Medication Therapy for Heart Disease

Bhamini Patel, PharmD, BCPS
Clinical Pharmacist
Objectives

• Review Conditions that affect the Heart
  – High Blood Pressure, Hyperlipidemia and Diabetes
• Review Medications for Heart Diseases
  – How they work
  – Common Adverse Effects
• Define the role of Generics and Medication Adherence in Medication therapy
• Conclusions and Questions
Physician

Exercise Physiologist

Nurse Practitioner

Nurse

Physician's Assistant

Pharmacist

Specialist

Dietician

YOU
Know Your Numbers!

- “Silent Killers” because there are often no symptoms
- Your numbers are your only warning!
Lifestyle Changes

- Quit Smoking
- Decrease Sodium Intake
- Exercise
- Drink Alcohol in Moderation
Medications for Heart Diseases

- Lifestyle changes may not be enough
- Medications are not a replacement for lifestyle changes
- Many available drugs help lower blood pressure, cholesterol and blood sugars
- Even have drugs to help stop smoking
Medications for Heart Diseases

• Many different drug classes
  – Each class has a unique way they work to lower blood pressure, cholesterol or sugars
  – Each class has different side effects, drug interactions and warnings associated with them
  – Certain people benefit from certain classes based on other diseases they may have
Which drug?

• Decision made between patient and physician

• Factors to consider:
  – Other co-morbid conditions of the patient
    • What other diseases does the patient have?
  – Cost
    • Is it covered by insurance? What copay? Is there a generic available?
  – Side Effects
  – Compliance
What is Blood Pressure?

- Blood Pressure is the force of blood against the walls of the arteries.
- Blood Pressure rises and falls throughout the day.
- When Blood Pressure stays elevated over time, it’s called High Blood Pressure.
- The medical term for High Blood Pressure is Hypertension.
Complications of High Blood Pressure

- 1 in 3 adults in the United States has High Blood Pressure
- Hypertension can lead to:
  - Coronary Heart Disease
  - Heart Failure
  - Stroke
  - Kidney Failure
  - Blindness
  - Death
## Blood Pressure Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic (top number)</th>
<th>Diastolic (bottom number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Less than 120</td>
<td>And Less than 80</td>
</tr>
<tr>
<td>Pre-hypertension</td>
<td>120-139</td>
<td>Or 80-89</td>
</tr>
<tr>
<td>High Blood Pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 1</td>
<td>140-159</td>
<td>Or 90-99</td>
</tr>
<tr>
<td>Stage 2</td>
<td>160 or higher</td>
<td>Or 100 or higher</td>
</tr>
</tbody>
</table>
Blood Pressure Drugs
Different Classes

- Diuretics
  - “water pills”
- Beta Blockers
- Angiotensin Converting Enzyme Inhibitors
  - “ACE” Inhibitors
- Angiotensin Receptor Blockers
- Calcium Channel Blockers
- Alpha Blockers
- Alpha-Beta Blockers
- Vasodilators
Blood Pressure Drugs: Diuretics

- Commonly known as “water pills”
- Work in the kidney to remove excess water and sodium (salt) from the body
- Hydrochlorothiazide, Chlorothiazide, Indapamide, Furosemide
- Many combination antihypertensives have a diuretic as a component
- Side effects: ↑ Urination, Dizziness, Dehydration, Changes in potassium and/or sodium
Blood Pressure Drugs: Beta Blockers

- Work on the heart to make it beat less often and with less force → Blood Pressure drops
- Common Examples: atenolol, metoprolol, carvedilol, bisoprolol, propranolol, labetalol
- Can be used for many different purposes
  - After a heart attack
  - Used in people with irregular heartbeats
  - Used in people with migraine headaches
  - Used in people with heart failure
BETA-BLOCKERS – SIDE EFFECTS

- Drowsiness or fatigue
- Weakness or dizziness
- Impotence
Blood Pressure Drugs: ACE Inhibitors

- Angiotensin Converting Enzyme Inhibitors
- Block the formation of a hormone (called angiotensin II) our body produces that causes blood vessels to narrow
- Common examples: lisinopril, enalapril
- Side Effect: Dry Cough, Angioedema
Blood Pressure Drugs: Angiotensin Receptor Blockers

