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Attention Deficit Hyperactivity Disorder (ADHD) Considerations in the Diagnosis and Treatment from a Pediatric Integrative Standpoint

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(Editor's Note: Dr. Rivera uses her broad experience in General Pediatrics and Infectious Diseases to share her experience in using an integrative approach to the ever increasing behavioral issue of the inattentive/hyperactive school-aged child and adolescent. She draws on her training in Integrative Pediatric Medicine to expand on the rationale for use of more 'natural' approaches to intervention thus minimizing the need for the traditional approach using stimulants.)

Pediatric Integrative Medicine is healing oriented medicine that takes into account the whole infant, child and adolescent. It includes all elements of lifestyle and family health. It emphasizes the importance of the child-family-practitioner bond, is informed by evidence, and makes use of all therapies.

This article outlines a bridge in my training in general pediatrics, pediatric infectious disease and integrative medicine. The combined study and practice of these disciplines have broadened my understanding of the basics of nutrition, stress related disorders and the harmful long term effects of prescription drugs. It has also made me aware of treatment options like natural supplements and botanicals that are evidence-based and the use of neuro-feedback. By neuro-feedback, I refer to such practices as meditation, exercise/tai chi and martial arts.

ADHD is one of the more common neuropsychiatric disorders in children- a disorder that clearly is increasing in prevalence. In 2003, four and a half million children were diagnosed using DSM IV criteria and over 2.5 million were put on stimulant medication. Today, 5-16% of American children meet the criteria for ADHD. Boys outnumber girls 4:1 with the majority being treated with some type of stimulant medication. This surpasses the current prevalence of asthma in the pediatric population which is estimated to be 9.3% (CDC statistics 2015).

Is this increased prevalence merely because more children are getting diagnosed or misdiagnosed on the basis of clearly defined criteria in the DSM?

In pediatrics the diagnosis is based on history from the parents, teachers and the child or adolescent. There are no formal imaging studies or lab tests to objectively confirm our clinical impression. We rely on the combination of clinical interviews and standardized rating scales such as the Connors. On presentation, these children are often classified as "the class clown, the persistent behavior problem, the inattentive child and/or the one who can't sit still."

From the broader integrative view, the practitioner, rarely usually takes the time to question:

1. The **nutritional status** of the child that includes: the lack of adequate food or the intake of excess saturated fats and fast foods.
2. The **sleep hygiene** and healthful benefit of that sleep - is there sleep apnea?
3. The amount of time spent on electronic devices – **screen time**.
4. Possible **toxins** in the environment like pesticides, heavy metals, artificial dyes or benzoates in the diet.
5. The **family dynamics**, parenting skills or stressors in the household.
6. The amount of **exercise** the child gets - Are there opportunities and safe places to go to exercise?
7. The likelihood or diagnosis of **other learning disabilities** or problems with audio or visual processing.
8. The possibility that **depression or anxiety exists**.
9. The **intellectual capacity** or nature of the child – is the child gifted and bored?
10. The **age and maturity** of the child in relation to the others in their class- are they simply immature and the youngest in the class?

Without a thorough, integrative evaluation, the child may be simply misdiagnosed as ADHD, started on stimulant medication and ineffectively monitored.

Over 300 studies have been completed on the efficacy of stimulant medication. Very few long term studies demonstrate long term benefits. Most benefits focus on behavioral versus academic gains. In addition, stimulant medications carry significant health risks and side effects. They may cause decreased appetite, weight loss, trouble sleeping, elevations in blood pressure, tics, hallucinations (variably reported to be as high as 1-5/100), abdominal pain and bizarre behavior. Some medications may cause emotional disorders (blunting to manic episodes). Physiologically there are effects on neurochemical transmitters similar to those of cocaine, MDMA or amphetamine. Our understanding of long term exposures to biologic and cognitive effects from these stimulant medications is limited.

When using an integrative approach, it is important to treat the whole child or adolescent. One must appreciate the unique combinations of strengths and weaknesses in the context of family, friends and community. As a provider, you no longer perceive only a set of symptoms to fix. Integrative pediatrics emphasizes the whole body system approach.

With this approach, one often starts with nutrition and explores if there is a deficiency or food sensitivity. If so, elimination diets may be tried. Nutritional supplements that are beneficial to the brain and that are supported by evidence based studies include:

1. **Omega 3**
 - Hydrogenated oils impair the production of EPA and DHA from omega 3 precursors.
 - EPA and DHA are building blocks of a normal nervous system.
 - Omega 3 is found in fish oil and can alleviate ADHD symptoms and can decrease depression, anger, anxiety, impulsivity and aggression.
 - It can also improve academic achievement.

- Flaxseed, walnuts and green leafy vegetables, salmon, sardines are good sources.
2. **Amino acids** - soy, tofu, bean, lentils milk, cheese, eggs
 3. **Minerals**
 - Zinc - Reduced levels of zinc are seen in ADHD. Treatment with 50 mg lead to significant improvements in hyperactivity, impulsivity and socialization, but not attention.
 - Iron - Low ferritin levels have been documented in children with ADHD (mean 23 with normal HGB and HCT).
 - Magnesium - 5 studies in Europe showed ADHD children with lower Mg levels than controls showed improvement with treatment.
 4. **L-carnitine** - This is an essential nutrient that is crucial for the fatty acid metabolism and mitochondrial energy production. 1-2 gm/day helps to improve attention and behavior.
 5. **Pycnogenol (Pinus Pinaster)** - This product is derived from bark of the French maritime pine and contains polyphenols which are powerful antioxidants that enhance immunity. Studies previously published in *The Journal of American Academy of Child and Adolescent Psychiatry* and further studies currently in process, tout promising results on effectiveness.
 6. **Valerian/Lemon Balm** - These can be used for calming and sleep inducing effects. A study done in children with hyperkinesia and dyssomnia who were treated for 4 weeks with a combination of these herbs showed improvement. However, this was a weak study as it had no control group or documentation of dose through calculated concentration.

