MORE FOCUS, LESS GROWTH?

EXPLORING THE ASSOCIATION BETWEEN GROWTH DEFICITS AND ADHD MEDICATION

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ABSTRACT

CONTEXT: Attention Deficit Hyperactivity Disorder (ADHD) is the most common neurobehavioural disorder among children. Stimulant medications have been proven to have both therapeutic and adverse effects. Methylphenidate (Ritalin) is the most commonly prescribed psychostimulant, followed by amphetamines such as Adderall.

METHODS: Literature review assessed evidence surrounding the association of stimulant medications (methylphenidate and mixed salts amphetamines) on children’s height and weight. Relevant studies were found using the following keywords: ADHD, Psychostimulants (Adderall, Ritalin), Children, Growth Deficits.

RESULTS: The studies reviewed concluded that no statistically significant effects; the psychostimulants medications showed decreased height and weight during active treatment, but eventually normalized.

BACKGROUND/RATIONALE

• Psychostimulants; methylphenidate and mixed salt amphetamines successfully relieve the symptoms of ADHD 75% of the time (Vitiello, 2008; Chen et al., 2016).
• ADHD prescriptions among youth from 1990-1996 increase from 1.9 per 1000 children to 11.0 per 1000 children (Miller et al., 2001).
• Current ADHD diagnosis is broad increasing over diagnosis leading to over-prescription rates (Chan et al., 2016).

OBJECTIVE

Is taking Adderall or Ritalin for more than one year associated with stunted growth in children under the age of 13, in comparison to children who are not taking psychostimulant medications?

RESULTS

Table 1: Summary the relationship between long-term use of psychostimulant medications (methylphenidate and amphetamines) and the effects on height and weight of children with ADHD

<table>
<thead>
<tr>
<th>Authors</th>
<th>Study Design</th>
<th>Demographic</th>
<th>n</th>
<th>Significant Long-term Effects of Psychostimulants Medications on Growth?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klein et al., 1988</td>
<td>Cohort</td>
<td>M/F (6-12)</td>
<td>58</td>
<td>Height (t=0.73) Weight (t=-2.98 p&lt;0.005)</td>
</tr>
<tr>
<td>Pizlka et al., 2006</td>
<td>Cohort</td>
<td>M/F (mean age 9.0 ± 2.3 years (MSA) and 8.5 ± 2.1 years (MMPH))</td>
<td>66 (MSA), 133 (MMPH)</td>
<td>Dose-height relationship (r=0.26, p=0.011) - No main effect of MSA vs. MHR on time on height 2 score. No significant time treatment interaction. Height: significant stimulant x time interaction (p= 0.02)</td>
</tr>
<tr>
<td>Poulton et al., 2003</td>
<td>Cohort</td>
<td>M/F (mean age 7.2 ± 1.9 years)</td>
<td>51</td>
<td>After 6 and 18 months (p&lt;0.001) -After 30 months (p=0.21)</td>
</tr>
<tr>
<td>Spencer et al., 1996</td>
<td>Longitudinal</td>
<td>M/F (6-17)</td>
<td>124 (ADHD) 109 (controls)</td>
<td>-Height age-specific z score (0.21, p&lt;0.001)** -Height: weight &gt; significant (NS)</td>
</tr>
<tr>
<td>Spencer et al., 2006</td>
<td>Longitudinal</td>
<td>M/F (6-13)</td>
<td>178</td>
<td>-Height z score (-0.63, p=0.054) -Weight z score (-0.09, p=0.689)</td>
</tr>
<tr>
<td>Swanson et al., 2007</td>
<td>Longitudinal</td>
<td>M/F (7-9.5)</td>
<td>579</td>
<td>-Height (p=0.05) -Height z score (p=0.0001)</td>
</tr>
<tr>
<td>Zachor et al., 2006</td>
<td>Retrospective medical chart review</td>
<td>M/F (6-15)</td>
<td>81</td>
<td>After 36 months: -Height (0.10, p=0.163, p=0.140) -Height 2 (0.45 ± 1.15, p=0.06, not significant)</td>
</tr>
</tbody>
</table>

DISCUSSION

- The results show a decrease in growth rates (height and weight) when treatment with Ritalin or Adderall is initiated.
- These growth deficits in height and weight in children later normalized after 3 years of treatment, suggesting that treatment was suspended or after the child reached adolescence.
- Are the results surprising?
- No. Through the effects are temporary, all the studies suspected a negative effect of psychostimulants on children’s growth.
- Is surprising that many of the studies proposed that the temporary growth deficits are disorder-related rather than treatment-related. This is seen through the study which found that the growth rebound occurs in the non-medicated group of children with ADHD.
- Our Limitations
- We should have specified a certain subtype of ADHD so that the results can be more accurate.
- We only included studies which assessed children, only three of which were longitudinal studies. It would have been useful to find more longitudinal studies that would help us understand the effects of long-term treatment. We should have specified a certain subtype of ADHD so that the results can be more accurate.
- Future Implications
- Future research should pursue to understand the mechanism by which ADHD itself affects growth in children and apply the findings in a clinical setting.
- Policy changes should begin by implementing a better program of closely monitoring the height and weight of children with ADHD including a nutrition assessment to implement the most beneficial diet for the child and their growth.
- Though growth deficits are not a cause for concern, we suggest a revision of the diagnosis criteria for ADHD due to the over-budget expenditure on childhood behavioral disorders as done by Sparks and Duncan (2008).

CONCLUSION

Long-term treatment of ADHD with psychostimulants such as Ritalin and Adderall in children is not significantly associated with lifelong growth deficits. Psychostimulants use in children can cause growth deficits in height and weight during the treatment and then normalizes with cessation of treatment, the emergence of puberty, or treatment duration of three years or more.

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REFERENCES