Mending Broken Hearts: Tools for Managing Heart Failure on an Outpatient Basis

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Disclosures

- Non-Declaration Statement:

  I have no relevant relationships within eligible companies to disclose within the past 24 months.

Note: Ineligible companies are defined as those whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

Educational Objectives

At the conclusion of this session, participants should be able to:

- Discuss the differences between acute and chronic heart failure
- Explain a stepwise approach to guideline-directed medical therapy (GDMT) for heart failure in the outpatient setting
- Describe appropriate hospital follow-up for patients with heart failure

Heart Failure (HF)

Growing economic burden, largely attributed to aging population.

- Absolute numbers have grown, partly as a result of increased numbers of older adults.
- Incidence of HF has decreased, though divergent:
  - HFrEF: ↓ incidence; HFpEF: ↑ incidence

An estimated 6.2 million American adults ≥ 20 years of age had HF between 2013 and 2016, compared with an estimated 5.7 million between 2009 and 2012.

- Prevalence is expected to rise by 46 percent by 2030.

Heidenreich et al., Krumholz, Virani et al.

Heart Failure Defined

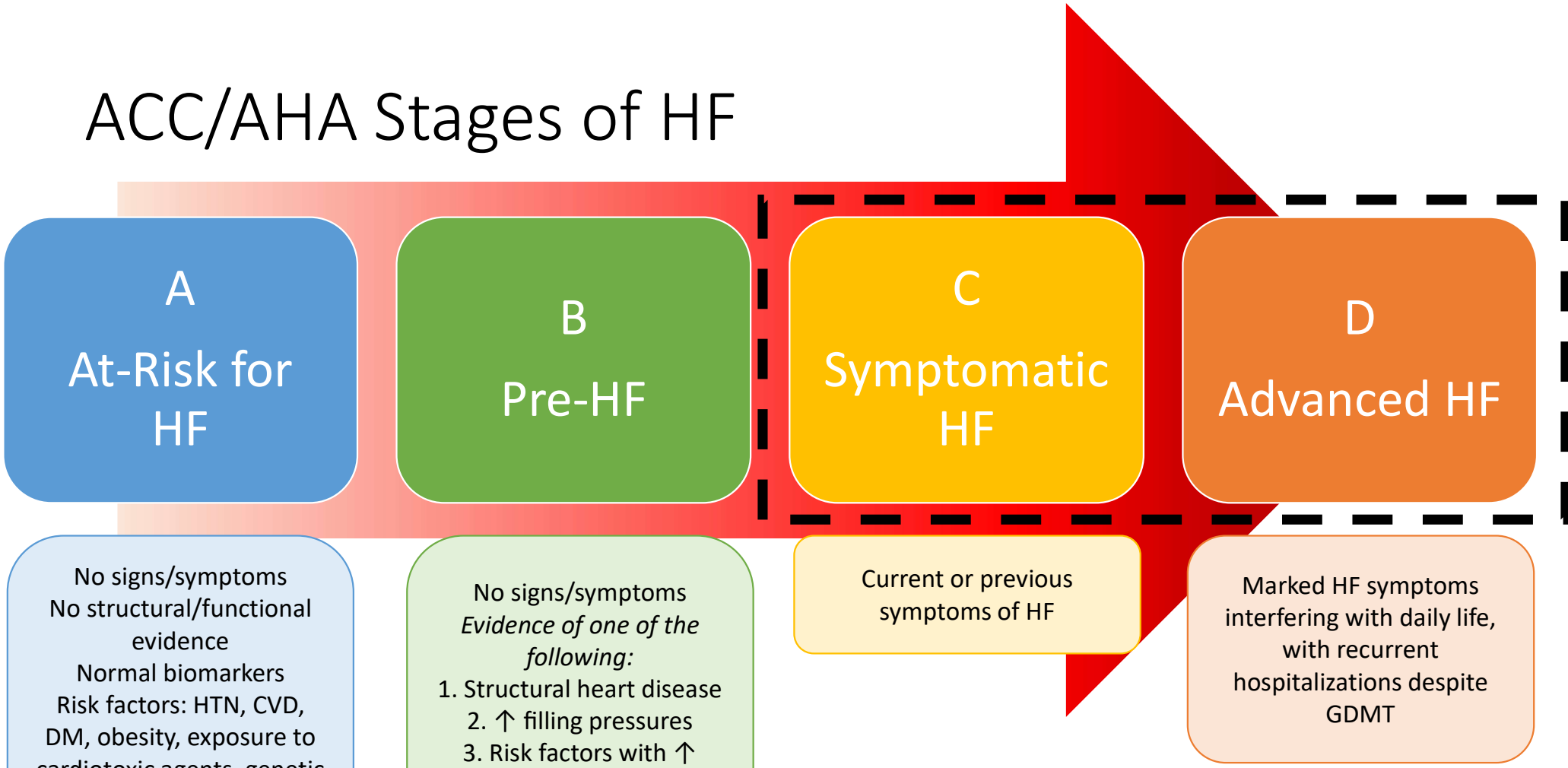
- Complex clinical syndrome with symptoms and signs that result from any **structural or functional impairment** of ventricular filling or ejection of blood.

