Top 20 Most Prescribed Drugs

Amelie Hollier, DNP, FNP-BC, FAANP
Advanced Practice Education Associates

Objectives
1. Review the most commonly prescribed medications in the US. in 2014/2015
2. Compare/Contrast select medications in specific medication classes
3. Relate medication mechanism of action with pathophysiology of specific disease states.

Top 20 drugs
• Top 20 by monthly prescription
• NOT top selling ($$$) - that’s a different list!

TOP 20 Dispensed Rx’s

<table>
<thead>
<tr>
<th>Medication</th>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Levothyroxine</td>
<td>11. Amoxicillin</td>
</tr>
<tr>
<td>2. Acetaminophen/hydrocodone</td>
<td>12. Fluticasone</td>
</tr>
<tr>
<td>5. Atorvastatin</td>
<td>15. Hydrochlorothiazide</td>
</tr>
<tr>
<td>6. Amlodipine</td>
<td>16. Azithromycin</td>
</tr>
<tr>
<td>7. Metformin</td>
<td>17. Furosemide</td>
</tr>
<tr>
<td>8. Omeprazole</td>
<td>18. Sertraline</td>
</tr>
<tr>
<td>10. Albuterol</td>
<td>20. Losartan</td>
</tr>
</tbody>
</table>

Top 20 drugs
Let’s talk about thyroid disease!

Synthroid (levothyroxine)
• 2-5/100 patients has hypothyroidism
• Thyroid supplement for patients with hypothyroidism (T₃)
• Enhance oxygen consumption by most tissues in the body and increase metabolic rate and metabolism of carbs, protein, and lipids
TSH (Thyrotropin)
• Third generation TSH has detection limits of about 0.01 mU/L
• Able to detect even mild hypo or hyper thyroidism

Usual levels are about 0.4 - 4.9 mU/L

What is the ULN for a TSH?
Usual levels are about 0.4 - 4.9 mU/L

Why 2.5 mU/L?
• 95% of rigorously screened euthyroid patients have serum values between 0.4 and 2.5 mU/L
• This will increase the number of patients diagnosed with subclinical hypothyroidism!
• Usual levels are about 0.4 - 4.9 mU/L

Thyroid 2003 Jan;13(1):3-126

What are “Normal Values”
• Lab solicits 100 healthy volunteers
• Determine the values for each patient for each parameter

95% of rigorously screened euthyroid patients have serum values between 0.4 and 2.5 mU/L
**Elderly “Normal Values”**
- TSH rises as people age
- Age-based normal ranges for TSH
- 70% of older patients had normal TSH 3.56 mU/L to 7.49 mU/L

**Clinical Practice Quiz**
Why should TSH measurement be considered when a patient presents with new onset dyslipidemia?

**Synthroid (levothyroxine)**
- Enhance oxygen consumption by most tissues in the body and increase metabolic rate and metabolism of carbs, protein, and lipids
- 2-5/100 patients has hypothyroidism
- Thyroid supplement for patients with hypothyroidism (T₄)

**Clinical Practice Quiz**
So, if the TSH is elevated in my dyslipidemic patient, should I initiate a statin?
1. Yes
2. No
3. It depends

**Clinical Practice Quiz**
What does it depend on?
If > 10, wait on statin!

**Synthroid (levothyroxine)**
- T₄ absorbed in the small bowel when taken orally
- Absorption varies from 40-80%
- Prefer daily oral dose, empty stomach, 30 minutes before food is eaten
- Fasting increases absorption of T₄
- Most important thing is consistency!
Clinical Practice Quiz

How much levothyroxine should you prescribe to a young, otherwise healthy adult diagnosed with hypothyroidism?

