“What is this medication for?”

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Disclosures

- None

Objectives

- Review general classes of outpatient cardiac medications for common cardiac conditions including coronary artery disease (CAD), congestive heart failure (CHF), atrial fibrillation, essential hypertension (HTN), hyperlipidemia (HLD) and peripheral arterial disease (PAD)
- Be able to identify newer medications for the above classes
- Improve confidence when talking with patients about medications

Question 1:

Barbara is a 79 yo female with PMH of HTN, HLD, CAD (s/p DES to the LAD in 2022) and chronic HFrEF/ICM (EF 35-40% by most recent echocardiogram) who was just recently admitted for an acute CHF exacerbation. She is just now returning to cardiac rehab and is complaining about recurrent UTIs since her admission. Which medication is the most likely culprit?

A. Carvedilol (Coreg)

B. Empagliflozin (Jardiance)

C. Sacubitril/Valsartan (Entresto)

D. Spironolactone (Aldactone)

Question 2:

Bobby is a 57 yo male who was recently admitted for an NSTEMI with DES to the RCA. He was previously consuming a cheeseburger a day and is now trying to follow a heart-healthy diet. His LDL was at 109 on most recent check and his goal LDL is < 55. He mentions during his class that they are wanting him to take a shot for cholesterol. Which medication do you think he is referring to?

A. Semaglutide (Ozempic)

B. Evolocumab (Repatha)

C. Ezetimibe (Zetia)

D. Enoxaparin (Lovenox)

Question 3:

Ralph is an 83 yo male and has been participating in maintenance classes following prior CABG (LIMA-LAD, SVG-OM and SVG-RCA). He was recently found to have episodes of paroxysmal atrial fibrillation on his cardiac monitor and his cardiology provider recommended starting anticoagulation given his CHA_2DS_2-VASc Score of 7. Which medication was he most appropriately started on for this?

A. Apixaban (Eliquis)

B. Clopidogrel (Plavix)

C. Prasugrel (Effient)

D. Aspirin

Coronary Artery Disease

Referring to stable CAD and ACS (includes STEMI, NSTEMI and Unstable Angina)

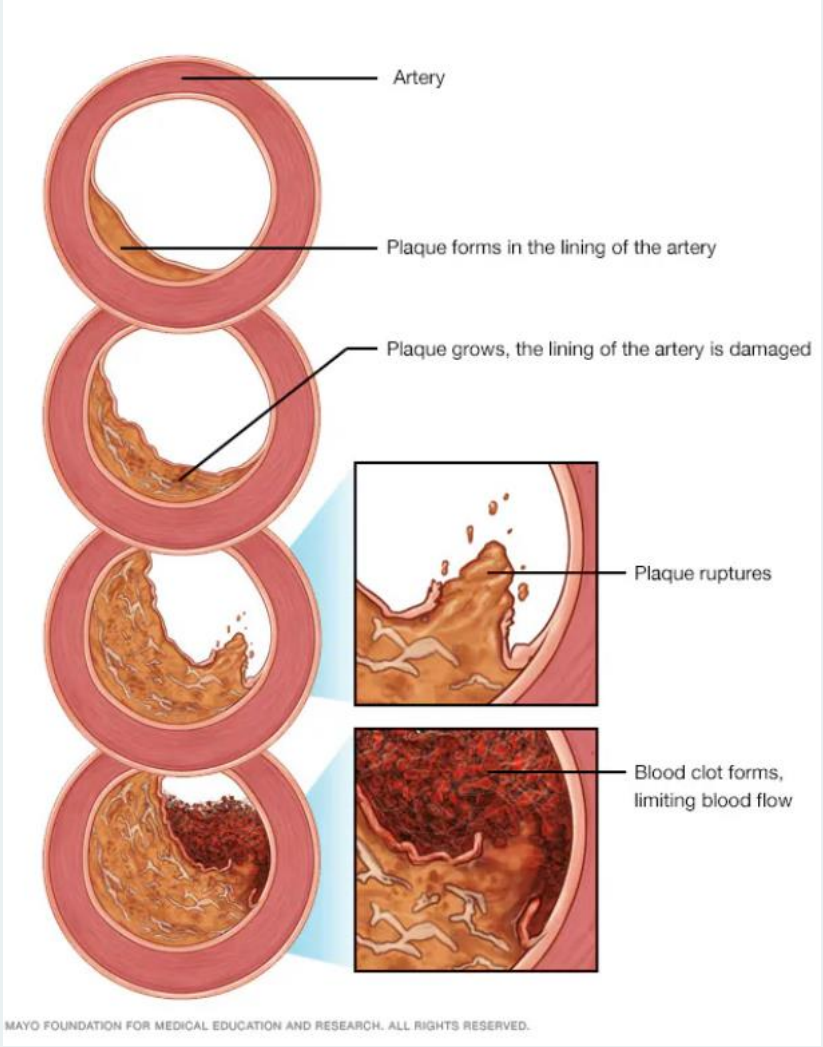
Aspirin

Antiplatelets (part of DAPT): P2Y12 inhibitors which prevent platelet aggregation; Generally prescribed for 12 months in the setting of ACS

- Clopidogrel (Plavix)
- Ticagrelor (Brilinta)
- Prasugrel (Effient)
    - Avoid if prior CVA or TIA
    - Typically not used if 75 years or older

Beta Blockers:

- Work by reducing sympathetic nervous system activity → decrease myocardial oxygen demand and decrease HR
- Used for ACS, anti-anginal benefit for CAD, cardiac arrhythmias, HTN and CHF
- End in "-lol"
- Beta blockers with indications for CHF as well include Metoprolol Succinate (Toprol-XL), Bisoprolol, Carvedilol
- 2023 Update: New recommendations for beta-blocker use in patients with chronic coronary disease. No longer recommended to improve outcomes in patients with chronic coronary disease in the absence of myocardial infarction in the past year, left ventricular ejection fraction ≤50%, or another primary indication for beta-blocker therapy.



Coronary Artery Disease

Anti-anginal Medications:

- Nitrates:
  - Cause relaxation of smooth muscle which leads to dilation of vessels
  - Avoid if having used a PDE-5 inhibitor within 24-48 hours
  - Most common side-effects include dizziness, nausea and headaches
  - PRN: SL NTG
  - Long-acting Nitrate: Isosorbide Mononitrate (Imdur)
- Ranolazine (Ranexa):
  - Mechanism of action is unknown but felt to inhibit the cardiac late-sodium current → which results in a reduction of the intracellular sodium and calcium overload in ischemic cardiac myocytes
  - Can cause QT prolongation
  - Minimal impact on HR and BP

Cholesterol lowering-medications:

- Statins: – 1st line
  - Atorvastatin (Lipitor), Rosuvastatin (Crestor)
  - Mechanism of Action → Competitive inhibitor of hydroxymethylglutaryl-coenzyme A (HMG-CoA) reductase, an enzyme necessary for the intracellular synthesis of cholesterol. Inhibition of HMG-CoA reductase lowers the amount of mevalonate and subsequently reduces cholesterol levels in hepatic cells. This, in turn, results in upregulation of LDL-receptors and increased hepatic uptake of LDL-cholesterol from the circulation.
  - Myalgias (muscle aches) are the most common side effect.
- More to come in a few slides…

Coronary Artery Disease

GLP-1 Receptor Agonists/GIP Receptor Agonist:

