UPMC LIFE CHANGING MEDICINE

ADHD Medications: Basics

David Benhayon MD, PhD

Goals & Objectives

- Understand basic classes of stimulants and equivalents
- Be exposed to role of nonstimulant alternatives
- Discuss the role of therapy in the treatment of ADHD

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Outline

- Stimulants
- CASE 1: Johnny
- Nonstimulant alternatives
- CASE 2: Rebecca

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Two (Very) Broad Classes of ADHD Medications

- **Stimulants**
  - **Methylphenidate**
  - **Amphetamine and derivatives**
- **Non-stimulants**
  - **Alpha-2 agonists**
  - **Atomoxetine (Strattera)**
  - **Bupropion (Wellbutrin)**

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Stimulants

- Mainstay of ADHD treatment
  - Potential for abuse/misuse is high
  - Side effects to watch for:
    - Decrease in appetite (with subsequent weight loss)
    - Upset stomach
    - Decline in sleep
    - Cardiac side effects
      - Elevation of pulse and blood pressure
      - AACAP does not recommend routine collection of baseline EKG
  - Drug Holidays are fine

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Two (Very) Broad Classes of Stimulants

- Methylphenidate
  - FDA approved for age 6 and up
  - AAP recommends starting with methylphenidate at 3-6 due to quality of evidence
- Amphetamine and derivatives
  - FDA approved for as young as 3 (Some forms)
    - DextroStat
    - Adderall

Very Hard to Predict Who Will Respond Better to One or the Other

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Stimulant Dosing

- Start low, go up
- Collect data from teachers and parents to assess progress
- Can tell very rapidly if a medication is going to work or not
- Side effects (esp GI) often get better if patients can persevere
- Generally do not exceed 2 mg/kg/day

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Methylphenidate

- Comes in numerous flavors/numerous names
  - Most medications have both (D, L) enantiomers of methylphenidate
    - Brand names include Concerta, Metadate, Ritalin, Daytrana, Quillivant, Methylin, Aptensio, Quillichew
    - **All** are the same medication, just different packaging and delivery systems
  - Methylphenidate (D)
    - Purified version of methylphenidate
    - Focalin

Methylphenidate Basics

- Medication inhibits Norepinephrine and Dopamine transporters
- Short ½ life: 2-4 hours
  - First developed in 1944, Ritalin has been used in ADHD since the 1960s
  - Due to the short half-life, an industry has arisen trying to get the medication to last longer and be delivered more evenly

Ritalin

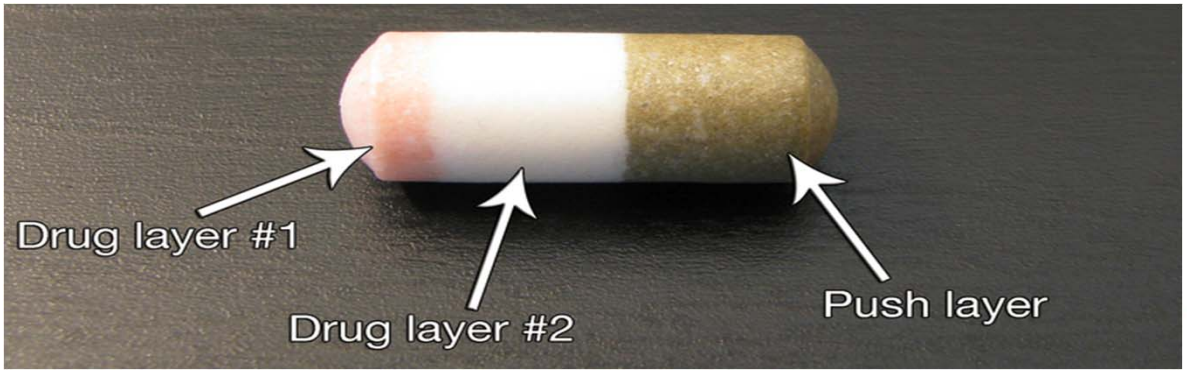
- The first ADHD medication used since 1950s
  - Comes in 3 preparations
    - Immediate release [IR] (lasting ~2-4 hours)
    - Sustained release [SR] (~4-6 hours, seldom used)
    - Long acting [LA] (~8 hours)
  - Advantage of Ritalin LA versus Concerta is this may be opened and sprinkled on food
  - Many times, the IR form will be used as a bridge for kids to get them through evenings and homework