Heidenreich et al.

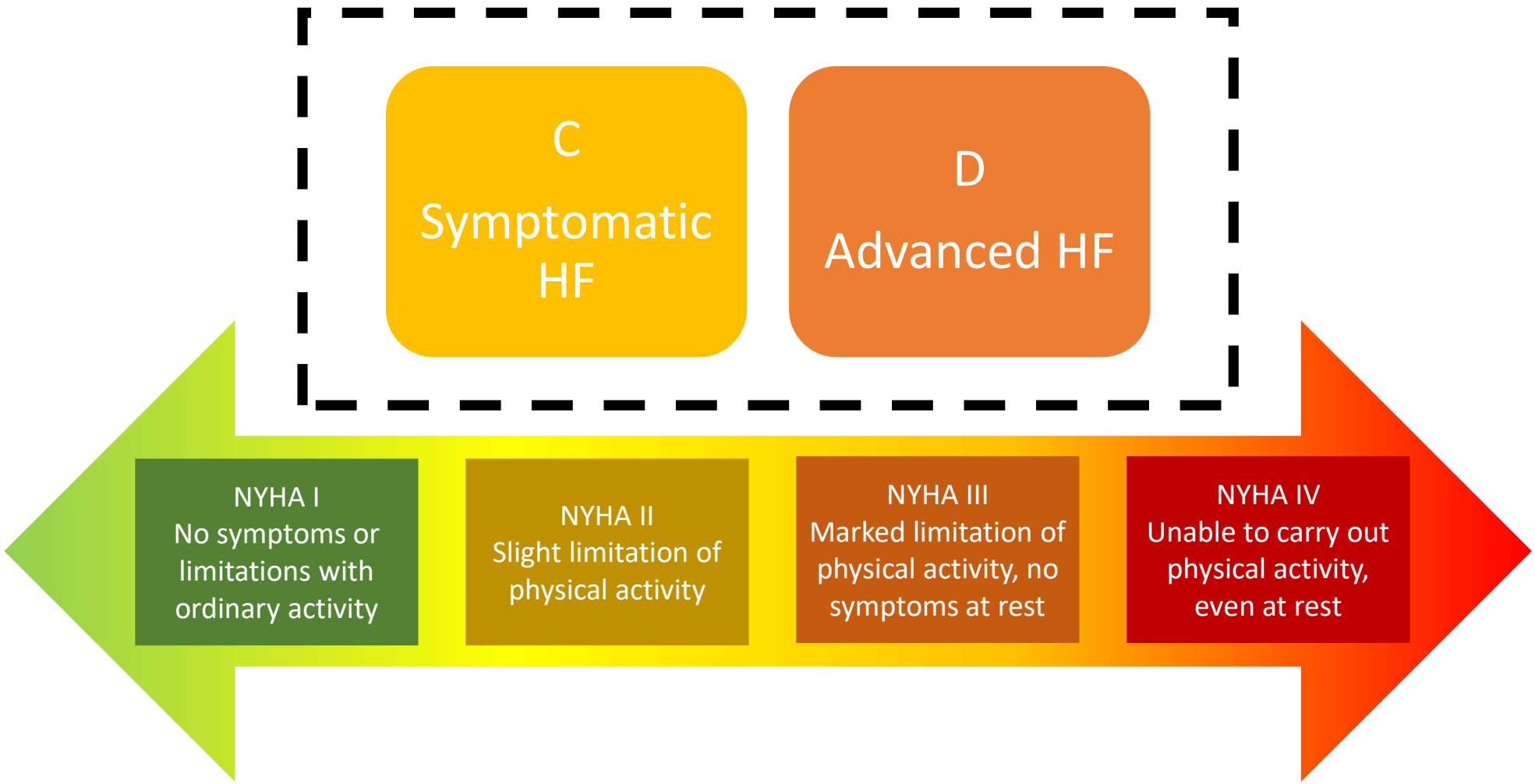
Heart Failure Types		LVEF	*Previously known as*
HFrEF	Heart Failure with **reduced** Ejection Fraction	≤40%	*Systolic HF*
HFpEF	Heart Failure with **preserved** Ejection Fraction	≥50%	*Diastolic HF*
HFmrEF	Heart Failure with **mildly-reduced** Ejection Fraction	41-49%	
HFimPEF	Heart Failure with **improved** Ejection Fraction	*Previous LVEF ≤40% and a follow-up measurement of LVEF >40%	