Synthroid (levothyroxine)

• Replacement based on ideal body weight: 1.6 mcg/kg/day
• 1.6 mcg/kg/day if little or no thyroid function

Replacement in the Elderly

• Patients 50-60 years old: start at 50 mcg daily; check TSH in 4-6 weeks
• Presence of cardiac disease: start at 12.5 25 mcg daily; check TSH in 4-6 weeks
• Increase every 3-6 weeks by 12.5-25 mcg until at normal TSH

Synthroid (levothyroxine)

• 7 days = Half life of $T_4$
• 2-3 days = Half life of $T_3$
• Stability in metabolism is created by $T_4$

Half-Life (levothyroxine)

<table>
<thead>
<tr>
<th>Day</th>
<th>1 week</th>
<th>2 weeks</th>
<th>3 weeks</th>
<th>4 weeks</th>
<th>5 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>88 mcg</td>
<td>44 mcg</td>
<td>22 mcg</td>
<td>11 mcg</td>
<td>5.5 mcg</td>
<td>2.75 mcg</td>
</tr>
</tbody>
</table>

Rule of Thumb:
Check a drug level after 5 (6) half lives of the drug.

Quiz:
Suppose my patient is still tired after being treated with levothyroxine alone for hypothyroidism?

When should a Levothyroxine level be checked? ???

When do we check a TSH level after dose change?
**Synthroid (levothyroxine)**

- 15% of patients will continue to have symptoms with normal TSH values
- Look for other causes of fatigue: depression, anxiety, anemia, autoimmune disorders
- 3-6 months to reach full benefit


**Synthroid (levothyroxine)**

- Some experts push the TSH levels to lower end of normal
- Not really evidence-based


---

**Quiz:**

Should you prescribe T3 for a patient with hypothyroidism who continues to have symptoms on T4 replacement?

---

**T3 (liothyronine) Cytomel**

- Benefit is questionable!
- Increases CV risks
- Some patients “just feel better”

---

**Why better with T3?**

- Possible defective thyroid hormone transporters
- Deiodinase activity may be subpar
- Tissue conversion to T3 might be inadequate
- Some tissues may have varying levels of T3

- No tests to precisely determine this

Prescriber’s Letter; January 2015; Vol: 31

---

**T3 (liothyronine) Cytomel**

If decision is made to give T3, then:

- 1:14 dose ratio of liothyronine to levothyroxine
- Do not use liothyronine ALONE!!!
- Do not use dessicated thyroid (Armour thyroid)
- Too many hormone fluctuations, high risk of CV toxicity

Prescriber’s Letter; January 2015; Vol: 31
**TOP 20 Dispensed Rx’s**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Levothyroxine</td>
<td>11. Amoxicillin</td>
</tr>
<tr>
<td>2. Acetaminophen/hydrocode</td>
<td>12. Fluticasone</td>
</tr>
<tr>
<td>5. Atorvastatin</td>
<td>15. Hydrochlorothiazide</td>
</tr>
<tr>
<td>6. Amlodipine</td>
<td>16. Azithromycin</td>
</tr>
<tr>
<td>7. Metformin</td>
<td>17. Furosemide</td>
</tr>
<tr>
<td>8. Omeprazole</td>
<td>18. Sertraline</td>
</tr>
<tr>
<td>10. Albuterol</td>
<td>20. Losartan</td>
</tr>
</tbody>
</table>

**Hydrocodone**

Changed to a Schedule II in October, 2014

Mrs. Boudreaux

Mrs. Boudreaux has chronic low back pain. She takes hydrocodone when she has bad "pain days". Mrs. Boudreaux gets good pain relief and and takes her meds as prescribed. She’s never called in early for a refill, she keeps her appointments with pain med provider, and she’s been compliant with all urine drug screens as part of her pain provider’s protocol.

Mrs. Boudreaux’s Adult Daughter

- Injures her back pushing her lawn mower. It’s a weekend. She is in a lot of pain and can’t get relief from 800 mg ibuprofen
- Mrs. Boudreaux gives her daughter one of her Lortab to relieve pain so she can sleep tonight
- Thoughts???

Mrs. Boudreaux’s Adult Daughter

- This is an illegal act of diversion
- It’s a violation of federal law

Your responsibility as a prescriber is to make sure that the person for whom the prescription is written is aware of this!

