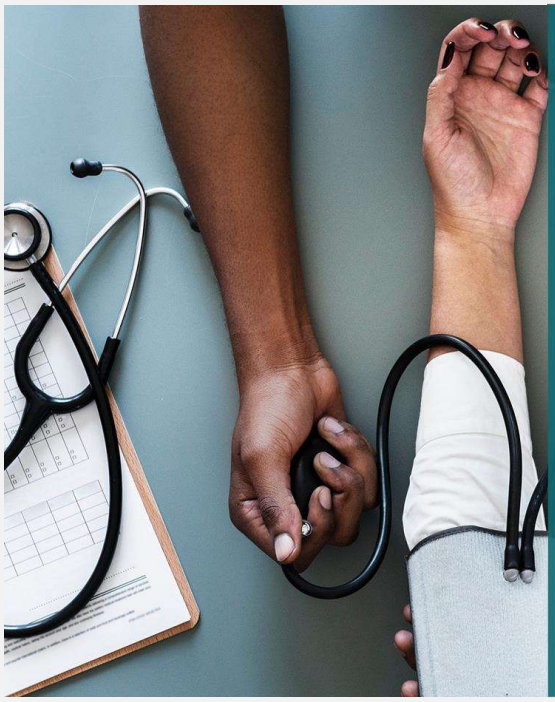


Heart Failure Update

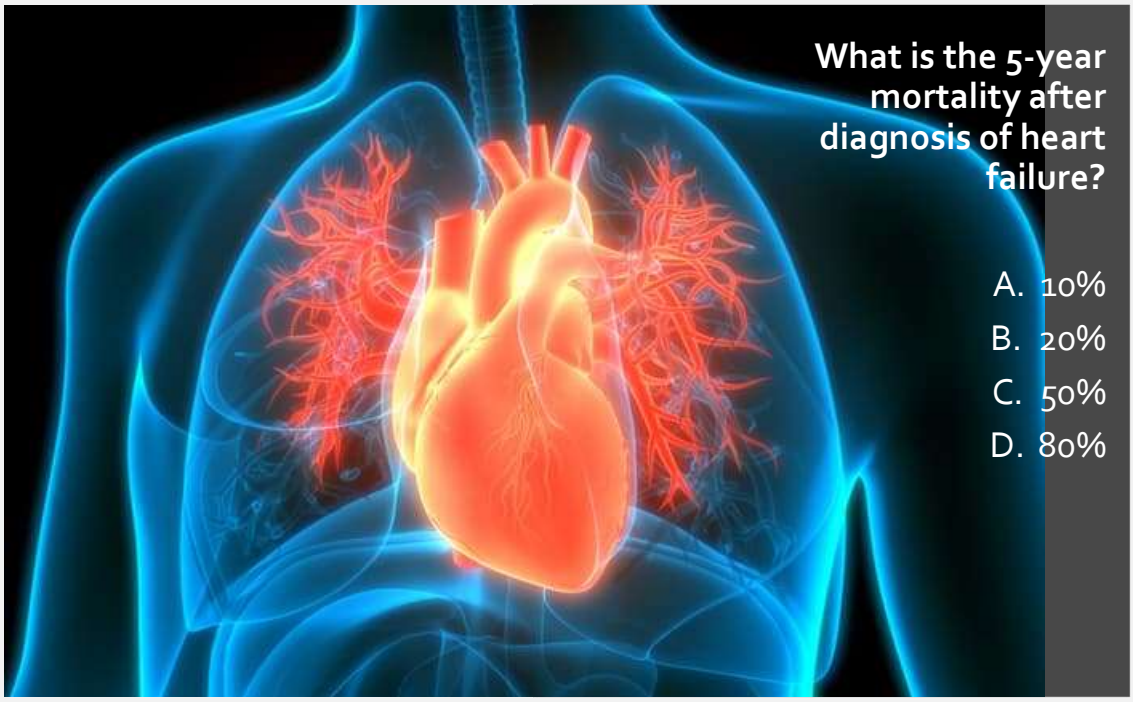
Lisa Soltis, MSN, APRN, RN-BC, PCCN-K, CCRN-CSC-CMC, CCNS, CES-A, FCNS, FCCM

1

- Clinical syndrome of decreased cardiac function from either structural or functional abnormalities
- Elevated natriuretic peptides
- Evidence of cardiogenic pulmonary or systemic congestion
- Categorized as either HFrEF (systolic), HFpEF (diastolic) or HFmEF (mild) dysfunction
- More than 6.5 Million Americans have some form of HF

Heart Failure

2



3

NYHA-Heart Failure Functional Classification

I: Symptoms with strong exertion

II: Symptoms with normal exertion

III: Symptoms with minimal exertion

IV: Symptoms occur at rest

4

AHA/ACC Staging of Severity

Stage A: Patients at risk for developing HF

- No structural heart disease
- No symptoms of HF
  - Treat preventable conditions (HTN, DM, dyslipidemia)

Usually asymptomatic/high risk

- Patient & family education
- ACE inhibitors are useful to prevent remodeling of cardiac muscle

5

AHA/ACC Staging of Severity

Stage B: Structural Changes Noted

- May be still be asymptomatic
- Patient and family education regarding management

Recommendations

- ACE inhibitor or ARB in ALL patients
- Beta-Blockers in select patients

6

Stage C

Structural heart disease

- Previous or worsening of current symptoms

Recommendations: ACE inhibitors & beta-blockers in ALL patients

- Low sodium diets, diuretics, digoxin
- Biventricular pacemaker (if BBB present)
- Coronary artery revascularization (if CAD present)
- Mitral valve repair/replacement (if mitral regurgitation)
- Aldosterone antagonist, nesiritide

7

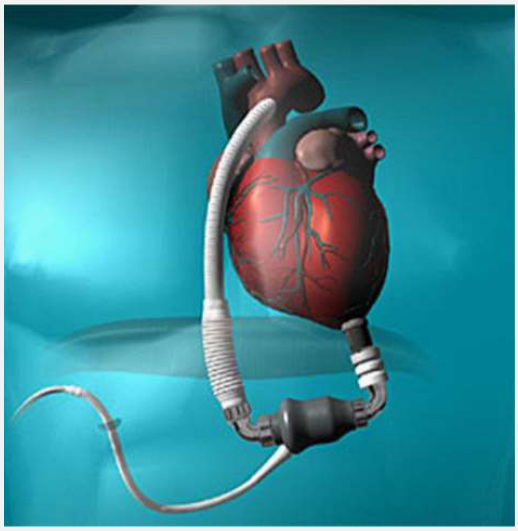
Stage D

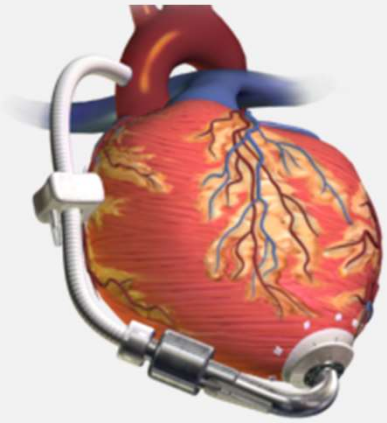
Refractory symptoms. Requires special interventions

