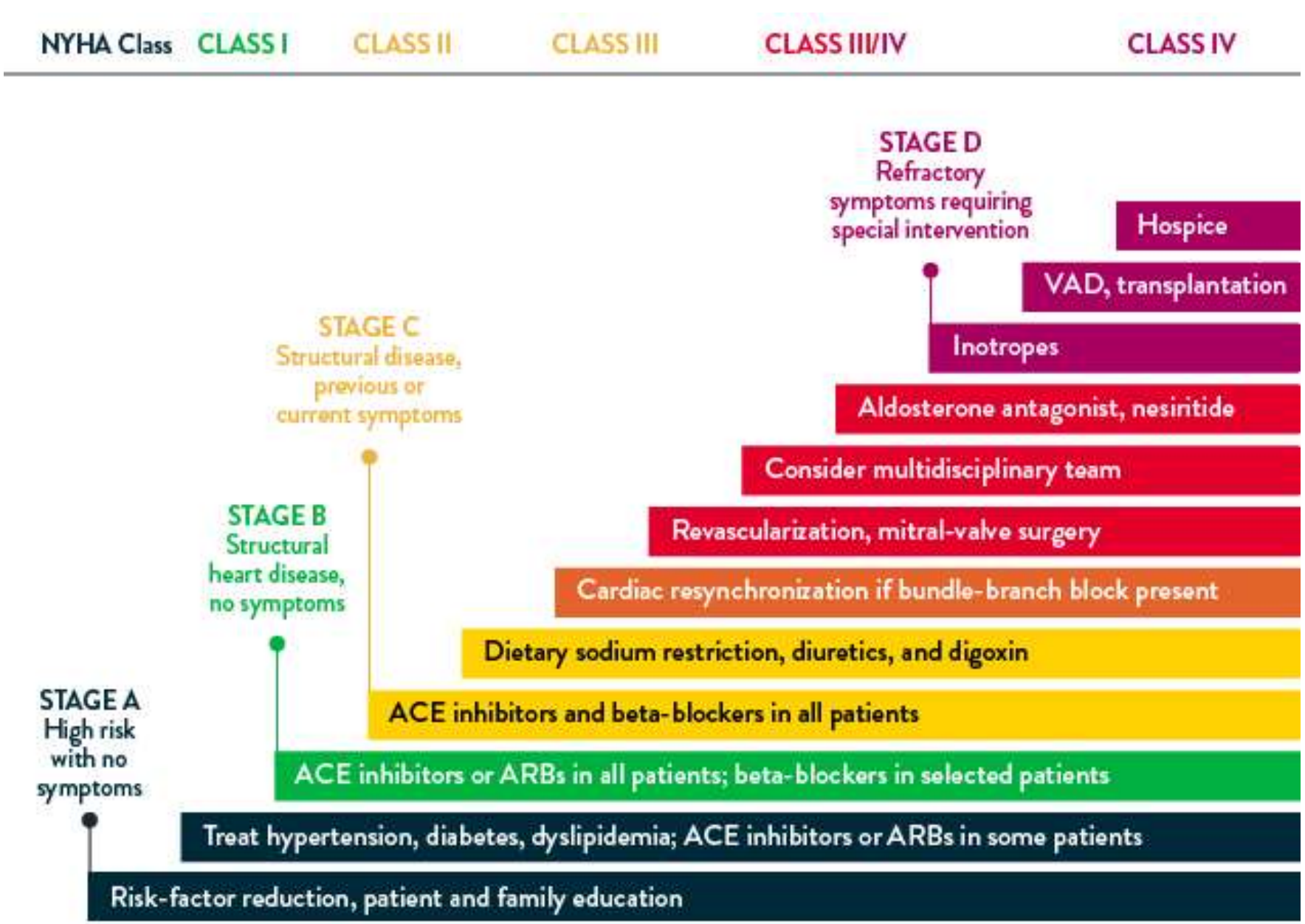
“HEART FAILURE MANAGEMENT IN 2024: WHAT IS NEW”

