motor tic	32 (6.6)
Presenting comorbid conditions at initial visit (not mutually exclusive)	
Attention deficit/hyperactivity disorder	197 (40.9)
Obsessive compulsive disorder	82 (17.0)
Aggression/rage	61 (12.7)
Oppositional defiant disorder	35 (7.3)
Mood disorder	24 (5.0
Anxiety	18 (3.7)
Total number of clinic visits to Tourette syndrome physician (not mutually exclusive)	
1	210 (43.6)
≤5	362 (75.1)
≤12	434 (90.0)

Comorbidities were described in 62.5% of patients at presentation and some patients had multiple comorbidities. Of those patients presenting with comorbidities, ADHD was mentioned in 40.9% (197/482) charts and OCD was mentioned in 17% (82/482). Pervasive developmental disorder–not otherwise specified and Asperger's disorder was specifically mentioned in 15 charts.

Of the initial patients presenting with no comorbidities, 23.2% went on to develop comorbidities noted at subsequent visits. Additional comorbidities were identified in patients who initially presented with comorbidities as well. In total, subsequent comorbidities were identified in 39.4% of patients followed with multiple visits. Of these, ADHD (21.4%) and OCD (13.9%) were the most frequently cited while autism was identified in 2.1% (10/482) and ODD in 6.0% (29/482). Intellectual disability was mentioned in 0.8% (4/482) and mood disorder in 7.3% (35/482). Anxiety was mentioned in 4.8% (23/482), rage in 12.7% (61/482), and learning disabilities in 5.4% (26/482).

Preterm birth was specifically mentioned in 7.9% (38/482) of charts. Each chart was evaluated for specific comments on birth complications. In all, 63.5% of charts had no specific comment on birth information, and 18% of charts contained specific comments on birth and prenatal factors. These encompassed a wide variety of comments, including preeclampsia, jaundice, maternal alcohol use, maternal smoking, maternal drug use, birth trauma, perinatal distress among others.

Family history was notable for a history of tics or TS in first-degree relatives of 71 charts reviewed (15%). Twenty-five charts specifically mentioned OCD in a first-degree relative (5%). Many charts made reference to tics or OCD but did not specify which family member and were not included in the number listed above.

Special education was specifically noted on the initial evaluation of 18.1% (87/482) patients. Homeschool or cyberschool was noted on 2.9% of initial evaluations. Specific mention of attending regular education at the initial visit was noted in 51.2% of charts reviewed; however school placement was not necessarily mentioned in all medical records.

Clinical Course and Treatment

A total of 47.9% (229/482) of patients had treatment for tics at the time of the initial visit. Of these, 93% (213/229) of initial treatments were pharmacological. In all, 164/213 (77.0%) of pharmacologic treatments were neuroleptics (typical or atypical) and 67/213 (31.5%) were nonneuroleptic agents. Some patients had more than one treatment. A variety of medications, including guanfacine, clonidine, benztropine, valproic acid, clonazepam, topirmate, fluoxetine were used. Monotherapy was used in 89.5% of patients and polytherapy in the remainder. Subsequent visits were reviewed. A total of 56.4% (272/482) of patients followed for multiple visits subsequently received medications before their last visit. The review did not distinguish how many patients received multiple treatment recommendations. The charts were reviewed for specific mention of side effects to medication; this represents 17.3% (47/272) of the eventually treated population.

Summary of Survey Responses

Of the 83 respondents, the age range was 18 to 61 years with a mean of 25.6 years; 77.1% of the respondents were male and 22.9% were female. Overall, 55.6% lived with their parents, 12.4% with a significant other, 6.2 % with a spouse with no children, and 11.1% with a spouse with children. A total of 1.2% lived with children and no spouse and 8.6% lived alone; 81.3% reported being never married, 17.5% reported being married and 1.2 % divorced. Seventy percent had attended some form of education beyond high school, including college, vocational school or beyond. 30% had a high school diploma, GED or less with 6.3% identified as never graduating

Table 2. Characteristics of Patients From Survey (N = 83).

Characteristic	N (%) or Mean ± SD
Age in years (range)	25.6 ± 7.4 (18-61)
Gender	
Male	64 (77.1)
Female	19 (22.9)
Motor tics as adults	
None	11 (13.6)
Mild	55 (67.9)
Moderate	14 (17.3)
Severe	1 (1.2)
Vocal tics as adults	
None	48 (59.3)
Mild	28 (34.6)
Moderate	4 (4.9)
Severe	1 (1.2)
Age of improvement	
<12 years	7 (10.3)
12-18 years	45 (66.2)
18+ years	16 (23.5)
Comorbid conditions as an adult (not mutually exclusive)	
Obsessive compulsive disorder	35 (42.2)
Attention deficit/hyperactivity disorder	34 (41.0)
Learning disability	22 (26.5)
Depression	18 (21.7)
Rage/anger	10 (12.1)
Bipolar	7 (8.4)
Other	20 (24.0)
Do tics affect your everyday life?	
Not at all	40 (50.6)
Yes, but do not have to make adjustments	22 (27.8)
Yes, but I take medications and am satisfied with the outcome	7 (8.9)
Yes, my life is not what I want it to be	9 (11.4)
Yes, my life is severely limited by tics	1 (1.3)

high school or obtaining a GED. Five percent attended graduate school, 27.5% graduated from college (Table 2).