- Mechanism of Action → binds to and activates the GLP-1 receptor which stimulates insulin secretion and reduces glucagon secretion in a glucose-dependent manner which can lead to a reduction of blood glucose. Also works by suppressing appetite and increasing satiety.
- Once weekly injection administered at home
- Most common side effects are GI related: nausea (11% to 44%), vomiting (5% to 36%), diarrhea (8.5% to 30%), abdominal pain (5.7% to 20%), abdominal distention (2% to 7%), constipation (3.1% to 24%), dyspepsia (0.6% to 9%), decreased appetite (6% to 9%), eructation (0.6% to 7%), flatulence (0.4% to 6%), gastroesophageal reflux disease (1.5% to 5%), gastroenteritis (4% to 7%), and gastritis (0.4% to 4%)
- Per American Academy of Cardiology → Semaglutide (Ozempic and Wegovy) and Tirzepatide (Mounjaro and Zepbound) have been proven more effective than lifestyle interventions at not only weight loss, but at reducing overall cardiovascular disease (CVD) risk.
- Additional indications: Type 2 diabetes, Obesity, Cardiovascular (CV) risk reduction as discussed above but including CVA as well in patients with Type 2 diabetes and existing CV disease or risk factors, Obstructive sleep apnea (Tirzepatide-Zepbound was approved in late 2024 for moderate-to-severe OSA in adults with obesity) and CKD (approved to reduce risk of worsening kidney function and CV death in adults with CKD and Type 2 DM)
    - Additional studies are now looking at indications for steatohepatitis, HFpEF, Alzheimer's disease and addiction disorders

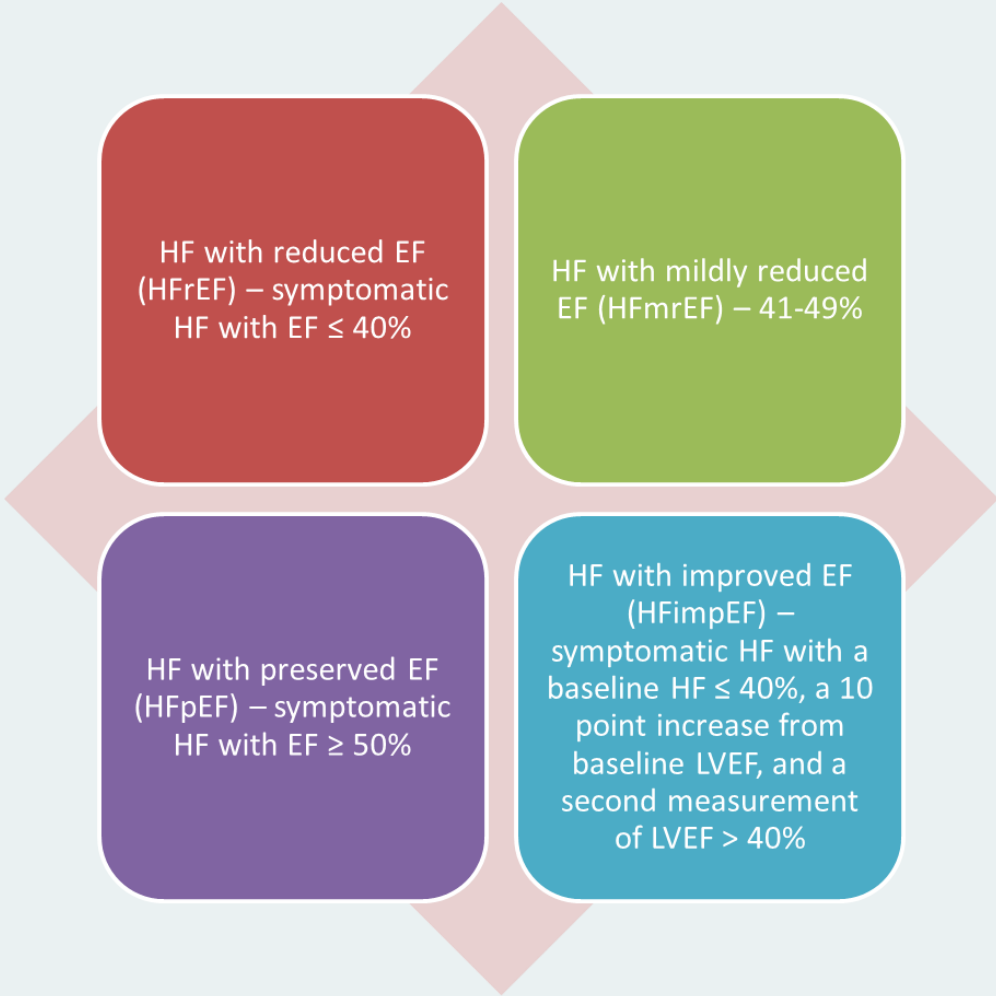
Ozempic vs. Wegovy Dosage Schedule

TIME-FRAME	OZEMPIC	WEGOVY
Month 1	0.25 mg once a week	0.25 mg once a week
Month 2	0.50 mg once a week	0.50 mg once a week
Month 3	1 mg once a week Typical maintenance dose	1 mg once a week
Month 4	2 mg once a week For additional blood sugar control	1.7 mg once a week
Maximum dose	2 mg once a week For additional blood sugar control	2.4 mg once a week

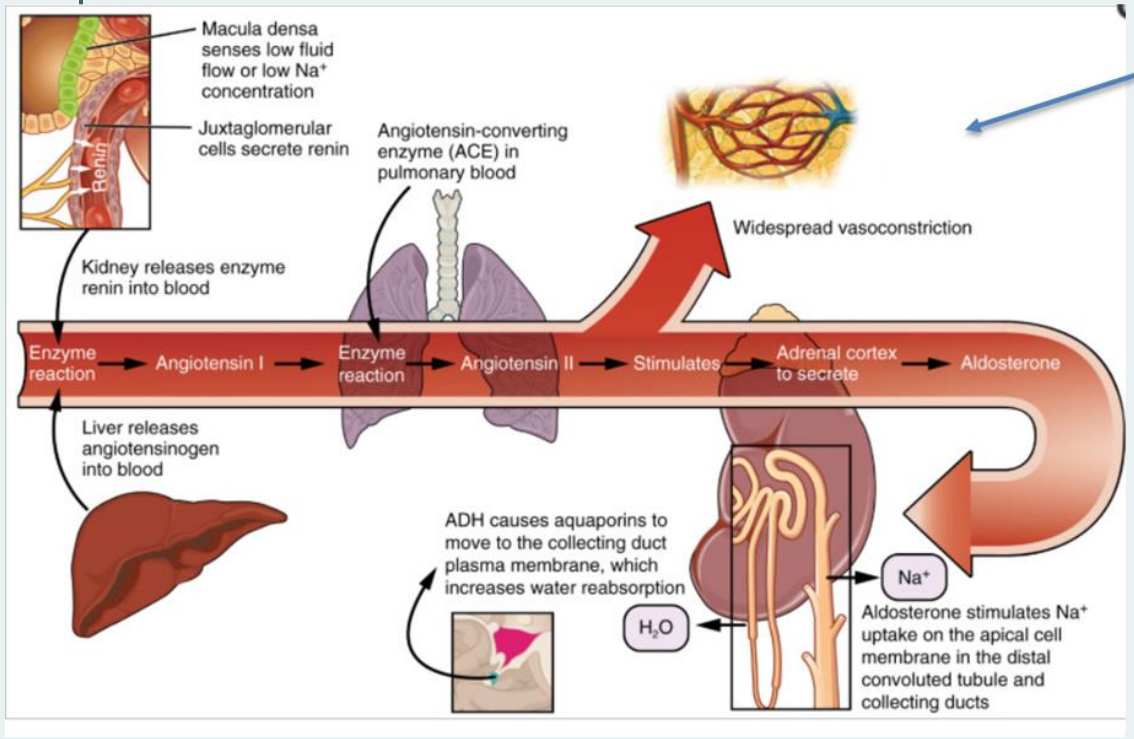
Reference: The Care Pharmacy and Clinical Key