Heidenreich et al.

ACC/AHA Stages of HF



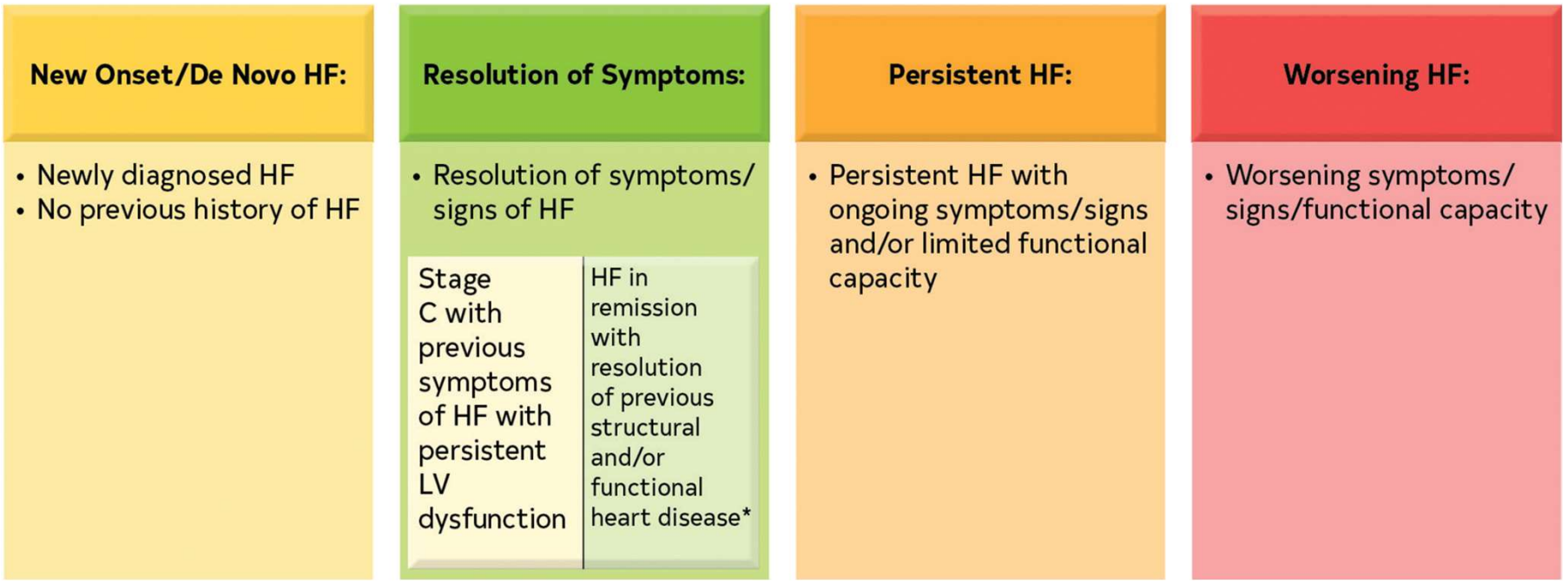
Heidenreich et al.


