

The use of stimulant medication in the treatment of attention deficit hyperactivity disorder



Français en page 701

The approach to the assessment and treatment of children with attention deficit hyperactivity disorder (ADHD) has changed since 1990, when the Canadian Paediatric Society published its statement on the use of stimulant medication in children with attention problems (1).

At the time of the previous statement, there was significant controversy about prescribing stimulant medication, and there still is. Many of the recommendations made at that time are still valid, including the need for appropriate evaluation of core symptoms and associated conditions; the need for titration of the dose of medication used; evaluating improvement in core symptoms; monitoring of side effects and physical parameters, individual prescription with respect to the frequency and amount of medication; and the involvement of the child in the process of medication prescription (1).

The objectives of the present statement are to:

- identify and summarize the important recent sources of information and guidelines on the assessment of children with possible ADHD; and
- update the recommendations for the use of stimulant medication based on the current evidence.

The review of other medical treatments for ADHD are beyond the scope of this paper.

A number of organizations have recently published recommendations with respect to both the diagnosis and treatment of children with ADHD. These include the National Institutes of Health (2), the American Academy of Pediatrics (3,4) and the American Academy of Child and Adolescent Psychiatry (5,6). A large study was recently published on different treatment approaches for ADHD, the Multimodal Treatment Study of Children with ADHD, the MTA study (7).

The criteria for making the diagnosis of ADHD have been established by the American Psychiatric Association and are published in the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV) (8). These criteria have been used across disciplines for clinical and research purposes, and are appropriate for use in paediatric practice. The decision to intervene medically is based on the use of these criteria, which have been accepted by the American Academy of Pediatrics and represent the most validated approach.

ADHD has a prevalence of 3% to 5% of the child population with boys being affected two to four times as often as girls (9,10). Once the diagnosis is made, symptoms improve over time, but the majority of individuals continue to exhibit significant symptoms through adolescence into adult life (11-13). This requires a long term management approach to individuals with ADHD and their families.

ASSESSMENT

The assessment requires evaluation of the presence of the symptoms in the child's different environments, the severity of symptoms, and the degree of impairment the child experiences. This requires gathering information from the family and the educational environments. Physicians must evaluate for the presence of other conditions and situations that can explain the presenting symptoms or those that commonly coexist with ADHD. ADHD can be present with or without comorbid learning disabilities, conduct disorder or other emotional disabilities. The Canadian Paediatric Society's manual on *Children with School Problems* (14) outlines a comprehensive approach that can be used to evaluate children who are referred to a physician due to problems at school.

The different recommendations for assessment from the recent published guidelines are presented in Table 1. The recommendations vary, reflecting the different perspectives of the publishing organizations.

TABLE 1
Recommendations for assessment of children referred to a physician for problems at school from recently published guidelines

Organization	National Institutes of Health (2)	American Academy of Pediatrics (3)	American Academy of Child and Adolescent Psychiatry (4)
Manoeuvre	Need for more consistent set of assessment procedures	Information directly obtained from parents on core symptoms and other criteria	Parent interview to consider symptoms and contributing factors
Child		Physical and neurological examination	Child interview to consider comorbid diagnoses Medical history and physical in past 12 months
School		Documentation of core symptoms Teacher narrative Evidence of current school work	Psychoeducational testing for learning disabilities Informal clinical observation of classroom
Rating scales		ADHD-specific scales clinical option in evaluation of both parents and schools	Recommended – yield valuable information
Other medical tests		Only when clinically indicated	Only when clinically indicated

The use of questionnaires, based on DSM-IV criteria, can add to the objective information regarding the descriptions of the child's symptoms and can be used to evaluate symptoms in both the home and educational environments. It is important that the symptoms are present often or very often. A much higher percentage of the population will be diagnosed if the symptoms are only present sometimes.

The physician must consider other explanations for the child's behaviour and coexisting conditions such as learning disabilities, oppositional defiant disorder, conduct disorder and anxiety disorders.

MANAGEMENT

Once the diagnosis of ADHD is made, there are a number of key principles of management. These include supporting families with information about ADHD and its management, parent training, behavioural interventions and medication. Intervention must be planned over long periods of time and include regular contact with the family about progress and performance. Academic issues change as programs require more organizational and study skills. The development of support to the child in school is a critical success factor.

Stimulant medication has been studied for many years. There is continued controversy over its use in general and the increasing number of children being treated. Some regions report that more than 10% of school children are taking stimulant medication (11), whereas most surveys indicate much lower use (15,16). This suggests that overuse is a concern, and a careful diagnostic approach is an essential component of care of children with possible ADHD. The use of stimulant medication is quite safe, with severe medical side effects being very rare (4,6,17).

