Herbal Medicine in the Treatment of Attention-deficit/Hyperactivity Disorder

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Abstract

Attention Deficit/Hyperactivity Disorder (ADHD) is a commonly diagnosed childhood disorder that affects approximately 3 to 7% of children. As a result, ADHD is one of the most common presenting problems among children referred to mental health professionals. Pharmacotherapy is the most commonly recommended intervention for ADHD and it has been shown to be the optimal treatment option in cases where no other comorbid conditions are present. Herbal medicine is widely used by families of children with ADHD. This review focused on herbal medicine in the treatment of ADHD.

Keywords: Attention Deficit/Hyperactivity Disorder, Children, Herbal Medicine

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Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a common neurobehavioral disorder of childhood and adolescence. According to a consensus paper published in 1998 by the National Institutes of Health, ADHD affects approximately 3-7% of school-age children [1, 2]. It is characterized by symptoms of inattention and/or hyperactivity/impulsivity that have persisted for at least six months, to a degree that is maladaptive and inconsistent with developmental level. Usually, some symptoms that caused impairment were present before age seven. Some impairment from the symptoms is present in two or more settings (e.g., at home and at school). Children with ADHD may experience significant functional problems, such as school difficulties, academic underachievement, troublesome interpersonal relationships with family members and peers, and low self-esteem. Individuals with a history of untreated childhood ADHD are more likely to experience conduct disorder, substance abuse, anti-social behavior and injuries later in life. Early recognition, assessment and management of this condition can redirect the educational and psychosocial development of most children with ADHD [3-5].

Signs and symptoms

Children with ADHD may fit into three common patterns: predominantly inattentive type (30 to 40%); hyperactive-impulsive type (10%); and combined type (50 to 60%) [6-8]. ADHD children who are predominantly inattentive have difficulty focusing on particular tasks, may skip from one uncompleted activity to another, be easily distracted by seemingly irrelevant stimuli, and avoid tasks requiring focused attention. Inattentive ADHD is the pattern most common among affected girls. Such children often have difficulty following directions and completing tasks such as homework, fail to pay attention to details, make careless mistakes, seem disorganized, “spacey” or “dreamy”, and commonly lose or forget things like books, homework, and assignments. Such children commonly complain of being “bored”, yet may have no trouble paying attention to activities that they find exciting or really enjoy. Children who are hyperactive may always seem to be “on the go” or in constant motion. They may appear restless or fidgety, have difficulty remaining seated, and run or climb in situations where sitting or quiet behavior is expected. Children who are impulsive have difficulty thinking before they act, often without apparent regard to the consequences of their actions. They may blurt out answers or inappropriate comments at school, intrude upon or interrupt others, and have difficulty waiting in line or taking turns [9, 10].

Etiology

The etiology of ADHD is unknown, and it is likely a heterogeneous disorder, but there is little reason to believe that the disorder can be caused by social factors or child rearing practices alone [11-12]. ADHD does appear to run in families with approximately one-third of affected children having a first degree relative with a history of ADHD. Central catecholaminergic neurotransmission systems appear to be involved in the pathophysiology of ADHD. Effective medication treatments for ADHD appear to modulate dopaminergic and noradrenergic neurotransmission in the prefrontal cortex. Children with ADHD as a group show differences from unaffected children in the volumes of specific brain regions in imaging studies (i.e., frontal lobes,

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temporal gray matter, caudate nucleus, and cerebellum). The cause of such differences is unknown and brain imaging is not useful as a diagnostic tool if used to differentiate youth with ADHD from those without. Traumatic brain injury has been associated with ADHD, but probably accounts for ADHD in only a small percentage of affected children. Environmental factors may also be relevant. Exposure to maternal tobacco or alcohol use in utero may increase the risk of ADHD in offspring. Exposure to lead early in life has also been associated with ADHD. Though up to 5% of children with ADHD may respond to dietary manipulations for food allergies, there is little evidence that exposure to refined sugar or food additives are responsible for ADHD in most affected children [13-17].

Medication

Stimulant Medications

Stimulant medication will help most children with ADHD [18, 19]. The short term efficacy of stimulants for the treatment of core ADHD symptoms has been well-established by numerous placebo controlled randomized trials. Interestingly, placebo response rates for children with ADHD are quite low. In the classroom, stimulants have been shown to decrease interrupting, fidgetiness, and finger tapping, improve attention, and increase on-task behavior. At home, stimulants can improve interactions between parents and children, and improve listening and on task behavior. With peers, stimulants have been shown to decrease aggressive behaviors, increase attention during sports, and improve the social ranking of treated children by their peers. Extended trials of 12 months and longer also suggest that stimulant response tends to be enduring as long as the stimulant medication is taken [20].

Non-stimulant Medications

Between 10 to 30% of those affected with ADHD may not respond to stimulants, in such instances or when families are unwilling to consider a stimulant, non-stimulant medications may be appealing. Several non-stimulant medications that affect noradrenergic and/or dopaminergic pathways have demonstrated efficacy in the treatment of ADHD, though effect sizes are probably somewhat less robust in short-term treatment trials than those of stimulants and less data has accumulated regarding the safety profile of nonstimulants in general [3, 4].

Herbal Medicine

Approximately 70% of children treated show improvement in the primary ADHD symptoms and in co-morbidity such as conduct disorder, although the benefits may not hold beyond two years [21]. Despite the well-established efficacy and safety of stimulants for ADHD, alternative medicines are still needed for several reasons [21]. About 30% of children and adolescents with ADHD may not respond to stimulants or may be unable to tolerate potential adverse events such as decreased appetite, mood lability and sleep disturbances. Although stimulants do not increase risk for later substance abuse in ADHD, concerns have been raised about special prescription rules, and a potential for abuse by persons other than the ADHD subjects [22, 23].

Complementary and alternative medicine (CAM) is widely used by families of children with ADHD. Prevalence of CAM use in children with ADHD is among the highest of any population, with reported use between 50-70%. As the prevalence of both ADHD and CAM use continues to rise, the need for reliable sources of information about specific

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CAM therapies for children with ADHD becomes more essential. In particular most studies in this field are open label, uncontrolled, and do not include sufficient numbers of patients [3, 4, 24],

Herbal medicines have been shown to ameliorate ADHD related behaviors in individuals without this disorder [24, 25]. For example, *Ginkgo biloba* is somewhat effective for dementia and memory impairment. A review of 40 controlled trials of *Ginkgo biloba* found at least a partial positive outcome in nearly all subjects who had cerebral insufficiency (eg, difficulties of concentration and memory). This finding may help to provide support for using Ginkgo in children with ADHD, especially those who are primarily inattentive. Moreover, Ginkgo improves cerebrovascular blood flow and attention and may help to reduce hyperactivity due to boredom and lack of focus [25]. However, a recent double blind, randomized and active controlled trial does not support the application of *Ginkgo biloba* in the treatment of ADHD [26]. A study by Akhondzadeh et al., showed that *Passiflora incarnata* may be a novel therapeutic agent for the treatment of attention deficit hyperactivity disorder. In addition, a tolerable side effect profile may be considered as one of the advantages of Passiflora in the treatment of attention deficit hyperactivity disorder [27].

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