Update on the Treatment of ADHD

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Lecture Goals

• Understand ADHD in children and adolescents

• Familiarity with Co morbid conditions associated with ADHD and how they relate to successful treatment

• Accommodations and strategies for success in ADHD
ADHD is a group of neurobehavioral disorders resulting in developmentally inappropriate self-regulation of attention, impulsivity, and hyperactivity.
DSM 5 Criteria for Inattention

- Careless
- Difficulty sustaining attention
- Seems not listen
- Fails to finish things
- Avoids/dislikes tasks requiring sustained mental effort
- Difficulty organizing
- Loses things
- Easily distracted
- Forgetful in daily activities

6 or more often manifested
DSM 5 Criteria for Impulsivity/Hyperactivity

- Hyperactivity
  - Squirms and fidgets
  - Unable to stay seated
  - Runs/climbs excessively
  - Can’t play/work quietly
  - On the go/”driven by a motor”
  - Talks excessively

- Impulsivity
  - Blurts out answers
  - Difficulty waiting turn
  - Interrupts or intrudes on others

6 or more often manifested
Attention Deficit / Hyperactivity Disorder

• Interest Driven, Not Task Driven
• Immature Executive Function
• Easily Distracted
• Excitable / Impulsive
• Poor Frustration Tolerance
Executive Function

- The ability to plan, organize, initiate, maintain and complete tasks, with the ability to monitor and shift priorities, as needed

- A collection of processes responsible for directing and managing cognitive, behavioral, psychosocial and emotional functions
Executive Skills

• **Initiation** – Getting started
• **Working Memory** – Holding and using information actively
• **Inhibition** – Not react to impulse, stop activity
• **Flexibility/Shifting** – Move from one task to another
• **Planning** – Anticipation of future events and developing strategies
• **Organizing** – Establish and maintain order
• **Self-Monitoring** – Attention to behavior and output with ability to revise
• **Emotional/Behavioral Control** – Regulate emotional response
Comorbidity in Children

- ODD 50%
- Conduct Disorder 10%
- Language Based LD 30%
- Specific Learning Disorder 25%
- Anxiety/OCD 25%
- Depressive Disorders 35%
- Smoking 3 Xs
- SUD 3 Xs
• In 2011 the AAP recommended evaluating young children at risk for ADHD at 4 years of age, using Vanderbilt Rating Scales and full work-up.

• Parents are to be counseled prior to starting medication.

• Methylphenidate (off label) recommended as initial therapy due to safety and efficacy.
ADHD in a Young Child

• Jimmy is a hyperkinetic 4 and 11/12 year old male referred for behavior and academic concerns. His oldest brother has been arrested for SUD. Another brother is being successfully treated for ADHD with Vyvanse. Vanderbilt Parent and Teacher Rating Scales are compatible with ADHD-C. The children are covered by Absolute Total Care (Medicaid).

• The only allowed medications for children less then 6 years old are IR Dexedrine and IR Adderall. See any problems?
Adolescent Issues with ADHD

• ADHD teens have 3-4 Xs the number of auto accidents, 4-6 Xs the speeding tickets, and 3 Xs the ER visits than control group
• Inattention and distractions as the cause
• Dr Daniel Cox has shown protection if stimulant taken properly
• Parents of teens often distracted by crisis with their own parents, leaving supervision of ADHD to the adolescent
• Unplanned pregnancy 4 Xs as likely
• Smoking and SUD
Clinical Course

- Hyperactivity and impulsivity diminish over time.
- Diminished executive functions persist.
- Accommodations and strategies develop.
- 80% of patients maintain some Sx into adulthood.
- 55-65% maintain clinically significant Sx.
- Heavy burden of losses (career, family, marriage, social).
Treatment of ADHD

ADHD medications are effective, but only ameliorate (not eliminate) symptoms, so treatment of ADHD is much more than just medications!
Treatment Plan

- Proper evaluation
- Demystification
- Behavioral modification
- Environmental modification
- Psychopharmacology
Evaluation for ADHD

• VPRS & VTRS Screeners (free online)
• Multiple sources for information
• Proper physical examination with vision, hearing and vital signs
• Expanded differential diagnosis
• Evaluate for the presence of comorbid conditions
Demystification

