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PHARMACOLOGY BASICS FOR THE GERIATRIC POPULATION: PART 2
Kenneth L Miller, PT, DPT, CEEAA
Objectives (Part 1 and 2)

1) Define and explain pharmacodynamics, pharmacokinetics, polypharmacy, medication errors, and adverse drug events.
2) Explain how to use the Beers List to identify potentially inappropriate drug use in the elderly population.
3) List the commonly prescribed medications (prescription and OTC), their indications and side effects.

Objectives (Part 1 and 2)

4) Explain medication adherence and how it relates to adverse drug events and health outcomes.
5) Identify adverse drug reactions, side effects, and intended effects of the medications geriatric patients take.
What this course is not...

- This course will not provide decision trees or information necessary to prescribe or select appropriate front line medications.
- The course will not cover all adverse drug interactions, desired effects, untoward effects, side effects, etc.

Course Schedule

- Background and Overview
- Commonly prescribed Medications (Prescription and Over the Counter)
- Common Adverse Drug Reactions
- Commonly Prescribed Drug Classes for the geriatric patient
- Q&A
Background

Prescription drug use

- Percent of persons using at least one prescription drug in the past 30 days: 48.7% (2009-2012)
- Percent of persons using three or more prescription drugs in the past 30 days: 21.8% (2009-2012)
- Percent of persons using five or more prescription drugs in the past 30 days: 10.7% (2009-2012)

Source: Health, United States, 2014, table 85 [PDF: 9.8 MB]

Physician office visits

- Number of drugs ordered or provided: 2.6 billion
- Percent of visits involving drug therapy: 75.1%
- Most frequently prescribed therapeutic classes:
  - Analgesics
  - Antihypertensive agents
  - Antidepressants

Source: National Ambulatory Medical Care Survey: 2010 Summary Tables, Tables 22, 23, 24

Background

Hospital outpatient department visits

- Number of drugs ordered or provided: 329.2 million
- Percent of visits involving drug therapy: 72.5%
- Most frequently prescribed therapeutic classes:
  - Analgesics
  - Antidiabetic agents
  - Antihypertensive agents

Source: National Hospital Ambulatory Medical Care Survey: 2011 Outpatient Department Summary Tables, tables 18, 19, 20

Hospital emergency department visits

- Number of drugs ordered or provided: 286.2 million
- Percent of visits involving drug therapy: 80.3%
- Most frequently prescribed therapeutic classes:
  - Analgesics
  - Antiemetic or antiemetic agents
  - Minerals and electrolytes

Source: National Hospital Ambulatory Medical Care Survey: 2011 Emergency Department Summary Tables, Tables 20, 21, 22
Prescription Drug Use

What were the most frequently used types of prescription drugs? The types of prescription drugs used by Americans varied by age (Figure 5).

Figure 5. Percentage of prescription drugs used most often, by drug type and age group: United States, 2007-2008

NOTES: Primary indication for the use of the drug class is in parentheses. CNS is central nervous system.
SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey.


Most Common Drugs by Age

The most commonly used types of prescription drugs in the United States by age were:

- Bronchodilators for children aged 0-11.
- Central nervous system stimulants for adolescents aged 12-19.
- Antidepressants for adults aged 20-59.
- Cholesterol lowering drugs for adults aged 60 and over.

Among children under age 6, penicillin antibiotics were the most frequently used prescription drugs.

Diuretics and β-blockers were also very commonly used drugs in adults and older Americans. These are usually used to treat high blood pressure and heart problems.

Polypharmacy stratified by Age

Figure 2. Percentage of prescription drugs used in the past month, by age: United States, 2007–2008

Trends in Prescription Use

Figure 1. Trends in the percentage of persons using prescription drugs: United States, 1999–2008
Chronic Health Conditions

Percentage of people age 65 and over who reported having selected chronic health conditions, by sex, 2009–2010

<table>
<thead>
<tr>
<th>Condition</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart disease</td>
<td>37</td>
<td>26</td>
</tr>
<tr>
<td>Hypertension</td>
<td>54</td>
<td>57</td>
</tr>
<tr>
<td>Stroke</td>
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<td>Asthma</td>
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<td>13</td>
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<td>Chronic bronchitis or emphysema</td>
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<td>Any cancer</td>
<td>28</td>
<td>21</td>
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<tr>
<td>Diabetes</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>Arthritis</td>
<td>45</td>
<td>56</td>
</tr>
</tbody>
</table>

NOTE: Data are based on a 2-year average from 2009–2010.
Reference population: These data refer to the civilian noninstitutionalized population.
SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.

