Interventions for Tic Disorders and Comorbid Attention-Deficit/Hyperactivity Disorder

Melanie Baerg

University of Calgary
In the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition-Test Revision (DSM-IV-TR,) Tic Disorders include Tourette’s Disorder, Chronic Motor or Vocal Tic Disorder, Transient Tic Disorder and Tic Disorder Not Otherwise Specified (APA, 2000). According to the DSM-IV-TR (APA, 2000), as many as 50% of clinic referred children with Tic Disorders also have diagnoses of Attention-Deficit Hyperactivity-Disorder (ADHD) however, the symptoms of ADHD are usually present before tics appear (Robertson, 2006). Children who have been diagnosed with a Tic Disorder and ADHD face unique challenges compared to children who present with either a Tic Disorder or ADHD (Dopfner & Rothenberger, 2007; Robertson, 2006). This paper will provide an overview of Tic Disorders and ADHD, and describe how they may impact on children in their home and school environments when they co-exist. Considering this information, this paper will conclude with a case study to demonstrate empirically sound interventions to support children who are diagnosed with Tic Disorders and co-morbid ADHD.

**Tic Disorders**

All Tic Disorders involve the presentation of tics which are “sudden, rapid, recurrent nonrhythmic, stereotyped motor [movements] or [vocalizations]” (APA, 2000, p. 108). Tics are considered either simple or complex, depending on the processes involved in their production (APA, 2000). For example, simple vocal tics might include throat clearing or coughing, whereas complex vocal tics involve words or phrases (APA, 2000). Similarly, rhythmic blinking is an example of a simple motor tic, whereas repetitive large arm movements are an example of a complex motor tic (APA, 2000). Individuals describe the urge to carry out a tic as tension or a sensation in the body, similar to feeling the need to sneeze (APA, 2000). Tics can be suppressed in certain contexts, such as at school or work, but eventually they need to be expressed, usually when individuals are relaxed in private settings (APA, 2000). Tics often increase during times of stress and are worsened when individuals are sleep deprived (Robertson, 2006). Up to 18% of children
may be affected by tics, but only 2% will still be affected by mid-adolescence and 1% by the time they are adults (Peterson, Pine, Cohen & Brook, 2001).

Tic Disorders differ from one another according to the types of tics that are present, how long they last, their frequency and the age they first appear in individuals (APA, 2000). Table 1 describes each disorder as defined in the DSM-IV-TR (APA, 2000). Tics usually decrease in severity and frequency as children mature and, in some cases, tics are minimal or absent by adulthood (APA, 2000). In addition to ADHD, Tic Disorders often co-exist with Obsessive Compulsive Disorder, Anxiety and Depression (APA, 2000). Research indicates that Tic Disorders are genetic but the severity and type of disorder seems to be influenced by environmental factors as not everyone with the genetic predisposition for a Tic Disorder develops one (APA, 2000).

Table 1

Description of Tic Disorders in the DSM-IV-TR (APA, 2000)

<table>
<thead>
<tr>
<th>Tic Disorder</th>
<th>Type of Tic</th>
<th>Duration/Frequency</th>
<th>Age of Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transient Tic Disorder</td>
<td>motor and/or vocal</td>
<td>minimum 4 weeks to maximum 12 weeks; many times a day, nearly every day</td>
<td>before age 18</td>
</tr>
<tr>
<td>Tourette’s Disorder</td>
<td>multiple motor and one or more vocal but not necessarily at the same time</td>
<td>more than one year with no break of more than 3 months; many times a day nearly every day or intermittently</td>
<td>before age 18</td>
</tr>
<tr>
<td>Chronic Motor or Vocal Tic Disorder</td>
<td>single or multiple motor or vocal tics, but not both</td>
<td>more than one year with no break of more than 3 months; many times a day, nearly every day or intermittently</td>
<td>before age 18</td>
</tr>
<tr>
<td>Tic Disorder Not Otherwise Specified</td>
<td>tics do not meet criteria for other Tic Disorders</td>
<td>duration or frequency does not meet criteria for other Tic Disorders</td>
<td>after age 18</td>
</tr>
</tbody>
</table>
Attention-Deficit/Hyperactivity Disorder