C
Symptomatic HF
D
Advanced HF
NYHA I
No symptoms or limitations with ordinary activity
NYHA II
Slight limitation of physical activity
NYHA III
Marked limitation of physical activity, no symptoms at rest
NYHA IV
Unable to carry out physical activity, even at rest

Acute vs. Chronic Heart Failure (HF)

- Acute
  - New onset, newly diagnosed HF
  - Exacerbation of established HF diagnosis
- Chronic
  - Resolution of symptoms
  - Persistent
  - Worsening

Trajectory of Stage C HF



**Full resolution of structural and functional cardiac abnormalities is uncommon.*

Heidenreich et al.

Common Factors Precipitating Hospitalization with Acute Decompensated HF

- ACS
- Uncontrolled hypertension
- AF and other arrhythmias
- Additional cardiac disease (e.g., endocarditis)
- Acute infections (e.g., pneumonia, UTI)
- Nonadherence with medication regimen or dietary intake
- Anemia
- Hyper- or hypothyroidism
- Medications that increase sodium retention (e.g., NSAID)
- Medications with negative inotropic effect (e.g., verapamil)

Heidenreich et al.

Clinical Presentation

❖Dyspnea, orthopnea, paroxysmal nocturnal dyspnea (PND), abdominal distention, early satiety, nausea, lower extremity edema

For suspected or new-onset HF, or acute decompensated HF

- CXR

and

- TTE

Stepwise Approach to GDMT for HF

In an Outpatient Setting

At-Risk for HF (Stage A)
Recommendations (Class 1)

- Lifestyle modifications

Patients with	Recommendation	Rationale
HTN	Optimal control of BP	Prevent symptomatic HF
T2DM AND CVD or high risk for CVD	SGLT2i	Prevent hospitalization for HF

Heidenreich et al.

Pre-HF (Stage B)
Recommendations (Class 1)

- Lifestyle modifications

Patients with	Recommendation	Rationale
LVEF ≤ 40%	ACEi	Prevent symptomatic HF and reduce mortality
Recent/remote MI or ACS	Statins	Prevent symptomatic HF and adverse CV events
Recent/remote MI or ACS AND LVEF ≤ 40%	Beta blockers	Reduce mortality
LVEF ≤ 40%	Beta blockers	Prevent symptomatic HF

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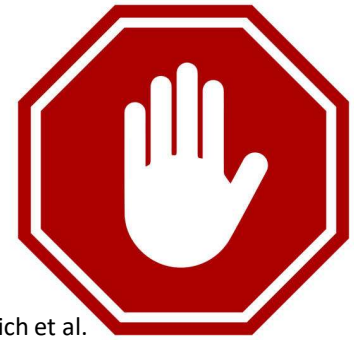
Pre-HF (Stage B)
Harm

Patients with	Recommendation	Rationale
LVEF ≤ 50%	Do NOT use thiazolidinediones	Increase risk of HF, including hospitalizations
LVEF ≤ 50%	Nondihydropyridine CCBs may be harmful	Due to negative inotropic effects



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Stage C

- Multidisciplinary teams
  - Treatment adherence
  - Health maintenance behaviors
- GDMT = mainstay
- Exercise rehabilitation program (stable on optimal GDMT)

Heidenreich et al.