A total of 21% were homeowners, and 38% identified themselves as receiving financial assistance from the government, family or both. Fifty percent were employed full time, 28.2% were employed part time, and 21.8% were not employed.

Tic onset was reported at greater than 12 years of age in 2.5%, at age 7 to 11 years in 59.5%, and at 6 years of age or less in 38%. Improvement occurred in 10.3% prior to age 12 years, in 66.2% between ages 12 and 18 years, and in 23.5% at greater than 18 years of age. A total of 13.6% reported they have no tics at all as an adult, 67.9% reported still experiencing tics, but mild, and 17.3% had moderate motor tics and 1.2% experienced severe motor tics at the time of the survey. Vocal tics were endorsed by 40.7% of respondents. In all, 34.6% reported mild tics, 4.9% reported moderate vocal tics and 1.2% reported severe vocal tics (Table 2).

Survey respondents were asked to check problems with which they still deal. Forty-one percent endorsed ADHD, 42.2% reported OCD, 26.5% indicated learning disability, 21.7% listed depression, 8.4% marked bipolar disorder, 12.1% endorsed rage, and 24.1% simply checked "other". Patients reporting dissatisfaction with their quality of life were significantly more likely to report difficulty with ADHD or learning disability (P = .002 and P = .003, respectively; Table 3).

Patients were asked to identify what helped the most with coping as a child. The top 2 responses were parents in 71.1% and medication in 26.5%. As adults, the top 2 factors listed as helpful with coping were family at 45.8% and friends at 22.9%.

Patients were asked if tics affect everyday life: 50.6% responded "not at all," 27.8% responded yes, but do not have to make adjustments, and 8.9% responded "yes, but medications help and satisfied with outcome." A total of 1.3% (1 patient) responded that "life is severely limited by tics" and 11.4% responded that "life is not what I want it to be" (Table 2).

Educational attainment was compared with how severely patients reported their lives were affected by tics. There was a strong inverse association between educational attainment and life affected by tics (P < .001) with lower levels of education associated with a greater proportion of patients who felt their life was affected by tics (90% vs 10% vs 0%; Table 3). Among the patients who completed college or beyond (25/68), none reported their lives were significantly affected by tics (Table 4).

A total of 77.8% do not see a physician for tics as an adult. Of the patients who see a physician, the responses were fairly evenly split between family doctor/internist (7), psychiatrist (6), and neurologist (7). Ninety-five percent of respondents had never heard of Comprehensive Behavioral Intervention for Tics (CBIT). One patient had heard of it, but not used it and 1 patient had used it. A total of 29.6% of patients reported trouble finding a physician knowledgeable about TS, and 7.5% reported using non-medication based therapy as an adult.

Subset of Patients With Suboptimal Adult Outcome

The responses of the 10 patients who were unhappy with their life as adults due to TS were further examined. This group represented 12% of the total responses, with ages ranging from 18 to 36 years and a mean of 23.9 years;

Table 3. Characteristics Associated With Life Affected by Tics (N = 83).[a]

Characteristic	Life Affected by Tics		*P* Value[b]
	Yes, n (%)	No, n (%)	
Education			
High school graduate/ GED or less	9 (90.0)	14 (20.6)	<.001
Some college/ vocational tech	1 (10.0)	29 (42.7)	
College graduate or more	0 (0.0)	25 (36.8)	
Self-reported comorbidities[c]			
Attention deficit/ hyperactivity disorder	9 (90.0)	25 (36.2)	.002
Obsessive compulsive disorder	4 (40.0)	31 (44.9)	1.0
Learning disability	7 (70.0)	14 (20.3)	.003

[a]Survey respondents comparing those who indicated "life significantly affected by tics" and those who did not.
[b]Chi-square test, exact test used as needed.
[c]Not mutually exclusive.

