ADHD

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Conflict of Interest

The presenter indicates that there is no conflict of interest in this presentation,
Objectives

1. Recognize signs/symptoms of different types of ADD/ADHD.
2. Differentiate ADHD from other disorders.
3. Identify the medications used for treating ADD/ADHD, and when to initiate therapy, and how to titrate or change medications.
4. Apply diet, behavioral, and medication management to select case study.
ADHD by the Numbers

- 11% of children 4-17 years old
- 6.4 million (2011)
- 7.8% in 2003 to 9.5% in 2007 and to 11.0% in 2011.
- Boys (13.2%) were more likely than girls (5.6%)
- Prevalence rates: 5.6% in Nevada to 18.7% in Kentucky
- Indiana 15.7% (2011)
ADD/ADHD

- What is my ADD is not your ADD

- Chemical imbalance of one or more of three neurotransmitters in the brain
  - GABA
  - Dopamine
  - Serotonin
The Overlap
Primary Symptoms

- Inattentiveness
- Distractibility
- Hyperactivity
- Disorganization
- Impulsivity
DMS-5 Criteria

- **Inattention:**
  - Six or more symptoms of inattention for children up to age 16
  - Five or more for adolescents 17 and older and adults
  - Symptoms of inattention have been present for at least 6 months, and they are inappropriate for developmental level:
Hyperactivity and Impulsivity:

- Six or more symptoms of hyperactivity-impulsivity for children up to age 16
- Five or more for adolescents 17 and older and adults
- Symptoms of hyperactivity-impulsivity have been present for at least 6 months to an extent that is disruptive and inappropriate for the person’s developmental level.
In Addition

- **The following conditions must be met:**
  - Inattentive or hyperactive-impulsive symptoms were present before age 12 years.
  - Several symptoms are present in two or more setting,
  - There is clear evidence that the symptoms interfere with, or reduce the quality of, social, school, or work functioning.
  - The symptoms do not happen only during the course of schizophrenia or another psychotic disorder.
ADD/ADHD Work-UP

- **History**
  - Behavior noted in more than 1 environment
  - Behavior before noted before 12 years old
  - Last Eye/Hearing Exam and by whom
  - Diet
  - Sleep Pattern

- **Physical Exam**
  - Attention to the Heart, B/P
  - Behavior during visit

- **Connor Scale**

- **Vanderbilt Scale (AAP toolkit)**
Tests

- **Lab**: CBC, T4, Lead level, Magnesium
- **Screenings**: Vision, Hearing
- **Scans** (Becoming Standard of Care: AAP)
  - Normal brain activity at rest
  - Decreased activity, especially in the prefrontal cortex, during a concentration task
Differential Diagnoses

- Autism
- Elevated Lead Level
- Hyperthyroidism
- Anemia
- Visual/Hearing Disorders
- Oppositional Defiant Disorder
If Behavior Change is New

- Consider head injury
- Substance Abuse
- Physical, Sexual, or Psychological Abuse
Affects of ADD on Brain
The Chemicals & the Brain

- Prefrontal cortex
- Cerebellum
- Anterior cingulate
- Basal ganglia
  - Produces Dopamine
- Temporal lobes
- Limbic System
Types of ADHD

- Classic ADD
- Inattentive ADD
- Over-focused ADD
- Temporal Lobe ADD
- Limbic ADD
- Ring of Fire ADD
- Anxious ADD
- Dr. Amens
Classic ADD/ADHD
Zametkin, et al., 1990

Brain with ADHD
Normal Brain
Treating Classic ADD

- **Stimulants and Supplements**
  - **Medications:** Ritalin, Adderall, Vyvanse, Concerta
  - **Supplements:** rhodiola, green tea, ginseng, and the amino acid L-tyrosine
- Fish oil that is higher in EPA than DHA.
Inattentive ADHD
Treating Inattentive ADD

- **The goal**—boost dopamine levels.
- **Supplements**: amino acid L-tyrosine,
- **Stimulant**: Adderall, Vyvanse or Concerta.
- **Diet**: High-protein, lower-carbohydrate diet
- **Exercise** daily.
Over-focused ADHD
Treatment Over-Focused ADD

- **The goal**-- boost serotonin and dopamine
- **Supplements first**—L-tryptophan, 5-HTP, saffron, and inositol.
- If supplements don't help,
  - Effexor, Pristique, or Cymbalta.
- **Diet**: Avoid higher-protein diet with this type, which can make patients mean.
- **Neurofeedback training**
Temporal Lobe ADD