ADHD is a common childhood disorder affecting 3-7% of school-aged children (APA, 2000). Children diagnosed with ADHD demonstrate inattentive and/or impulsive-hyperactive behaviours in multiple settings that go beyond what is considered developmentally appropriate when compared to children at the same developmental level (APA, 2000). There are three subtypes of ADHD: The Combined Type, which is the most common in children, indicates that six or more symptoms of inattention and hyperactivity-impulsivity are present for at least six months; the Predominantly Inattentive Type indicates that six or more symptoms of inattentiveness are present while fewer than six symptoms of hyperactivity-impulsivity are present for a period of at least six months; and the Predominantly Hyperactive-Impulsive Type indicates that six or more symptoms of hyperactivity-impulsivity are present while fewer than six symptoms of inattentiveness are present for a period of at least six months (APA, 2000). To diagnose any subtype, some symptoms must have been present before age seven, with clinically significant impairment from the symptoms in two or more settings or areas of functioning, such as academics at school and social skills in the community (APA, 2000). Also, the symptoms must not be caused by another condition or mental disorder (APA, 2000).

There is considerable evidence that the cause of ADHD has significant a genetic and/or neurological component, although the degree of impairment and impact on outcomes is often influenced by environmental factors such as socioeconomic status or environmental toxins (Barkley, 2003). In some cases, children outgrow their symptoms by late adolescence, but research by Barkley, Fischer, Smallish and Fletcher (2002; as cited in Barkley, 2003) indicates that 8% to 66% continue to live with the disorder as adults, and experience symptoms with negative impacts. As with Tic Disorders, individuals with ADHD may also have comorbid diagnoses of Obsessive Compulsive Disorder, Anxiety and Depression, as well as Conduct
Disorder (Barkley, 2003). The individual and societal costs of ADHD are high as the disorder can lead to increased risk of accidents and injury, poor academic performance, social problems, including conflict with peers and family members, and sleep problems (Barkley, 2003).

**Dual Diagnoses of Tic Disorders and ADHD**

Children who are diagnosed with Tic Disorders and ADHD face unique challenges because of how the two disorders interact with each other. Some of the difficulties that arise from ADHD can lead to an increase in the severity and frequency of tics (Robertson, 2006). For example, tics may become worse when children are in contexts they find stressful (Conelea & Woods, 2007) and individuals with ADHD often experience chronic stress due to an inability to meet the demands of their environments at home and school (Robertson, 2006). Sleep disturbances, common with both ADHD and Tic Disorders, may also increase the severity and frequency of tics and the symptoms of ADHD (Robertson, 2006). While stimulant medications, such as Dexedrine and Ritalin, have been shown to be highly effective for managing ADHD symptoms, they may make tics worse in some individuals (Barkley, 2003). Similarly, behavior treatments for tic disorders may place demands on executive functions that are impaired in children with comorbid ADHD, and therefore may not be effective in such children (Dopfner & Rothenberger, 2007).

Clearly, planning interventions to support individuals with comorbid Tic Disorders and ADHD requires careful consideration of each individual’s situation and response to treatments.

**Interventions for Tic Disorders and Comorbid ADHD**

For individuals who have Tic Disorders and ADHD, best practices in designing, implementing and evaluating quality interventions as described by Upah & Tilly (2002), can be illustrated in through a case study. Identifying details have been changed to ensure confidentiality.

**Case Study Background**
Sean is a 16-year-old, Grade 10 student who was diagnosed with ADHD and Tourette’s Disorder at age seven, and was recently diagnosed with General Anxiety Disorder. In a current psychoeducational assessment, Sean scored in the low average range on the Verbal Comprehension and Working Memory Indices, in the superior range on the Perceptual Reasoning Index, and in the average range on the Processing Speed Index of the Wechsler Intelligence Scale for Children, Fourth Edition (Wechsler, 2004). Academic achievement testing indicated that Sean performed in the average range on all subtests except for written expression and listening comprehension, which were in the below average range. Sean has had ongoing school support through special education and education assistants, including a scribe for written components of his tests. Sean was prescribed a slow-release dose of Dexedrine but has not been taking it due to side effects affecting his appetite. Sean is the oldest of three siblings and his parents are married. Sean’s father works in the high school that he attends. Sean was referred to the school psychologist by the School Based Team because he is at risk for academic failure and often becomes overwhelmed while at school.