**Number 1 Concern: Patient Safety Opioids**

- Overdose is common
- Estimated that 90% of OD is unintentional
- Respiratory Depression/Death are possible
Opioid Analgesics

- 41% of all fatal overdoses involve opioid analgesics
- Of these deaths, Benzo involved 31%; EtOH 19%
- Highest overdose rates are in middle aged adults; Whites, American Indians, Alaska natives
- Deaths: Males > Females

www.cdc.gov/media/releases/2013/p0220_drug_overdose_deaths.htm

Opioid Analgesics

- Any opioid can cause death or serious side effects, but risks are greater with extended release (ER) or long acting (LA) opioids
- Reason: Amount of drug per tablet is greater

www.cdc.gov/media/releases/2013/p0220_drug_overdose_deaths.htm

Painkiller Abuse is considered a Public Health Epidemic!

Number 1 Goal ER/LA Opioids: Patient Safety

“John”

- John is a 45 year old male smoker who has hypertension, type 2 diabetes. His BMI is 35, he doesn’t exercise.
- Does it seem prudent to screen him for hyperlipidemia?

“John”

- Hyperlipidemia is a risk factor if you have HTN and DM
- The purpose of screening is to identify risks that a patient has, so you can deliver excellent care!
By Analogy....
If you take opioids, we must screen you for other risk factors!

Patient Assessment
Risk Factors for Prescription Drug Abuse
Number 1 Risk Factor for Abuse:
• Ask about history of drug abuse
• Get good medical history from patient

Number 2 Risk Factor:
• Psychiatric co-morbidities: bipolar, anxiety, depression
• Must screen for these!
• Get good medical history from patient

Goal: Patient Safety
How can you make sure that your patient is safe while taking the opioids you prescribed?

Goal
What you are prescribing is in the urine.
Nothing else!

Tramadol (Ultram)
• Schedule IV of the controlled substance act in August 18, 2014
Tramadol (Ultram)
- Synthetic codeine analog (centrally acting synthetic opioid analgesic)
- Weak Mu opioid receptor agonist
- Inhibits the uptake of norepinephrine and serotonin (Drug interactions!!!)
- Do not give to opioid dependent patients (re-initiate physical dependence)

Tramadol (Ultram)
- Absorbs well orally (similar to codeine)
- Duration is 4-6 hours
- In combo with acetaminophen
- Extended release form available

Tramadol (Ultram)
- Low abuse potential because of low action on the opioid receptors
- 100 mg = 10 mg morphine
- Good use is chronic neuropathic pain
- Most common side effect is nausea, vomiting, sweating, dry mouth, dizziness, sedation

Quiz
Why can tramadol and other opioids produce nausea and vomiting?

TOP 20 Dispensed Rx's

<table>
<thead>
<tr>
<th>Medication</th>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Levothyroxine</td>
<td>11. Amoxicillin</td>
</tr>
<tr>
<td>2. Acetaminophen/hydrocortone</td>
<td>12. Fluticasone</td>
</tr>
<tr>
<td>5. Atorvastatin</td>
<td>15. Hydrochlorothiazide</td>
</tr>
<tr>
<td>6. Amlodipine</td>
<td>16. Azithromycin</td>
</tr>
<tr>
<td>7. Metformin</td>
<td>17. Furosemide</td>
</tr>
<tr>
<td>8. Omeprazole</td>
<td>18. Sertraline</td>
</tr>
<tr>
<td>10. Albuterol</td>
<td>20. Losartan</td>
</tr>
</tbody>
</table>

Nexium (esomeprazole)
3rd best selling medication
### History of Nexium (esomeprazole)

