

•> CASE 28

A 7-year-old girl is brought to her pediatrician on the suggestion of her second-grade teacher. The patient has been back in school for 3 weeks following a summer break. According to the teacher, the patient has found it very difficult to complete her classroom tasks since returning to school. The child is seldom disruptive but cannot finish assignments in the allotted time although her classmates do so without difficulty. She is also known to make careless mistakes in her work. Although she is still passing her classes, her grades dropped, and she seems to daydream a great deal in class as well. The teacher reports that it takes several repetitions of the instructions for the patient to complete a task (e.g., in an art class). The patient enjoys physical education and does well in that class.

Although her parents have noticed some of the same behaviors at home, they have not been particularly concerned because they have found ways to work around them. If they monitor the child and her work directly, she can complete her homework, but they must continually check her work for careless mistakes. She does seem to know the right answer when it is pointed out. The parents also report that the patient does not get ready for school in the mornings without moment-by-moment monitoring. Her bedroom is in shambles, and she loses things all the time. The parents describe their daughter as a happy child who enjoys playing with her siblings and friends. They note that she does not like school, except for the physical education classes.

- **What is the most likely diagnosis?**
- **What are the recommended treatments for this disorder?**

## ANSWERS TO CASE 28: Attention-Deficit/ Hyperactivity Disorder

*Summary:* A 7-year-old girl has been referred to a psychiatrist by her teacher because she displays inattention, distractibility, and poor concentration and because her poor academic performance resulted in falling grades. Her parents describe a difficulty in following directions, disorganization, and forgetfulness. She does not have any symptoms of depression, psychosis, or developmental problems.

+ **Most likely diagnosis:** Attention-deficit/hyperactivity disorder (ADHD), inattentive type.

^ **Recommended treatments:** Use of a psychostimulant or atomoxetine along with behavioral parent training and classroom behavior modification programs.

### Analysis

#### Objective

1. Discern a diagnosis of attention-deficit disorder based on the symptoms presented.
2. Understand the differences between the subtypes of attention-deficit disorder.
3. Understand the best treatment choices for this condition.

#### Considerations

This patient's history is fairly typical of attention-deficit disorder, inattentive type (versus the hyperactive type). She shows numerous traits consistent with this disorder, including inattention, making careless mistakes, difficulty paying attention, difficulty following instructions, difficulty organizing tasks, and forgetfulness (Table 28-1). This disorder is seen more commonly in girls than in boys. She does not have significant hyperactive symptoms, as do patients with the hyperactive and the combined types; specifically, she does not display behaviors such as squirming, leaving her seat, running or climbing, talking excessively, or constantly being "on the go."

Most practice guidelines suggest that the patient be treated with a stimulant, either methylphenidate or an amphetamine preparation. If one is not effective, then the other should be tried. It is important to remember that most treatment guidelines currently available were developed before the release of atomoxetine in 2003. Studies have shown that atomoxetine

**Table 28-1**  
**DIAGNOSTIC CRITERIA FOR ATTENTION-**  
**DEFICIT/HYPERACTIVITY DISORDER**

1. The patient exhibits six or more symptoms of inattention or hyperactivity/impulsivity.
2. There is evidence that these symptoms were present before the age of 7 years.
3. The impairment is present in more than one setting (school, work, or home).
4. There is clinically significant impairment.

Inattention symptoms include:

- Making careless mistakes
- Having difficulty focusing one's attention
- Often seeming not to listen
- Often failing to follow directions
- Having difficulty in organizing tasks
- Avoiding tasks requiring sustained mental effort
- Often losing things
- Often becoming distracted by other stimuli
- Being forgetful

Hyperactivity symptoms include:

- Fidgeting or squirming
- Often leaving one's seat
- Running or climbing excessively and inappropriately
- Difficulty playing quietly
- Often being "on the go"
- Talking excessively

Impulsivity symptoms include:

- Often blurting out on answer before a question is completed
- Difficulty waiting for one's turn
- Often interrupting others

(a selective norepinephrine reuptake inhibitor) is an effective treatment for ADHD and, in revised treatment guidelines, can be placed with the stimulants as a First-line treatment.