Recommendations: Inotropes, ventricular assist device (VAD), transplantation, hospice

8

LVADS Durable Support





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Neurohormonal Influences

- HF is a vicious cycle
  - Flogging of the myocardium by norepinephrine
    - Vasopressin released, SIADH common
      - Continuous activation of RAA system

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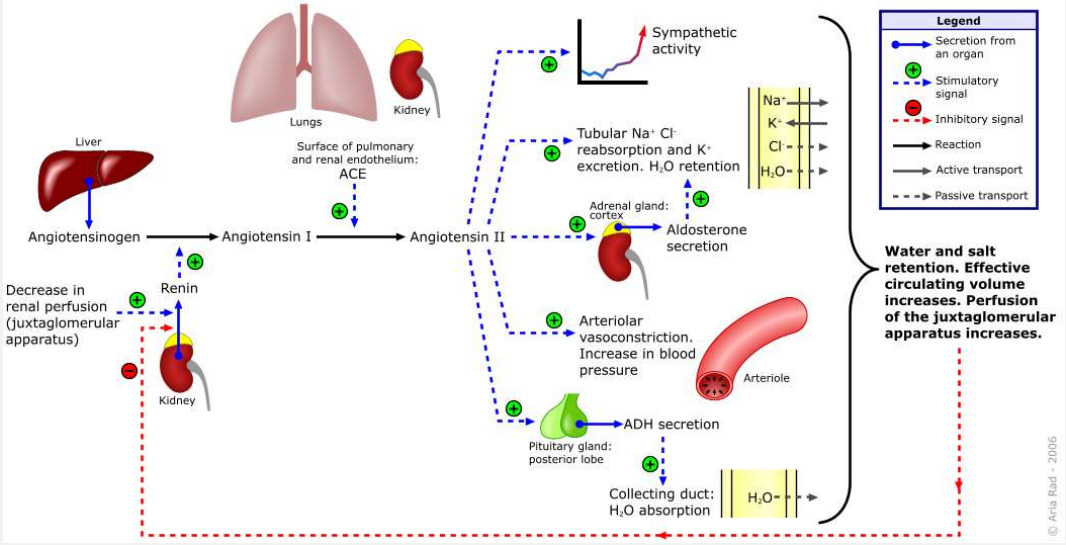
RAAS

Renin-angiotensin-aldosterone system



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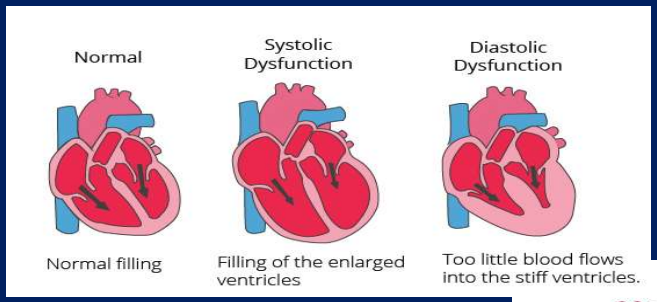
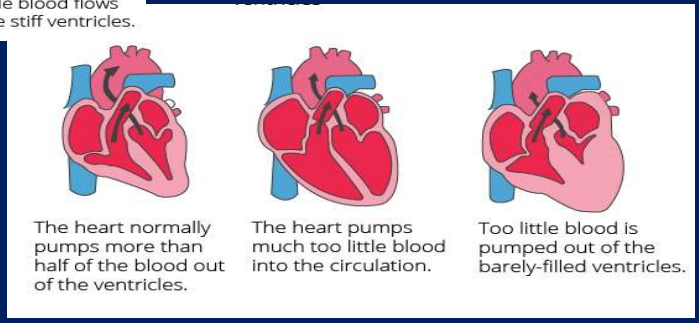
What happens with Heart Failure?



Diastole

Systole



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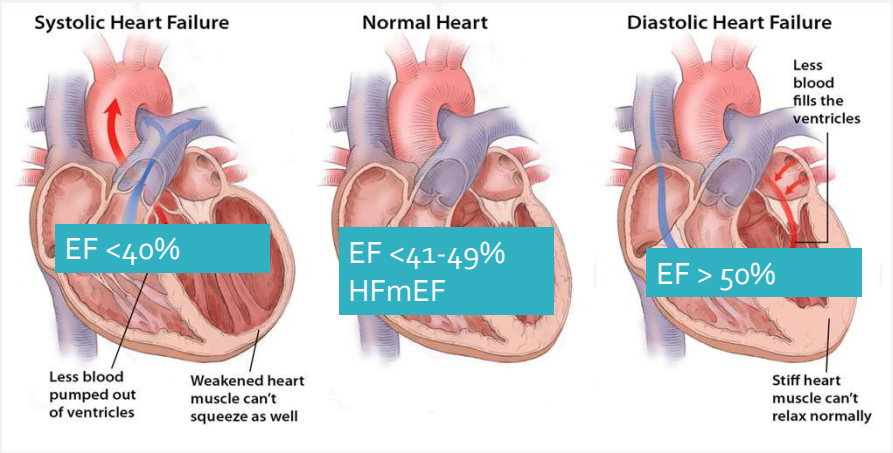
Comparison

HFrEF **HFpEF**



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Polling Question

- What is the most common cause of Diastolic Heart Failure or HFpEF?

A. Smoking
B. Hypertension
C. Ischemic Heart disease
D. Diabetes Mellitus

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VOL. 79, NO. 17, 2022

CLINICAL PRACTICE GUIDELINE: FULL TEXT

2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure

A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

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FIGURE 1 ACC/AHA Stages of HF

STAGE A: At-Risk for Heart Failure	STAGE B: Pre-Heart Failure	STAGE C: Symptomatic Heart Failure	STAGE D: Advanced Heart Failure
Patients at risk for HF but without current or previous symptoms/signs of HF and without structural/functional heart disease or abnormal biomarkers	Patients without current or previous symptoms/signs of HF but evidence of 1 of the following:	Patients with current or previous symptoms/signs of HF	Marked HF symptoms that interfere with daily life and with recurrent hospitalizations despite attempts to optimize GDMT
Patients with hypertension, CVD, diabetes, obesity, exposure to cardiotoxic agents, genetic variant for cardiomyopathy, or family history of cardiomyopathy	Structural heart disease Evidence of increased filling pressures Risk factors and • increased natriuretic peptide levels or • persistently elevated cardiac troponin in the absence of competing diagnoses		

The ACC/AHA stages of HF are shown. ACC indicates American College of Cardiology; AHA, American Heart Association; CVD, cardiovascular disease; GDMT, guideline-directed medical therapy; and HF, heart failure.

