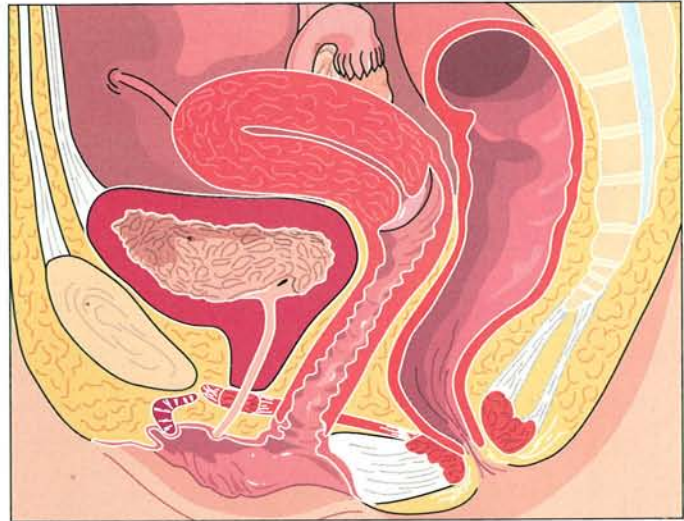


# FP R






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## Family Practice Recertification®

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# ADHD: It's not just in children

SHIRAH VOLLMER, MD

ABSTRACT

**A**ttention deficit hyperactivity disorder (ADHD) is a common, disabling psychiatric disorder in adults. While the syndrome has long been recognized in children, increasing evidence demonstrates that it persists into adulthood in from 1%-6% of cases. The characteristic features of ADHD are hyperactivity, attention problems, and impulsivity. Accurate diagnosis, which can be difficult in the adult patient, can prevent significant morbidity. Affected adults experience high rates of personal and work failure, along with a significant incidence of psychiatric comorbidity, including antisocial disorders and substance abuse. Therapeutic approaches are available that have proven effective, not only in treating the symptoms of ADHD, but also in managing the debilitating comorbidities that plague these patients. Pharmacotherapy is the treatment of choice. Functional outcome can also be enhanced with psychoeducational techniques that involve both the patients and their family members.

**M**ost family physicians will eventually encounter children, adolescents, and adults with attention deficit hyperactivity disorder (ADHD) in their practice.<sup>1</sup> The syndrome has long been recognized as one of the most common psychiatric disorders in children, and it was once believed that the symptoms of ADHD would "burn out" early in life. However, ample data demonstrate that youths do not routinely outgrow their symptoms as they enter into adolescence or adulthood.<sup>2,3</sup>

In addition to the persistence of the disorder in previously diagnosed children, there is increasing recognition that ADHD can remain undiagnosed until adulthood.<sup>4</sup> Although ADHD

in adults has become a common subject of party discussions and talk shows, where it is regarded as another excuse for laziness or substance abuse, considerable scientific evidence supports the diagnostic validity of adult ADHD.

Adult ADHD is characterized by a number of symptoms that the patient is acutely aware of but unable to change. The diagnosis in adults is essentially based on the same criteria used in children and adolescents, namely, the "core symptoms" of inattention, hyperactivity, and impulsivity. Patients are conspicuously inattentive, easily distracted and forgetful, and prone to daydreaming. Poor concentration and a tendency to shift from one activity to another are typical.<sup>5</sup> Affected adults are generally not able to string various pieces of reality together, use a conceptual map for planning, manage

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parallel tasks, or keep themselves from repeatedly running out of pills. The good news is that the same symptom relief provided to children and adolescents can work in adults.

### **Does ADHD differ in the adult and the child?**

While there are many similarities between all age-groups, the symptoms of childhood ADHD ordinarily diminish by about 50% every 5 years between the ages of 10 and 25 years. If ADHD goes undiagnosed and untreated in the child, there is an increased risk for serious psychopathology later in life, due to a gradual accumulation of adverse processes.<sup>6</sup> In general, the symptoms that persist into adulthood tend to be largely cognitive, reflecting some degree of developmental improvement in impulsivity and hyperactivity. According to two longitudinal studies of ADHD children who were followed into adulthood, 30%-50% of patients retain significant symptoms at age 25,<sup>3,7,8</sup> and 8% of these 25-year-olds continue to meet the diagnostic criteria for ADHD.<sup>9</sup>

Since major aspects of the adult's life are significantly affected, it is not surprising that these individuals experience high rates of separation and divorce, as well as poor academic and occupational performance regardless of intellectual capacity.<sup>5</sup> Adults with ADHD also represent a significant driving risk. Compared with normal controls, affected adults are more than three times as likely to be involved in motor vehicle crashes.<sup>10</sup>

The classic diagnosis for childhood ADHD lists 14 symptoms, of which 8 are required for diagnosis. The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV), has adopted age-neutral wording for these symptoms as an acknowledgment of the potential lifelong persistence of ADHD.<sup>11</sup> But the criteria remain essentially unchanged, with no standards specifically designed for adults.