Mortality – Leading causes (in order)

- Heart Disease
- Cancer
- Chronic Lower Respiratory Disease
- Stroke
- Alzheimer’s Disease
- Diabetes
- Influenza/Pneumonia
Are the Medications helping?

Death rates for selected leading causes of death among people age 65 and over, 1981–2009

Per 100,000

ICD-10*

Heart disease
Cancer
Stroke
Influenza and pneumonia
Diabetes
Chronic lower respiratory diseases
Alzheimer's disease


* Change calculated from 1999 when 10th revision of the International Classification of Diseases (ICD-10) was implemented.
NOTE: Death rates for 1981–1998 are based on the 9th revision of the International Classification of Diseases (ICD-9). Starting in 1999, death rates are based on ICD-10. For the period 1991–1998, causes were coded using ICD-9 codes that are nearly comparable with the 113 cause list for the ICD-10 and may differ from previously published estimates. Rates are age-adjusted using the 2000 standard population.
Reference population: These data refer to the resident population.
SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.

Commonly Used Medications
Prescribed and Over the Counter
Prescription Meds

- Antibiotics
- Vitamins
- Asthma
- Psychotropics
  - ADHD, ADD, Depression

Over the Counter

- Over the Counter (OTC)
  - Oral, topical, patch, sublingual, Otic/Ophthalmic
  - Symptom relief
    - Pain/Headache/Heartburn
    - Cough
    - Diarrhea/Constipation/Stomach Upset
    - Allergies/Itchiness
    - Sleeping
  - Health
    - Vitamins/Supplements/Herbals
Common Adverse Drug Reactions (ADR)

- ADR – unwanted and potentially harmful effect caused by a drug when the drug is given at the recommended dosage
  - Gastrointestinal Symptoms
  - Dizziness and Falls
    - Orthostatic Hypotension
  - Sedation
  - Confusion
  - Depression
  - Fatigue and Weakness
**Gastrointestinal Symptoms**

- Symptoms
  - Nausea
  - Vomiting
  - Diarrhea
  - Constipation
- Common Drug Classes
  - Opioids
  - NSAIDS

**Dizziness and Falls**

- Drug induced dizziness
  - Sedatives, Anti-psychotics, opioids, antihistamines, muscle relaxants
  - Orthostatic Hypotension
    - 20 mmHg or greater decline in systolic BP or 10 mm Hg or greater decline in diastolic BP with position change from lying to sitting to standing
    - Meds include: Blood Pressure, Angina
    - Symptoms of syncope and dizziness
Sedation

- Medications with primary sedative effects
  - Sedatives/Hypnotics
- Sedative side effects
  - Opioids
  - Anti-psychotics

Confusion

- Antidepressants
- Opioid Analgesics
- Drugs with Anticholinergic Effects
- Drug toxicity
  - Lithium
  - Digoxin
- Worsening of confusion for people with mild cognitive impairment
Depression

- Alcohol
- Antipsychotics
- Barbiturates
- Some high blood pressure meds
  - Clonidine (Alpha 2 Agonists) – prefrontal cortex responsible for attention, emotion and behaviors
  - Reserpine (peripheral neuron antagonist)

Fatigue and Weakness

- Skeletal Muscle Relaxants
- Diuretics
- Corticosteroids
  - Prednisone – long term use – steroid induced myopathy
Commonly Prescribed Drug Classes

The Geriatric Patient

Pharmacology

- Cardiac
  - HF, BP, Angina, Arrhythmia, Valvular Disease
- Cholesterol Lowering
- Pulmonary
- Anticoagulants
- Osteoporosis
Cardiac Physiology

- Preload = venous return. The amount of blood returning to the heart before each beat.
- Afterload = peripheral resistance. The amount of resistance that the heart works against to push the blood into the arterial system.
- Contractility = force of contraction which affects stroke volume.

Ejection Fraction (EF)

- Definition – amount of blood being pumped out of the ventricle with each contraction. Measure for Left or Right Ventricle. (LVEF or RVEF).
  - Most commonly used is the LVEF. LVEF is the amount of blood pumped to the body with each contraction and RVEF is the amount of blood pumped to the lungs.
AHA/ACC (American Heart Assn, American College of Cardiology) stages:
- Stage A – No Dx of HF, but the risk is high because of one or more of the following factors:
  hypertension; diabetes; known CAD and Hx of MI; Hx cardiotoxic drugs (therapeutic or recreational) or alcohol abuse; Hx of rheumatic fever; and family Hx of cardiomyopathy.