Ritalin Dosing

- IR comes in 5 mg, 10 mg, 20 mg tabs
  - Often patients will take every 4 hours if just using IR form
  - Younger children often do better with smaller amounts of IR medication if they cannot tolerate a long-acting medication
- LA comes in 20 mg, 30 mg, 40 mg capsules
- Start low, generally do not exceed ~2 mg/kg/day

Concerta

- Pill form (not breakable)
- Long acting stimulant: 8-13 hours
- OROS (**O**smotic **R**elease **O**ral delivery **S**ystem)



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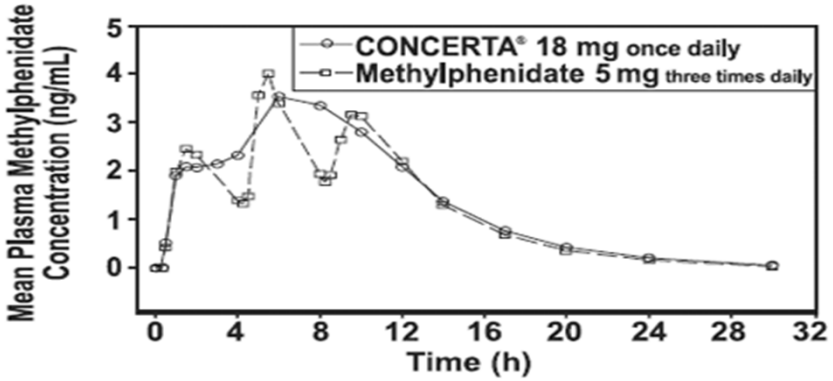
Concerta (continued)

- OROS delivery offers plateau of stimulant



- Child has to be able to swallow pills
- Dosing: 18 mg, 27 mg, 36 mg, 54 mg capsules
  - Maximum dose usually 72 mg/day

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Metadate

- Very similar to Ritalin
  - Controlled Dosing [CD] usually lasts ~8 hours and is comparable to Ritalin LA
    - Can be opened and sprinkled
    - Often insurance companies will approve one or the other
  - Extended Release [ER] is comparable to Ritalin SR
    - Lasts 4-6 hours
    - Seldom used

Daytrana

- Transdermal patch delivery
  - Lasts about 9 hours/day
  - Comes in 10 mg, 15 mg, 20 mg, 30 mg doses
  - Often takes about 1-2 hours to take effect
- Rashes are a frequent side effect
- Less potential for abuse
- Very expensive, second line medication
- Can be hard to find (manufacturer's shortage)

Other Forms of Methylphenidate

- Oral solution exists (Methylin) as does a chewable form
- Quillivant XR
  - Extended Release liquid formulation 25mg/5ml
  - Once daily dosing
- Quillichew ER
  - Extended Release chewable tablet
  - 20 mg, 30 mg, 40 mg tabs
- Aptensio
  - Extended release tablet will dissolve in hands
  - 10 mg, 15 mg, 20 mg, 30 mg, 40 mg, 50 mg, and 60 mg

Focalin

- Methylphenidate (D)
  - In theory, this is the active, purified version
  - In theory, this should limit side effects
- XR formulation-5, 10, 15, 20, 25, 30, 35, 40 mg tablets
- IR formulation-2.5, 5, 10 mg tablets

Amphetamine

- Again, comes in many flavors
- Amphetamine (D, L)
  - Adderall
- Amphetamine (D)
  - Dexedrine
  - Dextrostat
- Lisdexamfetamine (prodrug)
  - Vyvanse

Adderall

- Is FDA approved for ages 3 and up (IR form)
- Generally, try to use XR form whenever possible
  - Comes in 5, 10, 15, 20, 25, 30 mg tablets
  - Should last about 8-10 hours (ideally)
- Often requires an afternoon booster with a dose of IR (5, 10, 15, 20 mg) to get through homework and evening hours

Other Forms of Amphetamine

- Adzenys
  - Long acting orally disintegrating tab
  - 3.1 mg, 6.3 mg, 9.4 mg,12.5 mg, 15.7 mg, 18.8 mg
- Evekeo
  - Short-acting amphetamine tablet
  - 5mg, 10mg
- Procentra
  - Short-acting Bubble-gum tasting solution
  - 5 mg/5 mL
- Zenzedi
  - Short-acting DEXtroamphetamine tablet
  - 2.5 mg, 5 mg, 7.5 mg, 10 mg, 15 mg, 20 mg or 30 mg.