If the patient does not respond to stimulants or atomoxetine, then other alternatives include the use of bupropion, imipramine, nortriptyline, and pemoline. Low-dose clonidine is often used in ADHD patients to help with sleep disturbance or agitated behavior after they are on a stable dose of stimulant or other ADHD medication.

Therapy alone is seldom effective. Usually, once medication has controlled symptoms, behavioral parent training to teach them how to adapt their parenting style to the child's special needs is helpful along with classroom behavioral modification approaches.

## APPROACH TO ATTENTION- DEFICIT/HYPERACTIVITY DISORDER

### Definitions

**Distractibility:** Inability to focus attention for age-appropriate periods of time

**Hyperactivity:** Excessive activity significantly above the level expected for the setting and the individual's developmental stage

**Impulsivity:** Taking action without appropriate thought and consideration, which often leads to a dangerous situation

### Clinical Approach

**Attention-deficit/hyperactivity disorder** is defined as a **persistent pattern of inattention and/or hyperactivity** that is more frequent or severe than expected for a given level of development. Symptoms must be present for **at least 6 months**, begin before age 7, and be observed in more than one setting (e.g., home and school). It is important to remember that sometimes in homes that do not have a lot of structure, the parents can initially not realize that the patient's attention span is poor or that the child is unusually hyperactive or impulsive. In such cases, it is critical to contact other observers besides the school (day cares, after school programs, baby-sitters) to confirm the pervasiveness of the ADHD symptoms. The incidence is 3% to 5% of prepubertal children, and boys are affected with the hyperactive-impulsive type more often than girls. The inattentive type is characterized by failure to pay attention to details, failure to focus attention when performing tasks, failure to follow through with instructions, impaired ability to organize tasks, misplacing items, becoming easily distracted by external stimuli, and forgetfulness during the performance of daily activities. Hyperactivity is manifested by increased fidgeting of the hands and feet, inability to stay seated in a classroom setting, being unduly noisy during playtime activities, and a persistent pattern of increased motor activity not significantly modified by social context. Impulsivity is characterized by the blurting out of answers, difficulty waiting in line or for one's turn, interrupting, and talking excessively without an appropriate response to a given social situation.

Although the exact etiology of ADHD is not yet clear, the body of evidence suggests the dopaminergic and noradrenergic tracts are involved. Dopaminergic tracts of the mesolimbic and cortical areas serve as modulators of persistence, distractibility, motivation, and motor control, whereas the noradrenergic locus coeruleus modulates the child's reaction to novelty or challenging situations. Current research is still trying to refine the exact nature of the interaction of dopamine and norepinephrine in children with ADHD.

## Differential Diagnosis

The presence of oppositional defiant disorder (ODD) or conduct disorder in a child or youth with ADHD is relatively common. It is important to remember that medication can do only three things: (1) help the child sit still—if the child wants to sit still, (2) help the child to focus his or her attention—if the child wants to pay attention, and (3) help the child to think before he or she acts—but will not affect whether the child makes a good decision or not. Failing to recognize the presence of ODD or conduct disorder in a child with ADHD results in many physicians trying to medicate away purposeful disruptive behavior.

Patients with ADHD often have learning disabilities, and a thorough evaluation of this problem should be conducted for every child suspected of having this disorder. Patients with bipolar disorder, early onset, can have symptoms of restlessness and distractibility, but their symptoms also have an affective component. **Lead intoxication** can lead to hyperactivity, and the presence of this disorder should be ruled out by determining the lead level in the blood at the initial evaluation.

## Treatment

**Approximately 70% to 80% of all children with ADHD will respond to stimulant medications**, either methylphenidate or amphetamine preparations. Adverse effects typically include decreased appetite (sometimes with subsequent slowed growth rate), initial insomnia, irritability, dysphoria, and headache. Occasionally, the stimulants are associated with the development of **tics** or worsening of tics in those with tic disorders. Stimulants have, as a group, a very rapid onset of action, and typically, their therapeutic effects wear off by the end of the day.