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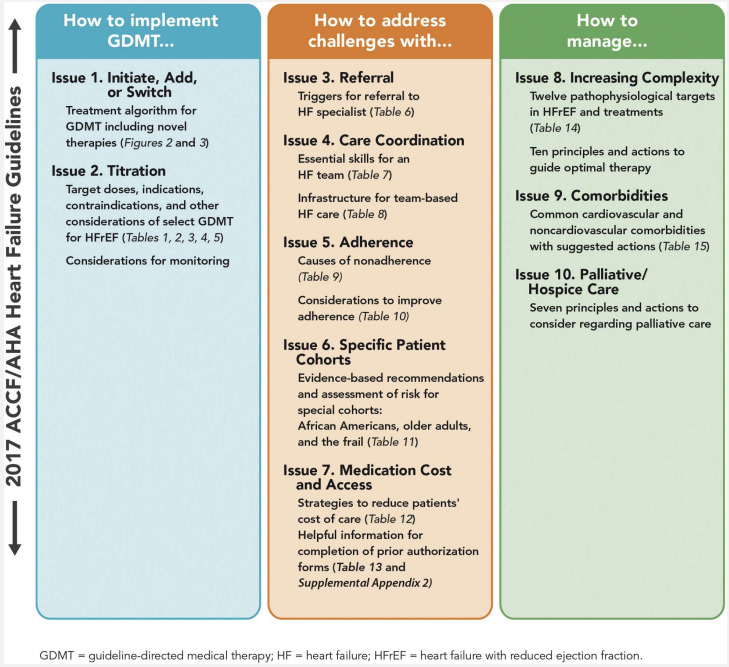

GDMT = guideline-directed medical therapy; HF = heart failure; HFrEF = heart failure with reduced ejection fraction.

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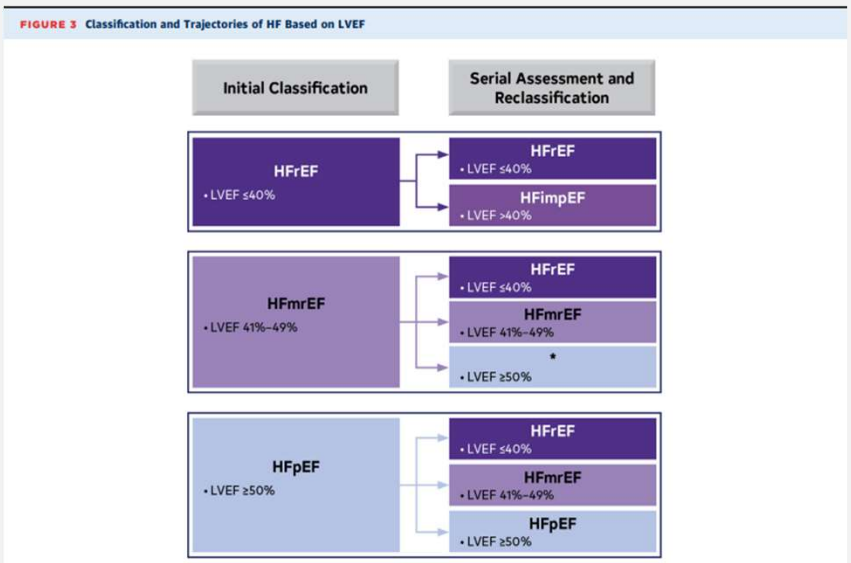

FIGURE 3 Classification and Trajectories of HF Based on LVEF

See Appendix 3 for suggested thresholds for laboratory findings. The classification for baseline and subsequent LVEF is shown. Patients with HFrEF who improve their LVEF to >40% are considered to have HFimpEF and should continue HFrEF treatment. HF indicates heart failure; HFimpEF, heart failure with improved ejection fraction; HFmrEF, heart failure with mildly reduced ejection fraction; HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction; and LVEF, left ventricular ejection fraction. *There is limited evidence to guide treatment for patients who improve their LVEF from mildly reduced (41%-49%) to ≥50%. It is unclear whether to treat these patients as HFpEF or HFmrEF.

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VOL. 74, NO. 15, 2019

EXPERT CONSENSUS DECISION PATHWAY

2019 ACC Expert Consensus Decision Pathway on Risk Assessment, Management, and Clinical Trajectory of Patients Hospitalized With Heart Failure

A Report of the American College of Cardiology Solution Set Oversight Committee

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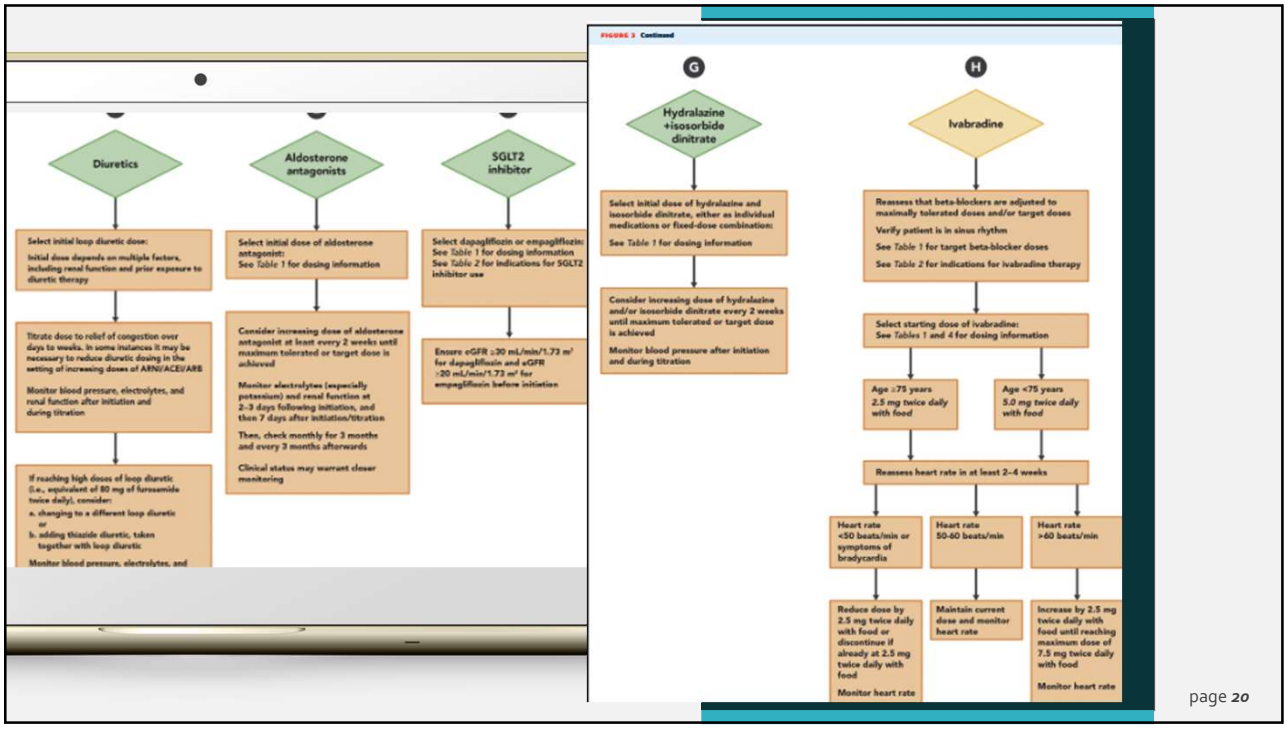