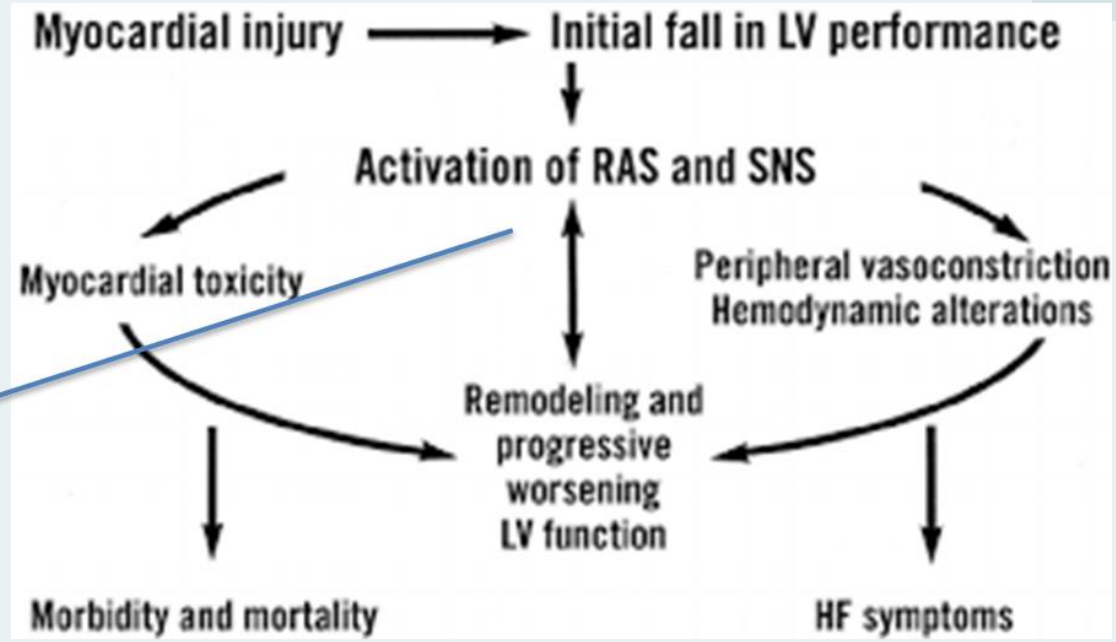
CHF

Classification by LVEF



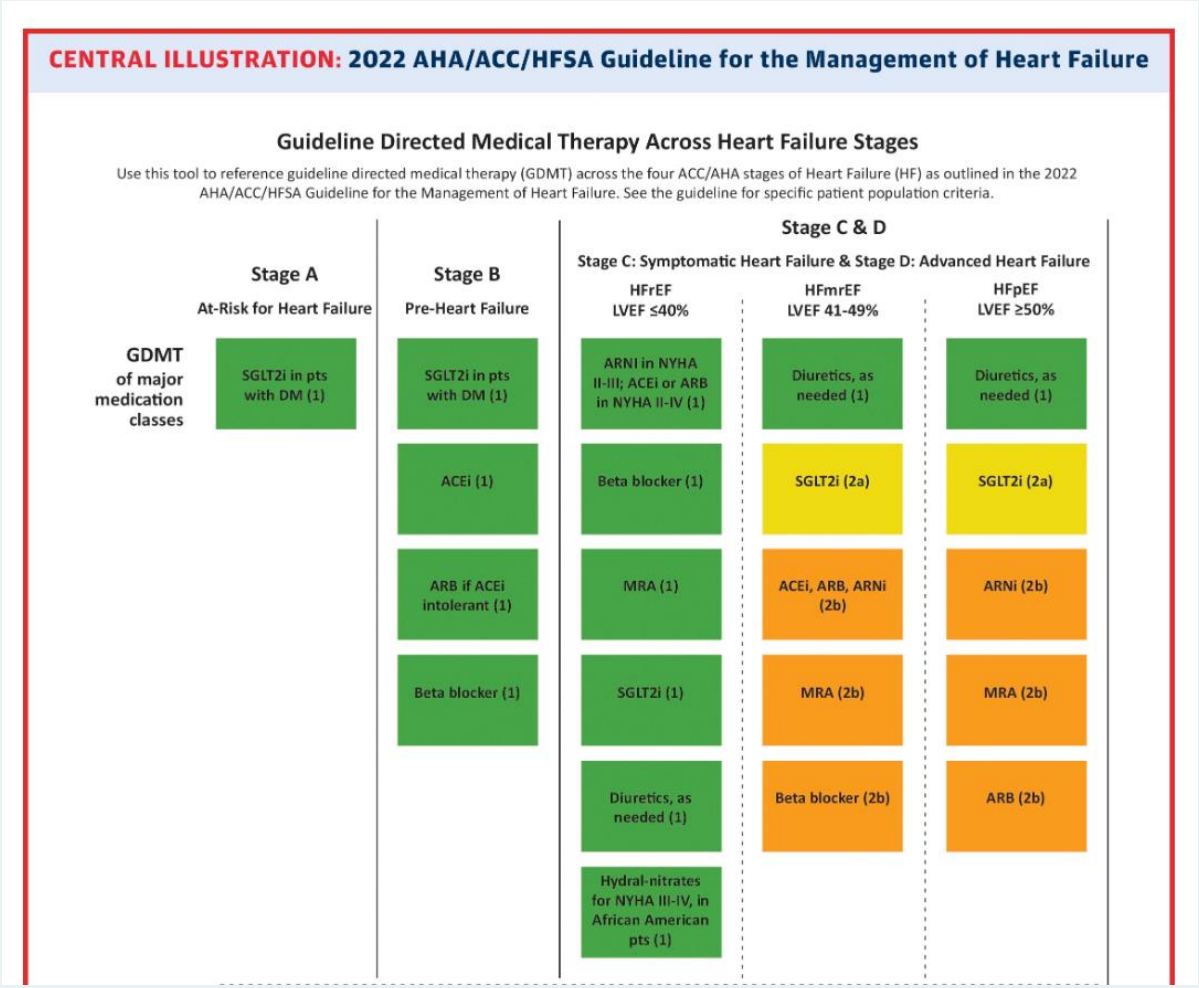
Neurohormonal Activation and LV Remodeling

