**DT 4th**

**Course Title: General pharmacology II**

**Student Name: Shah Fahad**

**Student ID: 14818**

**Discuss various drugs classes used for hypertension and Cardiac heart failure**

**The classes of blood pressure medications include:**

1. Diuretics.
2. Beta-blockers.
3. ACE inhibitors.
4. Angiotensin II receptor blockers.
5. Calcium channel blockers.
6. Alpha blockers.
7. Alpha-2 Receptor Agonists.
8. Combined alpha and beta-blockers.

### **Diuretics**

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

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| Loop diuretic | |
| furosemide | Lasix\* |
| bumetanide | Bumex\* |

### **Beta-blockers**

Beta-blockers reduce the heart rate, the heart's workload and the heart's output of blood, which lowers blood pressure.

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| --- | --- |
| Generic name | Common brand names |
| acebutolol | Sectral\* |
| atenolol | Tenormin\* |
| betaxolol | Kerlone\* |
| bisoprolol fumarate | Zebeta\* |
| carteolol hydrochloride | Cartrol\* |

### **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.

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| --- | --- |
| Generic name | Common brand names |
| benazepril hydrochloride | Lotensin\* |
| captopril | Capoten\* |
| enalapril maleate | Vasotec\* |
| fosinopril sodium | Monopril\* |

Some noted possible side effects of ACE inhibitors:

1. Skin rash
2. Loss of taste
3. Chronic dry, hacking cough
4. In rare instances, kidney damage
5. [Women](https://www.heart.org/en/health-topics/high-blood-pressure/why-high-blood-pressure-is-a-silent-killer/high-blood-pressure-and-women) who are taking ACE inhibitors or ARBs for high blood pressure should not become pregnant while on this class of drugs. If you're taking an ACE inhibitor or an ARB and think you might be pregnant, see your doctor immediately. These drugs have been shown to be dangerous to both mother and baby during pregnancy. They can cause low blood pressure, severe kidney failure, [excess potassium](https://www.heart.org/en/health-topics/heart-failure/treatment-options-for-heart-failure/hyperkalemia-high-potassium) (hyperkalemia) and even death of the newborn.

### **Angiotensin II receptor blockers**

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. This means blood vessels stay open and blood pressure is reduced.

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| --- | --- |
| Generic name | Common brand names |
| candesartan | Atacand\* |
| eprosartan mesylate | Teveten\* |
| irbesarten | Avapro\* |
| losartan potassium | Cozaar\* |
| telmisartan | Micardis\* |
| valsartan | Diovan\* |

Some noted possible side effects of Angiotensin II receptor blockers:

1. May cause occasional dizziness.
2. ARBs should not be used during pregnancy.Medications that act directly on the renin-angiotensin system can cause injury or even death to a developing fetus. When pregnancy is detected, consult your healthcare professional as soon as possible.

### **Calcium 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 hearts' contraction is not as forceful. Calcium channel blockers relax and open up narrowed blood vessels, reduce heart rate and lower blood pressure.

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| --- | --- |
| Generic name | Common brand names |
| amlodipine besylate | Norvasc\*, Lotrel\* |
| bepridil | Vasocor\* |
| diltiazem hydrochloride | Cardizem CD\*, Cardizem SR\*, Dilacor XR\*, Tiazac\* |
| felodipine | Plendil\* |
| isradipine | DynaCirc\*, DynaCirc CR\* |
| nicardipine | Cardene SR\* |
| nifedipine | Adalat CC\*, Procardia XL\* |
| nisoldipine | Sular\* |
| verapamil hydrochloride | Calan SR\*, Covera HS\*, Isoptin SR\*, Verelan\* |

Some noted possible side effects of calcium channel blockers:

1. Palpitations
2. Swollen ankles
3. Constipation
4. Headache
5. Dizziness

### **Alpha blockers**

These drugs reduce the arteries' resistance, relaxing the muscle tone of the vascular walls.

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| --- | --- |
| Generic name | Common brand names |
| doxazosin mesylate | Cardura\* |
| prazosin hydrochloride | Minipress\* |
| terazosin hydrochloride | Hytrin\* |

Some noted possible side effects of alpha blockers:

1. Fast heart rate
2. Dizziness
3. A drop in blood pressure when you stand up

### **Alpha-2 Receptor Agonists**

These drugs reduce blood pressure by decreasing the activity of the sympathetic (adrenaline-producing) portion of the involuntary nervous system. Methyldopa is considered a first line antihypertensive during pregnancy because adverse effects are infrequent for the pregnant woman or the developing fetus.

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| --- | --- |
| Generic name | Common brand names |
| methyldopa |  |

Some noted possible side effects of Alpha-2 Receptor Agonists:

1. Methyldopa can cause drowsiness or dizziness

### **Combined alpha and beta-blockers**

Combined alpha and beta-blockers are used as an IV drip for those patients experiencing a [hypertensive crisis](https://www.heart.org/en/health-topics/high-blood-pressure/understanding-blood-pressure-readings/hypertensive-crisis-when-you-should-call-911-for-high-blood-pressure). They may be prescribed for outpatient high blood pressure use if the patient is at risk for heart failure.

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| --- | --- |
| Generic name | Common brand names |
| carvedilol | Coreg\* |
| labetalol hydrochloride | Normodyne\*, Trandate\* |

A noted possible side effect of combined alpha and beta-blockers:

1. May cause a drop in blood pressure when you stand up

### **Central agonists**

Central agonists also help decrease the blood vessels' ability to tense up or contract. The central agonists follow a different nerve pathway than the alpha and beta-blockers, but accomplish the same goal of blood pressure reduction.

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| --- | --- |
| Generic name | Common brand names |
| alpha methyldopa | Aldomet\* |
| clonidine hydrochloride | Catapres\* |
| guanabenz acetate | Wytensin\* |
| guanfacine hydrochloride | Tenex\* |

Some noted possible side effects of central agonists:

1. Alpha methyldopa (Aldomet)\* may produce a greater drop in blood pressure when you're in an upright position (standing or walking), and it may make you feel weak or faint if the pressure has been lowered too far. This drug may also cause drowsiness or sluggishness, dryness of the mouth, fever or anemia. Male patients may experience impotence. If this side effect persists, your doctor may have to change the drug dosage or use another medication.
2. Clonidine (Catapres)\*, guanabenz (Wytensin)\* or guanfacine (Tenex)\* may produce severe dryness of the mouth, constipation or drowsiness. If you're taking any of these drugs, don't stop suddenly because your blood pressure may rise quickly to dangerously high levels.

### **Peripheral adrenergic inhibitors**

These medications reduce blood pressure by blocking neurotransmitters in the brain. This blocks the smooth muscles from getting the "message" to constrict. These drugs are rarely used unless other medications don't help.

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| Generic name | Common brand names |
| guanadrel | Hylorel\* |
| guanethidine monosulfate | Ismelin\* |
| reserpine | Serpasil\* |

***Drugs use for cardic heart failure.***

1 positive inotropic drugs

2 Vasodilators

3 Miscellaneous drugs for chronic failure

***1 Positive inotropic drugs***

a ) Cardiac glycosides (digoxin)

b) Beta agonists (dobutamine)

c) PDE inhibitors (milrinone)

***2) Vasodilators***

a) PDE inhibitors (milrinone)

b) Nitroprussid Nitrates

Hydralazine.

c) Loop diuretic ACE inhibitors. Nesiritide

***3) Miscellaneous drugs for chronic failure***

a) Loop diuretic ACE inhibitors.

Nesiritide

b) Beta blockers

spironolactone.