Attention-deficit Hyperactivity Disorder: Comparison of Medication Efficacy and Cost

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ABSTRACT

Although a common psychological disorder, pharmacologic treatment of attention-deficit hyperactivity disorder can be a costly endeavor. Among 4- to 5-year olds, methylphenidate is a safe, efficacious, and cost-effective option for short-, intermediate-, and long-acting medication options. Short-acting methylphenidate, intermediate-acting methylphenidate extended release and sustained release, and long-acting methylphenidate are the most efficacious and cost-effective medications. The selection of nonstimulant medications should be based on recommended guidelines rather than primarily on cost. For children incapable of swallowing pills, the most efficacious and cost-effective treatments are short-acting dextroamphetamine liquid and long-acting methylphenidate capsules that can be opened and sprinkled over food.

Keywords: attention-deficit hyperactivity disorder, cost, efficacy, medication, pediatric

Approximately 20% of children and adolescents in the United States exhibit signs or symptoms of a psychological or behavioral disorder.[1] Attention-deficit hyperactivity disorder (ADHD) is 1 of the more common childhood psychological disorders, affecting 3% to 7% of school-age children.[2] ADHD often presents in early childhood with symptoms of hyperactivity, impulsivity, and/or inattention.[3,4] Associated with a variety of complications, untreated ADHD has the potential to impair a child's cognitive, academic, behavioral, emotional, and social functioning.[3,5]

Unfortunately, obtaining ADHD medication can be a costly endeavor for the family with an ADHD child, especially if the family is either uninsured or underinsured. Between 1994 and 2003, the price of ADHD medications in the US rose by 285%.[6] Considering the ever-increasing costs of ADHD medications, "…providers and consumers should consider the cost-effectiveness of a medication when making decisions about drug acceptance and coverage."[6] Moreover, because untreated children with ADHD may suffer social, behavioral, and emotional consequences, health care providers (HCPs) must carefully assess ADHD medication costs and efficacy to meet the needs of the child and family. Therefore, the purpose of this review is to evaluate ADHD medications to promote the effective management of pediatric patients in relation to efficacy and expense.

METHODS

Several electronic database searches were conducted to review studies related to medications and treatments for ADHD. The databases search included MEDLINE, CINAHL, PsycINFO, UpToDate, and the Cochrane Library. Various Web sites were also reviewed. Inclusion criteria encompassed articles published in the past 10 years in English, age groups related to children and adolescents, ages 0 to less than 18 years, research articles using human studies, systematic and integrative reviews of randomized

controlled studies and drug trials, and pharmacologic treatment options of ADHD. In addition, only pharmacologic treatments approved by the US Food and Drug Administration (FDA) were included. Articles on adult treatment of ADHD or articles of ADHD diagnoses attached to other comorbidities were also excluded. Search terms included the following: ADHD, Attention Deficit Hyperactivity Disorder, medication, efficacy, cost, pediatric, treatment, effectiveness, safety, side effects, expense, children, adolescent, drug therapy, and risk.

RESULTS

Stimulants

Stimulants are the first-line treatment option for 75% to 90% of children suffering with the hyperactivity, impulsivity, and inattention of ADHD.[7-9] Despite a variety of preparations for the treatment of ADHD (short-acting, intermediate-acting, and long-acting), there is no evidence showing a clear benefit to using one stimulant over another in any of the preparations.[10-12] It is possible, however, that individual children will respond more favorably to 1 stimulant or preparation.[13] Therefore, clinical decisions guiding the use of a particular stimulant remain a point of caregiver preference with consideration of the patient's ability to swallow pills, needs regarding the duration of action, age, comorbidities, potential contraindications, and medication cost.[7]

Short-acting Stimulants. Short-acting stimulants last approximately 3 to 6 hours and often require dosing more frequently than once per day. Although the disadvantages from frequent dosing of short-acting stimulants include the possible disruption of the child's school day and confidentiality,[14] the frequent dosing also allows for greater precision when dosing. A list of short-acting stimulants, available doses, and associated costs is presented in Table 1.

Dextroamphetamine Dextroamphetamine is available in tablet or liquid form and as the brand names Dexedrine (tablet), Dextrostat (tablet), Procentra (liquid), and Zenzedi (tablet). All forms of dextroamphetamine are available as generic except the 2.5- and 7.5-mg doses, which are only available as the brand name Zenzedi. Other available dosing options of dextroamphetamine include 5, 10, 15, 20, and 30 mg. The cost of Dexedrine and Dextrostat are the same ($133.05 for 60 of the 5-mg tablets).[15] In comparison, 300 mL of 5 mg/5 mL Procentra is $414.00.[15] For 60 tablets of the 5-mg doses of Zenzedi, the cost is $224.25.[15] All of the short-acting dextroamphetamine preparations are approved by the FDA for use in children over the age of 3 years.[16]

Methamphetamine Desoxyn is the brand name preparation for methamphetamine and is available only in a 5-mg tablet. Methamphetamine is FDA approved for use in children 6 years old and older.[16] For 60 tablets of 5 mg methamphetamine, the cost is $334.78,[17] almost triple the cost of the dextroamphetamines.

Methylphenidate Methylphenidate is available in the following forms: tablet (brand name Ritalin), chewable tablet (brand name Methylin), and liquid (Methylin)[7,14,15] All formulations of methylphenidate are FDA approved for use in children 6 years old and older, and all brand names are available as generics.[16] Ritalin (tablet) is available in 5-, 10-, and 20-mg doses. Methylin (chewable tablet) is available in 2.5-, 5-, and 10-mg doses. Finally, as a liquid, Methylin is available in 5-mg/5 mL and 10-mg/5 mL forms. Methylphenidate tablets (Ritalin) costs $33.55 for 60 of the 5-mg tablets,[15] a fraction of the cost of dextroamphetamines and methamphetamines. The chewable methylphenidate tablets (Methylin) are more costly with a price of $268.80 for sixty 5-mg tablets.[15] The liquid form of methylphenidate (Methylin) costs $291.00 for 300 mL of the 10-mg/5 mL dose.[15]

Dexmethylphenidate Focalin is the common brand name for dexmethylphenidate, a tablet available as a generic and FDA approved for children 6 years and older.[16] Like Zenzedi (dextroamphetamine), dexmethylphenidate is available in smaller doses starting at 2.5-mg tablets and increasing in dosing to 5-mg and 10-mg tablets.[7,18] Currently, dexmethylphenidate is available for $46.20 for 60 tablets of the 5-mg dose,[15] which is similar to the cost of Ritalin.

Dextroamphetamine/Amphetamine The generic form of Adderall (dextroamphetamine/amphetamine) is FDA approved for use in children aged 3 years and older.[19] Dextroamphetamine/amphetamine generic is available in tablet form and in dosing increments of 5,