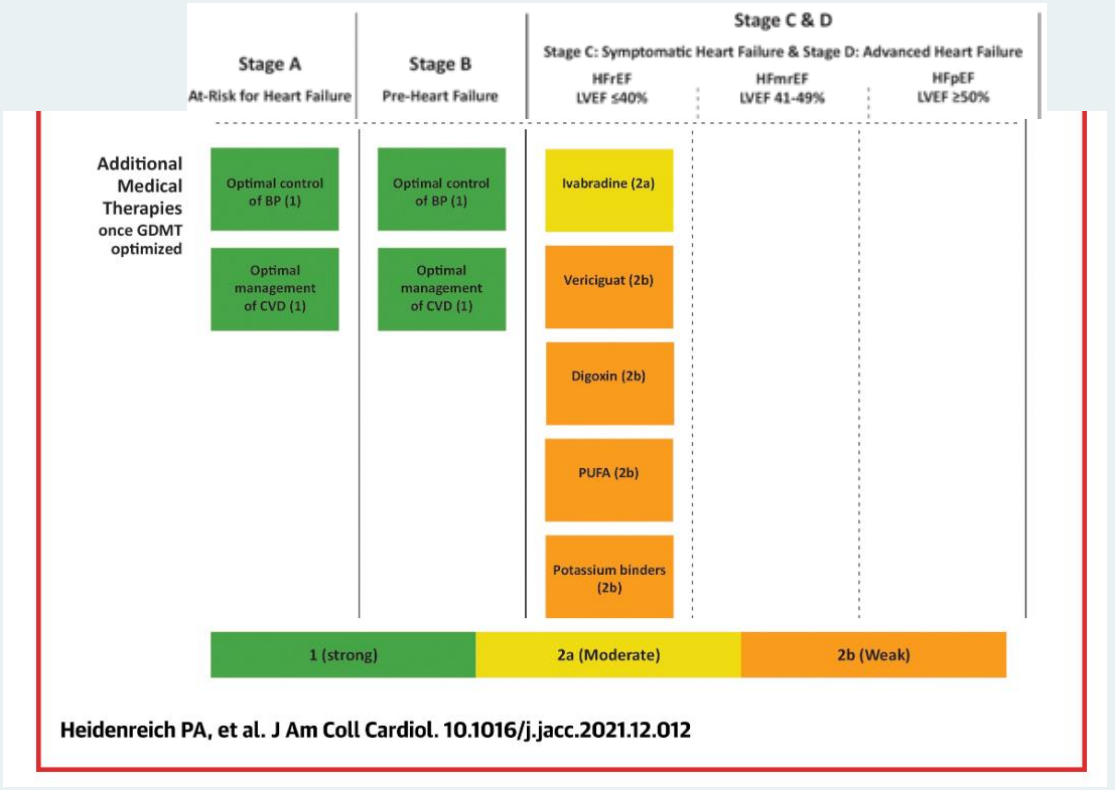




Source: https://www.ncbi.nlm.nih.gov

Congestive Heart Failure - Treatment





CHF

- Diuretics:
    - Typically Loop Diuretics which include Furosemide, Torsemide, Bumetanide
- Beta-blockers:
    - Ones used for HF include Bisoprolol (Beta-1 selective and safe in COPD), Carvedilol (try to avoid in asthma and COPD) and Metoprolol Succinate (Toprol-XL)
    - Cannot use in patients with symptomatic bradycardia, SSS, high-grade AV block, acute CHF exacerbation or recent cocaine use
- Angiotensin-converting enzyme inhibitor (ACE-I):
    - End in "-pril"
    - Enalapril, Lisinopril, Ramipril, etc.
    - Monitor BP, renal function and electrolytes
    - Most common side effect is a dry cough
- Angiotensin Receptor Blocker (ARB):
    - End in "-sartan"
    - Candesartan, Losartan, Valsartan

CHF

- Angiotensin Receptor-Neprilysin Inhibitor (ARNI):
  - Sacubitril/Valsartan (Entresto)
  - Avoid if history of angioedema
  - Replaces ACE-I or ARB; need 36-hour washout if switching from ACE-I to reduce risk of angioedema
- Mineralocorticoid Receptor Antagonist (MRA):
  - Spironolactone and Eplerenone
    - Spironolactone more commonly associated with gynecomastia
- Digoxin:
  - Used for inotropic effect
  - Can lead to Digitalis Toxicity → confusion, nausea, vomiting, visual disturbances, delirium, cardiac arrhythmias
- Hydralazine/Isosorbide Dinitrate (BiDil):
  - Relaxes blood vessels throughout the body which helps with BP and indicated for African American patients with NYHA Class III-IV and HFrEF who are receiving optimal medical therapy. For patients with HFrEF who cannot be given 1st line agents because of drug intolerances or renal insufficiency, a combination of Hydralazine and Isosorbide Dinitrate should be considered (Class 2b).
  - Most common side effects are headaches and dizziness
  - TID Dosing

CHF

- SGLT2i (sodium-glucose cotransporter 2 inhibitor):
  - Inhibit glucose and sodium being reabsorbed in the kidneys and therefore excreted in the urine
  - In symptomatic patients with chronic HFrEF, SGLT2i is recommended to reduce hospitalizations and cardiovascular mortality, regardless of the presence of Type 2 diabetes (Class of Recommendation 1a).
  - SGLT2i can also be beneficial in patients with HFmrEF and HFpEF
  - Dapagliflozin (Farxiga) and Empagliflozin (Jardiance) are the most common.
  - Side effects include UTI's, yeast infections and dehydration (usually diuretic dose is reduced)
- Vericiguat (Verquvo):
  - Mechanism of Action → stimulates soluble guanylate cyclase (sCG) which leads to increased production of cyclic GMP which then relaxes smooth muscle along blood vessels
  - Used in patients who were recently hospitalized or received IV medication and have an EF < 45%.
  - Most common side effects are hypotension and anemia

CHF

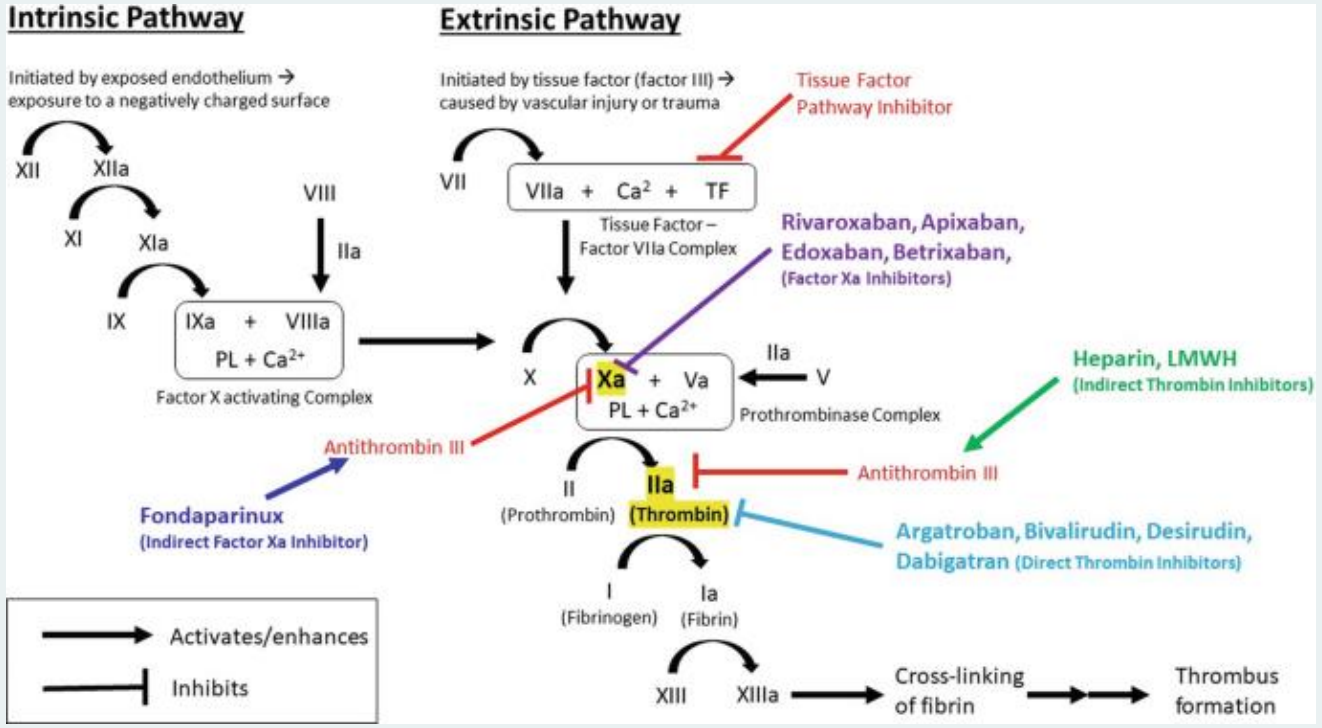
- Ivabradine (Corlanor):
  - Mechanism of Action → selectively inhibits the cardiac pacemaker current (a mixed sodium-potassium inward current that controls depolarization in the SA node)
  - For patients with symptomatic NYHA Class II to III and stable HFrEF who are already receiving a beta-blocker at maximum tolerated dose and in NSR with HR > 70 bpm at rest (Class 2a)
  - Most common side effects include bradycardia, luminous phenomena, elevated BP and increased risk of atrial fibrillation
- Finerenone (Kerendia):
  - Nonsteroidal mineralocorticoid receptor antagonist with physiochemical properties that are distinct from those of steroidal mineralocorticoid receptor antagonists, such as Spironolactone.
  - Initially indicated for patients with CKD and Type 2 DM as reduced risk of progressive kidney disease and CV events
  - Recent study (FINEARTS-HF) was designed to assess efficacy in heart failure patients → significantly reduced the composite risk of CV death and total HF events
    - FDA approval for adult patients with HF and LVEF ≥40%
    - Do not initiate if K+ > 5.0 or GFR < 25.
    - Most common side effects: hyperkalemia (9.7% vs 4.2%), hypotension (7.6% vs 4.7%), and hyponatremia (1.9% vs 0.9% in placebo)