Table 4. Social History Responses From Survey.[a]

	Social Adult Outcome Survey Responses	
	All Patients (N = 83), n (%)	Suboptimal Group (N = 10), n (%)
Education		
Less than high school graduate	5 (6.3)	3(30.0)
High school graduate/GED	19 (23.7)	6(60.0)
Some college/ vocational tech	30 (37.5)	1(10.0)
College graduate	22 (27.5)	0 (0.0)
Graduate school	4 (5.0)	0 (0.0)
Financial assistance received		
No	49 (62.0)	3 (30.0)
Yes	30 (38.0)	7 (70.0)
Government assistance	10/30 (33.3)	5 (50.0)
Family assistance	24/30 (80.0)	4 (40.0)
Employment		
Full time	39 (50.0)	2 (20.0)
Part time	22 (28.2)	1 (10.0)
Not employed	17 (21.8)	7 (70.0)
Marital status		
Never married	65 (81.3)	10 (100.0)
Married	14 (17.5)	0 (0.0)
Divorced	1 (1.2)	0 (0.0)

a The responses of patients indicating a less than optimal Tourette syndrome outcome as adults are listed in "suboptimal group" category.

80% were males. All were never married; 6 lived with parents, 2 lived alone, and 2 with their significant other. Nine of 10 attained a high school diploma or less, including 3 who did not complete high school. With regard to financial independence, 1 respondent was a homeowner; 7/10 identified themselves as recipients of financial assistance from the government (5/10), family (4/10), or both (2/10). Twenty percent were employed full time; 10% was employed part time, while 70% were unemployed. Fifty percent reported mild motor tics as an adult, 40% moderate, and 10% severe. Vocal tics were mild in 30%, moderate in 20%, and severe in 10%. A total of 40% had no vocal tics, and 90% of the patients reported that tics affected everyday life and identified with the statement "my life is not what I want it to be." One patient (10%) described life as severely limited by tics. Ninety percent reported comorbid ADHD, 70% comorbid learning disabilities, and 40% comorbid OCD. Sixty percent reported depression, 30% reported bipolar disorder, 10% problems with alcohol, and 30% had rage (Table 4). Of this subset of 10 patients with suboptimal outcomes, only 2 reported seeing a physician for their tics as an adult; their respective TS physicians were reported to be in the field of family medicine, neurology, or psychiatry. Seven of 10 reported difficulty finding a physician knowledgeable about TS as an adult, and 3 of 10 reported using nonmedication-based therapy as an adult. None in this group had heard of CBIT. This group recognized parents and medications as their top 2 supports during childhood, and family and medications as their top 2 supports as adults.

In looking back at the charts of the 10 patients with poor outcome, patients presented between ages 4 and 11 years. Multiple motor tics were seen in 90% at presentation and multiple vocal tics in 60% at presentation. A total of 90% had comorbidities at presentation, including 8 with ADHD, 3 with OCD, 1 with anxiety, 1 with rage, and 2 with learning disability. Additional subsequent comorbidities were identified in 6 of 10. Two charts had comments about preterm delivery and 2 patients were exposedto maternal alcohol or illicit drug use during pregnancy. Coprolalia was reported in 30%. Family history of TS in a first-degree relative was noted in 1 patient and 2 with OCD. Forty percent of patients were enrolled in special education on initial presentation while 60% patients used special education at some point during their clinical follow-up. Polytherapy was used in pharmacologic treatment of 30%.

Discussion

The treatment of TS is often complex. Many geographic areas have severe shortages of specialists in neurology, psychiatry, psychology, and therapists trained in occupational, speech, cognitive, and behavioral treatments

helpful to these patients[8]. This study follows a single practice run by an academic general pediatrician over 35 years. The characteristics of the patients seen are similar to other summary reports. The outcome data likewise are similar.[5]

A significant portion of the practice (44%) was seen only once, with initial consultation providing the information needed and no further treatment pursued by the family at that practice. Of those requiring return visits, 75% was seen in 5 visits or less. Most patients had comorbid conditions identified at initial presentation with further comorbidities evolving over time. This illustrates what is likely a bimodal grouping in the practice; one group of mildly affected patients seeking mostly diagnosis and education and requiring little in the way of follow-up or treatment. The second group encompasses patients with more involved issues, especially comorbid conditions, who tended to return for multiple visits and whose diagnoses evolved over time. These patients were more likely to have pharmacologic interventions, but overall the great majority was treated with pharmacologic monotherapy. There is no way to determine from this study how many of the patients may have gone to other centers or sought subspecialty care. The relative geographic isolation of the catchment area makes this option less likely, with very few providers in this region with experience in managing tic disorders.

It is interesting that over the time frame followed, the average age of presentation to the clinical actually increased slightly. Our hypothesis was that because of increasing public awareness, referral to clinic might actually occur at a younger age over the decades, but in this particular practice, this was not the case. Some sources report tic intensity is often maximal between the ages of 10 and 12 years,[10] and it is possible that age at presentation simply reflects the natural history of persistent and possibly temporarily worsening symptoms.