- Low activity in the Frontal Lobe
- Increased activity in the temporal lobe
- More often seen in patients with head injuries
- Classic ADD symptoms with a short fuse
Treatment of Temporal Lobe ADHD

- **Supplements:**
  - GABA (gamma-aminobutyric acid)
  - Magnesium
  - Gingko
  - Vinpocetine

- **Anticonvulsant medications**
Limbic ADD
No medication

Amphetamine
Treatment of Limbic ADD

- **Supplements**
  - DL-phenylalanine (DLPA)
  - L-tryosine
  - SAMe (s-adenosyl-methionine)
  - Fish oil (Omega 3 EPA)

- **Medications**
  - Wellbutrin  Researchers think it works by increasing dopamine
  - Imipramine is another option for this type.

- **Exercise**: Regularly

- **Diet**: 
Ring of Fire ADD

- Noticeable overall increased activity across the cortex

- Low prefrontal cortex activity (less common)
Treatment of R-of-F ADD

- **Stimulants**
- **Elimination Diet**
- **Supplements:** GABA, 5-HTP, and L-tyrosine supplements.
- **Anticonvulsants**
- **Blood pressure medicines:** guanfacine and clonidine may be helpful, calming overall hyperactivity.
Anxious ADD

- Classic ADD symptoms
- Tense, anxious
- Physical symptoms
- Predict the worst
- Freeze in anxiety-provoking situations
- High Activity in the Basal ganglia and deep structure in brain that produce dopamine.
- In most types of ADD, there is low activity in these areas
Treating Anxious ADD

- **Goal**—increase relaxation and boost GABA and dopamine levels.
- **Stimulants**
- **Supplements**—L-theanine, relora, magnesium, and holy basil.
- **Tricyclic antidepressants**—imipramine or desipramine to lower anxiety.
- **Neurofeedback**
Treatment Plans Include

- Parent/Child education
  - ADHD as a chronic disease
  - Involves a team approach
- Behavioral intervention strategies
- School accommodations and interventions
- Medications
- Requires regular follow-up and monitoring
Pharmacology Treatment

- **Medications**
  - Should be started as soon as diagnosis is made
  - First Line—Stimulants
  - Second Line—Antidepressants, Anticonvulsants, Antihypertensives

- **Supplements**
  - Omega 3
  - Magnesium
Stimulant Medication

- **Immediate Release**
  - *Methylphenidate* (10-60mg)
    - Ritalin, Metadate, Methylin, Concerta (18-54mg)
  - *Dexmethylphenidate*
    - Focalin (5-20mg)
  - *Dextroamphetamine*
    - Dexedrine (5-40mg)
  - *Lisdexamphetamine*
    - Vyvanse (30-70mg)
- **Amphetamines**
  - Mixed amphetamine salts (Addral 5-40mg))
  - Methamphetamine (Desoxyn-5-25mg)
Sustained Release

- **Methylphenidate** (10-60mg)
  - Ritalin SR, Ritalin LA,
  - Metadate ER, Metadate CD,
  - Metylin ER, Concerta, Daytrana (patch 15-30mg)
- **Dextroamphetamine**
  - Dexadrine spansules (5-40mg)
- **Amphetamine**
  - Adderall XR (5-40mg)
How they work

- Inhibition of dopamine reuptake
- Most have a rapid onset of action
- Symptom reduction in 30 to 60 minutes
- Duration of action 4 to 12 hours
## Side Effects & Solutions

<table>
<thead>
<tr>
<th>Side Effects</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Insomnia</td>
<td>Earlier dosing or with clonidine or trazodone at bedtime</td>
</tr>
<tr>
<td>Reduced Appetite</td>
<td>Switch to Focalin which may have less affect on appetite</td>
</tr>
<tr>
<td>Stomach ache</td>
<td>Give medication with Food</td>
</tr>
<tr>
<td>Mild Dysphoria</td>
<td>Switch classes of stimulants, or add an antidepressant such as bupropion</td>
</tr>
<tr>
<td>Lethargy</td>
<td>Reduce dose</td>
</tr>
<tr>
<td>Headache</td>
<td>Reduce dose or Change stimulants</td>
</tr>
</tbody>
</table>

