



ADHD: A Diagnostic Dilemma

This article is intended to provide a practical approach to the diagnosis of attention deficit hyperactivity disorder (ADHD). This can be a challenge because other conditions have similar symptoms, and because there are controversies and contraindications surrounding ADHD.

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Dealing with this very real, but challenging diagnosis of attention hyperactivity deficit disorder (ADHD), with its core symptoms of inattention, hyperactivity and impulsivity can be a nightmare. For the busy, time-constrained primary-care physician who is trying to keep abreast of new developments in all areas, the

questions are: where to begin, what to look for, whether or not to refer. Lengthy waiting lists for specialists, together with the real and often urgent plight of their patients, often force primary-care physicians to tackle this diagnosis without as much preparation or information as they would like.

A plethora of articles, books, journals, *etc.*, exists on this subject and deals with ADHD in depth. The intention of this article, after giving a brief overview of ADHD, is to narrow the focus and deal mainly with diagnostic issues.

ADHD has been well-described in the literature over the last century, dating back to Still in 1902. Numerous name changes have occurred over the years, ranging from The Hyperactive



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Child Syndrome (1960s) to Minimal Brain Dysfunction (1970s) and to Attention Deficit Disorder (1980s) to mention just a few. In 1994, ADHD became the accepted term from the American Psychiatric Association, as outlined in the current Diagnostic and Statistical Manual (DSM) IV, in 1994. In spite of the scientific evidence for the existence of ADHD, the myths continue to abound in the media and elsewhere, causing confusion and mistrust, even among some of the medical profession. It is imperative, therefore, that the primary-care practitioner feels confident and comfortable when approaching the diagnosis of this complex condition.

ADHD: How Common Is It?

ADHD is the most common neurobehavioral disorder of childhood, affecting 4% to 12% of the North American school-aged population, with continued morbidity into adolescence (85%) and adulthood (70%).¹⁻⁵ Prevalence rates vary across

studies, in part because of changing criteria over the years (*e.g.*, DSM III-R *versus* DSM IV). For example, the inclusion of the primarily inattentive category (DSM IV) identifies previously overlooked individuals, especially females. Gender differences exist, with estimates showing 9.2% of males and 2.9% of females having a diagnosis of ADHD.

Twin and family studies strongly support a hereditary basis for the majority of ADHD individuals. Gene studies are in their infancy, but results to date indicate two genes that regulate dopamine have been identified as being associated with ADHD. Many more are under investigation. Although there is compelling evidence supporting a genetic and hereditary basis for ADHD, one should also keep an open mind to other possible causes yet to be identified. Other factors, including perinatal problems and toxins (alcohol, drugs and tobacco), brain injury, anemia, lead poisoning, *etc.*, have all been associated with ADHD. There is no clear scientific evi-

Summary

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- Patients with ADHD can present in a variety of ways and settings. The concerns expressed by the parents could include the child's academic failure or underachievement, behavioral problems at home and/or in school, problems with paying attention, social difficulties, poor self-esteem, or low frustration tolerance.
- The incidence of comorbidities are high and should be explored extensively when taking the history.
- There are no specific medical neurological or laboratory tests for making the diagnosis of ADHD. The patient's history provides physicians with the most useful diagnostic information, and should be gathered in an organized, step-by-step format.
- Allocate sufficient time in the office to explore the diagnosis. A minimum of 60 minutes should be booked for the initial visit, with plans made for subsequent appointments to continue the diagnostic process.
- Early identification and management are imperative in order to offset the debilitating effects that can occur as a result of this chronic condition.

dence, however, linking these conditions directly to ADHD. Environmental factors, such as poor parenting, poverty, abuse and dietary sensitivities, may aggravate the symptoms of ADHD, but do not cause them.

What Causes ADHD?