• Resources for Families
  – Websites
    • Children and Adults with AD/HD (CHADD): www.chadd.org
    • National Resource Center on AD/HD: www.help4adhd.org
    • Dr. Patricia Quinn: (website for girls/women with ADHD): www.addvance.com
    • Wrights Law (website with information on educational law): www.wrightslaw.com
Demystification: Education

• Resources for Families
  – Books
    • *ADHD: What Every Parent Needs to Know* by AAP
    • *Taking Charge of ADHD: The Complete, Authoritative Guide for Parents* by Russell Barkley
    • *The ADHD Book of Lists* by Sandra Rief
    • *Understanding Girls with ADHD* by Patricia Quinn and Kathleen Nadeau
    • *Straight Talk and Psychiatric Medications for Kids* by Tim Wilens, MD
    • *Cory Stories: A Kid’s Book About Living with ADHD* by Jeanne Kraus and Whitney Martin
    • *Joey Pigza Swallowed the Key* by Jack Gantos
Environment: Home

• Fun and Organized
• Study Aides / Tutoring/ Coach
• Routine / Time Management
• Encouragement / Challenge
• Involved / Supportive Parents
• Efficient environment
• Consistent medication usage
• Sleep (www.sleepfoundation.org)
Environment: School

- Efficient and Organized
- Inclusive, Not Exclusive
- Preferential Seating
- Psycho-educational testing (if indicated)
- 504 / IEP / BIP (www.Wrightslaw.com)
- Silent Signal
- No Loss of Recess
- Peer mentor/tutor
- Teacher/student match
Environment: Work

- Efficient Environment/ Avoid Distractions
- Avoid traps (Games, Social Networking)
- Life/ Career Coach
- Organization aides (Apps, Smart Phone)
- Reminders (Sticky Notes)
- Planner/ Lists…Scheduled Checks
- Accountability Partner
Treatment: Medications

• Stimulants
  – Methylphenidate-based medications
  – Amphetamine-based medications
• Non-stimulants
  – Atomoxetine
  – Extended release alpha-2 agonists
Treatment: Medications

• Stimulants:
  – Immediate release:
    • 4 hour duration of effect
    • Diversion potential
  – Intermediate release:
    • 8 to 9 hour duration of effect
  – Extended Release:
    • 10 to 12 hour duration of effect
Treatment: Medications

• MPH-based Stimulants
  – Immediate Release MPH (Generics)
  – Extended Release®
    • OROS Delivery System (Concerta®)
      – Long acting oral MPH medication
      – Must be swallowed
      – Available in generic
      – 72 mg indication for adolescents/ adults
    • Bead Delivery System
      – Designed to mimic BID dosing
      – May be sprinkled and then swallowed (not chewed!)
      – 30/70 Release (Metadate CD®)
      – 50/50 Release (Ritalin LA®)
• **MPH-based Stimulants**
  
  – Extended Release (cont)
  
  • Wax Matrix Delivery System
    – Inconsistent delivery of medication even in same patient
    – Must be swallowed
    – Available in generics which are relatively inexpensive
      [brand names: Ritalin SR®, Metadate ER®, Methylin ER®]

• Oral Suspension (Quillivant XR®) 25 mg/5 ml
Treatment: Medications

• MPH-based Stimulants
  – Extended Release (cont)

  • Quillivant XR®
    – Liqui XR delivery system. 25 mg/5 ml
    – 20% IR in a polystyrene/ 80% in coated polystyrene
    – Must be shaken 10+ seconds before drawing up into syringe
    – 12 hour duration of effect
Treatment: Medications

• MPH-based Stimulants
  – Extended Release (cont)
• Transdermal (Daytrana®)
  – Start everyone on 10 mg q am (regardless of prior MPH dose) and titrate to effect
  – Patch should be worn for 9 hours, and then removed to get full 12 hour effect
  – Patch may be removed in less than 9 hours if shorter duration wanted
  – MPH is a skin irritant! Rotate application site through 4 positions on hip
Treatment: Medications

- MPH-based Stimulants / Dexmethylphenidate
  - Immediate Release (Focalin®)
  - Extended Release (Focalin XR®)
  - Bead Delivery System
  - May be sprinkled
  - Fewer side effects?
Treatment: Medications

