ADHD Update

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ADHD Definition

“A persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequent and severe than is typically observed in individuals of comparable level of development.”
Diagnosis

- 6 of 9 inattentive behaviors and/or 6 of 9 hyperactive/impulsive behaviors
- For at least six months
- In multiple settings as noted by multiple observers
- Impaired functioning
- Symptoms not better explained by another disorder or condition
Inattentive symptoms

- Fails to attend to details or makes careless mistakes
- Has difficulty sustaining attention
- Does not seem to listen
- Does not follow instructions or fails to finish tasks
- Has difficulty organizing tasks and activities
- Avoids tasks that require sustained attention
- Loses things
- Is easily distracted by extraneous stimuli
- Is often forgetful
Hyperactive/impulsive symptoms

- Fidgets with hands or feet, squirms
- Leaves seat
- Runs about or climbs excessively (feeling restless in adults)
- Has difficulty playing quietly
- Is “on the go” or “driven by a motor”
- Talks excessively
- Blurts out answers prematurely
- Has difficulty waiting turns
- Interrupts or intrudes on others
ADHD – DSM-5 changes

- Published in 2013
- Criteria staying almost same –
  - same behaviors,
  - different examples to expand age range
- Change in age of several symptoms present
  - From “by age 7” to
  - “Prior to age 12”
Additional DSM-5 changes

- “Subtype” changed to “current presentation”
  - Combined – if 6 or more inattentive sx and 6 or more hyperactive/impulsive sx
  - Predominantly Inattentive – if 6 or more inattentive sx and 3-5 hyperactive/impulsive sx
  - Predominantly Hyperactive/Impulsive – if 6 hyperactive/impulsive sx but less than 6 inattentive sx
DSM-5

- Additional “current presentation” added
  - Inattentive Presentation (Restrictive) – if meets inattentive criteria and but has no more than 2 hyperactive/impulsive criteria
- Now possible to diagnose both pervasive developmental disorders and ADHD in same child
More on DSM-5

- Made clearer that information must be obtained from at least two informants – preferably in different settings
  - Suggest both parents is not sufficient
  - With adult ADHD, sx must be confirmed by another adult, not just person with sx
- Stresses impairment in functioning
Diagnostic process

- Parent and child interview information
- Information from other observers – teachers, childcare providers etc.
- Medical history
- Physical exam
  - To rule out medical causes
  - To determine risk factors for meds
- Laboratory tests – none unless needed for possible alternative diagnosis
Things to keep in mind

- ADHD diagnosis - a description of a set of symptoms that occur together
- Symptoms have variable overlap - not discreet, independent symptoms
- No scientific process in selection of criteria
- Likely ADHD is a label representing a number of different alterations in brain structure and function
More things to keep in mind

- All the ADHD variations tend to respond to similar treatments
- Presence and number of co-existing conditions
  - Major impact on outcomes
  - Role in determining interventions
- ADHD is the most common mental health disorder in children (6 - 9% of all children now thought to have ADHD)
Vanderbilt

- Looks at behaviors in manner identical with diagnostic criteria
- Provides information about other behaviors/problems
- Includes information about impairment in functioning
- Teacher form and parent form
More on Vanderbilt

- Easy to complete
- Easy to “score”
- Easier not to “over-interpret”
- Still does not include information about other items in differential diagnosis
  - Environmental factors
  - Family factors
  - Medical conditions
Similar symptoms – medical differential diagnosis

- Learning disabilities – especially auditory processing problems – and intellectual limitation
- Depression or anxiety disorder
- Oppositional/defiant disorder or conduct disorder
- Sensory impairment (hearing or vision)
- Endocrine disorders
- Obstructive sleep apnea
More things with similar symptoms

- Unreasonable expectations for age
- Bright but bored
- Sleep deprivation
- Worry about situational things
- Domestic violence (witness or victim)
- Chronic medical conditions
- Side effects of some medications
Co-occurring problems

- Major factor in outcomes
- Important to address in treatment plans
- Specific issues
  - School performance problems
  - Disruptive and/or oppositional behaviors
  - Conduct problems
  - Anxiety (30%)
  - Depression (20-60+%)
School performance – Mayo Clinic study  (Barbaresi, JDBP 2007)

- Compared 370 children with ADHD to 740 non ADHD children (birth cohort 1976-82)
- ADHD group
  - Much lower median reading achievement scores in middle school (45 in ADHD group vs. 73 in non-ADHD group)
  - 3 times more likely to repeat a grade
  - 2.7 times more likely to drop out of school
Effects of medication on school performance (Mayo Clinic study)

- ADHD youth treated with stimulants
  - Modest improvement in reading scores over non-treated youth ($r=0.15$, $p=0.012$)
  - 1.8 X less likely to repeat a grade than ADHD youth never on stimulants

- Use of meds to treat ADHD did not change drop out rate
Other co-occurring problems

- Enuresis
- Coordination problems
- Sleep problems – both trouble getting to sleep and frequent night wakening
- Accidents
- Tics and Tourette’s – 75-90% of those with Tourette’s also have ADHD
American Academy of Pediatrics
ADHD Guidelines