The exact pathophysiology of ADHD remains unclear. Current research using brain imaging, however, shows changes in both brain morphology and functioning. Neuropsychological testing demonstrates deficits in executive functioning (*e.g.*, planning, organization, judgment, inhibition and selective attention). Although these findings are somewhat inconsistent and not exactly specific for ADHD, they do support the involvement of the frontal cortex and subcortical regions. These areas are richly supplied with the neurotransmitter substances dopamine and norepinephrine, long suspected of being implicated in the pathophysiology of ADHD. Depletion of these neurotransmitter substances at the synaptic cleft, because of failure to release them from the presynaptic dendrite, is thought to be responsible for impeding the transmission of impulses or messages from cell to cell. These impulses are thought to be necessary for control of attention, activity, impulsivity and other activities in the frontal and subcortical areas. These regions of the brain are, therefore, often referred to as being underaroused in the ADHD individual.

This information may, in turn, provide an explanation of how psychostimulant medication works in the treatment of an ADHD individual by activating these centers. These medications act by increasing the availability of the neurotransmitters at the synaptic cleft by both blocking their uptake and aiding in their release into the area.

Good Evidence for ADHD

Recent reports from The American Council, April, and The American Academy of Pediatrics, May 2000, endorsed the validity of DSM IV criteria.^{1,2} They emphasized these criteria are based on extensive empirical research and expert committee consensus, and that they can be used with reliability for diagnosing ADHD, if used appropriately. According to these reports, ADHD is one of the best researched disorders in medicine.

The following guidelines were outlined for primary-care physicians dealing with six- to 12-year-old patients with a relatively uncomplicated presentation.

- Physicians should initiate an evaluation for ADHD in children presenting with core symptoms of ADHD, academic underachievement and/or behavioral problems.
- The diagnosis of ADHD requires the child meet DSM IV criteria (Table 1).
- Assessment should include direct evidence (*e.g.*, letters, report cards, history, questionnaires, rating scales, *etc.*) from caregivers, classroom teachers and/or others.
- A search for associated conditions should take place (*e.g.*, learning disability [LD], anxiety, mood disorder, oppositional defiant disorder [ODD], conduct disorder [CD], *etc.*)
- No other diagnostic tests are routinely required to confirm the diagnosis, but may be used to assist in the search for other associated/co-existing conditions.

DSM IV Relevance in Practice

Table 1 outlines the criteria necessary to make a diagnosis of ADHD. Using the DSM IV in conjunction with other relevant information is part of the gold standard for diagnosis, as recommended

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Table 1

Diagnostic Criteria for Attention Deficit/Hyperactivity Disorder

A. Either number 1 or 2:

1. Six (or more) of the following symptoms of inattention have persisted for at least six months to a degree that is maladaptive and inconsistent with developmental level:

Inattention

- a. Often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities.
- b. Often has difficulty sustaining attention in tasks or play activities.
- c. Often does not seem to listen when spoken to directly.
- d. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions).
- e. Often has difficulty organizing tasks and activities.
- f. Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework).
- g. Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books or tools).
- h. Is often easily distracted by extraneous stimuli.
- i. Is often forgetful in daily activities.

2. Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least six months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity

- a. Often fidgets with hands or feet or squirms in seat.
- b. Often leaves the seat in classroom or in other situations where expected to remain seated.
- c. Often runs about or climbs excessively in situations that are inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness).
- d. Often has difficulty playing or engaging in leisure activities quietly.
- e. Is often "on the go" or often acts as if "driven by a motor."
- f. Often talks excessively.

Table 1 Cont'd

Diagnostic Criteria for Attention Deficit/Hyperactivity Disorder

Impulsivity

- g. Often blurts out answers before questions have been completed.
- h. Often has difficulty awaiting turn.
- i. Often interrupts or intrudes on others (*e.g.*, butts into conversations or games).

B Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before seven years of age.

C Some impairment from the symptoms is present in two or more settings (*e.g.*, at school, work and at home).

D There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E The symptoms do not occur exclusively during the course of a pervasive developmental disorder, schizophrenia, or other psychotic disorders and are not better accounted for by another mental disorder (*e.g.*, mood disorder, anxiety disorder, disassociative disorder, or a personality disorder).