Dexedrine/DextroStat

- Amphetamine (D) is one enantiomer of Amphetamine (D, L)
  - Cleaner version of amphetamine (theoretically)
  - Akin to Focalin versus other forms of methylphenidate
- Short-acting (3-6 hours, DextroStat) and Long-acting (8 hours, Spansule) forms
- Spansules may be opened and sprinkled on food

Lisdexamfetamine (Vyvanse)

- Prodrug of dextroamphetamine, activated in the GI tract
- Longest acting of the amphetamines (10-12 hours)
- Comes in 10, 20, 30, 40, 50, 60, 70 mg caps
  - May be opened and sprinkled or dissolved in water
  - Usually start 20-30 mg and increase by 10 mg increments

Stimulants Rough Equivalency

	Amphetamine	Methylphenidate
Short-acting		Ritalin 20 mg tid
		Focalin 10 mg bid
Intermediate-acting	Adderall 15 mg bid	Metadate CD 30 mg
	Evekeo 15 mg bid	
	Zenzedi 15 mg bid	
	Procentra 15 ml bid	Focalin XR 30mg
Long-Acting	Adderall XR 30mg	Quillivant 60 mg(note 25mg/5ml)
	Adzenys XR-ODT 18.8mg	Quillichew 60 mg
		Aptensio XR 60mg(actually equiv to ritalin 25.9 twice a day)
	Vyvanse 70mg (more similar to Ritalin 20mg tid or Adderall XR 30mg)	Concerta 54mg (similar to Ritalin 20 mg tid in terms of total dose but may need a chaser)

Case - Johnny

- Johnny is a 13 year old male with ADHD and no comorbidities. He has responded so well to Adderall XR 30mg in the past that he has not needed therapy for over 2 years. In the summer before 7th grade his insurance changed, and Adderall XR was no longer covered. Mom tells you she had heard good things about Concerta, which was covered with no co-pay. She has never thought that the medication worked after school. She also had concern about 7th grade being "harder due to more homework and having to switch between classes." She hopes that Concerta would work longer in the day than Adderall XR.
- Mom and Johnny come in today for a follow-up stating that 7th grade has been even worse than they anticipated, and they want to switch back to Adderall XR 30mg from the Concerta 36mg that he started over the summer.

Questions

- What happened?
- Where can you go next?
- Do you want more information?
- What about therapy?

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Atomoxetine (Strattera)

- Nonstimulant medication
  - Norepinephrine Reuptake Inhibitor (NRI) with secondary effects on Dopamine
  - Takes time for full effect/must be taken everyday
  - Side effects
    - Decreased appetite
    - Sedation and fatigue
    - Priapism
  - Generally second-line medication used if contraindication to stimulants or potential for abuse

Atomoxetine (Strattera)

- Requires titration in many cases
- Lots of dosages (10, 18, 25, 40, 60, 80, 100 mg)
  - Can become tricky as it often requires titration
  - Expensive
- Usually start at 0.5 mg/kg/day, increase after a week up to 1.2 mg/kg/day
- Once daily dosing

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Case-Rebecca

- Rebecca is a 10 year-old girl who had been struggling with ADHD symptoms of inattention that were diagnosed last year. She was started on Concerta and is currently taking 27 mg/day with improvement in school performance. She has been tolerating the medication well and has been thriving in 5th grade.

- Mother brings the patient to your practice for a sick visit, noting that for the past 2 weeks, Rebecca “has developed asthma and seizures.” She has been coughing persistently and occasionally shaking her head violently, and the teacher complained about her behavior disrupting class. She has no significant PMH, no other medications. Mother is very concerned about these episodes, which do not happen while she sleeps. Rebecca does not report being bothered by these behaviors, which “I just kind of have to do.”

Questions

- What is the problem?
- Why did it develop?
- What are the treatment options?

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Alpha-2 Agonists

- These are purported to work in Prefrontal Cortex for ADHD
- Also work in Brain Stem to decrease sympathetic activity, decreasing blood pressure
  - Side effects are largely from decreasing sympathetic signaling (i.e., dry mouth, sedation)
  - Hypotension
- Not often used as ADHD monotherapy, very often used as an adjunct
- Takes weeks to see full effect

Clonidine (Catapres)

- Can be sedating, dry mouth, hypotension
- Dosing: 0.1, 0.2, 0.3 mg tabs
  - Will often start at 0.05 mg
  - Can use BID dosing if not too sedating
- Extended Release form – Kapvay
  - Once daily dosing, can be challenging to get through insurance

Guanfacine (Tenex)

- Useful for tics
- Dosing: 1, 2 mg tabs
  - Can often start at 0.5 mg
  - Can use BID dosing, often a bit less sedating than clonidine
- Extended Release Form – Intuniv
  - Once daily dosing