Special Cases

- Preschool to School-aged Children
  - 4-5 years of age—start with Behavior therapy; assess for developmental problems
  - When therapy is not achieving symptom control, may try mediation
  - Currently, only dextroamphetamine is approved by the FDA for this age group.
  - Methylphenidate (Ritalin, Concerta, and Daytrana patch)

AAP recommendations
Adolescents & Adults

- Check for Substance Abuse
- Monitor for refills
- Medication coverage for evening.
- Use motivational interviewing techniques
## Alpha-2 Adrenergic Agonists

Reduce irritability, aggression, impulsivity, and insomnia, tics

<table>
<thead>
<tr>
<th>Generic</th>
<th>Brand</th>
<th>Typical Dose (for children &amp; Adolescents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clonidine</td>
<td>Catapres</td>
<td>0.15-0.4mg (3 to 4 times a day)</td>
</tr>
<tr>
<td>Guanfacine</td>
<td>Tenex</td>
<td>0.25-1.0 mg (2 to 3 times a day)</td>
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<tr>
<td>Preston et al (2010)</td>
<td></td>
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</tbody>
</table>
## Antidepressants

<table>
<thead>
<tr>
<th>Generic</th>
<th>Brand</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bupropion</td>
<td>Wellburin DR/LA</td>
<td>Child: 100-150 mg Adult: 150-300mg</td>
</tr>
<tr>
<td>Atomoxetine (Black Box Warning)</td>
<td>Strattera (Monitor Liver function)</td>
<td>1.2-1.8mg/kg (same for children and adolescents)</td>
</tr>
<tr>
<td>Preston et al (2010)</td>
<td>AAP recommendation</td>
<td></td>
</tr>
</tbody>
</table>
Benefits of Antidepressants

- Once a day dosing
- No need for special prescription pads
- No addition potential
- Most effective 5 to 40 days after starting
- Typically cover 24 hours
- Can be used to treat comorbid depression
Deciding on Medication

- Does the person have a tic disorder
- Efficacy of medication
- Preferred length of time coverage
- Can swallow pills or capsules
- Cost
- Ease of administration
- Minimum side-effects
- Time of day for maximum symptom control (Concerta)
- Will medication alter sleep pattern
- Risk status for drug abuse
Titrating Stimulants

- Start with low dose
- Titrate on a 3 or 7 day bases
- May evaluate symptom control with phone meetings with parents or adult
- Increasing doses can be done by prescriptions that allow for dose adjustments upward
- Or by 1 prescription of tablets/capsules with instructions to administer progressively higher amounts by doubling or tripling the dose weekly.

- **Week 4**: face-to-face meeting with child/parent or adult

AAP recommendations
When to Change Medications

- Stomach ache
- Mild Dysphoria
- Headaches
- If no symptom control after 1 month
- Target goals are not being meet
Supplements

- Omega 3 (higher in EPA than DHA)
- Those reduce inflammation
When the Medication Does Not Work

- Consider the Differential Diagnoses
- Consider the other types of ADD
- Consider need for poly-pharm therapy, refer to a specialist.
Follow-up Visits and Recommendations

- Teach patient/family how to monitor HR and B/P
- Ask School Nurse to monitor HR and B/P after increase in medications
- Increase medications at weekly intervals
- Use long-acting medications
- Follow-up face-to-face at 4 weeks
- Every three months if on stimulants and symptoms are controlled
Barriers to Treatment

- The family need to be informed
- Myths
  - ADHD does not affect behavior
  - One outgrows ADHD
- Cost of medication and supplements
- Need for Lifestyle changes
  - increasing activity
  - changing diet
  - Being consistent with plan of care
Behavioral Interventions

- Create a routine.
- **Get organized.**
- Avoid distractions.
- Limit choices.
- Change your interactions with your child.
- Use goals and rewards.
- Discipline effectively.
- Help your child discover a talent.

http://www.cdc.gov/ncbddd/adhd/treatment.html
Case Study

- Susie, a 7 year old, is referred to your practice, because her teacher says that she daydreams a lot in class and does not get her work done. Mom feels frustrated and asks if the teacher is making too much out of this as Susie does not cause any problems in the class.

- What is your response?
- Should this child be worked up for ADHD?
• What tests will you run?
• Who will you have do the Connor or Vanderbilt scale?
• When will you start Susie on medication or supplements?
• What about diet?
• What about exercise?
Resources

  - http://www.amenclinics.com/

Thank You

Questions?

Visit the AAP site for the ADHD toolkit