- Updated in 2011
- Expanded age range to include preschoolers but recommended caution in making diagnosis then
- Expanded scope - recommending behavioral interventions if full criteria for diagnosis not met
40% of preschool children - inattention symptoms of concern to teachers or parents

Vast majority resolve within 3-6 months

Estimated that only 5-10% of pre-schoolers with parent or teacher concerns about inattention have symptoms in 2nd grade consistent with ADHD dx

If persistent symptoms (> 6 months) and get ADHD dx – less than half have ADHD diagnosis by later childhood or adolescence
Treatment

- School age and teens
  - Use meds earlier than in past
  - Treat co-existing conditions with therapy/meds/behavioral strategies
  - Environmental changes
  - Educational supports
  - Behavioral interventions

- For preschool
  - Use environmental and behavioral approaches mainly
Med update

- Stimulants still first choice (and 2nd, 3rd, and 4th choice too)

- Reasons
  - Efficacy
  - Safety if doses skipped
  - Side effect profile the most benign

- Why stimulants? – not a paradoxical effect
Newer stimulants

- Long acting
  - Long acting methylphenidate (Concerta) – still a good choice especially for concerns re abuse
  - Lisdexamphetamine (Vyvanse) – very good side effect profile
- Dexmethylphenidate (Focalin and Focalin XR)
  - L-isomer only
  - Half the dose of usual methylphenidate products
  - Maybe less GI side effects
- Patch – lots of problems so few use
Newer stimulants – liquid and chewable forms

– Extended release liquid suspension of methylphenidate HCL (Quillivant XR)
  • 5 mg/mL
  • Works up to 12+ hours after taking

– Chewable long acting methylphenidate (QuilliChew ER)
  • Works up to 8+ hours after taking

– Oral suspension of amphetamine (Dyanavel XR Oral Suspension)
  • 2.5 mg/mL
  • Duration of action 10-12+ hours
New (2017) FDA approvals

- Mydayis
  - Long-acting, triple-bead, mixed amphetamine salts
  - Approved for ages 13 and up (incl. adults)
  - Onset of action in 2-4 hours, lasts 16 hours

- Cotempla XR-ODT (17.3, 25.9, 34.6, 51.8 mg sizes)
  - Methylphenidate extended-release orally disintegrating tablet
  - Approved for ages 6-17
  - Onset of action in one hour and lasts 12+ hours
Stimulants – side effects

- Main ones
  - Poor appetite when medicine in system
  - Stomach ache, especially if not taken with food
  - Rebound hyperactivity or irritability

- Side effects requiring decisions about treatment but not dangerous
  - Headaches
  - Tics
Stimulant side effects of concern

- **Cardiovascular**
  - Minor blood pressure and heart rate issues
  - Very small risk of sudden death – probably only for those with underlying cardiac disorders

- **Psychiatric**
  - Hallucinations – should stop meds
  - Mid dose irritability or increased hyperactivity – requires change in med, or change in dose
Risk of substance abuse in youth with ADHD (Mayo Clinic study)
Substance abuse


- Analyzed healthcare claims of almost 3 million adolescents and adults

- Both males and females were 31 - 35% (females – males) less likely to experience concurrent substance-related problems while receiving ADHD meds

- Two years after any ADHD meds, still 19% (males) and 14% (females) less likely to have substance related problems
Atomoxetine (Strattera)

- Norepinephrine reuptake inhibitor
- FDA approved to treat ADHD in kids – new generic version approved in 2017
- Requires building up meds over extended time (4-6 weeks)
- Side effects – difficulty falling asleep, sleepiness, GI, possible liver failure, slight increase in suicidal ideation
- Not as effective as stimulants – but can be combined with a stimulant
Alpha agonists

- Long acting forms of guanfacine (Intuniv) and clonidine (Kapvay) FDA approved for treatment of ADHD in children
- Kapvay also approved to treat migraines and anxiety disorders
- Most studies confirm not as effective as stimulant treatments for ADHD
- Note: doses of guanfacine 10X higher than equivalent doses for clonidine
Guanfacine vs. Clonidine

- 24 adults – no psychological diagnoses
- Guanfacine - improved “alertness” and information processing
- Clonidine - much larger sedating effect and greater shift toward “inactivity and apathy”
Guanfacine vs. Clonidine

- Double blinded placebo controlled study in healthy college students
- Equal alterations in blood pressure and subjective feeling of sedation
- At some, but not all doses of clonididine tested, poorer spatial working memory
- Guanfacine improved spatial working memory and planning
Alpha agonists in combination with stimulants

- If given at the same time as a stimulant,
  - Guanfacine enhances effectiveness of stimulant and has less sedative effects when given with stimulant than when given alone
  - Clonidine suppresses action of stimulant

- If trying to improve sleep and improve daytime attention
  - Use stimulants during day and
  - Use clonidine in the evening
Alpha agonists cont.