Because of significant psychiatric comorbidity seen in adult ADHD, it can be difficult for the primary care clinician to identify which disorder is responsible for the impairment required for establishing the diagnosis.<sup>13</sup> Physicians must be familiar enough with the

expressions of ADHD to be able to recognize it in the adult who may present with a complex picture of coexisting psychosocial problems, and to be able to exclude it in the patient whose symptoms are caused by another condition.<sup>11</sup>

### **How prevalent is adult ADHD?**

Although epidemiologic studies have not addressed ADHD in the adult population, numerous studies have estimated its prevalence in children to be from 3%-10%.<sup>7</sup> Approximately one third to two thirds will continue to manifest the core symptoms of ADHD in adulthood. Extrapolations from these data suggest that 1%-6% of adults are affected with the syndrome. In fact, the incidence may be even greater, since the diagnostic criteria developed for use in children may be too rigid or narrow when applied to an adult patient.<sup>12</sup>

There is some disagreement in the literature regarding the gender distribution of adult ADHD. Many experts believe that the disorder may be more chronic in girls. Numerous studies have found that, in contrast to the childhood boy-to-girl ratio of 10:1, the ratio of adult men to women is almost equal.<sup>11</sup> Some authors ascribe this discrepancy to the fact that adult females generally give themselves much higher ratings of ADHD-associated problems such as concentration, restlessness, self-control, anger, confidence, feelings, and family. Women also tend to be more willing to seek help for psychological problems.<sup>14</sup>

### **What causes ADHD?**

The etiology of the syndrome is still not fully understood. In essence, ADHD represents a variety of etiologies. For most, the syndrome is probably a final common pathway originating from both biological vulnerability and interacting antecedent variables. Its persistence in adults suggests some biological basis.<sup>4</sup> For some patients, the genetic component is operative, with a higher incidence of ADHD in children of ADHD adults—and no such link among adoptive parents of ADHD children.<sup>15</sup>

There is also a reported association between a mutant thyroid receptor beta gene, which is





**Table 1 Chronic psychosocial difficulties in adult ADHD**

Underachievement in academic and occupational settings
Difficulties in initiating tasks and behaviors; procrastination
Problems with intimacy
Trouble with authority
Self-defeating behaviors
Impatience
Impulsive outbursts and tantrums
Risk-taking activities
Low self-esteem, which can lead to depressive disorders
Specific learning disability without ADHD
Adjustment disorders

responsible for the rare thyroid condition, RTH (resistance to thyroid hormone). This connection is buttressed by findings that 70% of children and 42% of adults with RTH are also diagnosed with ADHD. Therefore, a family history of thyroid disease or other signs and symptoms of RTH (goiter, low weight as a child, short stature, history of recurrent upper respiratory tract infection, or hearing and speech difficulties) should arouse suspicion for ADHD.<sup>16</sup>

The second etiologic theory is derived from neurochemical studies, since the clinical efficacy of the anti-ADHD medications depends on alterations in dopaminergic and noradrenergic function.<sup>5</sup> The working hypothesis suggests that dopamine is underactive. Dopamine is metabolized by the enzyme monoamine oxidase B (MAO-B), and studies have found that almost 60% of ADHD adults report symptom improvement on low doses of two MAO-B inhibitors.<sup>17</sup>

There has also been an upsurge of interest in the role played by the frontal lobes. Brain positron-emission tomography studies in adult ADHD have demonstrated a reduction in glucose metabolism in cerebral cortex regions that control attention and motor activity.<sup>5</sup> Defects in

these regions might lead to "an inability to inhibit inappropriate responses," but it is unclear whether these deficits are antecedents to, or complications of, ADHD.

Some research points to prenatal, natal, and perinatal factors that influence the developing fetus. A relationship has been identified between maternal substance abuse during pregnancy and an increased incidence of ADHD in their offspring. Smoking during pregnancy has also been implicated, but it is more likely that these substance abuse activities are evidence of far more compelling risk factors, such as parental ADHD, lower maternal IQ, and lower socioeconomic status.<sup>18</sup> Thus, the supposed inheritability of ADHD may be due to environmental, not genetic, factors.<sup>19</sup>

#### **What are the characteristic features of adult ADHD?**

In general, adult ADHD is suggested by the classic triad of developmentally inappropriate levels of hyperactivity, inattention and distractibility, and impulsivity, although many adults do not exhibit the entire triad.<sup>11</sup> Hyperactivity typically recedes in prominence during adolescence; and inattention, impulsivity, and personal disorganization may become more salient features in young adulthood.<sup>20</sup>

This can be a difficult diagnosis for clinicians who lack specialty training in ADHD to make,<sup>13</sup> but accurate identification is important to prevent unnecessary distress and disability.<sup>4</sup> It may help to remember the chronic psychosocial difficulties often found in adult ADHD (Table 1). The following descriptions may also help in recognizing the adult syndrome.