**Problem Identification**

**behavioural definition**

Being overwhelmed at school means that Sean: leaves his classes to seek support from his father; cries when he has to do tasks that are perceived as too difficult for him; forgets to bring his supplies, which may include his homework, textbooks, binder, agenda and a pen or pencil; arrives late to classes; and/or does not work toward completing tasks while in his classes due to daydreaming during direct instruction, refusing to participate in class discussions, and/or avoiding working with peers or working independently. Non-examples of being overwhelmed include: staying in class the majority of the time, except when excused by the teacher for short breaks; asking for help from the teacher, education assistant or a peer when tasks are difficult; bringing all
necessary supplies to class; arriving on time for class; and working toward completing tasks while in his classes which may include listening to instruction, participating in class discussions, working with peers or working independently.

**baseline data**

Baseline data was collected over a period of two weeks. The school office recorded that Sean was late for class at least twice a day, usually in the morning and after lunch, on at least three days during each week. Sean’s father recorded the number of times and length of time that Sean came to see him during class time. Sean sought his father’s support everyday but it varied from once day to four times a day, and ranged from a 3 minute visit to a 40 minute visit. Teachers, or an education assistant when available, recorded the type of supplies and number of times that Sean was not prepared for his classes. Sean did not have a pencil or pen 80% of the time, his homework 50% of the time, his textbook or binder 30% of the time, and his agenda 90% of the time. The special education teacher observed Sean’s on-task behavior during two of each of his academic classes, including Science, Math, English and Social Studies, over a total of four days. Data showed that Sean was most on-task during Social Studies and English, though this did vary. On one occasion, Sean was so tired that he fell asleep during the first ten minutes of English class and was sent home. Sean was least on-task during Science and Math, particularly during lectures from the teacher. The special education teacher noted that Sean tended to daydream unless he was regularly cued to attend and that his daydreaming increased when lectures went beyond 10 minutes without cues. During two math classes and one science class, Sean left the class, without permission, after becoming frustrated with his independent work. While he did not cry in class, his father reported that Sean did cry when he was with is father on those occasions. The special education teacher also noted that on three of the four days, Sean’s vocal and motor tics, which
consist of throat clearing and rhythmic blinking, were more apparent during independent work time. The number of tics ranged from 10 to 26 during one class.

**Problem Validation**

After reviewing the baseline data, the School Based Team concluded that Sean’s behavior was significantly different from that of his peers and that he was not behaving the way a Grade 10 student is expected to behave. The School Based Team and the school psychologist agreed that the problem was significant enough to warrant further assessment, planning and interventions.

**Problem Analysis**

Considering the baseline data and the information from Sean’s recent psychoeducational assessment, the school psychologist concluded that more information was needed about Sean’s sleep patterns and their relationship to the frequency and severity of tics, his ability to self-manage and his level of engagement in response to different types of instruction in the classroom. After meeting with Sean’s parents and teachers, his approximate hours of sleep were tracked, as were his tics, self-management and engagement in class. The school psychologist hypothesized that Sean’s lack of sleep was directly impacting the severity of his tics, his anxiety and his ability to attend in class and manage his materials. This hypothesis was confirmed and an intervention plan was developed.

**Plan Implementation**

**Goal Setting**

The school psychologist, School Based Team and Sean’s parents agreed that the desired outcome of the intervention was to improve Sean’s academic performance and reduce his level of stress and anxiety. Specific goals included the following:

- In six weeks, Sean’s sleep pattern will improve to a minimum of eight hours per night, seven days per week.
In six weeks, Sean’s stress and anxiety will be reduced as shown through a reduction in the frequency of his tics to a maximum of five tics per class and the elimination of visits to his father during class time.

In six weeks, Sean’s level of engagement during class time will improve as shown through his successful completion of assignments and tasks.

In six weeks, Sean’s self-management skills will improve as shown through the number of times he is prepared and on time for his classes.

**intervention plan development**

The intervention plan consisted of components to address Sean’s physiological needs, environmental needs and emotional needs. Sean was referred to the psychiatrist who had been treating him for anxiety, ADHD and Tourette’s Disorder. Because Sean was impacted by the symptoms of his ADHD, his tics and his sleep problems, the psychiatrist prescribed clonidine, which may help in all three areas (Robertson, 2006). Clonidine can be taken at bed time (Robertson, 2000) so it was administered at home, eliminating any concerns about medications being administered at school. The School Psychologist also referred Sean and his parents to a Child and Youth Mental Health Counselor for Cognitive Behaviour Therapy which has been shown to help children recognize situations when tics are likely to increase and develop strategies for anxiety and stress management (Dopfner & Rothenberger, 2007).