Products found to increase symptoms of ADHD include:

1. **Artificial dyes, colors, flavors and preservatives (benzoate)** - A study conducted (Archives of Diseases in Children 2004 JUN) enrolled 273 three year olds to receive a diet free of food coloring and preservatives. They were then given a daily drink with food coloring and sodium benzoate or a placebo drink. Results demonstrated significant increases in hyperactivity when getting the active mixture (even for those not hyperactive at baseline).
2. **Sugar** - Double blind studies have shown that simple sugars do not cause hyperactivity. Sugar does cause swing secondary to high glycemic index with secondary emotional lability and release of stress hormones like adrenaline. Subjects appear fidgety and look like ADHD but this mechanism is driven by a separate mechanism. Thus it is recommended to avoid the "Pop Tart breakfast" and eat a complex carbohydrate with low glycemic index for slow release.

In the integrative model addressing the following factors have been shown to help ADHD:

1. **Sleep** – This has been found to be of utmost importance. Sleep deprivation impairs focus, organizational skills and self-discipline during boring tasks. Efficient and effective sleep is an absolute necessity. Sleep apnea should be ruled out. Electronic devices should be turned off 2 hours before retiring to quiet the mind. No bright lights should be on in the room to avoid what has become known as the 'Edison effect'.

2. **Water** – Adequate fluid intake has proven to be essential; the body is composed of 66 % water and dehydration impairs memory and attention.
3. **Exercise** - This component is key; 30-60 minutes daily of aerobic exercise improves attention.
4. **Mind & Body** – The incorporation of Tai chi, yoga, meditation and/or moving practices (martial arts) is helpful. Playful and developmentally sensitive activities are becoming increasingly available.
5. **School Interventions** - The right school and the right teacher can make all the difference. Parents and teacher should have open dialog and institute a 504 plan which allows for reasonable classroom modifications such as: a set of books for home, modified homework, more test taking time and direct communication on assignments.
6. **Helping Parents** - This is a crucial step as they get frustrated and often need intervention by mental health consultants. This can be accomplished with BMPT (see below).
7. **BMPT** - There needs to be some form of combined behavioral management with parental training. This helps to deal with family issues, conflicted parent - child interactions and psychopathology. Parenting skills, social skills and family issues need also to be addressed.
8. **Biofeedback** - Children with ADHD have predictable brain wave abnormalities. This can be measured by Quantitative EEG (QEEG). They generally have more frequent slow wave (Theta wave arousal) activity and less Fast wave (beta –high arousal) activity than controls. In one study QEEG had 86% sensitivity and 98% specificity for diagnosis of ADHD. (Neuropsychology 1999 NEBA (beta/theta ratio test) was approved by FDA this year) Children can be trained to alter these brain waves by biofeedback techniques in ways somewhat similar to the action of stimulants. Unfortunately it is expensive and not all insurance plans pay for this option.
9. **Herbs/Botanicals** - Look for a good product that is reputable and has standard set by USP (United States Pharmacopeia) or National Sanitation Foundation (NSF International).

So, an integrative approach is a comprehensive approach. It deals with a whole body evaluation that includes: family dynamics and history, nutritional assessment, physical and environmental screenings to rule out toxins, reduction of excessive screen time, as well as an appraisal of school settings and interactions. It evaluates how the child sleeps and the effectiveness of that sleep. It deals with relationships and community, spirituality, and looks for strengths in each child. Before a medication that could potentially have long term side-effects is prescribed, diet should be modified and labs evaluated to look for specific deficiencies. Replacements with supplements should be started, if necessary. Beneficial supplements that are evidence based are recommended and behavioral modifications and school interventions should be initiated. If indicated, botanicals and herbs may be used to aid in sleep. If feasible, QEEG neuro-feedback may be a consideration. Should stimulant medication be necessary, initiation with low dose and titrating with frequent monitoring would be in order.

ADHD has increasingly become a behavioral diagnosis in the inattentive school aged child and adolescent. We must be careful to not over diagnose and treat with medications that have the potential for long term adverse effects. The integrative approach considers an expanded view of possible influences on the disorder, thus suggesting a 'gentler' approach to management. This approach may also preclude the need for medication and the risk for its negative impact on the developing brain.

The reference material for much of the presentation is from two of my mentors who are respected practitioners in the field of Pediatric Integrative Medicine. They are true pioneers in this quickly changing and very exciting science. I acknowledge and thank them.

For additional information I would suggest:

ADHD without Drugs - A Guide to the Natural Care of Children with ADHD

Sanford Newmark, MD
ISBN 978-0-9826714-0-5
Copyright 2010
Nurtured Heart Publications

Mental Health for the Whole Child - Moving Young Clients from Disease & Disorder to Balance & Wellness

Scott M. Shannon, MD
ISBN 978-0-393-70797-7
Copyright 2013 by Scott M. Shannon, M.D.
W.W. Norton & Company, Inc

Integrative Pediatrics

Timothy Culbertson and Karen Olness
PP395-424
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