- *Hyperactivity features* The classic hallmark of ADHD is hyperactivity, which is manifested as restlessness and an inability to relax. Sedentary activities are particularly difficult to endure, and inactivity induces dysphoria. Hyperactivity is no longer regarded as a prerequisite for diagnosis in the adult, however, and a reduced level of activity may be seen, particularly in women. This can lead to misdiagnosis when the patient is inattentive without being hyperactive.<sup>11</sup>

Hyperactivity, which is a prominent feature





in childhood, is the symptom most likely to remit with age. On the other hand, motor hyperactivity is an expression of ADHD in many adults. The examining physician must be keenly aware of signs of excess kinesis that imply the patient is battling impulses to move, such as shifts in position, frequent scratching, and exaggerated gesticulations.<sup>11</sup>

- **Attentional deficits** The inability to be attentive is a defining feature in both childhood and adult ADHD. The social consequences of this can be dramatic,<sup>11</sup> since attentional problems undermine the ability of the individual to learn the subtle art of interpersonal behavior. The ambiguous and somewhat covert nature of interpersonal conduct leaves the ADHD adult with the feeling that social rules are an indecipherable code. The result is social awkwardness, discomfort, and inappropriate behaviors. At the same time, patients can concentrate for hours on activities they enjoy and are good at. The inattention is thus selective and related to motivation and pleasure derived from the task. Other attention-related features include losing and misplacing items, and forgetting things such as appointments, plans, car keys, and purses or wallets.

- **Impulsivity**, which may be a reflection of frontal lobe disinhibition, can express itself many ways—talking excessively or repeatedly interrupting others, for example. Passive waiting can be unbearable for the adult with ADHD, and impulsivity can result in reckless behavior, as when affected drivers are confronted with heavy traffic.<sup>11</sup>

Impulsivity is not only pervasive, it is the target symptom most likely to persist and to be particularly disabling in adults who were hyperactive as children. Patients are left feeling immature, helpless, and usually remorseful.

- **Disorganization** ADHD adults have difficulty planning, prioritizing, and executing activities, as a result of cognitive disorganization, short-term memory problems, and an inability to sustain tasks. This translates into irresponsibility and interpersonal negligence. They forget to return phone calls, show up late or miss appointments, and get lost while driving to meet-

ings. Others can perceive this behavior as a lack of caring and commitment and come to think of the offenders as unreliable and inconsiderate.

- **Cycle of recrimination** Adults with ADHD have a history of impaired functioning or outright failure in their work life and interpersonal relationships. They have a higher divorce rate, a propensity for conflict with others, frequent job changes, and overall lower socioeconomic status. Patients internalize the associated guilt and shame. Mounting failures lead to self-blame which, in turn, leads to self-defeating behaviors and still more failures. When the distress becomes severe enough, it usually prompts the individual to seek treatment.

#### **Can other syndromes produce ADHD symptoms?**

The differential diagnosis in ADHD is broad. The condition should be considered in adults with psychiatric and behavioral disorders, particularly depression, anxiety disorders, obsessive compulsive disorder, Tourette's syndrome, chronic fatigue syndrome, and seizure disorders. Also included in the differential are schizophrenia, learning disabilities, hyperthyroidism, migraine, and speech/language disability.<sup>16</sup> It is likely, however, that these conditions are actually comorbid with ADHD.

Adults with ADHD have a much higher incidence of depression, anxiety, and obsessive disorders.<sup>21</sup> Many experts consider mood disturbances to be a common expression of adult ADHD, despite their absence in the DSM-IV diagnostic criteria. Typical manifestations are excessive reactive (situationally dependent) mood swings, irritability, and a low threshold of frustration.<sup>11</sup>

Due to the extremely high incidence of coexisting psychiatric disorders, contributing ADHD may go unrecognized while the clinician focuses on the more conspicuous accompanying illnesses.<sup>11</sup> It can be difficult to discern which of the comorbid conditions is responsible for the impairment required for making the diagnosis of ADHD,<sup>13</sup> since disturbances in attention or activity level may be caused by





any number of coexisting psychiatric, medical, and neurologic disorders, including epilepsy and depression.<sup>6</sup>

Sometimes ADHD is confused with cyclothymia (mild mood swings) or bipolar disorder (BPD), since impulsivity, affective instability, angry outbursts, and feelings of boredom are characteristics of all these disorders. But the impulsivity in ADHD is thoughtless, in contrast to the driven nature of impulsivity in BPD. Patients with BPD have more intense affects with conflictual relationships, self-mutilation, and feelings of abandonment. ADHD mood swings last for hours, not days or weeks, and anhedonia and related physiologic concomitants are not seen in ADHD.<sup>22</sup>

There are some notable differences in the pattern of comorbid conditions observed in adult and childhood ADHD. Anxiety disorders, which are fairly uncommon in children, affect almost 50% of adults.<sup>12</sup> Abuse of alcohol or drugs is rampant in hyperactive children followed to adulthood, affecting approximately one third of adult patients.<sup>23</sup> While substance abuse must always be addressed before introducing medications, a history of abuse does not necessarily proscribe stimulants, because these proclivities are frequently linked to the patients' innate efforts to overcome their dopamine insufficiency.

