To meta-analyze or not to meta-analyze? A combined meta-analysis of N-of-1 trial data with RCT data on amphetamines and methylphenidate for pediatric ADHD

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Abstract

Objectives
To assess how the inclusion of N-of-1 trial data into randomized controlled trial (RCT) meta-analyses impacts the magnitude and precision of yielded treatment effects, using amphetamines and methylphenidate for pediatric ADHD as a model.

Study Design and Setting
We combined the N-of-1 and RCT data generated from previously conducted systematic reviews using parent and teacher ratings of hyperactivity/impulsivity as the outcome. Data was combined using standardized mean differences assuming a random effects model. The amphetamine and methylphenidate evidence were synthesized separately.

Results
We found that the inclusion of N-of-1 trial data in the meta-analysis impacted both magnitude and precision. The addition of the N-of-1 trial data narrowed the confidence intervals in 3 of the 4 comparisons as compared to the treatment effect yielded by RCT-only data. Furthermore, the addition of N-of-1 trials changed the overall treatment effects yielded by the RCT-only meta-analyses from statistically non-significant to statistically significant in one of the four outcomes.

Conclusions
If the overall goal of a meta-analysis is to synthesize all available evidence on a given topic, then N-of-1 trials should be included. This study shows it is possible combine N-of-1 trial data with RCT data as well as the potential merits of this approach.