<table>
<thead>
<tr>
<th>Year</th>
<th>Medication</th>
<th>Generic Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>Prilosec</td>
<td>Omeprazole</td>
</tr>
<tr>
<td>2001</td>
<td>Nexium</td>
<td>Esomeprazole</td>
</tr>
<tr>
<td>2003</td>
<td>Prilosec OTC</td>
<td>Omeprazole</td>
</tr>
<tr>
<td>2010</td>
<td>Zegerid</td>
<td>Omeprazole plus Na Bicarb</td>
</tr>
<tr>
<td>2014</td>
<td>Nexium OTC</td>
<td>Esomeprazole</td>
</tr>
<tr>
<td>2014</td>
<td>Esomeprazole strontium</td>
<td>Esomeprazole strontium</td>
</tr>
</tbody>
</table>

### PPI-Interesting Situation

**Esomeprazole strontium**
- This drug does NOT have a brand name
- It is NOT generic for Nexium (but that's what you might think!)
- Not cheap!

### PPI

**Esomeprazole magnesium = Nexium**
- Patent covers esomeprazole salts: magnesium, calcium, sodium, lithium, and ammonium
- Patent did NOT cover strontium!
- Strontium is not equivalent to the magnesium salt: bone issues, Preg Cat C

**Esomeprazole strontium Doses**
- 2 strengths: 24.65 mg, 49.3 mg
- 24.65 mg (equiv to 20 mg Nexium)
- 49.3 mg (equiv to 40 mg Nexium)

### PPI

**Omeprazole vs esomeprazole**
- Omeprazole = mixture of R and S enantiomers of omeprazole
- Esomeprazole = just S enantiomers of omeprazole

### Proton Pump Inhibitors

**Drug Interactions**

<table>
<thead>
<tr>
<th>PPI</th>
<th>How Metabolized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexlansoprazole</td>
<td>C19, 3A4, induces 1A2, inhibits 2C19</td>
</tr>
<tr>
<td>Lansoprazole</td>
<td>C19, 3A4, induces 1A2, inhibits 2C19</td>
</tr>
<tr>
<td>Omeprazole</td>
<td>C19, 2C9, 3A4; inhibits 2C19, 2C9; induces or inhibits 1A2</td>
</tr>
<tr>
<td>Esomeprazole</td>
<td>C19, 3A4, induces 1A2</td>
</tr>
<tr>
<td>Omeprazole + Na bicarb</td>
<td>C19, 2C9, 3A4; inhibits 2C19, 2C9; induces or inhibits 1A2</td>
</tr>
<tr>
<td>Pantaprazole</td>
<td>C19, 3A4; inhibits 2C19</td>
</tr>
<tr>
<td>Rabeprazole</td>
<td>C19, 3A4; inhibits 2C19</td>
</tr>
<tr>
<td>Esomeprazole strontium</td>
<td>C19, 3A4, inhibits 2C19</td>
</tr>
</tbody>
</table>
### PPI Indications
- Indicated for short term use to treat GI and duodenal ulcers
- GERD
- *H. pylori* infections
- Erosive esophagitis
- To prevent NSAID related ulcers
- Zollinger-Ellison syndrome

### PPI OTC and Rx
- Omeprazole and Na bicarb (Zegerid)
- Na bicarb = baking soda
- Allows omeprazole to be absorbed a little bit faster
- Each cap contains 300 mg Na
- Avoid in HTN, HF, or other patients in whom Na should be restricted

### PPI Use
**Increased gastric pH**
- Alters the absorption of many drugs
- Calcium, Fe, Vitamin B12

### PPI Harms
**Fracture Risk** in patients > 50 years, high doses, or use > 1 year
- 25% increase in all fractures
- 47% increase in spinal fractures
- FDA requires fracture risk info added to labeling in OTC and Rx PPIs

### PPI Harms
- Possible decreased calcium absorption caused by PPIs
- Inconclusive relationship between PPIs and bone density

### PPI Harms
**Infection**
- Pneumonia/C. difficile: R/T gastric acid suppression may allow bacterial growth
- Care in use with patients with COPD, asthma, increased age, immunosuppression
How to Discontinue Chronic PPI Use

Taper Dose
- Taper dose first
- Dose every other day for 1-2 weeks and stop
- Use H2 blockers for symptoms
- Consider antacids for symptoms