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TABLE 7 Essential Skills for an HF Team

- HF diagnosis and monitoring for progression
- Treatment prescription, titration, and monitoring
- Patient and caregiver education on disease and treatments
- Lifestyle prescription (e.g., diet, exercise), education, and monitoring
- Psychological and social support assessment, treatment, and monitoring
- Palliative and end-of-life counseling and care
- Coordination of care for concomitant comorbidities

HF = heart failure.

EXPERT CONSENSUS DECISION PATHWAY

2021 Update to the 2017 ACC Expert Consensus Decision Pathway for Optimization of Heart Failure Treatment: Answers to 10 Pivotal Issues About Heart Failure With Reduced Ejection Fraction

A Report of the American College of Cardiology Solution Set Oversight Committee

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Quadruple Therapy

- **RAAS inhibition**
  - ACEi/ARB/ARNI
- **Beta Blocker**
- **MRAs**
  - Mineralcorticoid receptor antagonists
- **SGLT2i**
  - dapagliflozin
  - empagliflozin

Four Pillars of HFrEF Care

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TABLE 1 Starting and Target Doses of Select GDMT and Novel Therapies for HF (choice and timing of each therapy and in whom they should be added discussed in the text)*

	Starting Dose	Target Dose
Beta-Blockers		
Bisoprolol	1.25 mg once daily	10 mg once daily
Carvedilol	3.125 mg twice daily	25 mg twice daily for weight <85 kg and 50 mg twice daily for weight ≥85 kg
Metoprolol succinate	12.5-25 mg daily	200 mg daily
ARNIs		
Sacubitril/valsartan	24/26 mg-49/51 mg twice daily	97/103 mg twice daily
ACEIs		
Captopril	6.25 mg 3× daily	50 mg 3× daily
Enalapril	2.5 mg twice daily	10-20 mg twice daily
Lisinopril	2.5-5 mg daily	20-40 mg daily
Ramipril	1.25 mg daily	10 mg daily
ARBs		
Candesartan	4-8 mg daily	32 mg daily
Losartan	25-50 mg daily	150 mg daily
Valsartan	40 mg twice daily	160 mg twice daily
Aldosterone antagonists		
Eplerenone	25 mg daily	50 mg daily
Spironolactone	12.5-25 mg daily	25-50 mg daily
SGLT2 inhibitors		
Dapagliflozin	10 mg daily	10 mg daily
Empagliflozin	10 mg daily	10 mg daily
Vasodilators		
Hydralazine	25 mg 3× daily	75 mg 3× daily
Isosorbide dinitrate†	20 mg 3× daily	40 mg 3× daily
Fixed-dose combination isosorbide dinitrate/hydralazine†	20 mg/37.5 mg (1 tab) 3× daily	2 tabs 3× daily
Ivabradine		
Ivabradine	2.5-5 mg twice daily	Titrate to heart rate 50-60 beats/min. Maximum dose 7.5 mg twice daily

Medical Management

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ACE Inhibitors

ACE inhibitors reduce afterload by preventing the production of angiotensin II, which is a potent vasoconstrictor: indirectly increase SV/SI and CO/CI by decreasing afterload

Reduces preload/afterload by producing arterial and venous dilation

Decreases aldosterone secretion causing diuresis and decreased preload

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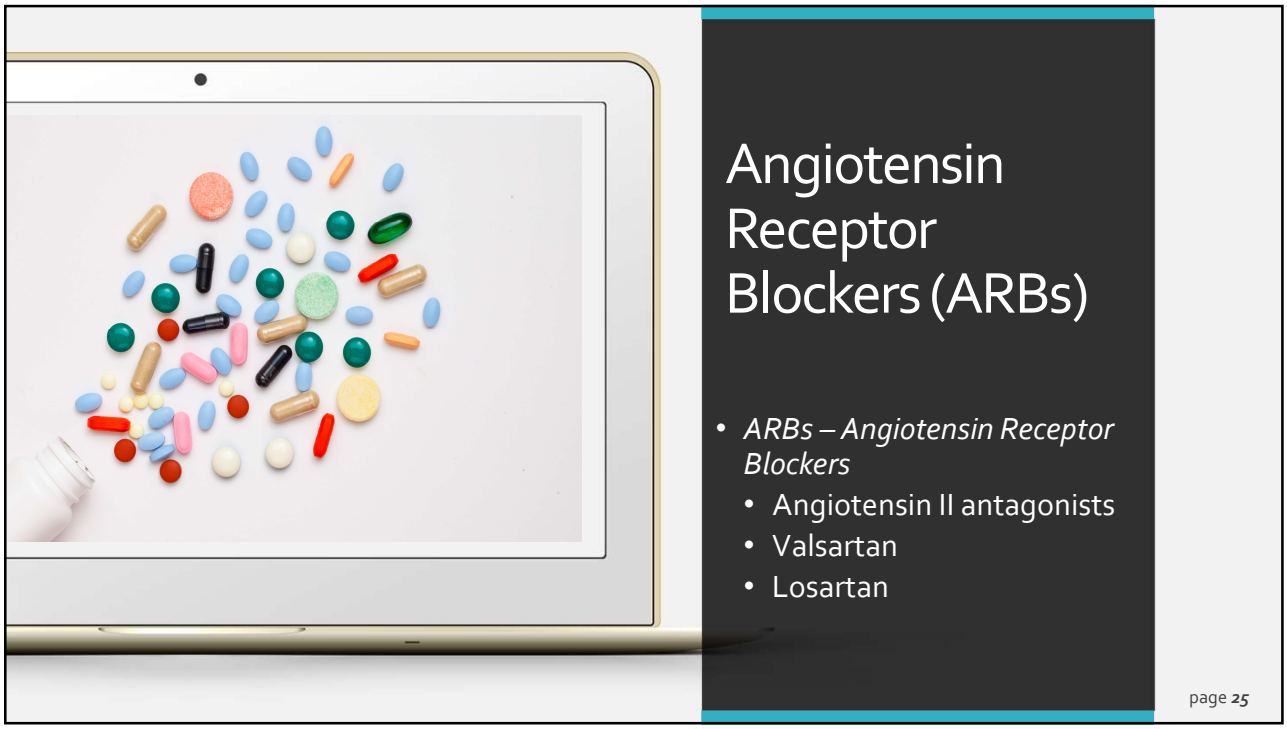