It is important to engage parents in the decision to initiate medical therapy for ADHD. Parents are concerned about potential side effects, both short and long term, and how medication will benefit their child directly, not just how it will improve the ability for adults to manage the child. If the child is taking medication, parents usually want the lowest possible dose to allow the child to be successful. It is important to involve the child in a manner appropriate to their level of development.

There is consistent evidence that stimulant medication can improve the core symptoms of ADHD, particularly the hyperactive and/or impulsive symptoms (7). The MTA study evaluated outcomes over one year and found that careful titration of the dose, up to three times per day, and frequent contact for monitoring of the child's status did lead to improvements in the child's overall situation compared with usual community care. This is despite the fact that 67% of the community care group received medication at some time over the study period.

In the past, it was thought that anxiety predicted a poor response to medication, but more recent studies have not shown this. This was confirmed in the MTA study. Children who were anxious clearly benefited from behavioural supports in addition to the medication, while in non-comorbid ADHD, additional behavioural interventions did not add significantly to the improvement. Parents in all groups were more satisfied, however, when behavioural strategies were included (18).

The first principle of medical management is to choose a stimulant, most often methylphenidate. The starting dose is 5 or 10 mg per dose, with the higher dose used in children over 25 kg. In the MTA trial, children were given doses of 5, 10 or 15 mg, twice or three times per day, and up to 20 mg per dose if over 25 kg. The third dose, if given, was half that

of the earlier doses. It is necessary to titrate the dose to the most effective level based on the target symptoms. In the past, a dose between 0.3 and 0.7 mg/kg was recommended. There is no evidence that an approach based on weight leads to improved response, but the weight can be used to judge the relative amount a child is receiving. All symptoms do not respond equally to each dose of medication so it is important that the target symptoms are defined before initiating medication. The physician should contact the family about the child's status about one week after initiating therapy, with titration of the dose of medication based on improvement and side effects. There are objective ways of monitoring both effects and side effects with rating scales. There is no indication for routine bloodwork associated with the use of stimulant medication. The MTA study used monthly contacts with the families to monitor and adjust the dose, once the most effective dose had been found. This close follow-up was associated with improved outcomes compared with community care (7). Occasional times to reduce or discontinue the medication in collaboration with families can be planned but there is no evidence that these so-called drug holidays are needed (4,6).

If methylphenidate is not effective or if there are severe side effects, then the next alternative is dextroamphetamine. The dose is half that of methylphenidate. There are occasions where stimulants are not effective. The use of other psychoactive medications is outside the scope of this discussion, but additional consultation may be appropriate in difficult situations.

REFERENCES

1. Canadian Paediatric Society, Mental Health Committee. Use of Methylphenidate for attention deficit hyperactivity disorder. *CMAJ* 1990;142:817-8.
2. National Institutes of Health Consensus Development Conference Statement. Diagnosis and treatment of attention-deficit/hyperactivity disorder (ADHD). *J Am Acad Child Adolesc Psychiatry* 2000;39:182-93.
3. American Academy of Pediatrics, Subcommittee on Attention-Deficit/Hyperactivity Disorder and Committee on Quality Improvement. Diagnosis and evaluation of the child with attention-deficit/hyperactivity disorder. *Pediatrics* 2000;105:1158-70.
4. American Academy of Pediatrics. Subcommittee on Attention-Deficit/Hyperactivity Disorder and Committee on Quality Improvement. Treatment of the school-aged child with attention-deficit/hyperactivity disorder. *Pediatrics* 2001;108:1033-44.
5. American Academy of Child and Adolescent Psychiatry. Practice parameters for the assessment and treatment of children, adolescents, and adults with attention-deficit hyperactivity disorder. *J Am Acad Child Adolesc Psychiatry* 1997;36:85S-121S.
6. Greenhill L, Pliszka S, Dulcan MK, et al. Practice parameter for the use of stimulant medications in the treatment of children, adolescents, and adults. *J Am Acad Child Adolesc Psychiatry* 2002;41(Suppl 2):26S-49S.
7. MTA Cooperative Group. 14-Month randomized clinical trial of treatment strategies for attention deficit hyperactivity disorder. *Arch Gen Psychiatry* 1999;56:1073-86.
8. American Psychiatric Association. *Diagnostic and Statistical Manual for Mental Disorders*, 4th edn. Washington: American Psychiatric Association, 1994.
9. Scahill L. Epidemiology of ADHD in school-age children. *Child Adolesc Psychiatr Clin North Am* 2000;9:541-55, vii.
10. Offord DR, Boyle MH, Szatmari P, et al. Ontario Child Health Study, II: Six month prevalence of disorders and rates of service utilization. *Arch Gen Psychiatry* 1987;44:832-6.
11. Barkley RA, Fischer M, Edelbrock CS, et al. The adolescent outcome of hyperactive children diagnosed by research criteria: An 8-year prospective follow-up study. *J Am Acad Child Adolesc Psychiatry* 1990;29:546-57.
12. Gittelman R, Mannuzza S, Shenker R, et al. Hyperactive boys almost grown-up. *Arch Gen Psychiatry* 1985;42:937-47.
13. Hechtman L. Attention deficit hyperactivity disorder in adolescence and adulthood: An updated follow-up. *Psychiatr Annals* 1989;19:597-603.
14. Fox AM, Mahoney WJ. *Children with School Problems*. Ottawa: Canadian Paediatric Society, 1998.
15. Angold AJ. Stimulant treatment for children: A community perspective. *J Am Acad Child Adolesc Psychiatry* 2000;39:975-84.
16. Jensen PS, Kettle L, Roper M, et al. Are stimulants over-prescribed? Treatment of ADHD in four US communities. *J Am Acad Child Adolesc Psychiatry* 1999;38:797-804.
17. Goldman LS, Genel M, Bezman RJ, Slanetz PJ. Diagnosis and treatment of attention-deficit/hyperactivity disorder in children and adolescents. Council on Scientific Affairs, American Medical Association. *JAMA* 1998;279:1100-7.
18. The MTA Co-operative Group. Moderators and mediators of treatment response for children with attention-deficit/hyperactivity disorder: The Multimodal Treatment Study of children with attention-deficit/hyperactivity disorder. *Arch Gen Psychiatry* 1999;56:1088-96.
19. Elia J, Rapoport JL. Ritalin versus dextroamphetamine in ADHD: Both should be tried. In: Greenhill LL, Osmoson BB, eds. *Ritalin: Therapy and Patient Management*. New York: Mary Ann Liebert, 1991:69-74.
20. Schachar RJ, Tannock R, Cunningham C, Corkum PV. Behavioral, situational, and temporal effects of treatment of ADHD with methylphenidate. *J Am Acad Child Adolesc Psychiatry* 1997;36:754-63.