#### Evaluation of ADHD in the adult

A thorough history is the most critical element in the initial assessment of the adult patient with suspected ADHD (Table 2). Spouses, significant others, adult children, and parents can also provide information about the features of ADHD that the patient may not be able to recognize.

ADHD symptoms should not be the sole focus of the initial interview, however, and the patient should be queried about symptoms consistent with other conditions that may masquerade as, or contribute to, a deficiency in attention or impulse-control. Findings integral to distinguishing between ADHD-related attention deficit and other potential causes include the presence of symptoms in childhood,

**Table 2** Evaluation of ADHD disorder

Mental status examination
Developmental history
School history
Past and present impulsivity, inattention, hyperactivity
Impairment
Family
Peers
School
Work
Psychiatric history
Diagnosis
Treatment
Rating scales
Brown Attention-Activation Scale
Wender Utah Rating Scale
Medical history
Head trauma
Migraine
Seizure disorder
Thyroid disease
Medication history
Antihistamines
Corticosteroids
Phenobarbital
Sympathomimetics
Theophylline
Family history
Abuse or neglect
ADHD
Learning disorder
Substance use
Tic disorder
Corroborating interview
Adult children
Parents
Significant other
Spouse
Physical examination
Neurologic evaluation
Consider referral for IQ assessment
Laboratory tests
None, unless history suggests thyroid problem



**Table 3 Treatment planning**

Target symptoms and baseline
Treat comorbid conditions
Monitor multiple domains of functioning
Academic or vocational
Daily living skills
Emotional adjustment
Family interactions
Medication response
Social relationships
Long-term supportive contact to ensure compliance and address problems that may arise

their persistence into adulthood, global impairment (in that ADHD adversely affects all arenas of patients' lives—social, occupational, and academic), and the reliable exclusion of other conditions.<sup>11</sup>

Establishing a chronic and pervasive history of these behaviors is important, but self-reports may be misleading since it is not uncommon for adults to fail to remember childhood hyperactivity.<sup>20</sup> Support for the chronic nature of the condition may require a review of documents that detail the childhood and adolescent history, especially school history. If parents or siblings are available, they can be interviewed. Rating scales are helpful when suspicion is high and the results of the history are equivocal.

Among the screening tests developed explicitly for the evaluation of adults with suspected ADHD are the Wender Utah Rating Scale and the Brown Attention-Activation Disorder Scale. Hamilton's Depression Rating Scale and the Beck Anxiety Inventory can be helpful in confirming or excluding these comorbid disorders.<sup>11</sup> Thyroid function tests or intelligence testing may also be warranted.

Although there are no neuropsychological tests diagnostic of ADHD, a broad neuropsychological assessment can be used to detect other possible causes of symptoms. It will also estab-

lish a baseline determinant of the patient's abilities, which can then be used to assess the efficacy of treatment.<sup>11</sup>

Finally, because of the strong familial correlation of the disorder, clinicians may consider "screening" parents and siblings of newly diagnosed ADHD cases for core symptoms, which may identify previously subclinical cases of ADHD.<sup>4</sup>

### Treatment planning

As in childhood ADHD, pharmacotherapy is generally recognized as an important treatment option in the adult patient. Medication is not only effective in reducing the symptoms of ADHD, but also in treating comorbid psychiatric disorders.<sup>5</sup> Total management ideally involves nonpharmacologic therapies as well, including group psychotherapy and educational programs.<sup>4</sup> The goals of treatment planning are outlined in Table 3.

Once the diagnosis has been reliably made, the risk/benefit ratios of treatment and the routine changes expected with pharmacologic treatment should be discussed with the patient (Table 4, page 54). The prescribing physician should try to maintain routine contact with a family member to supplement the patient's self-reports, since ADHD adults are typically unable to accurately or fully appreciate their symptoms.<sup>9</sup>

The decision whether or not to use medication can be difficult because no research is available for guidance. Stimulants are highly effective in ameliorating symptoms, but when they are stopped, the symptoms invariably return. Since stimulants are not necessary for all ADHD patients, medication may be reserved for those with disabling symptoms that are most likely to respond to stimulants. In other words, the use of psychopharmacology depends on the activities and interests of the patient. A trial of medication may be appropriate for patients with significantly troubled relationships, underachievement, and distress in the family, but close supervision of drug use and response is an essential—and time-consuming—element in this therapy.