Atrial Fibrillation

- Rate-controlling medications:
  - Beta-blockers
  - NDHP Calcium Channel Blockers – Cardizem and Verapamil
  - Digoxin
- Antiarrhythmic medications:
  - Amiodarone – Potassium channel blocker; can be used for atrial arrhythmias, PVC's and ventricular arrhythmias
    - Can be started as inpatient or outpatient
    - Monitoring includes CXR, TSH, LFT's and PFT's. Also need an annual eye exam
    - Lots of side effects (pulmonary toxicity, transaminitis, hypothyroidism, skin discoloration, corneal opacity and optic neuritis)
  - Flecainide – Sodium channel blocker; commonly used for atrial fibrillation, SVT or PVC's
    - Started as an outpatient and need an EKG 7-10 days after initiation and every 6-12 months afterwards; Also arrange for a GXT to assess for PR/QRS duration changes
    - Cannot use if history of CAD
    - When used for atrial arrhythmias, must be on AV nodal blocking agents such as a beta-blocker
  - Tikosyn – Potassium channel blocker; specific admission for initiation due to risk of QT prolongation. Serial EKG's along with checking K+ and Mg.
    - If you miss two doses, readmission for resuming Tikosyn is recommended
  - Sotalol – Potassium channel blocker; specific admission for initiation as well due to QT prolongation and risk of Torsades.

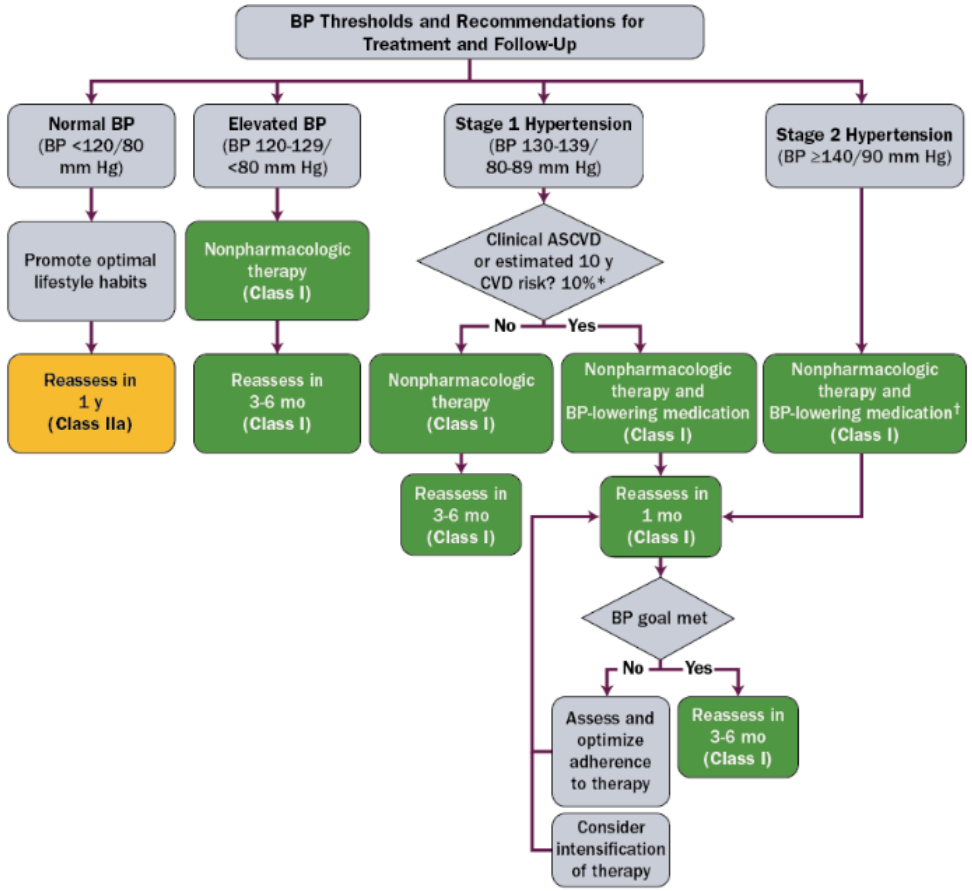
Atrial Fibrillation (continued)

- <u>Anticoagulants:</u>
  - Coumadin (Warfarin)
    - Inhibits Vitamin K which helps with production of clotting factors and anticoagulant proteins
    - INR checks
    - Consistent intake of Vitamin K in your diet
  - Dabigatran (Pradaxa)
    - Direct thrombin inhibitor which prevents conversion of fibrinogen to fibrin
  - Apixaban (Eliquis)
    - Blocks the activity of Factor Xa which interrupts the coagulation cascade
    - Dosed as BID medication for atrial fibrillation - Dosing determined by age, weight and kidney function
  - Rivaroxaban (Xarelto)
    - Same mechanism of action as Apixaban
    - Dosed as once daily medication for atrial fibrillation – dosing determined by CrCl



HTN

BP Thresholds and Recommendations for Treatment and Follow-Up



Blood Pressure Thresholds for and Goals of Pharmacologic Therapy in Patients With Hypertension According to Clinical Conditions

Clinical Condition(s)	BP Threshold, mm Hg	BP Goal, mm Hg
General		
Clinical CVD or 10-year ASCVD risk ≥10%	≥130/80	<130/80
No clinical CVD and 10-year ASCVD risk <10%	≥140/90	<130/80
Older persons (≥65 years of age; noninstitutionalized, ambulatory, community-living adults)	≥130 (SBP)	<130 (SBP)
Specific Comorbidities		
Diabetes mellitus	≥130/80	<130/80
Chronic kidney disease	≥130/80	<130/80
Chronic kidney disease after renal transplantation	≥130/80	<130/80
Heart failure	≥130/80	<130/80
Stable ischemic heart disease	≥130/80	<130/80
Secondary stroke prevention	≥140/90	<130/80
Peripheral artery disease	≥130/80	<130/80

HTN

Lifestyle Modifications to Manage Hypertension

Modification	Recommendation	Approximate SBP Reduction (Range)
Weight Reduction	Maintain normal body weight (BMI 18.5-24.9 kg/m^2).	5-20 mm Hg/10 kg weight loss
Adopt DASH Eating Plan	Consume a diet rich in fruits, vegetables, and low-fat dairy products with a reduced content of saturated and total fat.	8-14 mm Hg
Dietary Sodium Reduction	Reduce dietary sodium intake to no more than 100 mmol per day (2.4 g sodium or 6 g sodium chloride).	2-8 mm Hg
Physical Activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 min per day, most days of the week).	4-9 mm Hg
Moderation of Alcohol Consumption	Limit consumption to no more than two drinks (1 oz. or 30 ml ethanol; e.g., 24 oz beer, 10 oz wine, or 3 oz 80-proof whiskey) per day in most men and to no more than one drink per day in women and lighter weight persons.	2-4 mm Hg

Source: ACCSAP: Reproduced from Chobanian AV, Bakris GL, Black HR, et al. The Seventh report on the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 (Express) Report. JAMA 2003;289:2560-72.