Usual therapies:
- Smoking cessation, stop alcohol and illicit drugs
- Start Exercise
- Treat HTN, ↑ cholesterol and triglycerides,
  - Thiazide diuretic is the initial drug of choice for patients with essential HTN.
  - ACE inhibitors and ARB’s are the first line antihypertensive agents of choice without MI.
  - MD may prescribe Beta Blocker for Hx of MI.
Stages of Heart Failure (HF)

- AHA/ACC (American Heart Assn, American College of Cardiology) stages:
  - Stage B – Heart failure diagnosed by an ejection fraction below 40% but no past or current symptoms.

Stage B

- Usual therapies:
  - Same as Stage A and
  - Coronary revascularization and valve repair or replacement (as appropriate)
  - ACE inhibitor and Beta Blocker (unless contraindicated)
**Stages of Heart Failure (HF)**

- AHA/ACC (American Heart Assn, American College of Cardiology) stages:
  - Stage C – Heart failure diagnosed, with past or current symptoms, including shortness of breath, fatigue, and reduced exercise tolerance.

**Stage C**

- Usual therapies:
  - All therapies for Stage A plus:
  - All patients should be taking an ACE inhibitor, Beta Blocker
  - Also prescribed – diuretic and digoxin
  - Restrict salt intake
  - Monitor body weight and restrict fluid intake (as appropriate)
    - Spironolactone when symptoms are severe
Stages of Heart Failure (HF)

- AHA/ACC (American Heart Assn, American College of Cardiology) stages:
  - Stage D – Advanced symptoms of heart failure after receiving optimal medical care.

Stage D

- Usual therapies:
  - All therapies in Stages A, B, C plus
    - Eval for other treatment options:
      - Heart transplant, ventricular-assist device, other surgeries, continuous infusion of inotropic drugs, and research therapies.
Meds to reduce preload

- Diuretics –
  - Lasix (furosemide)
  - Chlorothiazide (Diuril)
  - Hydrochlorothiazide (Hydrodiuril)
  - Spironolactone (Aldactone)
- Nitrates – vasodilators that decrease venous return

Meds to reduce afterload

- ACE inhibitors “prils”
  - Benazepril, captopril, enapril, lisinopril, ramipril
- ARB’s
  - Cozaar, diovan, atacand
- Calcium channel blockers “pines”
  - Amlodipine, felodipine, nifedipine
Meds to increase contractility

- Digoxin (digitalis/lanoxin)–
  - Mechanism of action – increases contractility of heart (increases ejection fraction), decreases heart rate.
  - Clinical use – CHF, Arrhythmias
  - Side effects – bradycardia, heart flutter, fatigue, confusion, hallucinations

Meds to control BP

- Alpha Blockers
- Beta Blockers
- ACE inhibitors (Angiotension-Converting Enzyme Inhibitor)
- ARBs (Angiotensin II receptor blockers)
- Calcium Channel Blockers
- Diuretics
Alpha Blockers

- These drugs reduce the arteries' resistance, relaxing the muscle tone of the vascular walls.
  - Cardura, minipress, hytrin
  - Adverse effects: Rapid heart rate, dizziness, orthostatic hypotension.

Beta Blockers

- Beta-blockers reduce the heart rate, the heart's workload and the heart's output of blood, which lowers blood pressure.
  - Atenolol, propanolol, sotalol, timolol, metoprolol, nadolol
- Beta Blockers blunt heart rate response with activity. PR is not a good measure of work load in pts on B blockers. Use RPE instead. Also, beta blockers reduce the ability to meet increasing oxygen demand with increasing exertion by dampening Cardiac Output.
  - Adverse effects: Insomnia, Cold hands and feet, Tiredness or depression, Slow heartbeat, Symptoms of asthma, Impotence may also occur. If you have diabetes and you’re taking insulin, have your responses to therapy monitored closely.
ACE inhibitors

- Angiotensin is a chemical that causes the arteries to become narrow, especially in the kidneys but also throughout the body. ACE stands for Angiotensin-converting enzyme. ACE inhibitors help the body produce less angiotensin, which helps the blood vessels relax and open up, which, in turn, lowers blood pressure.
  - Adverse effects: skin rash, loss of taste, chronic dry hacking cough, rare instances kidney damage.