• Also called “ARB’s”
• Blocks enzyme that relaxes Blood vessels → ↓ blood pressure
• Common examples: Cozaar, Avapro, Diovan, Benicar, Micardis
• Cozaar (Losartan) is generic, also available in combination with a diuretic
Blood Pressure Drugs: Calcium Channel Blockers

- Keep calcium from entering the muscle cells of the heart and blood vessels → blood vessels relax and pressure goes down
  - diltiazem, verapamil, amlodipine, felodipine
- Side Effect: Feeling Tired, Swelling of the abdomen, ankles or feet, Heartburn or upset stomach, Constipation (verapamil)
What is Cholesterol

Cholesterol is produced by the liver and we consume it from meat and dairy products.
What is Cholesterol?

- Cholesterol is an important part of a healthy body and performs many needed bodily functions
  - It is a constituent of membranes and the source of steroid hormones
- High cholesterol causes plaques that narrow the lumen of blood vessels
  - Arthrosclerosis
Cholesterol

**Total Cholesterol**: Sum of all cholesterol
- **LDL**: Low density lipoprotein
  - “Bad” cholesterol
- **HDL**: High density lipoprotein
  - “Good” cholesterol
- **VLDL**: Very low density lipoprotein
  - Like LDL but more dense, not often measured
- **Triglycerides**: Most common type of fat
## Cholesterol Goals

<table>
<thead>
<tr>
<th></th>
<th>Normal:</th>
<th>Borderline High:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Cholesterol</strong></td>
<td>&lt; 200mg/dL</td>
<td>200-239mg/dL</td>
</tr>
<tr>
<td><strong>LDL (BAD Chol)</strong></td>
<td>Low Risk:</td>
<td>Moderate Risk:</td>
</tr>
<tr>
<td></td>
<td>&lt;160mg/dL</td>
<td>&lt;130mg/dL</td>
</tr>
<tr>
<td></td>
<td>High Risk:</td>
<td>&lt;100mg/dL</td>
</tr>
<tr>
<td></td>
<td>VERY High Risk:</td>
<td>&lt;70mg/dL</td>
</tr>
<tr>
<td><strong>HDL (GOOD Chol)</strong></td>
<td>Goal: M: &gt;40mg/dL, W: &gt;50mg/dL</td>
<td>Best: &gt;60mg/dL</td>
</tr>
<tr>
<td><strong>Triglycerides</strong></td>
<td>Normal:</td>
<td>Borderline High:</td>
</tr>
<tr>
<td></td>
<td>&lt;150mg/dL</td>
<td>150-199mg/dL</td>
</tr>
</tbody>
</table>
Medications to Lower Cholesterol

- LDL lowering
  - Statins, Ezetimibe, Niacin, Bile Acid Sequestrants
  - Alternate: Fibrates, Plant stanols/sterols

- Triglyceride Lowering
  - Fibrates, Niacin, Fish Oil

- Raise HDL
  - EXERCISE!, Niacin
Statins

- ↓ synthesis of cholesterol in body
- ↓ CVD & stroke by an average of 33.8%
- >40% who need statins are not on a statin
Statins

- Examples:
  - Simvastatin, Pravastatin, Lovastatin,
  - Lipitor®, Crestor®,

- Adverse Effects
  - Muscle Aches
  - Increased liver enzymes
Nicotinic Acids

• Lower LDL and Triglyceride synthesis
  – Immediate release Niacin
  – Extended release Niaspan®

• Adverse Effects
  – Flushing
  – Upset stomach
  – ↑ blood glucose, uric acid
Fibric Acids

- ↓ rate of triglyceride synthesis is liver
  - Fenofibrate (TriCor)
  - Gemfibrozil

- Adverse Effects
  - Dyspepsia
  - Muscle Aches
  - Gallstones
Bile Acid Sequestrants

- Bind to Bile acids
- Interfere with the absorption of other drugs
  - Warfarin
- Adverse Effects
  - Constipation
  - Upset stomach
Zetia