Code Based on Type

314.01 ADHD Combined Type: If both criterion A1 and A2 are met for the past six months.

314.00 ADHD Predominantly Inattentive Type: If criterion A1 is met, but criterion A2 is not met for the past six months.

314.01 ADHD Predominantly Hyperactive-Impulsive Type: If criterion A2 is met, but criterion A2 is not met for the past six months.

Source: American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, (4th Edition), Washington, D.C., American Psychiatric Association, 1994.

in the guidelines (see Good Evidence for ADHD implications for the practitioner).

The DSM IV, 1994, treats ADHD as a single entity with three subtypes:

- ADHD combined type;
- ADHD predominately inattentive; and
- ADHD predominately hyperactive-impulsive type.

The DSM IV, when used appropriately, can help identify and clarify the typical ADHD characteristics. It narrows the field of focus, which

helps to ensure that the symptoms presented are attributed to ADHD alone, and not to other conditions.

How to use the DSM IV: Words of Caution

- Never use the DSM IV on its own as the sole basis for making a diagnosis of ADHD. Use it in combination with other information gathered.

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- Reserve its use until after all the information has been gathered, data evaluated and examination and observations completed. This helps the physician pull the information together in a more comprehensive fashion. It also adds to the precision of the evaluation.
- Remember the actual diagnosis is made only after careful consideration of all the existing evidence. In the end, diagnosis is a matter of clinical judgment.

Supplement the “in office” interview and observations by using questionnaires and ratings scales designed to help detect ADHD and screen for other “look-alike” or co-existing conditions.

- Clearly stipulate these symptoms must occur with more frequency, intensity and pervasiveness than in other children of the same chronological age and developmental stage. In order to do this, have the parents visualize their child in play situations, while doing chores, doing homework and in the classroom.
- The symptoms should occur in more than one setting, but may be more obvious in one, usually school.
- Note that in order to meet the criteria for diagnosis, these symptoms must occur often. The diagnosis, therefore, does not apply to individuals who present with similar symptoms only periodically.
- Record the results alongside the correct section on the DSM IV and in the chart.
- Show the actual DSM IV results to the parents and give them a copy. This visual aid helps clarify their understanding of ADHD and why their child meets this diagnosis. It also may assist them in their efforts to obtain support at school. Have them start a file on their child for future needs.

When Do They Present?

Children with the more severe symptomatology and/or with co-existing conditions are usually noticed in preschool and early elementary grades. These tend to be the predominately hyperactive/impulsive (H/I) or combined type (H/I plus inattentive [I]).

The mild to moderate, uncomplicated ADHD child with average to above-average ability, who has a supportive family and school, is more likely to go unnoticed until late elementary and/or junior high school. At these stages, the child has difficulty compensating for his/her poor organizational skills due to the increasing demands in these settings. As a result, he/she begin to underachieve and often may feel overwhelmed and frustrated.

How Do They Present?

Patients with ADHD can present in a variety of ways and settings. The concerns expressed by the parents could include:

- The child’s academic failure or underachievement;
- Behavioral problems at home and/or in school;
- Problems with paying attention;
- Social difficulties;
- Poor self-esteem; and
- Low frustration tolerance.

Individuals with ADHD are very diverse and unique. The presence or absence of associated and/or co-existing conditions can complicate the diagnosis and the management. Intellectual

functioning, temperament, family stability, health issues, social skills, *etc.*, all affect the individual's ability to function on a day-to-day basis, and influence his/her overall long-term prognosis. Furthermore, along with having the core symptoms of ADHD, patients commonly experience many other characteristics. Typically, these individuals have significant problems with distraction, procrastination, time management, organization, written output and consistency. They have a tendency to misplace or lose items, are forgetful, often daydream and some can get into trouble without intending to do so. Conversely, one should remember the positive attributes of ADHD patients. They are often very caring, helpful, kind, energetic and creative individuals, who can focus on subjects of exceptional interest to them for long periods of time. As a result of their varied and somewhat confusing characteristics, the ADHD individual is often misunderstood.