- Amphetamine-based Stimulants
  - Dextroamphetamine
    - Short acting
      - Generic Tablet (Brand Name: Dexedrine®)
      - Brand Name Liquid (Procentra®)
    - Extended Release (Dexedrine Spansule®)
      - May be sprinkled
      - Available in generic
      - Lisdexamfetamine Dimesylate (Vyvanse®)
  - May be sprinkled OR dissolved in water
• Amphetamine-based Stimulants
  – Mixed amphetamine salts
    • Immediate Release (Adderall®)
    • Extended Release (Adderall XR®)
    • Bead Delivery System
    • May be sprinkled
Treatment: Medications

• Non Stimulants
  – Atomoxetine (Strattera®)
    • Provides 24 hour coverage of ADHD symptoms
    • May be given in the evening® or in the morning (with food!)
    • Must be swallowed because drug is an esophageal irritant
    • Dosed by weight: target dose of 1.2 – 1.4 mg/kg daily/ max 80 in adolescents and 100 in adults
    • Side effects: similar to stimulants (HR and BP)
    • Rare side effects: jaundice/liver injury, suicidal ideation, activation, disinhibition. Adults with ED
Treatment: Medications

- **Stimulants**
  - Side Effects: decreased appetite, weight loss, headache, stomachache (give after food!), emotion/mood changes, rebound hyperactivity, sleep difficulties, emergence of tics
  - Rare Side Effects: psychotic episode, sudden cardiac death?
  - “Risks/benefits discussed, including psychiatric and cardiac risks”
Treatment: Medications

- Non-stimulants
  - Alpha-2 Agonists
    - Extended release guanfacine (Intuniv®)
      - Once daily
      - May be given at night or in the morning
      - Start everyone at 1 mg daily
      - May increase dose by 1 mg each week to max of 0.12 mg/kg/day (but no more than 4 mg daily)
      - MAXIMUM DOSE: 4 mg
    - Side Effects: fatigue, somnolence, headache, decreased blood pressure, syncope
Treatment: Medications

- Non-stimulants
  - Alpha-2 Agonists
    - Extended release clonidine (Kapvay®)
      - Start with 0.1 mg bedtime dose; increase by 0.1 mg each week to desired effect (if SEs tolerated)
      - Doses higher than 0.1 mg should be given in 2 divided doses
      - If reach 0.3 mg, give 0.2 mg at night and 0.1 mg in the morning
      - Max dose 0.4 mg/day
    - Side Effects: fatigue, somnolence, headache, decreased blood pressure, syncope
Treatment: Medications

• General Principles
  • Some patients need dose of immediate release medication in the afternoon to help with evening focus, rebound hyperactivity, and/or evening dysphoria
  • Do not use Rx as a test for ADHD; do full evaluation on all patients
  • Treat mood disorder first, intrinsic anxiety second, and then ADHD
  • Treat ADHD first when dealing with mild anxiety
Pearls for Managing ADHD

- Use specific target symptoms and monitor efficacy
- Start low and titrate dose until maximum improvement or side effect (SE)
- Change to different class of stimulant if SE persist
- Middle school onward should be treated 365 days per year to protect from substance use/abuse, auto injuries, unplanned pregnancy, etc
**Pearls for Managing ADHD**

- Monitor growth and vital signs with each visit
- Re-evaluate diagnosis and continued need for therapy
- Watch for emergence of co-morbid disabilities
- Re-examine patient q 3 months
- Discourage drug holidays
- Monitor flow of Rx (freq of use) and be aware of risks for diversion.
  - Immediate release >> delayed release
Suggested Reading

- Plizka, S et al. (1999). *ADHD with Comorbid Disorders*. Quilford Press. NY
Read about treatment for attention deficit hyperactivity disorder (ADHD), which can help relieve the symptoms and make the condition much less of a problem in day-to-day life. There are 5 types of medicine licensed for the treatment of ADHD: methylphenidate, dexamfetamine, lisdexamfetamine, atomoxetine, guanfacine. These medicines are not a permanent cure for ADHD but may help someone with the condition concentrate better, be less impulsive, feel calmer, and learn and practise new skills. Medications are the only proven treatment for attention deficit hyperactivity disorder (ADHD), with its symptoms of distractibility, impulsiveness, and hyperactivity. But the benefits of stimulants last only as long as patients continue to take them, and worries about the risks of long-term use are again in the news. Please note the date of last review or update on all articles. No content on this site, regardless of date, should ever be used as a substitute for direct medical advice from your doctor or other qualified clinician.