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angiotensin receptor-neprilysin inhibitor (ARNI)

- ANRIs (sacubitril/valsartan - Entresto)
  - used in place of an ACEI or angiotensin II receptor blocker (ARB) and in conjunction with other standard, heart-failure treatments (beta-blocker, aldosterone antagonist)
  - The 2016 update to the HF guidelines recommended an ARNI, ACEI, or ARB to reduce morbidity and mortality in patients with chronic HFrEF and that patients with NYHA class II to III symptoms who can tolerate an ACEI or ARB should transition to an ARNI to further reduce morbidity and mortality.
  - Decreases remodeling associated with the RAAS activation in HF
  - PARADIGM-HF trial showed 20% reduction in mortality to placebo, 16% reduction in all cause mortality

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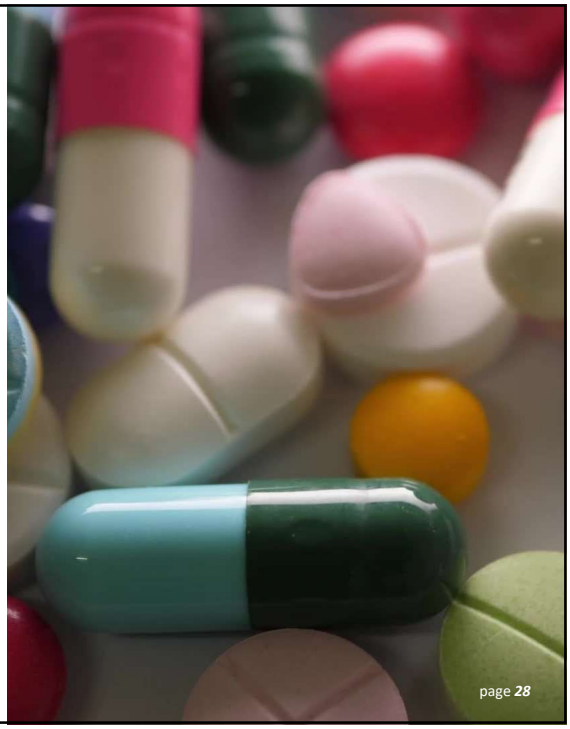
SGLT2 inhibitor - Sodium glucose co transporter 2 inhibitor

- SGLT2 inhibitors are especially useful in patients with heart failure and comorbid type 2 diabetes (T2D) because they block the reabsorption of filtered glucose, thereby reducing the risk of heart failure events.
- Farxiga (dapagliflozin)
  - People who received Farxiga had fewer cardiovascular deaths, hospitalizations for heart failure, and urgent heart failure visits than those receiving the placebo.
- Jardiance® (empagliflozin)
  - Emperor Preserved trial
  - Associated with a significant (25%) relative risk reduction in the primary endpoint of time to cardiovascular death or hospitalization due to heart failure. Reduced the relative risk of first and recurrent hospitalization for heart failure by 30%

27

Medication updates

- Sotagliflozin, a novel agent that inhibits sodium-glucose cotransporter (SGLT) 1 as well as SGLT2, received FDA approval May 2023
- Reduces the risk for cardiovascular death, hospitalization for heart failure, and urgent heart failure visits in patients with heart failure, and also for preventing these same events in patients with type 2 diabetes, chronic kidney disease (CKD), and other cardiovascular disease risk factors.
- Similar drug class as SGLT2 inhibitors dapagliflozin (Farxiga) and empagliflozin (Jardiance)
- SOLOIST-WHF demonstrated a decrease in rehospitalizations by 50% after both 30 and 90 days



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ivabradine (Procoralan /Corlanor)

- Ivabradine is in a class of medications called hyperpolarization-activated cyclic nucleotide-gated (HCN) channel blockers. It works by slowing the heart rate so the heart can pump more blood through the body each time it beats.
- Prolongs diastolic filling and decreases heart rate
- Indicated with HFrEF, on Beta Blockers and HR >70 bpm

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TABLE 2 Indications for ARNI, Ivabradine, and SGLT2 Inhibitor Use

Indications for Use of an ARNI

- HFrEF (EF ≤40%)
- NYHA class II-IV HF
- Administered in conjunction with a background of GDMT for HF in place of an ACEI or ARB

Indications for Use of Ivabradine

- HFrEF (EF ≤35%)
- On maximum tolerated dose of beta-blocker
- Sinus rhythm with a resting heart rate ≥70 beats/min
- NYHA class II or III HF

Indications for Use of an SGLT2 Inhibitor

- HFrEF (EF ≤40%) with or without diabetes
- NYHA class II-IV HF
- Administered in conjunction with a background of GDMT for HF

ACEI = angiotensin-converting-enzyme inhibitor; ARB= angiotensin receptor blocker; ARNI = angiotensin receptor-neprilysin inhibitor; EF = ejection fraction; GDMT = guideline-directed medical therapy; HF = heart failure; HFrEF = heart failure with reduced ejection fraction; NYHA = New York Heart Association; SGLT2 = sodium-glucose cotransporter-2.

Indications for Use

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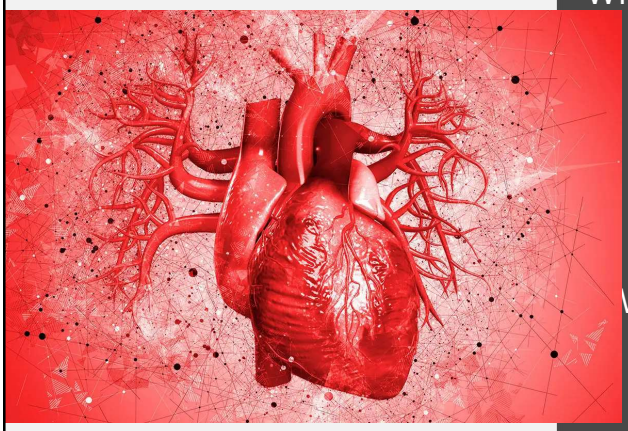

Which population is more likely to develop HFpEF?

A. Males

B. Females

What is the most common cause of HFrEF?

A. Diabetes

B. Hypertension

C. Ischemic heart disease

D. Rheumatic fever

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EXPERT CONSENSUS DECISION PATHWAY

2023 ACC Expert Consensus Decision Pathway on Management of Heart Failure With Preserved Ejection Fraction

A Report of the American College of Cardiology Solution Set Oversight Committee

HFpEF now accounts for more than 50% of all cases of HF while carrying similar outcomes to those with HFrEF.