Definition

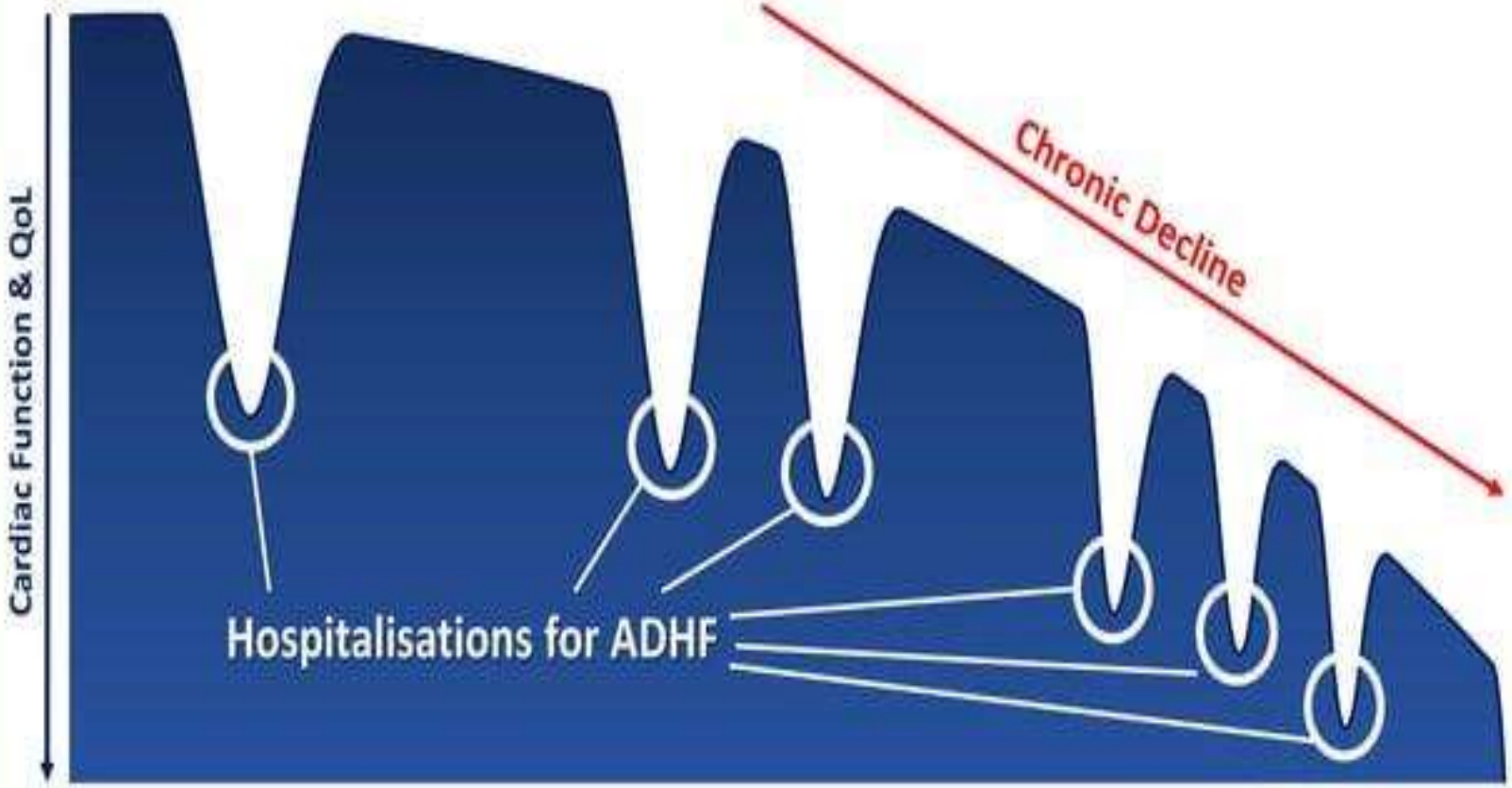
Heart failure (HF) is defined as a clinical syndrome with symptoms and/or signs caused by a structural and/or functional cardiac abnormality, corroborated by elevated natriuretic peptides and/or objective evidence of pulmonary or systemic congestion