HTN

- Lifestyle!
- Beta Blockers
- Calcium Channel Blockers
    - DHP - Amlodipine, Nifedipine, Felodipine
    - NDHP - Cardizem, Verapamil
- Angiotensin Converting Enzyme Inhibitor (ACE-I)
    - Benazepril, Lisinopril, Enalapril, Ramipril
- Angiotensin Receptor Blocker (ARB)

  Olmesartan, Telmisartan, Valsartan, Irbesartan
- Diuretics
    - Thiazide Diuretics (inhibit sodium absorption)
        - HCTZ, Chlorthalidone, Metolazone
    - Loop Diuretics (inhibit sodium and chloride absorption)
        - Furosemide, Bumetanide, Torsemide
    - Potassium-sparing diuretics
        - Triamterene, Amiloride
- Aldosterone-receptor blockers
    - Eplerenone, Spironolactone
- Alpha-1 Receptor Blockers
    - Doxazosin, Terazosin
- Alpha-2 Receptor Agonists
    - Clonidine, Methyldopa
- Vasodilators
    - Hydralazine, Minoxidil

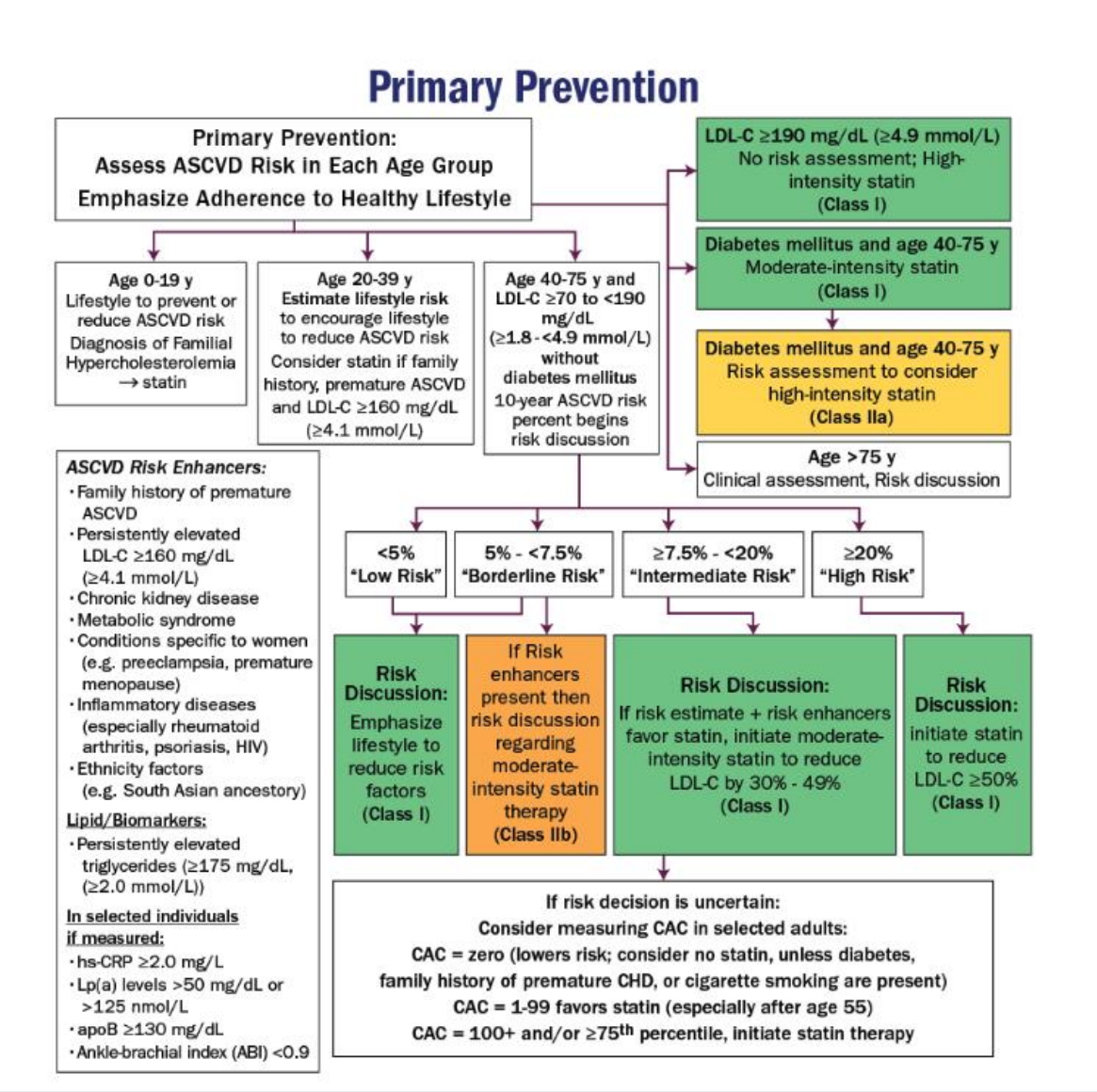
Common Adverse Effects with Different Classes

Thiazide diuretics	Hypokalemia; increased insulin resistance/new onset diabetes; increased uric acid levels (may worsen gout); may increase cholesterol levels (less so of indapamide); hyponatremia (uncommon)
Loop diuretics	Hypokalemia; volume depletion
Potassium-sparing diuretics	Hyperkalemia–Use cautiously with potassium supplementation, ACE inhibitors, angiotensin II antagonists
Aldosterone-receptor blockers	Hyperkalemia–Use cautiously with potassium supplementation, ACE inhibitors, angiotensin II antagonists; gynecomastia, sexual dysfunction with spironolactone
ß-Blockers	Increased insulin resistance/new onset diabetes; fatigue; sexual dysfunction; insomnia; bronchospasm; bradycardia; negative inotropic effect; may mask hypoglycemic symptoms; may worsen symptoms of peripheral vascular disease; may suppress exercise tolerance; may increase triglyceride levels (less true for agents with ISA); rebound syndrome (hypertension and/or angina) may occur with abrupt discontinuation; acebutolol is both cardioselective and has ISA
Combined α- and ß-blockers	With higher doses, similar to ß-blockers
ACE inhibitors	Cough; much less common are angioedema, rash, hyperkalemia; contraindicated in pregnancy; use cautiously with renal artery stenosis
Angiotensin II antagonists	Hyperkalemia; angioedema (rare); contraindicated in pregnancy; use cautiously with renal artery stenosis
Calcium channel blockers non-dihydropyridines	AV node suppression; possible negative inotropic effect; constipation can occur with verapamil; use cautiously with ß-blockers
Calcium channel blockers dihydropyridines	Ankle edema; flushing; headache; gingival hypertrophy (uncommon); increase in heart rate may occur
α_1-Blockers	First-dose effect (can be minimized with gradual titration or taking first dose at bedtime)
Central α_2- agonists and other centrally acting drugs	Dry-mouth; fatigue, drowsiness; sexual dysfunction; symptoms minimized with patch, guanfacine; rebound syndrome can occur with abrupt discontinuation of clonidine and/or methyldopa pills
Direct vasodilators	Fluid retention and tachycardic effects usually require concomitant use of a loop diuretic and a ß-blocker; hydralazine is associated with a lupus-like syndrome, particularly with higher doses; minoxidil may induce pericardial effusion; hirsutism limits use of minoxidil in women

ISA = intrinsic sympathomimetic activity

- Source: ACCSAP – Reproduced from Oparil S, Weber M, eds. Hypertension, Companion to Brenner and Rector's, The Kidney. Philadelphia: W.B. Saunders Company; 2000:662-74

HLD (this slide refers to Primary Prevention Only)



10-year ASCVD Risk Estimator

Current Age * — Age must be between 20-79

Sex * — Male | Female

Race * — White | African American | Other

Systolic Blood Pressure (mm Hg) * — Value must be between 90-200

Diastolic Blood Pressure (mm Hg) * — Value must be between 60-130

Total Cholesterol (mg/dL) * — Value must be between 130 - 320

HDL Cholesterol (mg/dL) * — Value must be between 20 - 100

LDL Cholesterol (mg/dL) — Value must be between 30-300

History of Diabetes? * — Yes | No

Smoker? * — Current | Former | Never

On Hypertension Treatment? * — Yes | No

On a Statin? — Yes | No

On Aspirin Therapy? — Yes | No

HLD

- Statins:
    - Mechanism of Action: Competitive inhibitor of hydroxymethylglutaryl-coenzyme A (HMG-CoA) reductase, an enzyme necessary for the intracellular synthesis of cholesterol. Inhibition of HMG-CoA reductase lowers the amount of mevalonate and subsequently reduces cholesterol levels in hepatic cells. This, in turn, results in upregulation of LDL-receptors and increased hepatic uptake of LDL-cholesterol from the circulation.
- Ezetimibe (Zetia):
    - Reduces absorption of cholesterol in the gut
    - Reduces LDL by 10-25%
- Niacin:
    - Now rarely used, raises HDL, causes flushing
- Fibrates:
    - Fenofibrate, Gemfibrozil