TOP 20 Dispensed Rx’s

<table>
<thead>
<tr>
<th>Medication</th>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Levothyroxine</td>
<td>11. Amoxicillin</td>
</tr>
<tr>
<td>2. Acetaminophen/hydrocodone</td>
<td>12. Fluticasone</td>
</tr>
<tr>
<td>5. Atorvastatin</td>
<td>15. Hydrochlorothiazide</td>
</tr>
<tr>
<td>6. Amlodipine</td>
<td>16. Azithromycin</td>
</tr>
<tr>
<td>7. Metformin</td>
<td>17. Furosemide</td>
</tr>
<tr>
<td>8. Omeprazole</td>
<td>18. Sertraline</td>
</tr>
<tr>
<td>10. Albuterol</td>
<td>20. Losartan</td>
</tr>
</tbody>
</table>

Metformin: ADA First Line Treatment for Pre-DM, T2DM
Evidence Level: A
- Metformin is first choice for oral treatment unless there is a contraindication
- Metformin reduces CV risks!!

Metformin
Metformin often chosen for:
- Effect on glucose
- Absence of weight gain or hypoglycemia
- Low incidence of side effects
- Low cost
- Reduction in all cause mortality

Metformin and Lactic Acidosis
- Metformin’s precursor, phenformin, removed from market for lactic acidosis

Metformin and Lactic Acidosis
- Metformin contraindicated for patients in whom lactic acidosis is a possibility
- Examples: HF, renal or hepatic dysfunction
New Data: Metformin and Lactic Acidosis

Incidence of lactic acidosis in DM:
• With metformin: 6.3/100,000 patient years
• Without metformin: 7.8/100,000 patient years


FDA Label for Metformin

Contraindications for metformin
• Males: serum Cr > 1.5 mg/dL
• Females: serum > Cr 1.4 mg/dL

Metformin for Special Populations

<table>
<thead>
<tr>
<th>eGFR mL/min</th>
<th>Max Daily Dose</th>
<th>Renal Function Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>2550 mg daily</td>
<td>Annually</td>
</tr>
<tr>
<td>45-59</td>
<td>2000 mg daily</td>
<td>Every 3-6 months</td>
</tr>
<tr>
<td>30-44</td>
<td>1000 mg daily</td>
<td>Every 3 months</td>
</tr>
<tr>
<td>&lt; 30</td>
<td>None</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Prescriber’s Letter: March 2015; Vol. 22, No. 3

TOP 20 Dispensed Rx’s

<table>
<thead>
<tr>
<th>Medication</th>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Levothyroxine</td>
<td>11. Amodiacllicin</td>
</tr>
<tr>
<td>2. Acetaminophen/hydrocodone</td>
<td>12. Fluticasone</td>
</tr>
<tr>
<td>5. Atorvastatin</td>
<td>15. Hydrochlorothiazide</td>
</tr>
<tr>
<td>6. Amlodipine</td>
<td>16. Asclthromycin</td>
</tr>
<tr>
<td>7. Metformin</td>
<td>17. Furosemide</td>
</tr>
<tr>
<td>8. Omeprazole</td>
<td>18. Sertraline</td>
</tr>
<tr>
<td>10. Albuterol</td>
<td>20. Locartan</td>
</tr>
</tbody>
</table>

What’s New in 2016?

Section 8

Consider aspirin therapy for women aged > 50 years who have diabetes
Advair, Spiriva, and Proventil HFA are 3 of the highest $$ grossing lower respiratory medications.


IF you have a Rx for albuterol..... I'll bet you also have a Rx for one of these!