Angiotensin II receptor blockers (ARB’s)

- These drugs block the effects of angiotensin, a chemical that causes the arteries to become narrow. Angiotensin needs a receptor- like a chemical "slot" to fit into or bind with- in order to constrict the blood vessel. ARBs block the receptors so the angiotensin fails to constrict the blood vessel. The vessels stay open and BP is reduced.
  - Adverse effects - dizziness
Calciun Channel blockers

- This drug prevents calcium from entering the smooth muscle cells of the heart and arteries. When calcium enters these cells, it causes a stronger and harder contraction, so by decreasing the calcium, the heart's contraction is not as forceful. Calcium channel blockers relax and open up narrowed blood vessels, reduce heart rate and lower blood pressure.

  - Adverse effects:
    - Palpitations, LE Edema, Constipation, Headache, Dizziness

Diuretics

- Diuretics help the body get rid of excess sodium (salt) and water and help control blood pressure. They reduce fluid volume. They are often used in combination with additional prescription therapies.

  - Clinical use – hypertension, reduces edema from excess buildup of fluid in the body.
  - Adverse effects: potassium loss, dehydration, gout, increases blood sugar in diabetics.
Black Box Warning

- Cautions: NSAIDS’ increase fluid retention and may worsen Heart Failure.

- NSAID’s can cause sodium retention and peripheral vasoconstriction and attenuate the efficacy and enhance the toxicity of diuretics and ACE Inhibitors.

Improving heart function in HF

- Preload – reduce the preload (heart is less dilated and able to handle the venous return). Preload is reduced with diuretics by reducing fluid volume. Meds include furosemide.

- Afterload – reduce peripheral resistance in the blood vessels. Afterload is reduced with ACE inhibitors, ARBs, Calcium channel blockers, Vasodilators (nitrates).

- Contractility – may increase cardiac output by increasing stroke volume with stronger cardiac muscle contraction with the use of digitalis/digoxin.
Acute Coronary Syndrome

- Acute MI or unstable angina
  - Unstable angina is chest pain or discomfort that is unexpected or occurs at rest
  - Angina occurs as a result of atherosclerotic buildup in the major coronary arteries

Angina

- Pain in the chest associated with ischemic heart disease.
- Oxygen delivery to heart muscle is insufficient to meet energy demands.
- Usually occurs with activity, but can occur at rest with the older population
- Medical intervention
  - Nitrates – vasodilator – reduce oxygen demand
  - Beta Blockers – reduce oxygen demand
  - Calcium Channel Blockers – increase oxygen supply
Cardiac Arrhythmias

- Arrhythmia meds
  - Class I - sodium channel blocker
  - Class II - Beta Blockers
  - Class III – Prolong repolarization
  - Class IV – Calcium Channel Blockers
- Anticoagulant
  - Example – Coumadin for Atrial Fibrillation

Valvular Heart Disease

- Anticoagulants prescribed to prevent the formation of blood clots
  - S/P Mechanical valve replacement
Hyperlipidemia

Cholesterol Lowering Drugs

- Statins – inhibit rate limiting enzyme in cholesterol synthesis
  - Lowers total cholesterol, triglycerides and low density lipoproteins
  - Atorvastatin, simvastatin, lovastatin
- Intestinal Uptake Blockers – block cholesterol uptake in the large bowel
  - Lowers total cholesterol in dietary induced high cholesterolemia
  - Zetia
Cholesterol Lowering Drugs

- Fibric Acid Derivatives – breaks down triglycerides in the blood
  - Lowers triglyceride levels
  - Gemfibrozil
- Bile Acid Sequestrates – enhance intestinal cholesterol removal from the bile salts in the liver
  - Lowers total cholesterol
  - Questran
- Niacins – decrease fat transportation to the liver
- ↑ High Density Lipoproteins, ↓ Low Density lipoproteins
- Niaspan

Combo Meds

- Vytorin
  - Simvastatin and Zetia
- Advicor
  - Lovastatin and Niaspan
Adverse Drug Effects

- Statins
  - Myalgia, Arthralgia, hepatotoxicity
- Fibric Acid Derivatives
  - Fatigue, myositis, hepatotoxicity
- Niacins
  - Dyspepsia, flushing in head and neck, hepatotoxicity