**Table 4** Likely benefits of pharmacotherapy in adult ADHD

Symptom	Benefits
Hyperactivity	Fidgeting and restlessness decrease; patients can stay longer at the dinner table, a movie, or church
Inattention	Concentration is greatly enhanced; patients can pay better attention to family members in conversation
Mood lability	Improved; mood described as level
Temper	Threshold for anger is raised
Disorganization	Lessened; improved ability to implement strategies
Stress	Sensitivity to stress is reduced; patients feel less hassled by daily existence
Impulsivity	Decreased; patients can think before speaking and control self-ruinous behaviors such as buying sprees

Note: These changes are often observed only by significant others.

Because the diagnosis of ADHD in adults can be so confounding, some clinicians prescribe a trial of psychostimulants in an effort to confirm an indefinite diagnosis. This can be misleading, since patients suffering from mood disorders will describe similar beneficial results. Another potential problem with such trials is that adult patients typically self-report on the efficacy of a medication, whereas a child's response is typically confirmed by two disparate witnesses (parent and teacher) who observe the child in two distinct contexts.<sup>13</sup> Despite these caveats, when no other condition is clearly the cause of symptoms consistent with ADHD, a stimulant prescription may be a valid choice, provided no medical contraindications exist.<sup>11</sup>

#### Pharmacologic treatment options

The state of the art of drug treatment for adult ADHD is far less developed than for the child or for other adult psychiatric disorders. The physician is obligated to develop a reasonable behavior plan before writing a prescription. Psychostimulants are regarded as the first line of pharmacologic treatment, and 60%-80% of patients will respond to either methylphenidate, dextroamphetamine, or pemoline. The percentage of positive responses tends to increase if several psychostimulants are tried.<sup>24</sup> Dex-

troamphetamine mixed salts may also be effective, although they have been less well studied in adult ADHD. While the long-term effects of stimulants have not been demonstrated, the short-term therapeutic dividend can be dramatic. Tolerance to the effects of stimulants have been observed but not extensively studied.

Nonstimulant medications that may be used as an adjunct to stimulants or in patients nonresponsive to stimulants include antidepressants (bupropion, tricyclic antidepressants) and antihypertensives ( $\beta$ -blockers). Combination therapy may be indicated in some situations.

- *Methylphenidate HCl (Ritalin)* is the most widely prescribed anti-ADHD drug. In five double-blind crossover placebo-controlled studies in adults, a positive response was demonstrated in 55% of cases.<sup>25</sup> Aimless restlessness becomes more goal-directed, and sustained attention and measures of inhibitory control also show improvement. The dosage is 0.1-0.6 mg/kg, up to 1 mg/kg; with a common range of 20-80 mg/d. The usual starting dosage is 10 mg bid, although some adults respond to as little as 2.5 mg/d.

Methylphenidate usually requires 3-4 doses a day, but some patients may need up to 6 doses a day because the duration of the response can be as brief as 2 hours. Likely side effects include reduced appetite, sleep problems, and tic exacerbation. Because there can





be an associated increase in heart rate and blood pressure, it is important to monitor these parameters 1 hour after a dose is taken. The short duration of action is something akin to riding a roller-coaster, and patients may experience a very distinct on-and-off effect. Methylphenidate is available in a sustained release form, but the results have been generally disappointing because, by definition, ramp stimulants work by means of rapid entry into the bloodstream. Periodic drug holidays permit ongoing assessment of the continued need for medication.

There is a potential for abuse, but drug misuse is more likely to be associated with symptoms of poor impulse control. Psychotic reactions with tactile hallucinations are possible in high medication doses. Choreoathetoid (jerky, involuntary) movements are also seen at inappropriately high doses, usually in the context of medication abuse.

There have been five methylphenidate-related deaths resulting from liver failure reported in the last five years. This drug also lowers the seizure threshold, and it must be discontinued if the patient develops seizures. Drug interactions with methylphenidate are outlined in Table 5 (page 63).

- *Dextroamphetamine sulfate (Dexedrine, DextroStat)* has a longer duration of action than methylphenidate, but has not been studied in controlled trials in adults. Average daily dosage is 10-40 mg, in divided doses. Dosages typically start at 2.5-5 mg/d, with gradual titration. Many patients require a second or third daily dose because the maximal therapeutic benefit occurs during the absorption phase of the drug.<sup>26</sup>

- *Pemoline (Cylert)* has been evaluated in one study in adults, with a positive response.<sup>27</sup> One advantage of pemoline is its low abuse potential, but it is associated with an increased risk of liver failure. Since adults have slower hepatic metabolism compared with children, lower mg/kg dosages are indicated. Recommended dosages range from 37.5-150 mg, titrated up from 18.75 mg, either as a single dose or divided into 2 daily doses. Serum liver function tests

must be monitored, as abnormal readings develop in 2%-3% of adults taking pemoline.

Absorption of pemoline is complete but much less rapid than that of methylphenidate. It peaks at 2 hours after dosing, and is thus a threshold stimulant, not a ramp stimulant. Because of its association with life-threatening hepatic failure, pemoline should not ordinarily be considered as first-line therapy (although it is approved for treating ADHD). Of the 13 cases of liver failure reported in the literature, 11 resulted in death or liver transplantation.