If the diagnosis has been appropriately made, the response rate to stimulant medication is about 80% to 96% (19). It is, therefore, not necessary to do a blinded trial of medication in all situations, but this approach is appropriate when the response is unclear, when there are different opinions about the response to medication, or when the family wishes to use the most objective measurement of treatment efficacy. This can be arranged through a pharmacy.

Once the treatment regimen has been stabilized, the physician should maintain ongoing contact with the child and family to provide ongoing support, assess the course of comorbid conditions if present, evaluate side effects and monitor the physical parameters of height, weight and blood pressure. There are some side effects associated with mood difficulties that may emerge after a couple of months of therapy (20).

Longitudinal studies indicate that ADHD symptoms continue in the majority of individuals for many years, implying that medication may be a clinical consideration for a patient for a long period of time, perhaps into adulthood (13).

CONCLUSION

In summary, stimulant medication continues to be an effective treatment for the core symptoms of ADHD. Treatment must be individualized and other supports, including parent information and training, behavioural treatment and intervention for comorbid conditions are essential components in managing a child with this disorder.

PSYCHOSOCIAL PAEDIATRICS COMMITTEE

Members: Drs Anne-Claude Bernard-Bonnin, Département de pédiatrie, Hôpital Sainte-Justine, Montréal, Québec; Kim Joyce Burrows, Kelowna, British Columbia; Anthony Ford-Jones, Department of Pediatrics, Joseph Brant Memorial Hospital, Burlington, Ontario; Sally Longstaffe, Child Development Clinic, Children's Hospital, Winnipeg, Manitoba (chair); Theodore A Prince, General and Developmental Pediatrics, Calgary, Alberta; Sarah Emerson Shea, IWK Health Centre, Halifax, Nova Scotia (director responsible)

Consultants: Drs Rose Geist, The Hospital for Sick Children, Toronto, Ontario; William J Mahoney, Children's Hospital, Hamilton Health Sciences Centre, Hamilton, Ontario; Peter Nieman, Calgary, Alberta

Liaisons: Drs Joseph F Hagan, University of Vermont College of Medicine, Burlington, Vermont (Committee on Psychosocial Aspects of Child & Family, American Academy of Pediatrics); Anton Miller, Sunnyhill Health Centre for Children, Vancouver, British Columbia (Developmental Paediatrics Section, Canadian Paediatric Society)

Principal author: Dr William Mahoney, Children's Hospital, Hamilton Health Sciences Centre, Hamilton, Ontario

The recommendations in this statement do not indicate an exclusive course of treatment or procedure to be followed. Variations, taking into account individual circumstances, may be appropriate.