Hanwella et al. BMC Psychiatry 2011, 11:176
http://www.biomedcentral.com/1471-244X/11/176

BMC Psychiatry

RESEARCH ARTICLE Open Access

Comparative efficacy and acceptability of methylphenidate and atomoxetine in treatment of attention deficit hyperactivity disorder in children and adolescents: a meta-analysis

Raveen Hanwella, Madhri Senanayake and Varuni de Silva*

Abstract

Background: Psychostimulants and non stimulants are effective in the treatment of ADHD. Efficacy of both methylphenidate and atomoxetine has been established in placebo controlled trials. Direct comparison of efficacy is now possible due to availability of results from several head-to-head trials of these two medications.

Methods: All published, randomized, open label or double blind trials, comparing efficacy of methylphenidate with atomoxetine, in treatment of ADHD in children, diagnosed using DSM-IV™ criteria were included. The outcome studied was ADHDRS-IVParent:Inv score. The standardized mean difference (SMD) was used as a measure of effect size.

Results: Nine randomized trials comparing methylphenidate and atomoxetine, with a total of 2762 participants were included. Meta-analysis did not find a significant difference in efficacy between methylphenidate and atomoxetine (SMD = 0.09, 95% CI -0.08-0.26) (Z = 1.06, p = 0.29). Synthesis of data from eight trials found no significant difference in response rates (RR = 0.93 95% CI 0.76-1.14, p = 0.49). Sub group analysis showed a significant standardized mean difference favouring OROS methylphenidate (SMD = 0.32, 95% CI 0.12-0.53 (Z = 3.05, p < 0.002). Immediate release methylphenidate was not superior to atomoxetine (SMD = -0.04, 95% CI -0.19-0.12) (Z = 0.46, p = 0.64). Excluding open label trials did not significantly alter the effect size (SMD = 0.08, 95% CI -0.04-0.21) (Z = 1.27, p = 0.20). All-cause discontinuation was used as a measure of acceptability. There was no significant difference in all cause discontinuation between atomoxetine and methylphenidate (RR 1.22, 95% CI 0.87-1.71). There was significant heterogeneity among the studies (p = 0.002, I^2 = 67%). Subgroup analysis demonstrated the heterogeneity to be due to the open label trials (p = 0.001, I^2 = 81%).

Conclusions: In general atomoxetine and methylphenidate have comparable efficacy and equal acceptability in treatment of ADHD in children and adolescents. However OROS methylphenidate is more effective than atomoxetine and may be considered as first line treatment in treatment of ADHD in children and adolescents.

Background

Pathophysiology of ADHD is multifactorial and its causal mechanisms have not precisely been established. However structural and functional imaging studies suggest that dysfunction of cingulate, frontal, and parietal cortical regions and imbalances in the dopaminergic and noradrenergic systems, contribute to the pathophysiology of ADHD [1,2].

It is characterized by inattention, hyperactivity and impulsivity. Estimates of worldwide prevalence of ADHD among school aged children vary from 2.4-19.8% [3-5]. Children with ADHD commonly exhibit disruptive behaviour in the classroom and underachieve academically. ADHD is associated with co-morbidities such as learning disorders, tics, anxiety, oppositional defiant disorder and conduct disorder [6]. In the long term, antisocial behavior, substance abuse, and a variety of problems related to conduct and learning can occur [7].

* Correspondence: varunidesilva2@yahoo.co.uk
Department of Psychological Medicine, Faculty of Medicine, University of Colombo, Sri Lanka