High intensity (average LDL-C reduction ≥50%)	Moderate intensity (30 to <50% reduction)	Low intensity (<30% reduction)
Atorvastatin 40–80 mg	Atorvastatin 10–20 mg	Simvastatin 10 mg
Rosuvastatin 20–40 mg	Rosuvastatin 5–10 mg	Pravastatin 10–20 mg
Simvastatin 80 mg	Simvastatin 20–40 mg	Lovastatin 20 mg
	Pravastatin 40–80 mg	Fluvastatin 20–40 mg once daily
	Lovastatin 40 mg	Pitavastatin 1 mg daily
	Fluvastatin XL 80 mg	
	Fluvastatin 40 mg PO BID	
	Pitavastatin 2–4 mg	

Image Source: MDPI.com

HLD

- Bempedoic Acid (Nexletol):
  - Inhibits ATP-citrate lyase which plays a role in cholesterol synthesis
  - The CLEAR Outcomes (Cholesterol Lowering via Bempedoic Acid, an ACL-Inhibiting Regimen) trial
    - Looked at 13,970 patients over 40.6 months who were statin intolerant or unwilling to take statins. Primary endpoint was four-component MACE, including death from CV causes, nonfatal MI, nonfatal stroke, and coronary revascularization. Patients taking bempedoic acid had a significantly lower risk. At 6 months of follow-up, those taking bempedoic acid had a lower LDL-C level (21.7% vs. -0.6%). Bempedoic acid therapy reduced the total number of CV events.
    - Side effects → Higher levels of uric acid (2.1% vs. 0.5%), a higher incidence of gout (1.4% vs. 0.4%), decreased glomerular filtration rate (0.7% vs. <0.1%), and increased liver enzyme levels (2.8% vs. 1.3%). An increased incidence of tendon rupture.
  - Can reduce LDL by 15-24% as Bempedoic Acid (Nexletol) alone or up to 36% when added with Ezetimibe (Nexlizet)

HLD

- PCSK9 Inhibitor Therapy:
  - Inhibit PCSK9 which is a protein that regulates the recycling of LDL; Reduce the risk of major cardiovascular events
  - Can reduce LDL up to 71% when added to maximum statin therapy or as monotherapy
  - Alirocumab (Praluent) – Studied in Odyssey Trial → typically injected every 2 weeks or higher-dose of 300mg every 4 weeks
  - Evolocumab (Repatha) – Studied in Fourier Trial → injected every 2 weeks
  - Side effects: Injection site reaction (3-6%), Naso-pharyngitis (4% to 12%), URI (2% to 9%), influenza (1% to 9%), cough (1% to 5%), urinary tract infection (1% to 5%), sinusitis (4%), diarrhea (3%), gastroenteritis (3% to 6%), nausea (2%), back pain (2% to 6%), arthralgia (2%), myalgia (4%), muscle cramps/spasms (1%), musculoskeletal pain (3%) and fatigue (2%)

HLD

- Inclisiran (Leqvio):
  - Mechanism of Action → Inclisiran is a double-stranded small interfering ribonucleic acid (siRNA) that prevents proprotein convertase subtilisin/kexin type 9 (PCSK9) translation in the liver. This increases LDL-C receptor recycling and expression on the hepatocyte cell, which increases LDL-C uptake and reduces LDL-C concentrations in the circulation.
  - Dosing → 284 mg subcutaneously every 3 months for 2 doses, then 284 mg subcutaneously every 6 months
  - Side effects: Injection site reaction reported in 8% of patients; Arthralgias (5%) and bronchitis (4%).
  - Approved by FDA in December 2021 as adjunctive therapy to diet and maximally tolerated statin therapy for adults with HeFH or clinical ASCVD who require additional lowering of LDL-C levels.
    - Inclisiran may be particularly useful for additional LDL-C lowering for those with a history of suboptimal medication adherence as the medicine is administered by a health professional.
    - Covered under Medicare Part B medical benefit rather than as a prescription drug benefit, thus helping reduce medication costs for those with such insurance coverage.

HLD – What about OTC medications?

- SPORT trial which included adults of 40-75 years of age with no history of ASCVD, LDL-C levels 70-189 mg/dL, and a PCE-estimated ASCVD risk between 5% and 20%, or in men 40-50 years of age or women 50-60 years of age with diabetes mellitus, and <20% 10-year risk.
- Dosing was randomized for patients to receive rosuvastatin 5 mg daily, placebo, fish oil, cinnamon, garlic, turmeric, plant sterols, or red yeast rice. The primary endpoint was percentage of change in LDL-C level for rosuvastatin versus each of the supplements after 28 days of treatment.
- Among 190 patients who completed the study, the mean reduction in LDL-C level with rosuvastatin compared with placebo was -35.2%. There was no significant reduction in LDL-C level with any of the supplements compared with placebo.

Peripheral Arterial Disease (PAD)

- Treatment focused on the prevention of cardiovascular events, amelioration of claudication symptoms, and prevention of skin breakdown, wound formation, or infection.
- Smoking cessation is key! Prior studies have shown that smoking cessation improved treadmill walking distance by 40% at 10 months. Can use NRT, Bupropion, and Varenicline. Also consider referral for smoking cessation program.
- Cholesterol Management → high-intensity statin is 1st line. Can consider alternatives with Zetia, PCSK9i or other alternatives as previously discussed.
- Diabetes Management → Target Hgb A1c < 7.0.
- HTN Management → Target BP < 130/80.
- Antiplatelet → Typically with Aspirin or Plavix; Can also consider anticoagulation with low-dose Xarelto with ASA.
- Symptom Control → Cilostazol (Pletal): Has antithrombotic, antiplatelet, and vasodilatory actions; The vasodilatory actions are greater on femoral arteries than on vertebral, carotid, or superior mesenteric arteries. Common side effects include headache (27-34% of patients), diarrhea (12% to 19), dizziness (9% to 10%), palpitations (5% to 10%) and peripheral edema (7% to 9%).

Hypertrophic Obstructive Cardiomyopathy

- Left ventricular hypertrophy (LVH) not explained by abnormal hemodynamic loading conditions such as hypertension or aortic stenosis. Patients with hypertrophic cardiomyopathy with obstruction and heart failure symptoms are initially treated with beta-blockers or calcium channel blockers and then can consider Mavacamten (Camzyos).