Pulmonary Medications
Bronchodilators

- Bronchodilator: relaxes smooth muscles in the lungs so that more air can move in and out
  - Adrenergic Agonist: increase airway patency through smooth muscle relaxation
    - Rescue: Proventil, Ventolin, ProAir, Primatene Mist (albuterol or albuterol sulfate)
    - Long-Acting: Serevent(salmeterol), Brovana(arformoterol), Perforomist(formoterol)
  - Anticholinergic Agents: increase airway patency through preventing bronchoconstriction
    - Ex: ipratropium (Atrovent) and tiotropium(Spiriva)
    - Both Long Acting drugs
    - Spiriva pills – DO NOT TAKE CAPSULES ORALLY - use in the handihaler device

- Both are inhaled bronchodilators so go directly to lungs with few side effects

- Generally prescribed a “rescue” inhaler first, but if have to use >2x/wk, will be prescribed a long acting.
Anti-inflammatory Agents

- Glucocorticosteroids/Corticosteroids
  - Prevent inflammatory-induced bronchoconstriction
  - Inhibit inflammatory cells
  - Decrease histamine response
  - Decrease edema
  - Improve lung function
  - 1-2x/day dosing; not indicated for acute bronchospasm
  - Med List:
    - flunisolide(Aerobid), budesonide(Pulmicort),
    - fluticasone(Flovent), ciclesonide(Alvesco),
    - beclomethasone(Qvar), mometasone(Asmanex)

Combination Drugs-Long acting

- **Advair:** is a combination of two medications -- fluticasone, a corticosteroid, and salmeterol, a long-acting, beta-agonist bronchodilator. Advair is used for maintenance treatment of COPD.

- **Symbicort:** contains formotorol, a long-acting, beta-agonist bronchodilator, and budesonide, a corticosteroid.

- **Combivent(inhaling) or DuoNeb(nebulizer):** contains two bronchodilators -- albuterol (a beta agonist) and ipratropium, an anticholinergic. Combination bronchodilator inhalers like Combivent, may help increase the bronchodilator effect of the medications, with the same or fewer side effects
Mucoactive Agents

- **Mucolytics:**
  - Reduce the viscosity of the mucus
  - Ex: acetylcysteine (Mucomyst, Acetadote)

- **Expectorants:**
  - Increase volume/hydration of secretions
  - May also induce coughing
  - Ex: most common is guaifenesin, which is found in most OTC cough meds, e.g. Duratuss, Mucinex, Amibid,
  - Side Effect diarrhea

Anticoagulant Drugs
Anticoagulant Meds

- Heparin or LMWH (Lovenox)
- Coumadin (warfarin) – PT/INR lab draws twice weekly to determine coumadin dose.
- Aspirin
- Xarelto

Osteoporosis
Bone Physiology

Bone is a dynamic living tissue that is formed, resorbed, remodeled over and over throughout the life span.

It is influenced by genetics, meds, supplements, diet, activity level and disease.

By understanding the physiology of bone, clinicians can best develop individualized programs to maximize bone health and minimize osteopenia, osteoporosis (low bone mass) and fracture.

Bone Mass - Factors

- **Intrinsic Factors**
  - Genetics
  - Age
  - Gender (women 80% of cases of osteoporosis)

- **Extrinsic Factors**
  - Nutritional status (levels of Calcium, protein, and Vitamin D.)
  - Activity level
  - Environmental risk factors (smoking, alcohol)
  - Disease
  - Medications (corticosteroids)
Function of Bone tissue

- Bone serves two primary functions:
  - 1. Support of the body
  - 2. Storehouse of Calcium and Phosphorus

- The two functions are mediated by the hormonal system.

Osteogenesis

- Bone remodeling: The process of bone formation and resorption throughout life.

- Osteoclasts – cells that break down bone tissue

- Osteoblasts – cells that build up new bone
Hormonal Control of Bone Health

- Growth Hormone – responsible for bone growth until adulthood.
- Parathyroid Hormone – promotes activity of osteoblasts
- Estrogens – induces osteoclasts to self destruct, slowing the destruction of bone
- Calcitonin and thyroid stimulating hormone both inhibit osteoclasts

Hormonal Control of Bone Health

- Vit D₃ – needed for deposition of calcium into bones
- Osteoprotegerin- a protein that inhibits osteoclast activity
- Leptin – regulates the balance between osteoblast and osteoclast activity

- Provide intervention consisting of exercise or physical therapy and/or vitamin D supplementation to prevent falls.
- Vit D shown to reduce the risk of falling!