Diuretics & Decongestion Strategies

- Fluid retention → diuretics

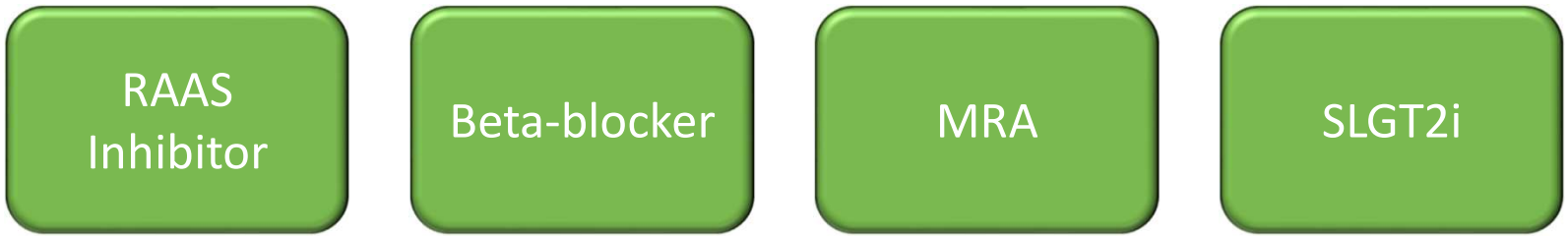
Class	Drug	Initial Daily Dose	Maximum Total Daily Dose
Loop	Bumetanide	0.5-1.0 mg once or twice	10 mg
Loop	Furosemide	20-40 mg once or twice	600 mg
Loop	Torsemide	10-20 mg once	200 mg
Thiazide	Hydrochlorothiazide	25 mg once or twice	200 mg
Thiazide	Metolazone	2.5 mg once	20 mg

CAUTION: Adding a thiazide diuretic should be reserved for patients who do not respond to moderate- or high-dose loop diuretics to minimize electrolyte abnormalities!

Heidenreich et al.

Guideline-Directed Medical Therapy (GDMT)

- Goal: achieve and maintain target doses
- Target doses
  - Used to establish efficacy and safety
  - Serve as the basis of the guideline recommendations
- If target dose cannot be tolerated, then the highest tolerated dose is recommended



Heidenreich et al.

Treatment of HFrEF: RAAS inhibition

Recommended first-line therapy:

- Renin-angiotensin-aldosterone system (RAAS) inhibition
  - ARNi (ARB, valsartan + neprilysin inhibitor, sacubitril)

  or
  - ACEi
    - If ARNi not feasible

  or
  - ARB
    - If intolerant to ACEi

Heidenreich et al.

Treatment of HFrEF: Beta Blockers

- Evidence-based beta blockers reduce mortality and hospitalizations
  - Bisoprolol

  or
  - Carvedilol

  or
  - Sustained-release metoprolol succinate

- All patients when HFrEF is diagnosed, including in-hospital, unless contraindicated or not tolerated.

Heidenreich et al.

Treatment of HFrEF: MRAs

- Mineralocorticoid receptor antagonists if eGFR >30 and serum potassium <5
  - Spironolactone

  or

  - Eplerenone

Heidenreich et al.

Treatment of HFrEF: SGLT2i

- Sodium-glucose cotransporter 2 inhibitors are recommended with symptomatic HFrEF, *irrespective of presence of T2DM*
  - Dapagliflozin

  or
  - Empagliflozin

Heidenreich et al.

Appropriate Hospital Follow-up for HF

- Visit within one week
- Review medication list
  - Identify changes between before/after hospital discharge
  - Medication education
- Continued up-titration & laboratory monitoring
- Patient education
  - Nutrition – sodium restriction, dietary counseling
  - Exercise recommendations – cardiac rehab
  - Daily weight and BP monitoring
  - Tobacco cessation counseling
  - Social/psychological support

Drugs that can worsen HF

- Nondihydropyridine CCBs (diltiazem, verapamil)
- Thiazolidinediones
- Dipeptidyl peptidase-4 (DDP-4) inhibitors (saxagliptin, alogliptin)
- NSAIDs
- Anti-arrhythmics

Heidenreich et al.

Class	Drug	Initial Daily Dose(s)	Target Dose(s)
ARNi	Sacubitril-valsartan	49 mg sacubitril and 51 mg valsartan twice daily *(therapy may be initiated at 24 mg sacubitril and 26 mg valsartan twice daily)*	97 mg sacubitril and 103 mg valsartan twice daily
ACEi	Lisinopril	2.5–5 mg once daily	20–40 mg once daily
ACEi	Enalapril	2.5 mg twice daily	10–20 mg twice daily
ARB	Losartan	25–50 mg once daily	50–150 mg once daily
ARB	Valsartan	20–40 mg once daily	160 mg twice daily
BB	Bisoprolol	1.25 mg once daily	10 mg once daily
BB	Carvedilol	3.125 mg twice daily	25–50 mg twice daily
BB	Metoprolol succinate extended release (metoprolol CR/XL)	12.5–25 mg once daily	200 mg once daily
MRA	Spironolactone	12.5–25 mg once daily	25–50 mg once daily
MRA	Eplerenone	25 mg once daily	50 mg once daily
SGLT2i	Dapagliflozin	10 mg once daily	10 mg once daily
SGLT2i	Empagliflozin	10 mg once daily	10 mg once daily

Heidenreich et al.