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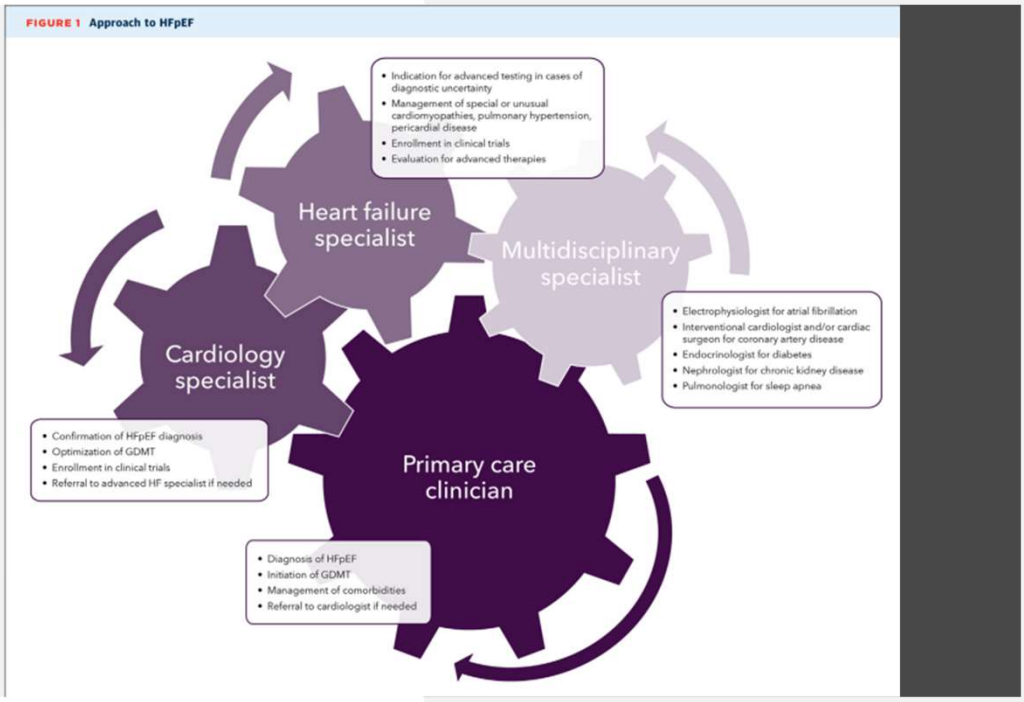

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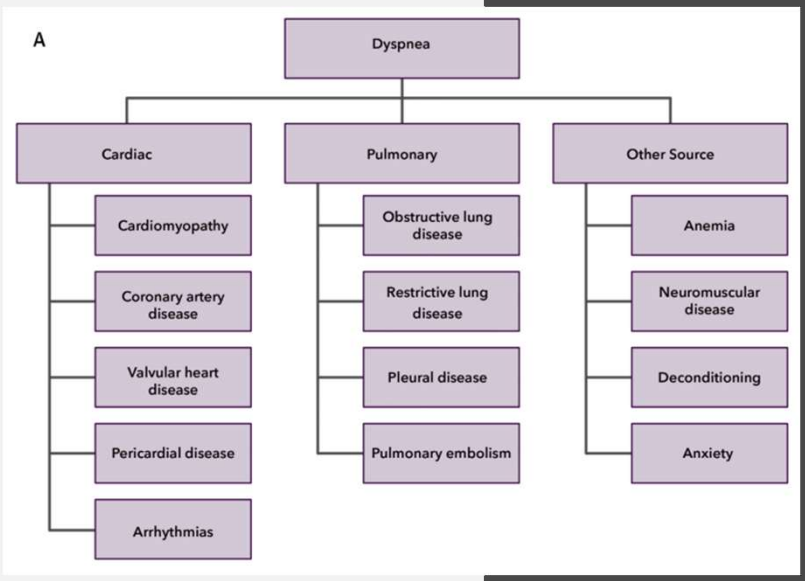

Challenges in early identification of HFpEF

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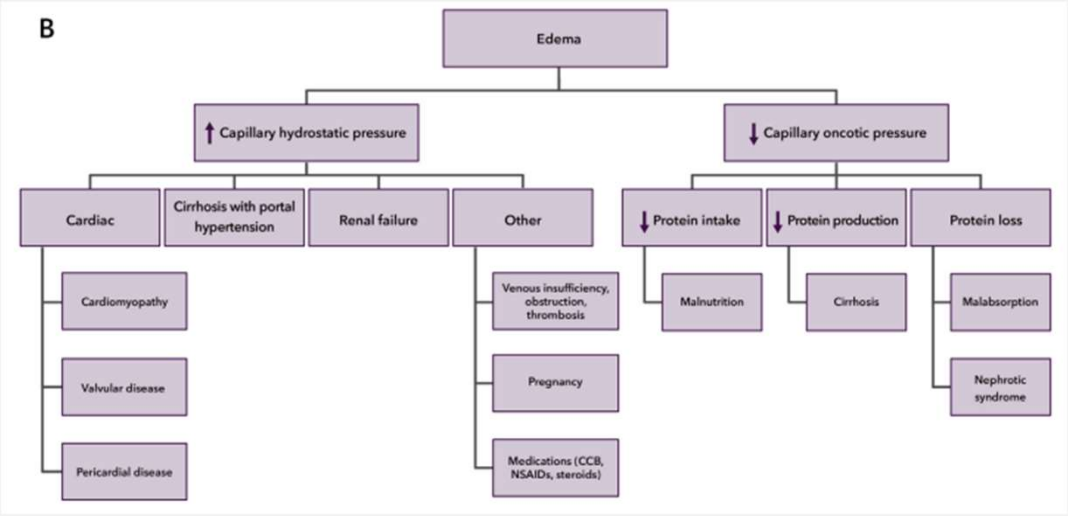
Challenges in early identification of HFpEF



35

A

H_2FPEF

H_2	**H**eavy (BMI >30 kg/m²) On ≥2 anti**H**ypertensives	2 1
F	Atrial **F**ibrilllation	3
P	**P**ulmonary hypertension (PASP >35 mm Hg on Doppler echocardiography	1
E	**E**lder (age >60 years)	1
F	**F**illing pressure (E/e' >9 on Doppler echocardiography)	1