The patients who responded to the survey were largely young adults. Most identified tics or TS as playing a minimal role in their adult lives and many were symptom free. This is consistent with other reports of adult outcome in TS patients with significant reduction in tics in the great majority of patients (59% to 85%).[2,3] Comorbidities were a significant issue for many patients and supports from family, friends, and medications were listed as quite important. Our data showed that more than 80% of respondents reported persisting motor and/or vocal tics as mild or nonexistent, but more than 40% continued to report some type of comorbidity, with ADHD and OCD most commonly indicated. This illustrates the relative persistence of psychiatric problems, while tics most often lessen in severity with time.

Access to care as an adult patient with a history of TS was assessed. CBIT is a relatively new therapy that has been shown to be helpful in some patients with tic disorders.[6] This nonpharmacologic treatment is the subject of much discussion and knowledge of this treatment reflects recent developments in the field.[11] Ninety-five percent of patients had never heard of this treatment. Their physicians therefore had not mentioned this treatment, nor were they exposed to information sources that kept them up-to-date with developments in the treatment of TS. Overall, 29.6% of respondents reported difficulty finding a physician knowledgeable about TS as an adult.

Regarding the natural history of TS, it is interesting to note that 16/68 (23.5%) patients reported tics improved after the age of 18 years. Other literature suggests that some neuropsychiatric conditions such as ADHD may continue to change due to delayed neuromaturation.[12,13] The mechanism for continued improvement at this age is only speculative, but could potentially be related to ongoing neuromaturation and development of frontal compensatory responses.[14]

In looking at the subset of patients with a self-described poor outcome, these patients had multiple tics at presentation, and were more likely to have used polydrug therapy during childhood. Multiple vocal tics and comorbidities were quite evident at presentation. A higher percentage (3/10) had coprolalia during childhood. The contribution of comorbidities to life satisfaction appears to be significant, in that severe tics were reported in only one case of adults self-identifying as poor outcome. Most suffered from learning disabilities and a higher percentage did not complete education past high school. This likely correlated with the higher rate of financial dependency reported. However, the younger average age (24 years) would require further follow-up to determine if this is at least in part related to young adulthood rather than TS specifically. This may have affected other factors such as marital status, homeownership and other measures of social outcome. Seventy percent of this subgroup reported having difficulty finding a physician knowledgeable about TS and none had heard of CBIT. Educational attainment appeared to be affected by the patient's perception that tics affected daily life, with lower educational achievement associated with significant burden of suffering. However, of these respondents only 1/10 reported severe tics and 5/10 moderate or severe motor tics; 1/10 reported severe vocal tics and 3/10 reported moderate to severe vocal tics. Thus, a significant portion of the patients reporting that tics affected their daily lives were likely greatly affected by the psychiatric and learning disability comorobidities reported rather than tics alone. When comparing self-reported comorbidities, those patients who state their lives were adversely affected by tics as adults were significantly more likely to report ongoing trouble with ADHD and learning disability than their

counterparts ($P < .002$). This is consistent with prior reports linking quality of life measures more with psychiatric comorbid conditions.[15,16]

This study was limited in several important ways. Because of the retrospective nature of the chart review, not all historical features were noted in each chart. In addition, patients may have had comorbidities that were not mentioned, as there was no checklist used for each visit. There is likewise no method to follow patients who may have sought care elsewhere because the course of their disorder was more severe, and the results may not reflect the full scope of outcome or care required. The lack of a more robust response to surveys may have been due to the long lag time between when patients were seen and when the survey was sent out. The large number of patients for whom no current address was available also impacted the response rate. This may have particularly affected patients seen less recently, since the address on file was the original address of their childhood home, unless it was updated in the electronic medical record for subsequent medical care.

In order to address access to care issues, we must broaden the scope of physicians caring for patients with TS. In all, 26% of the surveyed adults found it difficult to find a physician treating adults who was knowledgeable about TS. In many areas, a severe shortage of pediatric neurologists and child psychiatrists means that many patients will have difficulty obtaining access to care if it is limited to specialty physicians. Our training programs must identify interested trainees and primary care practitioners and provide them with the education and tools needed to provide at least initial evaluation and care for this important segment of our population.

It is possible for primary care physicians to become knowledgeable about and obtain significant expertise in the management of tic disorders. A major part of the management of tic disorders is in counseling the patient and family about the nature of tics including prevalence, change in location, intensity, duration and the treatment available. The experience being reported here is notable in that 44% of the patients were only seen once, only 10% had more than 12 visits, and monodrug therapy was used in 89% of treated patients. One important interpretation of this is that most cases presented to the primary care physician are mild and with experience can be managed without referral to a specialist (neurologist or psychiatrist). This will be much appreciated by the family and provide the physician with significant satisfaction. The important attributes for acquiring knowledge is an interest in these disorders coupled with appropriate education modules. The Tourette Syndrome Association (www.tsa-usa.org) offers many programs for the education of physicians in the management of tic disorders.

Declaration of Conflicting Interests

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