- *Amphetamine mixed salts (Adderall)* This combination drug has not been studied in adults with ADHD, but the differential rate of absorption of combined d-amphetamine and l-amphetamine might theoretically lead to a smoother clinical effect. This agent appears to produce a long duration of clinical effect (4-10 hours), which compares favorably with that of pemoline, without the risk of hepatotoxicity.<sup>9</sup> Published data documenting these potential advantages are scant, however.

- *Bupropion HCl (Wellbutrin)*, an aminoketone antidepressant with noradrenergic and dopaminergic activity, has been studied in one open trial that demonstrated moderate to marked benefits in 75% of cases.<sup>28</sup> At the present time, bupropion appears to be a second-line drug. It may be indicated in the patient with comorbid mood instability or when cardiovascular problems prohibit the use of traditional stimulant medications.<sup>5</sup>

- *Tricyclic antidepressants (TCAs)*, such as desipramine HCl (Norpramin), imipramine HCl (Tofranil), and nortriptyline HCl (Pamelor), commonly produce more significant improvement in behavior than in cognition.<sup>29</sup> They also relieve symptoms of anxiety, depression, and tics.

Their onset of action is more rapid in ADHD than in depression. The mean doses range from 20-173 mg/d. Some patients require high doses, while others respond to as little as 10-50 mg/d. Baseline and follow-up ECGs are essential if prescribing for patients younger than 12 or older than 45, due to quinidine-like effects. Advantages of TCAs include the absence of




**Table 5 Medications used to treat adult ADHD**

Drug	Dosage	Comments
<b>Stimulants</b>		
Methylphenidate HCl (Ritalin)	0.1-0.6 mg/kg up to 1 mg/kg; may need 3-6 doses/d	Use cautiously with pressor agents and MAOIs; may inhibit metabolism of anticoagulants, anticonvulsants, phenylbutazone, and TCAs
Dextroamphetamine sulfate (Dexedrine, DextroStat)	10-40 mg/d in divided doses	Has not been used in controlled trials in adults; use cautiously in patients with even mild hypertension
Pemoline (Cylert)	37.5-150 mg/d or divided bid; titrate from 18.75 mg/d	Monitor liver function tests; do not use as first-line therapy due to risk of liver failure
Amphetamine mixed salts	2.5-4 mg/d (usual dose in children)	Has not been studied in adults
<b>Antidepressants</b>		
Bupropion HCl (Wellbutrin)	360 mg/d	Second-line drug of choice; may be appropriate with comorbid mood instability or cardiac abnormalities
TCAs: Desipramine HCl (Norpramin) Imipramine HCl (Tofranil) Nortriptyline HCl (Pamelor)	20-173 mg/d	TCAs are not FDA-approved for ADHD; may be appropriate for patients with concurrent anxiety and depression; follow-up and baseline ECGs essential
<b><math>\beta</math>-Blockers</b>		
Nadolol (Corgard)	10-160 mg/qid	Mainly used as adjunctive treatment for anxiety and tension
Propranolol HCl (Inderol)	20-40 mg/d	Useful adjunctive treatment for excessive excitability/overarousal

Key: FDA = Food and Drug Administration; MAOI = monoamine oxidase inhibitor; TCA = tricyclic antidepressant

rebound and insomnia and a lack of abuse potential, but they are not approved for the treatment of ADHD at this time.

- *$\beta$ -Blockers*, such as nadolol (Corgard) and propranolol (Inderol), are referenced in a small series of ADHD adults. Propranolol dosages of 10-160 mg qid and nadolol dosages of 20-40 mg/d are well-tolerated in adults.<sup>26</sup> Propranolol demonstrated beneficial results in one open trial of 13 ADHD adults, but 9 weeks of medication in enormous dosages (mean dose of 428 mg/d) were required.<sup>9</sup>

These nonselective  $\beta$ -blockers can be useful, largely as an adjunct to stimulants. By blocking

peripheral receptors and attenuating somatic disturbances, they reduce motor overactivity, sympathetic excitement, and disruptive tendencies,<sup>29</sup> but their efficacy in treating adult ADHD is still unclear.<sup>5</sup>

- *Combination therapy* Despite high reported rates of success with pharmacologic therapy, it may be ineffective in as many as 30%-40% of adults. In patients whose response to single agents is inadequate, a combination of several anti-ADHD agents may be necessary<sup>5</sup> although no drug combination has been adequately evaluated in controlled studies. There are potential risks in combining most anti-ADHD medica-





tions, including cardiovascular changes affecting blood pressure and heart rate. Notwithstanding, all of these agents may be used in combination, provided there is gradual dose titration and careful patient monitoring.<sup>9</sup>

Multiple agents may be required in patients with coexisting anxiety and mood disorders. Combination therapy may also be appropriate when significant symptoms are only partially responsive to single-agent therapy; when the potential synergistic effects of multiple agents (for example, a stimulant plus a TCA) might improve response; when lower doses of multiple agents might reduce the adverse effects of a single agent; and when medications are being changed in order to avoid clinical deterioration by overlapping treatments.<sup>5</sup>