- Main side effects
  - Sleepiness
  - Hypotension
  - Rebound hypertension if stopped abruptly

- Short acting – especially clonidine
  - Used after school as a transition med
  - Used in evening to help with problems falling asleep
Other options – none good

- Antidepressants (bupropion, tricyclic antidepressants, SSRI)
  - Lots of side effects
  - Dangerous in overdose

- Major tranquilizers (risperidone, etc.)
  - Severe side effects possible
  - Metabolic syndrome

- MAO inhibitors – severe side effects with certain co-meds or with certain foods
ADHD/depression issue

- Often hard to sort out which diagnosis or if both

- Treatment plan
  - Try stimulant first
  - If no response, switch to antidepressant and/or cognitive behavior therapy (CBT)
  - If partial response, consider adding antidepressant and/or adding CBT
Other changes in treatment

- For school age children – consider using medication earlier
- New evidence to support improvement in academics with meds (significant gains but not dramatic) and less grade repetition
- Still need to use combined approach – environmental changes, educational support, behavioral strategies and treat co-existing conditions
Treatment for pre-school age

- Parent training as first line
  - Good documented efficacy
  - Likely relates to improved behavior management and improved organizational support
  - Some efficacy related to behaviors being more due to parenting issues than underlying neurologic problem
Medication for pre-school age

- Use only after parent behavior training
- Medication options
  - Dextroamphetamine products
    - FDA approved but no studies
  - Methylphenidate
    - One study of methylphenidate with good efficacy
    - Effect not as strong as for school age
    - More side effects than school age children
Other potential treatments

- “Counseling” for youngster
  - No place for play therapy or insight therapies
  - Cognitive behavior therapy – good efficacy in addressing co-occurring anxiety and/or depression
  - Organizational help for kids 12 and up

- Parent behavior training
  - Good for parents in general
  - Intermittent to address specific issues
Dietary treatments

- **Sugar**
  - Acute doses of sugar show no impact on behavior in controlled trials
  - No data on chronic sugar consumption
  - Restriction is a healthy option anyway

- **Food colorings**
  - Restriction helpful for small number (less than 5-10%) but can be impressive
More on dietary treatments

- Omega 3 fatty acids
  - Meta-analysis suggests positive impact on parent rating but not teacher rating of symptoms
    P-C Chang et al. Omega 3 Polyunsaturated Fatty Acids in Youth with Attention Deficit Hyperactivity Disorder: A Systematic Review and Meta-Analysis of Clinical Trials and Biologic Studies” Neuropsychopharmacology 10.1038/npp.2017.160

- Gluten
  - Restriction helps small number (2-3%)

- Megavitamins
  - No documented efficacy
  - High risks to large doses of vitamins
More other potential treatments

- **Biofeedback**
  - Limited studies
  - Previously some short term benefit
  - Recent study with longer term benefits

- **Computerized instruction**
  - Improved focusing on computer tasks
  - Little carry over to other areas of concentration
Other interventions

■ Behavior plans
  – To work, child must get reward at least 75% of time
  – Need to change rewards in order to maintain interest

■ Strategies to fix organization problems
  – Routines
  – Visual cues and use of color
More on other interventions

- **Focus on successes**
  - Give positive feedback for success
  - Help think through what helped be successful
  - Add to personal “toolkit” of strategies to continue
Outcome

- Outcome heavily dependent on presence or absence of co-occurring disorders (LD, externalizing behaviors, depression, anxiety, etc.)
- Medication treatment effective in short run and likely has some positive long term impact
- Supportive environment and learning coping strategies and building up strengths makes a difference
Summary

- ADHD diagnosis is based on common description of set of behaviors
- Diagnosis likely represents several different etiologies and brain structural problems
- Symptoms often caused by other things – important to get complete information to sort out
- Children with ADHD often have co-occurring problems
Summary cont.

- Treatment should be multi-modal and include behavior management and environmental changes
- Medication can play an important role in treatment
- Interventions should be tailored to child’s strengths and weaknesses – use positive approaches whenever possible
Issue of obesity

- Men with childhood ADHD had higher BMI as adults (30.1 vs 27.6, p<0.001)
  Cortese study, Pediatrics, 131:e1731-1738, 2013

- ADHD adults also had significantly higher rates of non-alcohol substance use disorders and nicotine dependence (p<0.001) and lower SES (p<0.001) than the control population
Is obesity linked to ADHD meds?

- Schwartz study *(Pediatrics. 133(4); 668-676, 2014)*
- Compared youth with no ADHD diagnosis to ones with ADHD in a large dataset
- Kids with ADHD diagnosis but no meds had increased obesity compared to no ADHD diagnosis
- ADHD diagnosis plus meds – later onset of obesity but slightly greater BMI eventually
- Study has major flaws
Cortese study attributed differences to

- Deficient inhibitory control and delay aversion (features of impulsivity)
- Poor planning and difficulty monitoring eating behaviors
- Abnormal executive function leading to irregular eating patterns
- Dysfunction in fronto-striatal dopaminergic pathways – linked to both ADHD and obesity separately