Smoking Cessation
• Benefits are immediate and long-term
• Decreases CV risks and decreases risk of lung cancer

Electronic Cigarettes
• Been around since 2007
• No tobacco (not regulated by US tobacco laws), but does contain nicotine
• CHANGE expected late 2014: FDA expected to place e-cigs under Tobacco Control Act and allow FDA to regulate
• Prohibit sales if < 18 years old

How E-Cigs Work
• Atomizer heats liquid containing nicotine ("Vaping")
• Cartridge flavored: chocolate, bubblegum, caramel, strawberry

Electronic Cigs
• Amount of liquid nicotine varies by cartridge
• Can contain up to 100mg/mL of nicotine
• 6-13 mg/kg can be lethal in a toddler
Poisonings with E-cigs

Fruit and Candy Flavorings

- 215 calls/month 2014 to poison control
- Most were in 1-5 year olds
- N, V, D, HTN, tachycardia, seizures, coma, death
- Poisoning: atropine, scopolamine given to block cholinergic effects
- No child proof caps
- Can be absorbed through the skin

Electronic Cigs

- CDC: not clear if e-cigs help people quit smoking
- Not clear on how e-cigs will affect cigarette usage
- Could e-cigs attract children?

TOP 20 Dispensed Rx’s

<table>
<thead>
<tr>
<th>Medication</th>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Levothyroxine</td>
<td>11. Amoxicillin</td>
</tr>
<tr>
<td>2. Acetaminophen/hydrocortone</td>
<td>12. Fluticasone</td>
</tr>
<tr>
<td>5. Atorvastatin</td>
<td>15. Hydrochlorothiazide</td>
</tr>
<tr>
<td>6. Amlodipine</td>
<td>16. Azithromycin</td>
</tr>
<tr>
<td>7. Metformin</td>
<td>17. Furosemide</td>
</tr>
<tr>
<td>8. Omeprazole</td>
<td>18. Sertraline</td>
</tr>
<tr>
<td>10. Albuterol</td>
<td>20. Losartan</td>
</tr>
</tbody>
</table>

The more often you’re exposed to an antibiotic....

The more likely you are to harbor resistant organisms
**Mycoplasma “Walking Pneumonia”**

If Mycoplasma is documented as the pathogen, what is the best treatment?
1. Azith 500 mg once, then 250 mg x 4 days
2. Azith 2g once
3. Doxy 100 mg PO BID
4. Amox-clav 875 PO mg BID

**Patient #1**

- Increasing macrolide resistance with Mycoplasma
- Doxycycline is a superior choice

JAC 68:506, 2013

**What Antibiotic for ABRS?**

- Amoxicillin not a good choice any more (too much resistance, less Strept pneumo, more incidence of H. flu is 27-43%)
- Amoxicillin with clavulanate better choice

**However.....**

Group A beta hemolytic Streptococcus has NEVER been resistant to Penicillin.

Continue to use amox!

**TOP 20 Dispensed Rx’s**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Levothyroxine</td>
<td>11. Amoxicillin</td>
</tr>
<tr>
<td>2. <em>Acetaminophen/hydroc.</em></td>
<td>12. Fluticasone</td>
</tr>
<tr>
<td>5. Atorvastatin</td>
<td>15. *Hydrochlorothiazide</td>
</tr>
<tr>
<td>7. *Metformin</td>
<td>17. *Furosemide</td>
</tr>
<tr>
<td>8. Omeprazole</td>
<td>18. *Sertraline</td>
</tr>
<tr>
<td>10. Albuterol</td>
<td>20. *Lorcipan</td>
</tr>
</tbody>
</table>

**Quiz:**

What predictable side effect does each of the “asterisked” * drugs have?
### PDE5 Inhibitors (Phosphodiesterase)

- **Viagra** (sildenafil)
- **Stendra** (avanafil)
- **Cialis** (tadalafil)
- **Leitra, Staxyn** (vardenafil)

### PDE5 Inhibitors

- Original use was for pulmonary hypertension
- Mild vasodilators

### Background....

- In the reproductive system, nitric oxide (NO) is "the messenger!"
- Increased blood flow in the penis causes an erection
- Problems: Insufficient NO produced, poor blood flow to penis

### Take Home Point:

A complaint of ED can be forerunner of symptomatic cardiovascular disease.

### How things work... when things work

- Male receives a stimulus
- Nitric oxide released
- cGMP activated, smooth muscle relaxation
- Increased blood flow produces erection.