#### **Nonpharmacologic treatment options**

Patient outcome can be enhanced when counseling and education are included in the therapeutic process. Once pharmacologic treatment has alleviated the primary symptoms of ADHD, secondary problems with depressive symptoms, family difficulties, and substance abuse may then become amenable to treatment.<sup>26</sup>

Although the data on psychosocial interventions are entirely anecdotal, it is important to educate the patient about the biological nature of ADHD. Adults benefit from learning that personal and interpersonal limitations stem from the underlying biology of ADHD, not from defects in their character. Psychotherapy can help the patient deal with the effects that ADHD has had on their symptoms and behavior. Notable success has been reported with cognitive-behavioral therapeutic approaches,<sup>9</sup> in which patients begin to understand how ADHD has affected their personality, academic and vocational experiences, friendships, sexual relationships, marriage, and parenting. Substantial time spent in a continual treatment program may enable the patient to appreciate the story of his or her life in the context of ADHD.

Educating the patient through books, articles, and therapeutic sessions provides an opportunity for self-forgiveness. Teaching method-





ologies that can be employed to manage emotional overreactivity and distractibility can facilitate their reduction in the patient's maladaptive behavior. Active participation by the spouse in the psychoeducational process can be extremely helpful.

Environmental engineering should also be considered. The severity of symptoms in specific settings can be mitigated with various environmental manipulations. Distractions can be minimized by reducing sensory stimulation in the home or job site, by declining party invitations, or by avoiding supermarkets and malls, for example—although such benefits do not generalize to all situations.<sup>9</sup> External tools such as date books, notebooks, minicassette recorders, and lists can be used to maintain a sense of control and provide guidelines for managing daily living. Support groups for the patient and family members are also beneficial.

Referral to a psychiatrist or clinical psychologist should be considered when the physician is unable to confidently establish or rule out a pattern of symptoms consistent with ADHD.<sup>11</sup> Psychiatric referral is also indicated for patients with dangerous or disturbed behavior, coexisting psychiatric disorders, or a failure to respond to treatment; or if the patient requests a second opinion.

### Conclusion

Adult ADHD is a common disorder affecting 1%-6% of the population. The hallmarks of the syndrome in adults are similar to those in children, including inattention, impulsivity, and hyperactivity. Many cases are genetically transmitted, and the most likely etiology is decreased dopamine activity in the brain. Diagnosis can be vexing, since there is no single laboratory marker. There is a huge human toll when ADHD goes undiagnosed. Comorbidities are common. Substance abuse and bipolar disorder are important diagnoses to consider during patient evaluation. Treatment may very well prove to be life-changing. Approximately 60% of patients will experience a dramatic response to medication, with stimulants being the drugs of choice. While treatment is primari-

ly based on pharmacology, total patient management requires a broad-based biopsychosocial approach that includes psychotherapy and education. §

## SELF-EXAMINATION

1. Which of the following statements about differentiating adult ADHD from bipolar disorder (BPD) is false?
  - a) In the ADHD patient, the nature of the impulsivity is driven, in contrast with the thoughtlessness of impulsivity in the BPD patient.
  - b) Self-mutilation is more characteristic of BPD.
  - c) ADHD is not associated with anhedonia.
  - d) The mood swings in ADHD last for hours versus a duration of days or weeks in BPD.
2. Psychostimulants are contraindicated in the ADHD adult with a history of substance abuse.
  - a) true
  - b) false
- 3) The symptoms of ADHD-related attention deficit can be distinguished from other potential causes by \_\_\_\_\_.
  - a) the presence of symptoms in childhood
  - b) global impairment
  - c) lifelong symptom persistence
  - d) the continuation of symptoms between episodes of other disorders
  - e) all of the above
4. Once the diagnosis of ADHD has been established, a trial of psychopharmacology is mandatory.
  - a) true
  - b) false
5. Which of the following statements about





drug treatment of adult ADHD is false?

- a) Periodic "medication holidays" are recommended when methylphenidate is used for treatment.
- b) Liver function tests are mandatory in the patient taking pemoline.
- c) Bupropion should not be used in the patient with comorbid mood instability.
- d) Baseline and follow-up ECGs are essential when tricyclic antidepressants are prescribed for children younger than 12 or adults older than 45.
- e) Combination therapy may be used to manage the side effects of stimulants.

