Amphetamines and methylphenidate for pediatric ADHD: a systematic review and meta-analysis of n-of-1 evidence

Salima Punja, Dongying Xu, Christopher H. Schmid, Lisa Hartling, Liana Urichuk, Catherine Jane Nikles, Sunita Vohra

Journal of Clinical Epidemiology (2016)
DOI: [http://dx.doi.org/10.1016/j.jclinepi.2016.03.026](http://dx.doi.org/10.1016/j.jclinepi.2016.03.026)

Abstract

Objectives
To evaluate how data from n-of-1 trials may be used in systematic reviews and meta-analyses by examining the effects of amphetamine and methylphenidate for attention-deficit/hyperactivity disorder (ADHD).

Study Design and Setting
Electronic search of MEDLINE, EMBASE, and PsychINFO for English language articles published from 1950-2013. N-of-1 trials of pediatric participants with ADHD that assessed either amphetamine or methylphenidate versus placebo were included. The primary outcome was improvement of core symptoms of ADHD, which was assessed by multiple rating scales. Studies with obtainable individual participant data were included in the meta-analysis. Weighted mean differences were computed using a random effects-model.

Results
Nine studies were included in the amphetamine-placebo comparison, and ten in the methylphenidate-placebo comparison. Meta-analyses were consistently in favour of amphetamine in 10 out of 11 ADHD symptom domains and methylphenidate in 7 out of 12 symptom domains. A high degree of heterogeneity across participant treatment response was observed.

Conclusions
Meta-analysis of n-of-1 trials suggests that amphetamine and methylphenidate are effective treatments for pediatric ADHD. Synthesizing n-of-1 trials enables assessment of individual responses to treatment as well as aggregate summaries across individuals and studies. It offers a promising general approach with applications across diverse treatments and disorders.