ADHD Diagnostic Evaluation

There are no specific medical neurological or laboratory tests for making the diagnosis of ADHD. The patient's history provides physicians with the most useful diagnostic information, and should be gathered in an organized, step-by-step format. The history is the key to diagnosis.

The following outline provides the framework for a comprehensive evaluation of ADHD.

The following is an outline for collecting the relevant data when evaluating an individual suspected of having ADHD.

- History of presenting complaint.
- Onset of symptoms.
- Other associated/comorbid symptoms.
- Perinatal history.
- Developmental history.
- Child's temperament.
- Family history.

- Education history: Grade by grade.
- Development of social skills.
- Home behaviors.
- Parental functioning.
- Review of symptoms.
- Request result of vision and hearing tests.
- Inquire about medications.
- Past medical history.
- History of allergies.
- Immunization history.
- Any previous diagnostic and treatment attempts.
- Note behavioral observations.
- Physical examination: Include height, weight, blood pressure and a neurodevelopmental assessment. Exclude other causes.
- Mental status examination.
- Lab tests: Only if indicated.
- Use questionnaires and rating scales to supplement history.
- Psycho-educational testing: Review if already completed; request only if indicated.
- Review diagnostic criteria on DSM IV.
- Consider differential diagnosis.
- Make the diagnosis.
- Explain the diagnosis to child and parent.
- Share information regarding appropriate resources for ADHD. Give up-to-date booklets, video lists and support group information.
- Determine a treatment plan.
- Communicate with other agencies.

Diagnostic Pointers

- Be systematic. Always have a plan and use the same format for each patient presenting with possible ADHD (*i.e.*, use the outline Table 2 provided or another, similar approach).
- Use both structured and open-ended questions to elicit the necessary details.
- Supplement the "in office" interview and

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Table 2

Distinguishing Look Alikes from ADHD: The Differential Diagnosis

Disorder	Similarities	Differences
LD and Language Disorders	Apparent inattention Possible frustration with resulting behavioral problems	LD noticed only after starting school, usually subject/situation specific (e.g., may be excellent at math, but struggles with reading). Discrepancy between potential and achievement. Language disorders have diagnosed language impairments which are often obvious from an early age (e.g., preschool).
ODD CD	Disruptive behavioral disorders Inattentive, hyperactive and impulsive	Defiant, non-compliant, argumentative, angry, vindictive, lacks remorse and empathy, lies, steals, can be aggressive, etc. (symptoms are pervasive and a challenge to manage) CD is a more extreme anti-social disorder than ODD.
Anxiety Mood Disorders	Inattentive and/or fidgety	Usually onset is older than seven years. Other symptoms are indicative of depression or anxiety and meet the diagnostic criteria for these disorders.
Medical	Inattentive and/or hyperactive and impulsive	Sensory impairments, seizure disorders, FAS, thyroid disorders, Tourette's Syndrome, brain injury/infection, medication side effects, substance abuse, etc. All have recognizable symptom patterns and physical traits specific to the underlying medical disorder.
Developmental	Inattentive and/or hyperactive and impulsive	Mental retardation has a definite history of developmental delay, usually global. Pervasive developmental disorders, including the autistic spectrum disorders have significant deficits in social relationships, language impairments, restricted interests, poor eye contact, etc. Syndromes including Fragile X, have typical characteristic features.
ADHD	Inattentive and/or hyperactive	Symptoms usually pervasive, but can be more obvious in one setting (e.g., school or large group situations). Patients often present before age seven and are usually remorseful and caring. They fully meet DSM IV criteria.

LD = learning disability; ODD = oppositional deficit disorder;
 CD = conduct disorder; I = inattention; H/I = hyperactive/impulsive;
 C = combined; FAS = fetal alcohol syndrome

observations by using questionnaires and ratings scales designed to help detect ADHD and screen for other “look-alike” or co-existing conditions.