The school psychologist worked with the special education teacher to develop recommendations for teachers and the school environment. These recommendations included best practices for classroom instruction, such as direct instruction, peer tutoring, cooperative learning and other methods of increasing classroom engagement as well as interventions to help improve self-management (Elliott, Busse & Shapiro, 1999). The special education teacher then worked with each teacher to determine the best strategies to implement considering each teacher’s subject
area, teaching style and expertise. Specifically, the special education teacher developed a bin system to help Sean learn to manage his materials and supplies. Rather than going to his locker between each class, Sean went to the Learning Assistance room where he checked in with an education assistant who supervised him pick up his supplies from a bin designated for him. The bin contained a supply of textbooks, pens, pencils and a binder of each of Sean’s classes, where appropriate. A second set of textbooks were kept at home to eliminate the risk of Sean forgetting them at home or at school. Sean also checked in at the end of the day and was helped to organize his homework into a folder which went home for completion, preventing his binders from being forgotten in either location. Sean’s agenda was also checked by the education assistant and was used to send notes home about his performance at school. His parents in turn, used the agenda to communicate with the school about Sean’s amount of sleep and level of stress or anxiety. This type of scaffolded self-management technique and the notes to his parents are empirically supported intervention techniques for children with academic performance problems (Elliott, Busse & Shapiro, 1999).

**measurement strategy**

Data collection to monitor the impact of the intervention plan consisted of: daily office monitoring of attendance and the number of late arrivals; teacher or education assistant monitoring of class preparedness, task and assignment completion in each academic class; monitoring of tic frequency once a week in each class by the special education teacher; hours of sleep monitored and recorded by Sean’s parents every night; and monitoring of visits to his father during class time by his father as they occurred.

**decision making plan**

Data collection occurred over six consecutive weeks. This time period was chosen to give time for the interventions and medication to be established and in effect. Data was forwarded to
the special education teacher on a weekly basis so that significant changes, or lack thereof, could be addressed before the end of the intervention period if necessary. Significant changes included an increase in behaviours that were supposed to decrease, from the highest level of baseline data, such as tics or visits with Sean’s father during class time, or a decrease in behaviours from baseline data that were supposed to increase, such as completion of assignments. For example, when data collection revealed that Sean was constantly late for his first class, the special education teacher inquired and found that he was excessively lethargic and had been taking clonidine for two weeks. He was referred back to his psychiatrist immediately, not after six weeks, to have his dosage adjusted. Also when changes in assignment completion were not happening in a particular classroom after two weeks, the special education teacher reviewed the intervention strategies and changed them to accommodate a less experienced substitute teacher who had replaced the regular classroom teacher for a short period.

Program Evaluation

progress monitoring and formative evaluation

The special education teacher graphed the data that was collected every week to clearly demonstrate the progress on each of the four goals. Graphs were created for late arrivals, assignment and task completion, visits to Sean’s father during class time, frequency of tics, hours of sleep per night, and coming to class prepared. The baseline data had also been graphed which allowed the special education teacher to regularly evaluate the plan, and make necessary changes as the intervention progressed.

treatment integrity

To ensure that the interventions were being implemented as intended, the school psychologist checked in with the parents regarding medication compliance and tracking of sleep. The special education teacher met with teachers and education assistants weekly as well.
summative evaluation

After six weeks, the team met to evaluate the intervention and its success. The special education teacher described how she adjusted the intervention based on the decision making plan and shared the graphs for each goal. Sean’s overall academic progress improved significantly, as did his anxiety and stress. The team reviewed each goal and began developing a new plan to maintain the progress and reduce Sean’s dependence on school staff.

Conclusion

As demonstrated through the case study, it is important to consider the whole child when planning interventions for individuals with Tic Disorders and comorbid ADHD. The child’s behaviours must be clearly described and assessed to discern which behaviours are most problematic, those from the Tic Disorder, or those from the ADHD, or both (Robertson, 2000). In the case of Sean, both disorders were significantly problematic and both needed to be addressed in order to deal effectively with either. Successful interventions are often interdisciplinary and are dependent on the resources that are available to support the child. In complex comorbid diagnoses like Tic Disorders and ADHD, the close collaboration of the parents, teachers, support staff, medical professionals and the school psychologist are vital for interventions to have positive outcomes.
References