*Answers at end of reference list.*

#### REFERENCES

1. Higgins RW. ADHD: The role of the family physician. *Am Fam Physician* 1997;56:42-44.
2. Gittelman R, Mannuzza S, Shenker R, et al. Hyperactive boys almost grown up. I. Psychiatric status. *Arch Gen Psychiatry* 1985;42:937-947.
3. Mannuzza S, Klein RG, Bessler A, et al. Adult outcome of hyperactive boys. Educational achievement, occupational rank, and psychiatric status. *Arch Gen Psychiatry* 1993;50:565-576.
4. Bourgeois JA. Three cases of adult attention-deficit hyperactivity disorder. *Mil Med* 1995;160:473-476.
5. Wilens TE, Biederman J, Spencer TJ, et al. Pharmacotherapy of adult attention deficit/hyperactivity disorder: A review. *J Clin Psychopharmacol* 1995;15:270-279.
6. Goldman LS, Genel M, Bezman RJ, et al. Diagnosis and treatment of attention deficit/hyperactivity disorder in children and adolescents. *JAMA* 1998;279:1100-1107.
7. Weiss G, Hechtman L, Milroy T, et al. Psychiatric status of hyperactives as adults: A controlled prospective 15-year follow-up of 63 hyperactive children. *J Am Acad Child Psychiatry* 1985;24:211-220.
8. Weiss G, Hechtman LT. *Hyperactive Children Grown Up*. New York, NY: The Guilford Press; 1986.
9. Popper CW. Antidepressants in the treatment of attention deficit/hyperactivity disorder. *J Clin Psychiatry* 1997;58(suppl 14):14-29.
10. Barkley RA, Murphy KR, Kwasnik D. Motor vehicle driving competencies and risks in teens and young adults with attention deficit hyperactivity disorder. *Pediatrics* 1996;98:1089-1095.
11. Feifel D. Attention-deficit hyperactivity disorder in adults. *Postgrad Med* 1996;100(3):207-211.
12. Murphy K, Barkley RA. Attention deficit hyperactivity disorder adults: Comorbidities and adaptive impairments. *Compr Psychiatry* 1996;37:393-401.
13. Roy-Byrne P, Scheele L, Brinkley J, et al. Adult attention-deficit hyperactivity disorder: Assessment guidelines based on clinical presentation to a specialty clinic. *Compr Psychiatry* 1997;38:133-140.
14. Arcia E, Conners CK. Gender differences in ADHD? *J Dev Behav Pediatr* 1998;19:77-83.
15. Wender PH. The minimal brain dysfunction syndrome in children. I. The syndrome and its relevance for psychiatry. II. A psychological and biochemical model for the syndrome. *J Nerv Ment Dis* 1972;155:55-71.
16. Zimetkin AJ. Attention-deficit disorder: Born to be hyperactive? *JAMA* 1995;273:1871-1874.
17. Wender PH, Wood DR, Reimherr FW, et al. An open trial of pargyline in the treatment of attention deficit disorder, residual type. *Psychiatry Res* 1983; 9:329-336.
18. Carlson GA. Compared to attention deficit hyperactivity disorder. *Am J Psychiatry* 1996;153:1128-1130.
19. Biederman J, Milberger S, Faraone SV, et al. Family-environment risk factors for attention-deficit hyperactivity disorder: A test of Rutter's indicators of adversity. *Arch Gen Psychiatry* 1995;52:464-470.
20. Toone BK, Van Der Linden, GJ. Attention deficit hyperactivity disorder or hyperkinetic disorder in adults. *Br J Psychiatry* 1997;170:489-491.
21. Mannuzza S, Klein RG, Bonagura N, et al. Hyperactive boys almost grown up. V. Replication of psychiatric status. *Arch Gen Psychiatry* 1991;48:77-83.
22. Akiskal HS. Dysthymic disorder: Psychopathology of proposed chronic depressive subtypes. *Am J Psychiatry* 1983;140:11-20.
23. Shekim WO, Asarnow RF, Hess E, et al. A clinical and demographic profile of a sample of adults with attention deficit hyperactivity disorder residual state. *Compr Psychiatry* 1990;31:416-425.
24. Cantwell DP. ADHD through the life span: The role of bupropion in treatment. *J Clin Psychiatry* 1998; 59(suppl 4):92-94.
25. Spencer T, Wilens TE, Biederman J, et al. A double-blind, crossover comparison of methylphenidate and placebo in adults with childhood-onset attention-deficit hyperactivity disorder. *Arch Gen Psychiatry* 1995; 52:434-443.
26. Fargason RE, Ford CV. Attention deficit hyperactivity disorder in adults: Diagnosis, treatment, and prognosis. *South Med J* 1994;87:302-309.
27. Caresia L, Pugnetti L, Bessana R, et al. EEG and clinical findings during pemoline treatment in children and adults with attention deficit disorder. An 8-week open trial. *Neuropsychobiology* 1984;11:158-167.
28. Wender PH, Reimherr FW. Bupropion treatment of attention-deficit hyperactive disorder in adults. *Am J Psychiatry* 1990;147:1018-1020.
29. Mattes J. Propranolol for adults with temper outbursts and residual attention deficit disorder. *J Clin Psychopharmacol* 1986;6:299-302.

*Answers: 1)a, 2)b, 3)e, 4)b, 5)c*