**Atomoxetine** is a potent selective inhibitor of the presynaptic norepinephrine transporter and is an effective alternative to the stimulants in controlling ADHD symptoms. It is not a stimulant or a controlled substance. It tends to have a more gradual onset of action over a period of two to three weeks and once working seems to have a 24-hour length of action. Many patients sleep well with the medication and occasionally complain of sedation. The patient's appetite needs to be followed. Atomoxetine is not likely to cause tics, but this is still being studied.

**Pemoline** also has stimulant action, but its association with a **rare hepatotoxic reaction** has resulted in recommendations that a baseline alanine aminotransferase (ALT) be obtained and that it be remonitored every two weeks while the patient is on the medication. The medication should be stopped if there are significant increases above normal or if the patient fails to clinically benefit from adequate dosing after 3 weeks.

Bupropion, imipramine, and nortriptyline all have studies indicating efficacy in the treatment of ADHD. In the case of imipramine and nortriptyline,

blood levels and electrocardiograms (EKGs) should be followed because of QT prolongation. Bupropion is contraindicated in individuals with seizure disorder.

Behavioral parent training and classroom behavior modification approaches are often effective approaches, whereas the efficacy of other types of psychotherapy remain to be convincingly demonstrated.

### Comprehension Questions

- [28.1] A 9-year-old boy is referred to a psychiatrist for the same kinds of school problems discussed in the previously mentioned case. In addition, he appears hyperactive and fidgety at school, which disrupts the class. His parents have noticed no difficulties at home, but his soccer coach has noticed attention problems during practice, and his Sunday school teacher has trouble teaching him because of distractibility. Which of the following is the most likely diagnosis for this patient?
- A. ADHD, combined type
  - B. ADHD, predominantly hyperactive type
  - C. ADHD, predominantly inattentive type
  - D. Specific learning disability
  - E. No diagnosis, because the ADHD symptoms must be reported in the home.
- [28.2] Which of the following is the best initial course of action in the treatment of children with ADHD?
- A. Stimulant medication or atomoxetine
  - B. Pemoline
  - C. Clonidine
  - D. Bupropion, imipramine, or nortriptyline
- [28.3] Which subtype of ADHD is more common in girls than in boys?
- A. ADHD, combined type
  - B. ADHD, predominantly hyperactive type
  - C. ADHD, predominantly inattentive type
  - D. Specific learning disability

### Answers

- [28.1] A. Attention-deficit disorder, combined type. The diagnostic criteria for ADHD require that the symptoms be present in more than one setting, usually at home and at school. However, this child seems to have evidence of symptoms observed at school, church, and soccer.
- [28.2] A. Stimulant medication or atomoxetine and behavioral parent training with classroom behavior modification.

- [28.3] C. Girls seem to be less likely to demonstrate hyperactivity symptoms than boys. As a result, the condition is more likely to go undiagnosed because their symptoms produce fewer disruptions in the classroom.

## CLINICAL PEARLS

There are three primary subtypes of ADHD (inattentive type, hyperactive-impulsive type, and combined type), all of which have different presentations.

Use of a stimulant medication or atomoxetine is probably the best medication for these children. Pemoline is effective in ADHD, but its association with a rare hepatotoxic reaction has resulted in recommendations that a baseline ALT be obtained and that it be remonitored every two weeks while the patient is on the medication.

## REFERENCES

- Kratochvil CJ, Heiligenstein JH, Dittmann R, et al. Atomoxetine and methylphenidate treatment in children with ADHD: a prospective, randomized, open-label trial. *J Am Acad Child Adolesc Psychiatry* 2002;41 (7):776-784.
- McCracken JT. Attention-deficit disorders. In: Sadock BJ, Sadock VA. eds., *Comprehensive textbook of psychiatry*. 7th ed. Philadelphia: Lippincott Williams & Wilkins, 2000:2679-2687.
- Pliszka SR, Greenhill LL, Crismon ML, et al. Texas consensus conference panel on medication treatment of childhood attention-deficit/hyperactivity disorder. *J Am Acad Child Adolesc Psychiatry* 2000;39(7):908-919.