- ↓ absorption of cholesterol from the gut

- Adverse Effects: Headache, Rash
Diabetes

- Type 1: Absolute lack of Insulin
- Type 2: Progressive ↓ in Insulin secretion and insulin resistance
- Symptom: ↑ Urination, ↑ thirst, unexplained weight loss
- Complications: Heart, blood vessels, kidneys, Eyes, Nerves, Skin
Diabetes

• What is A1c?
  – Blood test that measures the average blood glucose level over the past 2 to 3 months, reported as a percentage

• Goals
  – A1c of < 7%
  – Before meal blood glucose 70-130mg/dl
  – After meal blood glucose <180 mg/dl
Diabetes Medication: How do they work

- Stimulating the pancreas to produce and release more insulin
- Inhibiting the production and release of glucose from the liver, which means you need less insulin to transport sugar into your cells
- Blocking the action of stomach enzymes that break down carbohydrates or make tissues more sensitive to insulin.
Diabetes Medications Different Classes

- Sulfonylurea
- Metformin
- Thiazolidinediones
- Alpha glucosidase inhibitors
- DDP4 Inhibitors
- Glucagon like peptide agonist
- Insulin
Diabetes Medications

• **Biguaniides**: Improves the effectiveness of Insulin
  – Metformin (Glucophage®)
  – Side effect: Nausea, Diarrhea, weight loss

• **Sulfonylureas**: ↑ production and release of Insulin
  – Glimepride (Amaryl®), Glipizide (Glucotrol®), Glyburide (DiaBeta®, Glynase®)
  – Side effect: Hypoglycemia, Weight gain
Diabetes Medications

- **Meglitinides**
  - Repaglinide (Prandin), Nateglinide (Starlix)
  - Side Effect: Hypoglycemia, Weight gain

- **Alpha glucosidase Inhibitors**
  - Acarbose(Precose) Miglitol(Glycet)
  - Side Effect: Diarrhea, abdominal pain, flatulence,

- **DDP-4 Inhibitors**
  - Saxagliptin (Onglyza), Sitagliptin (Januvia)
  - Side Effect: Hypoglycemia, allergic skin reactions
Diabetes Medications

- **Insulin**
  - Fast acting: Insulin asparte (Novolog), Insulin gluisine (Apidra), Insulin Lispro (Humalog)
  - Intermediate acting: NPH Insulin (NovolinN), Regular Insulin (NovolinR)
  - Long acting: Insulin glargine (Lantus®), Insulin detemir (Levemir®)
Diabetes Medications

Injectables Medications that ↓ Glucagon secretion, gastric emptying and food intake, ↑ insulin secretion.

- Amylin Analogues:
  - Pramlintide (Symlin)
  - Side Effect: Nausea, Hypoglycemia, Nausea, Weight Loss

- Incretin mimetics: ↓ Glucagon secretion, gastric emptying and food intake, ↑ insulin secretion
  - Affects after meal glucose
  - Byetta, Victoza
  - Side Effects: Nausea, diarrhea, hypoglycemia, pancreatitis
HMM. HAVING TROUBLE PRONOUNCING THE NAMES OF YOUR GENERIC DRUGS, I SEE.
Generic Medications

- Same as the brand-name drug in dosage, safety, strength, how it is taken, quality, performance and intended use
- FDA requires all drugs be safe and effective. Generics use the same active ingredients and are shown to work the same way in the body
- They have the same risks and benefits as their brand-name counterparts
Quick Tips for Adherence

• Keep a medication calendar near your medication and make a note every time you take your dose
• Do not stop taking your medication without talking to your physician or provider
• Keep a list of your medications with you
Take Charge

- Know your numbers
- Know your goals
- Know the name of medications
- Know the possible side effects of your medications
- Know how to take your medication
- Know what to do if you miss a dose
COUNTERTHINK

This drug may cause dizziness, chest pain, diarrhea, loss of memory, blood clots, joint pain and anal leakage.

Are those the side effects?

No. Those are the main effects.

The side effect is that it might lower your cholesterol.

Concept: Mike Adams
Art: Dan Berger
QUESTIONS