HF Self-Management

Patient medication instructions

- To take each medication each day at the times indicated by using a system (list, pill box, etc.).
- Not to allow prescriptions to expire or bottles to become empty before refilling.
- To use the same pharmacy each time.
  - To ask the pharmacy to synchronize refills, enabling medication refills all to be requested at the same time of the month.
- Not to skip doses, even when they are feeling well.
- To bring all their medications to each doctor's visit.
- To contact their doctor immediately if they feel they are having side effects from medications, rather than stopping them without telling anyone.
- To discuss barriers to obtaining medications (such as cost difficulties) with the physician.

Instructions for patients able to perform medication management

- Which pill is their diuretic.
- How to change the dose of the diuretic according to the HF action plan.
- To carry out any additional changes that should accompany diuretic dose changes (eg, need for earlier refills, addition of potassium supplementation).

Krumholz

HF Self-Management

Daily weights

Patients should be instructed to:

- Use a scale with large enough print to be readily visible
- Use a scale that is big enough for the patient to stand on easily
- Use a scale that is easy to "zero," such as a digital scale
- Weigh themselves at the same time every morning
  - After urinating but before eating or drinking
  - Before getting dressed or in the same amount of clothing each day
- Record the results in a log book or other permanent record
- Compare results with previous day and with previous week
- Know their target weight

Krumholz

HF Self-Management

Daily check for edema

Patients should be instructed to:

- Examine their legs each day for swelling or an increase in existing swelling
- Describe how far up the leg the swelling reaches (ankle, shin, knee)

Daily check of symptom severity

Patients should perform the following checks daily:

- Monitor their exercise tolerance (eg, using a scale ranging from no shortness of breath, shortness of breath after moderate exertion, shortness of breath after mild exertion, shortness of breath at rest).
- Monitor their breathing at night (eg, using a scale ranging from no shortness of breath lying flat, needing two pillows or more, sleeping upright or awakening with sudden shortness of breath).
- Watch for dizziness or lightheadedness (eg, using a scale ranging from not dizzy, dizzy for a while after standing, near syncope/syncope or fall).

Krumholz

Promoting Effective Self-Care

- Use teach-back techniques to ensure understanding.
- Limit teaching points to no more than 3-4 per session.
- Repeat, reinforce and review teaching points at regular intervals.
- Engage patients in the process.
  - Developing plans, daily logging/monitoring.
  - Build on existing routines.

Symptom(s)	Action
Daily weight: _____ • No difficulty breathing • No chest pain • No weight change (overnight/over last week) • Usual amount of ankle swelling • Able to participate in normal activities	Continue daily medications as directed Weigh yourself daily and record weight Keep medical follow-up appointments
If you have any of the following: • Need more pillows than usual to sleep • More trouble breathing with activity • More coughing than usual • Gain 2 pounds overnight, or 5 pounds in one week • More swelling than usual	Call your doctor's office to find out what you should do You may need to take extra medicine
If you have any of the following: • Trouble breathing at rest, or can't stop coughing • Wheeze or feel chest tightness at rest • Wake up at night because you can't breathe well • Feel dizzy, very tired, or like you might fall • Gain or lose more than 5 pounds compared to your normal weight	You probably need to see a doctor right away
If you have any of the following: • **Trouble breathing that does not get better no matter what you do** • **Feel like you can't breathe or start to turn blue** • **Cough up pink, frothy saliva** • **Have pain or pressure in your chest or other signs of a heart attack** • **Have a fast or uneven heartbeat that makes you feel dizzy or lightheaded** • **Feel very confused or faint**	**Call 9-1-1 for an ambulance** Krumholz

What about HFpEF??

- Patients with HFpEF and hypertension should have medication titrated to attain blood pressure targets in accordance with published clinical practice guidelines to prevent morbidity.

- Diuretics PRN to reduce congestion and improve symptoms.

Heidenreich et al.

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