≥6 points: highly diagnostic of HFpEF

HFpEF Scoring System

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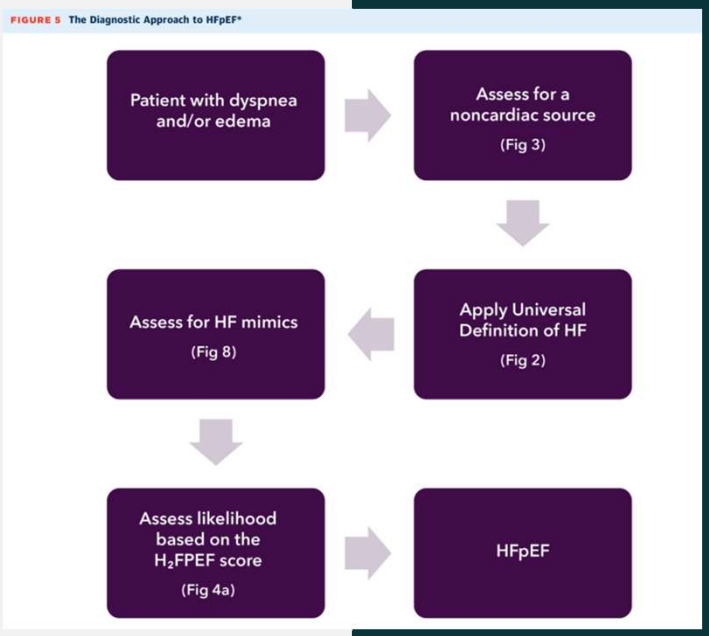

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- Valvular Dysfunction
- Mitral Insufficiency
  - Mitral Clip
- Aortic Stenosis
  - TAVR/TAVI

Structural Heart Concerns

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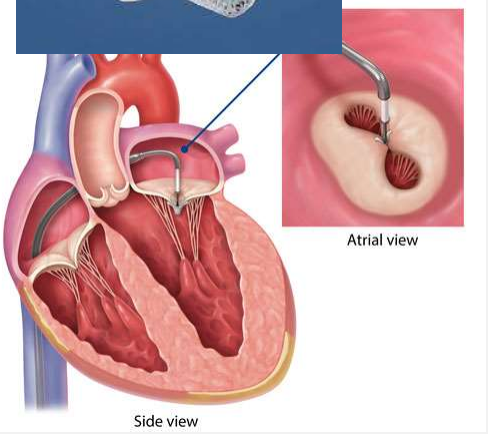
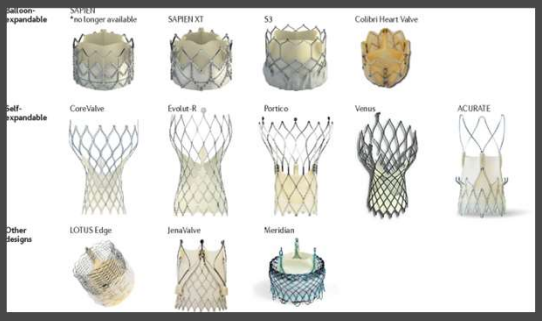
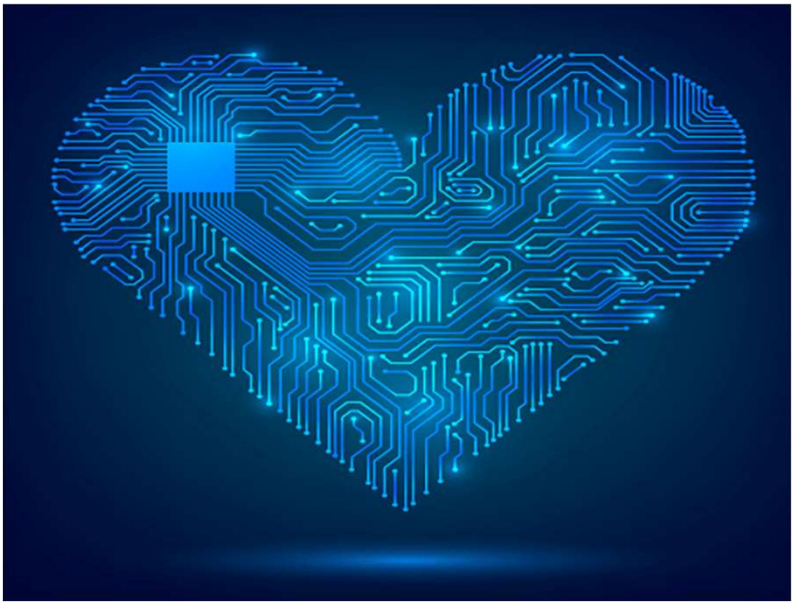




Heart Failure due to Structural problems

39



ELECTRICITY!

CARDIAC RESYNCRONI-ZATION THERAPY

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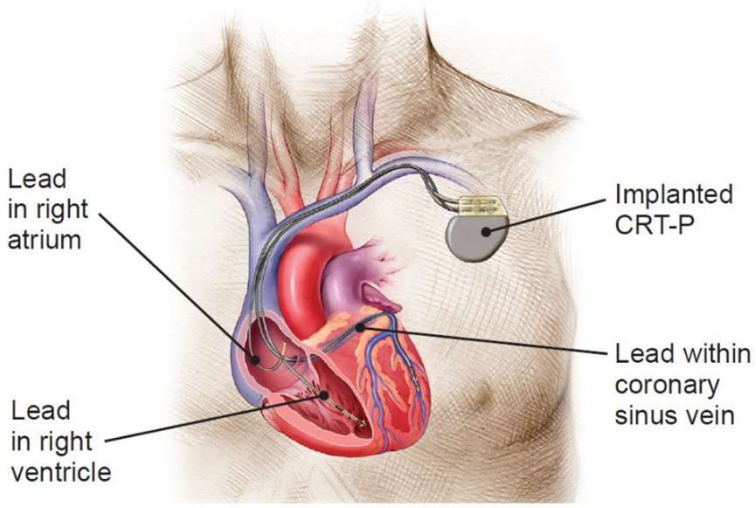

An implanted CRT-P system.

CRT-P

BI-VENTRICULAR PACING TO RESTORE EFFECTIVE PUMPING

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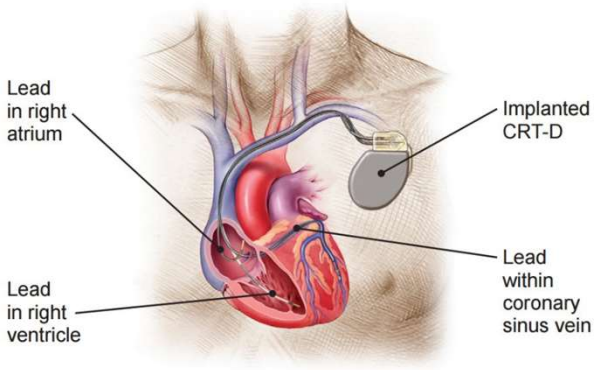
CRT-D

PACEMAKER & IMPLANTABLE DEFIBRILLATOR



An implanted CRT-D system.