- Allocate sufficient time in the office to explore the diagnosis. A minimum of 60 minutes should be booked for the initial visit, with plans made for subsequent appointments to continue the diagnostic process. Contact the parents in advance, so they understand this is a lengthy process and there is no one specific test or magic cure. Reassure the family that you are willing to follow-up with them and be supportive. The primary-care physician can have the advantage of already knowing the child and family. If sufficient time and interest is not available for pursuing a thorough assessment, the child should be referred.
- Check academic functioning, either by reviewing tests and report card results, or by using some informal/formal methods in the office. For example, have the child read a sample grade-appropriate passage. Watch for typical ADHD traits, such as careless errors, substitution or omission of simple words familiar to the child and skipping words. Do the assessment or testing results indicate attention problems, learning problems or both? (The LD child without ADHD is usually attentive to the text in a one-on-one situation, but struggles with the material presented in spite of apparent normal intelligence).

“Look-Alike” Conditions or Differential Diagnosis

The similarities between ADHD and their look-alike conditions can be perplexing. The clinically astute practitioner will be able to unravel the

differences by truly understanding the nature of the typical ADHD characteristics, their pervasiveness and chronicity and how they differ from other conditions that mimic ADHD. On the surface, the presenting features may seem to be the same, but on a deeper exploration *via* detailed history-taking, they take a different twist.

In order to clarify the differences, having a basic knowledge of normal child development and its variations is mandatory. A basic under-

Primary-care physicians are not expected to diagnose a learning disability, but if this is suspected based on the history and findings, then a referral for psycho-educational testing is essential.

standing of these look-alike conditions, such as anxiety, depression, oppositional deficit disorder (ODD) and learning disabilities, is also essential. Primary-care physicians are not expected to diagnose a learning disability, but if this is suspected, based on the history and findings, then a referral for psycho-educational testing is essential. The most currently accepted definition of a learning disability states that there must be a significant discrepancy between a child’s potential for learning (as assessed by intelligence quotient [IQ] testing) and his/her actual academic achievement in one or more areas.

Many of the look-alike conditions also can co-exist with ADHD. It has been estimated that greater than 50% of ADHD children have a co-existing psychiatric condition, and these comorbidities increase with age, occurring more frequently in ADHD-C (combined type) or ADHD-

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H/I males in general.

Learning disabilities are estimated to co-exist in approximately 20% to 30% of children with ADHD. As ADHD children with comorbidities or suspected comorbidities are often very complex and time-consuming, the primary-care practitioner may prefer to refer the child to a specialty clinic, which would be very appropriate.

Practitioner Beware

Family practitioners should be aware of the following factors before diagnosing a child with ADHD:

- Possible teacher/child personality conflict (obtain past reports from other teachers).
- Poor child/parent temperament fit. How does the parent deal with other children at home?
- Variations of normal child development (*e.g.*, a child who is active and highly energetic, but usually completes tasks).
- Rule out a learning disability. Request psycho/education testing only if this is suspected.
- Determine if the child is simply bored. Gifted children without ADD usually complete their tasks quickly and can subsequently appear distracted and be disruptive. The ADHD gifted child usually cannot complete tasks and, therefore, fails to benefit from the environmental incentives to finish.
- Beware of assessing children in the physician's or psychologist's office. These settings are novel, small-group and structured. The child is usually focused and on his/her best behavior, so the usual ADHD symptoms may not be obvious. Check with the receptionist, who has had to deal with the child in the waiting area. His/her observations may be very revealing.

Conclusion

Early identification and management are imperative in order to offset the debilitating effects that can occur as a result of this chronic condition. Empathy, understanding, advocacy, investigation, education, demystification and teamwork among school, home and the physician are important aspects of dealing with ADHD and helping families cope. Hopefully, physicians who are interested in becoming involved in this process will find this information useful in day-to-day practice and will be inspired to do further reading in this area. This information should provide a better understanding of the diagnostic process to make management issues less of a challenge, as well as help physicians know when to refer.

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