Bisphosphonates

- This class of drug inhibits bone breakdown (much like estrogen), preserve bone mass, and even increase bone density in your spine and hip, reducing the risk of fractures. Oral or IV infusion.
- Used to prevent steroid induced osteoporosis
- Drug examples: alendronate (Fosamax), ibandronate (Boniva), risedronate (Actonel) and zoledronic acid (Reclast).
- Serious side effects: osteonecrosis of the jaw, irregular heartbeats and visual disturbances.
  - More recent news- atypical Fx of femur correlated.
Bisphosphonates and increased Fx risk?

  - Possible risk of atypical femoral fracture...
  - Labeling change and medication guide for bisphosphonates (fosamax, actonel, boniva) to reflect this possible risk.
  - Optimal duration of bisphosphonate use is unknown.
  - Fractures may be related to use of these drugs for longer than five years.

SERMS

- This class of drugs mimics estrogen's beneficial effects on bone density in postmenopausal women, without some of the risks associated with estrogen, such as increased risk of uterine cancer and, possibly, breast cancer. Hot flashes are a common side effect of raloxifene, and you shouldn't use this drug if you have a history of blood clots.
- Raloxifene (Evista).
Calcitonin

- A hormone produced by your thyroid gland, calcitonin reduces bone resorption and may slow bone loss. It may also prevent spine fractures, and may even provide some pain relief from compression fractures. It's usually administered as a nasal spray and may cause nasal irritation in some people who use it, but it's also available as an injection. Because calcitonin isn't as potent as bisphosphonates, it's normally reserved for people who can't take other drugs.

Teriparatide (Forteo)

- This powerful drug, an analog of parathyroid hormone, treats osteoporosis in postmenopausal women and men who are at high risk of fractures. It works by stimulating new bone growth, while other medications prevent further bone loss. Teriparatide is given once a day by injection under the skin on the thigh or abdomen. Long-term effects are still being studied, so therapy is recommended for two years or less.
Hormone Therapy

- Estrogen, especially when started soon after menopause, can help maintain bone density. However, the use of hormone therapy can increase your risk of blood clots, endometrial cancer, breast cancer, and possibly heart disease. Because of concerns about its safety and because other treatments are available, hormone therapy is generally not a first-choice treatment anymore.

Pain Medications

Opioids, NSAIDS, Tylenol, Corticosteroids
Opioids

- Narcotic analgesic
  - Codeine, Oxycodone, hydrocodone
- Half-life varies by drug
- Drug addiction
- Drug tolerance
- Physical Dependence

NSAIDS

- Non-steroidal Anti-inflammatories
- OTC and Prescription
- May cause stomach upset
- Related to Aspirin
  - Ibuprofen, Naproxen
Tylenol

- Non-opioid Analgesic
- Hepatotoxicity
- Half-life – 2-3 hours

Corticosteroids

- Anti-inflammatory effects
- Side effects
  - Hyperglycemia
  - Swelling
  - Delayed healing
- Long Term side effects
  - Myopathy
Depression, Anxiety

Antidepressants

- Tricyclic Antidepressants
  - Blocks reuptake of 3 neurotransmitters to increase post-synaptic activity
    - Norepinephrine, serotonin and dopamine
  - Ex. Elavil

- Side effects – sedation, anticholinergic, orthostatic hypotension
Antidepressants

- Selective Serotonin Reuptake Inhibitors (SSRI)
  - Blocks reuptake of serotonin
  - Prozac, zoloft, Paxil
- Side effect – (increased risk for suicide)

Antianxiety

- Benzodiazepines
  - Increase inhibitory effect of GABA
- Side effect – drowsiness, sluggishness
- Risk of addiction if used indiscriminately for sleep disorders for greater than 4 weeks
Parkinsons

- Loss of dopamine neurotransmitter
- Replacement with substrate
  - Levodopa/Carbidopa – converted in brain to dopamine
- Side effects – Nausea, vomiting, confusion, depression, dyskinesias

Antipsychotics

- Used to treat agitation; dementia; seizure disorders, anxiety, depression, bipolar,
- Typical and Atypical antipsychotics (2nd generation)
- For dementia
  - Increase cholinergic activity – Cognex, Aricept, exelon
  - NMDA receptor blocker – Namenda
Other Meds

- Metabolic Disorders
  - Diabetes – oral and injectables
  - Hypothyroid – replacement thyroxine
- Cancer
  - Chemotherapy
- Anemia
  - Procrit, Epogen, Iron supplementation
- Infections
  - Antiviral, Antibiotic
- Neurological Disorders
  - Multiple Sclerosis

Therapists and Medications

Following scope of practice…provide patient education
Patient Education

Thank You!

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References


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