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Home
Monitoring
Cardea solo
monitor
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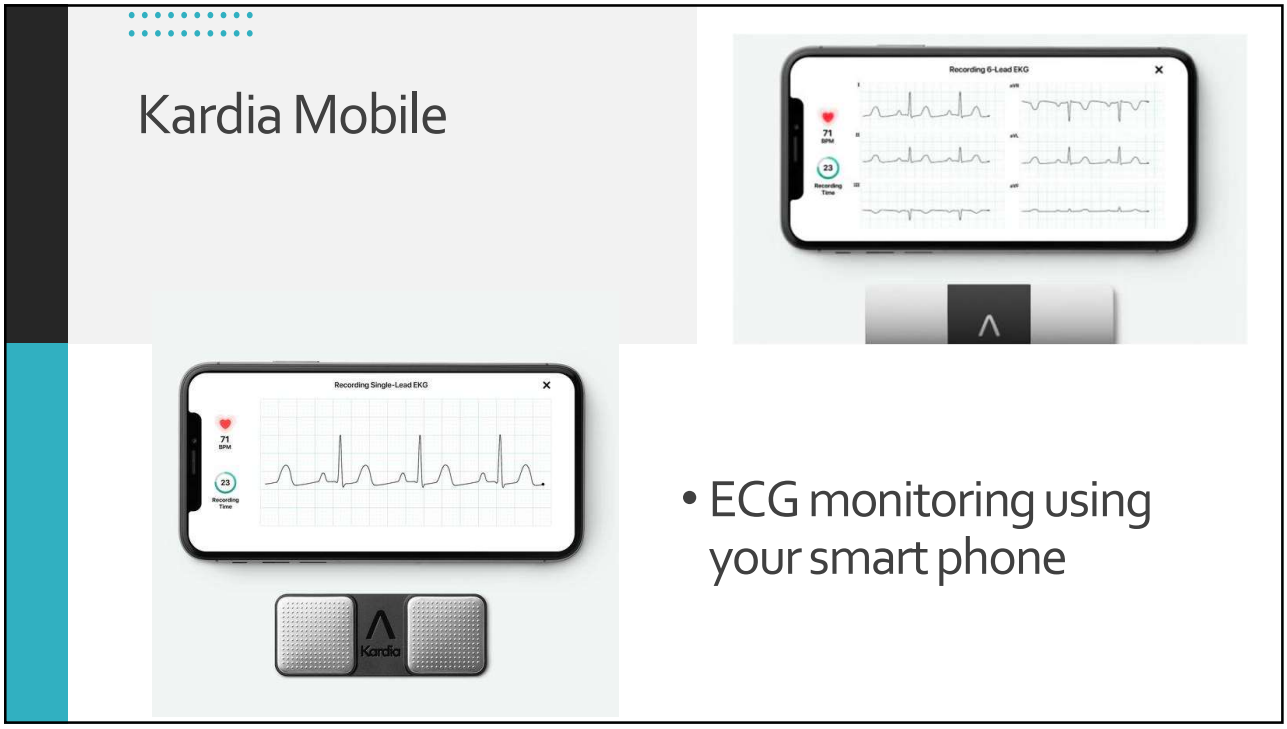
Kardia Mobile
Recording 6-Lead EKG
Recording Single-Lead EKG
Kardia
• ECG monitoring using your smart phone

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Kardia Mobile

- Carry Pod

https://store.alivecor.com/products/kardiamobile

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Kardia mobile

- FDA-cleared, clinical grade personal EKG monitor. KardiaMobile captures a medical-grade EKG in 30 seconds
- Detect Atrial Fibrillation, Bradycardia, Tachycardia or Normal heart rhythms
- Store your EKGs on your phone, and email your EKG to your doctor with the press of a button

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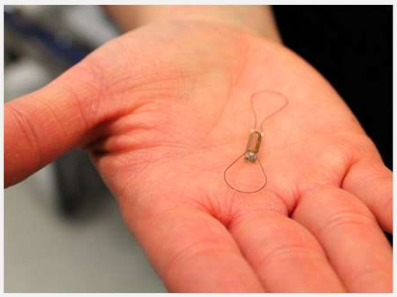

Cardiomems

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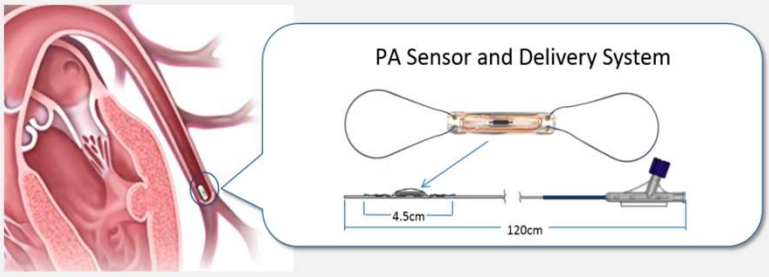
Cardiomems

monitoring from home



https://www.youtube.com/watch?v=RDr-FaKM7S8

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Reasons for Non-Adherence

TABLE 9 Reasons for Nonadherence (World Health Organization)

Patient	■ Perceived lack of effect ■ Poor health literacy ■ Physical impairment (vision, cognition) ■ Mental health conditions (depression, anxiety) ■ Social isolation ■ Cognitive impairment (dementia)
Medical condition	■ High HF regimen complexity ■ Impact of comorbidities (e.g., depression) ■ Polypharmacy due to multiple comorbidities
Therapy	■ Frequency of dosing ■ Polypharmacy ■ Side effects
Socioeconomic	■ Out-of-pocket cost ■ Difficult access to pharmacy ■ Lack of social support ■ Homelessness
Health system	■ Poor communication ■ Silos of care ■ No automatic refills ■ Difficulty navigating patient assistance programs

HF = heart failure.

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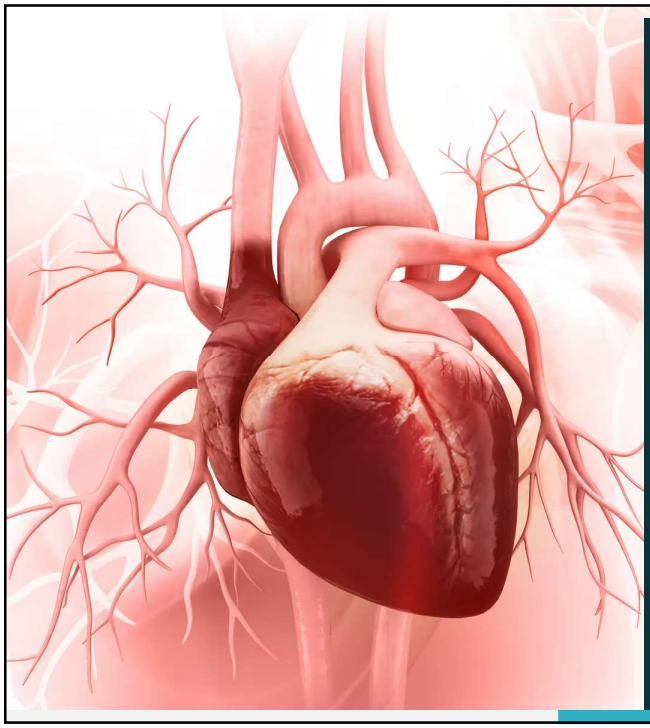

Complexity creates challenges for patient management.

50

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