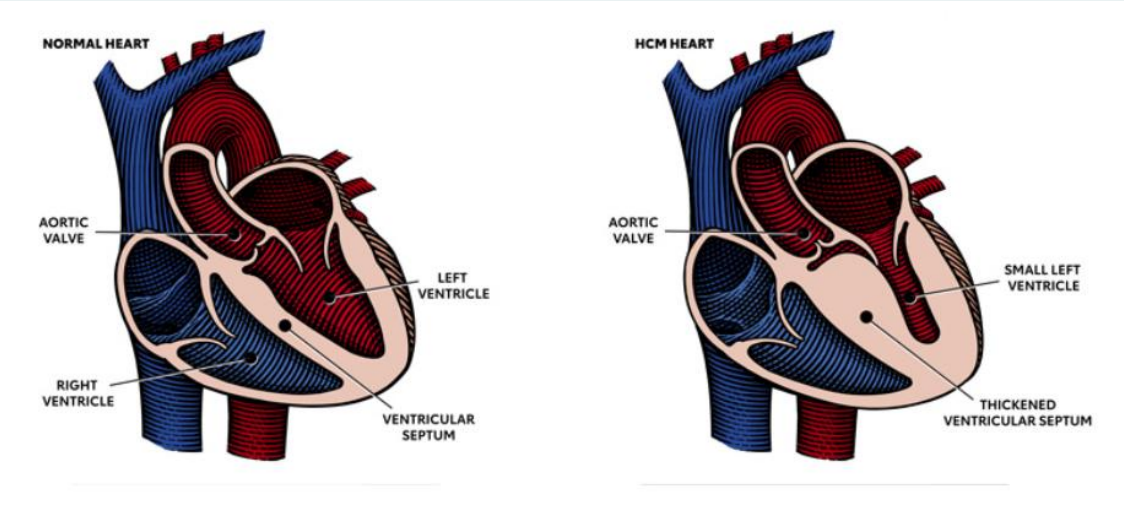
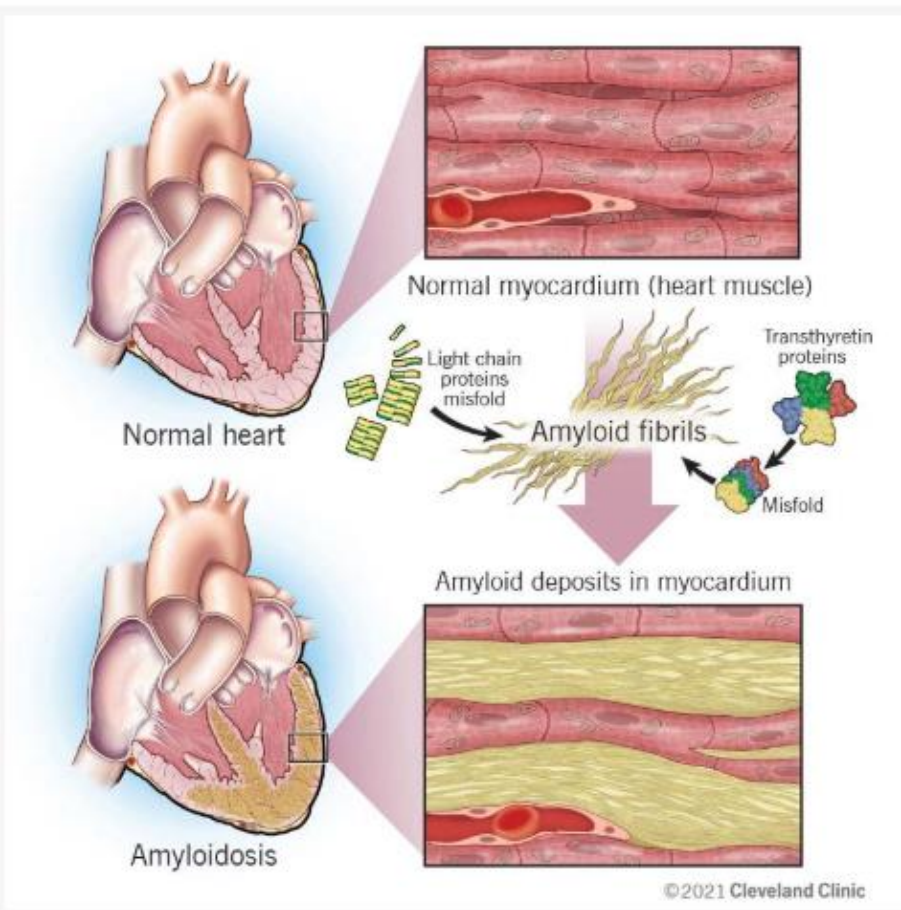


Image Source: American Heart Association

- <u>Mavacamten</u>
  - Small molecule cardiac myosin inhibitor (CMI) which reduces the LVOTO and symptoms in controlled studies
  - EXPLORER-HCM (Clinical Study to Evaluate Mavacamten [MYK-461] in Adults With Symptomatic Obstructive Hypertrophic Cardiomyopathy)
    - Was associated with a highly significant improvement in the primary outcome of change in exercise capacity and/or NYHA class IV. Also showed significant improvements in left ventricular outflow tract (LVOT) gradients and circulating levels of the cardiac biomarkers NT-proBNP and cardiac troponin in patients treated with Mavacamten. Kansas City Cardiomyopathy Questionnaire (KCCQ) demonstrated a significant marked improvement in the quality of life in patients treated with Mavacamten.
    - Approved In 2022 → Stipulation that providers and dispensing pharmacies participate in a Risk Evaluation and Mitigation Strategy program to minimize the potential for sustained reductions in LVEF and associated heart failure.

Cardiac Amyloid

- Most common types of amyloid are AL amyloidosis and ATTR amyloidosis.
    - AL amyloidosis arises from light chain deposition in end-organs leading to end-organ dysfunction. Abnormal light chain production and deposition can arise from a variety of plasma dyscrasias, such as multiple myeloma. The heart is affected in approximately 50-75% of cases.
    - Transthyretin (TTR), a protein produced by the liver, can cause both a genetic form of amyloidosis when the TTR protein is mutated (ATTRm) and a wild-type or senile form of the disease when the wild-type protein drives disease (ATTRwt). ATTRm commonly affects the peripheral nerves and kidneys but may also be associated with significant cardiac involvement in approximately one-fourth of cases.



Source: Cleveland Clinic

Treatment for Cardiac Amyloid

Features of Cardiac Amyloidosis Based on Amyloid Type

Type of Amyloidosis	Precursor Protein	Usual Age at Onset	Main Organs Involved	Average Survival Time in Untreated Patients	Specific Treatment
AL (primary)	Abnormal light chains	50+	All except central nervous system; heart involved in 50% of cases	Noncardiac disease, 24 months; disease with heart failure, <9 months	Chemotherapy aimed at plasma cells
Familial (ATTR)	Mutant TTR	20-70+ (partially dependent on mutation)	Peripheral and autonomic neuropathy; heart	7 to 10 years for neuropathy	Liver transplantation. Investigational agents to stabilize TTR (tafamidis) or suppress it's production
Senile systemic amyloidosis (SSA)	Wild-type TTR	70+	Heart	5 to 7 years	Investigational agents to stabilize TTR (tafamidis) or suppress its production
Isolated atrial amyloidosis (IAA)	Atrial natriuretic peptide	Unknown	Cardiac atria (particularly in already diseased hearts)	No effect on survival	None needed
AA (secondary amyloidosis)	Serum amyloid A (SAA), an inflammatory protein	Teens upward, depending on underlying inflammatory condition	Liver, kidney; heart rarely	10+ years	Treatment of underlying inflammatory condition

Source: ACCSAP

For ATTR Cardiac Amyloid:

- Tafamadis (Vyndaqel; Vyndamax) → helps stabilize the TTR tetramer, which reduces the end-organ deposition of TTR monomer that causes amyloid.
- Clinical trials have shown reduction in all-cause mortality and cardiovascular-related hospitalizations.
- Most common side effects → UTI's, GI related, fatigue, MSK pain
- $$$$$

Question 1:

Barbara is a 79 yo female with PMH of HTN, HLD, CAD (s/p DES to the LAD in 2022) and HFrEF/ICM (EF 30-35% by most recent echocardiogram) who was just recently admitted for an acute CHF exacerbation. She is just now returning to cardiac rehab and is complaining about recurrent UTI's since her admission. Which medication is the most likely culprit?

A. Carvedilol (Coreg)

B. Empagliflozin (Jardiance)

C. Sacubitril/Valsartan (Entresto)

D. Spironolactone (Aldactone)

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Question 2:

Bobby is a 57 yo male who was recently admitted for an NSTEMI with DES to the RCA. He was previously consuming a cheeseburger a day and is now trying to follow a heart-healthy diet. His LDL was at 109 on most recent check and his goal LDL is < 55. He mentions during his class that they are wanting him to take a shot for cholesterol. Which medication do you think he is referring to?

A. Semaglutide (Ozempic)

B. Evolocumab (Repatha)

C. Ezetimibe (Zetia)

D. Enoxaparin (Lovenox)

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Question 3:

Ralph is an 83 yo male and has been participating in maintenance classes following prior CABG (LIMA-LAD, SVG-OM and SVG-RCA). He was recently found to have episodes of paroxysmal atrial fibrillation on his cardiac monitor and his cardiology provider recommended starting anticoagulation given his CHA_2DS_2-VASc Score of 7. Which medication was he most appropriately started on for this?

A. Apixaban (Eliquis)

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“ Thank you for listening to my mom more than I do!”

- Norah