### When things don’t work... several possibilities

- Male receives a stimulus
- Nitric oxide released insufficiently
- cGMP inactivated too quickly by PDE5
- Poor blood flow
PDE Receptors

• 9 different PDE receptors found in the body
• PDE5 receptors are found in male erectile tissue, platelets, vascular, skeletal, visceral tissues
• PDE3 receptors are found in coronary tissues
• PDE6 receptors are found in the retina

Understanding Side Effects

• Hypotension (PDE3, PDE5)
• Abnormal vision (PDE6): color tinge to vision, increased sensitivity to light, blurred vision
• Cerebrovascular hemorrhages, SAH (PDE5)
• Diarrhea (PDE5)
• Nasal congestion (PDE5)

Understanding Side Effects

• Avoid ALL nitrates with PDE5 inhibitors
• Avoid all alpha blockers except tamsulosin and other uro specific alpha blockers (but it doesn’t mean there won’t be hypotension)

Good Rule of Thumb

Choose an agent that is most specific in the medication class for the problem you are treating.

ALPHA BLOCKERS

<table>
<thead>
<tr>
<th>Non-selective Alpha Blockers</th>
<th>Medications</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doxazosin</td>
<td>Cardura</td>
<td></td>
</tr>
<tr>
<td>Prazosin</td>
<td>Minipress</td>
<td></td>
</tr>
<tr>
<td>Terazosin</td>
<td>Hytrin</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Uro-specific Alpha Blockers</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Uroxatral</td>
<td>Alfuzosin (needs renal and hepatic dose adjustments)</td>
</tr>
<tr>
<td>*Flomax (generic)</td>
<td>Tamsulosin (no renal or hepatic precautions); sulfa allergy precaution</td>
</tr>
<tr>
<td>*Rapaflo</td>
<td>Silodosin (needs renal and hepatic dose adjustments)</td>
</tr>
</tbody>
</table>

PDE5 Inhibitor Drug Interactions

• Metabolized by CYP450 3A4 enzymes
• Vardenafil by CYP450 3A5 enzymes
• Blocking these enzymes can produce exaggerated side effects
• Issues with QT interval prolongation
PDE5 Inhibitor Drug Interactions

- Metabolized by CYP450 3A4 enzymes
- Grapefruit juice inhibits metabolism of PDE5 Inhibitors

PDE5 Inhibitor Drug Interactions

- Alcohol = mild vasodilator, decreases ability to have an erection
- Symptomatic hypotension

PDE5 Inhibitor Drug Interactions

- QT interval Prolongation

High Risk DRUGS

- Macrolides, quinolones, telithromycin, sulfonamides
- Amitriptyline, citalopram, paroxetine, sertraline, venlafaxine, fluoxetine
- Albuterol, levalbuterol, salmeterol
- Phenylephrine, pseudoephedrine
- Cocaine

WHO is at risk?

- Elderly
- Psychiatric patients
- Patients with eating disorders (electrolyte imbalances)

TOP 20 Dispensed Rx’s

<table>
<thead>
<tr>
<th>Medication</th>
<th>Prescription</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Levothyroxine</td>
<td>11. Amoxicillin</td>
</tr>
<tr>
<td>2. Metoprolol</td>
<td>12. Fluticasone</td>
</tr>
<tr>
<td>5. Amlodipine</td>
<td>15. Hydrochlorothiazide</td>
</tr>
<tr>
<td>6. Omeprazole</td>
<td>16. Amlodipine</td>
</tr>
<tr>
<td>7. Metformin</td>
<td>17. Furosemide</td>
</tr>
<tr>
<td>8. Albuterol</td>
<td>18. Omeprazole</td>
</tr>
<tr>
<td>10. Losartan</td>
<td>20. Losartan</td>
</tr>
</tbody>
</table>
Thank you!

To Reach me:
Amelie Hollier, DNP, FNP-BC, FAANP
Advanced Practice Education Associates
Lafayette, LA
amelie@apea.com