JOURNAL OF CARDIAC FAILURE


NYHA Class
CLASS I
CLASS II
CLASS III
CLASS III/IV
CLASS IV
STAGE D
Refractory symptoms requiring special intervention
Hospice
VAD, transplantation
Inotropes
STAGE C
Structural disease, previous or current symptoms
Aldosterone antagonist, nesiritide
Consider multidisciplinary team
STAGE B
Structural heart disease, no symptoms
Revascularization, mitral-valve surgery
Cardiac resynchronization if bundle-branch block present
Dietary sodium restriction, diuretics, and digoxin
ACE inhibitors and beta-blockers in all patients
STAGE A
High risk with no symptoms
ACE inhibitors or ARBs in all patients; beta-blockers in selected patients
Treat hypertension, diabetes, dyslipidemia; ACE inhibitors or ARBs in some patients
Risk-factor reduction, patient and family education

NEJM 2003

HF – A Chronic condition interspersed with acute Episodes



Circulation 2012

Ten Pivotal Issues About HFrEF

How to implement GDMT...

Issue 1. Initiate & Switch

Treatment algorithm for GDMT, including novel therapies (*Figures 2 and 3*)

Issue 2. Titration

Target doses, indications, contraindications, and other considerations of select GDMT for HFrEF (*Tables 1, 2, 3, 4, 5*)

Considerations for monitoring

How to address challenges with...

Issue 3. Referral

Triggers for referral to HF specialist (*Table 6*)

Issue 4. Care Coordination

Essential skills for a HF team (*Table 7*)

Infrastructure for team-based HF care (*Table 8*)

Issue 5. Adherence

Causes of non-adherence (*Table 9*)

Considerations to improve adherence (*Table 10*)

Issue 6. Specific Patient Cohorts

Evidence based recommendations and assessment of risk for special cohorts: African-American patients, older adults, and patients with frailty (*Table 11*)

Issue 7. Medication Cost and Access

Strategies to reduce patients' cost of care (*Table 12*)
Helpful information for completion of prior authorization forms (*Table 13* and Online Supplemental Appendix)

How to manage...

Issue 8. Increasing Complexity

Ten pathophysiologic targets in HFrEF and treatments (*Table 14*)

Ten principles and actions to guide optimal therapy

Issue 9. Comorbidities

Common CV and non-CV comorbidities with suggested actions (*Table 15*)

Issue 10. Palliative/ Hospice Care

Seven principles and actions to consider regarding palliative care

How to Initiate, Add, or Switch to Evidence-Based Guideline-Directed Therapy for HFrEF

Current available therapies for heart failure- Fantastic Four

In 2013, there were
3 main pillars of heart failure therapy

ARNI changed the face of HF treatment

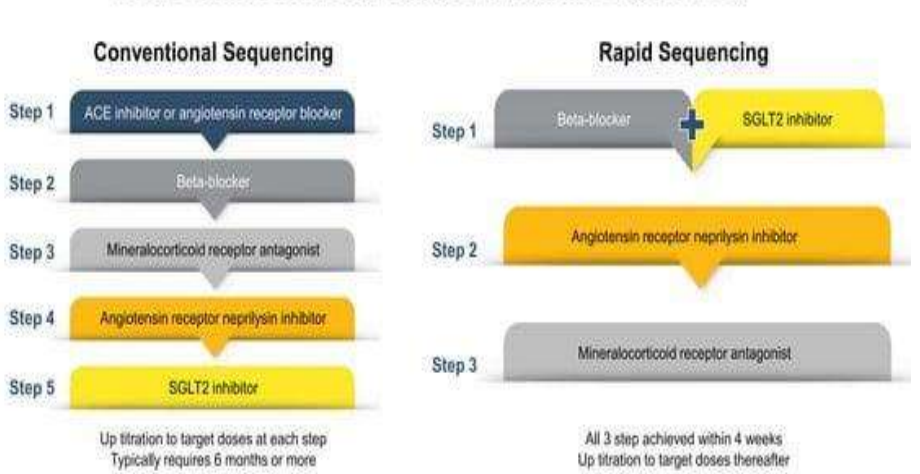
In 2014, Sacubitril/Valsartan, a new class of drug comprising an angiotensin receptor-neprilysin inhibitor (ARNI) was tested against Enalapril in HFrEF patie

PARADIGM-HF

New evidence for HF treatment with ARNI after a decade

Now, in 2024, there are 4 main pillars of heart failure therapy

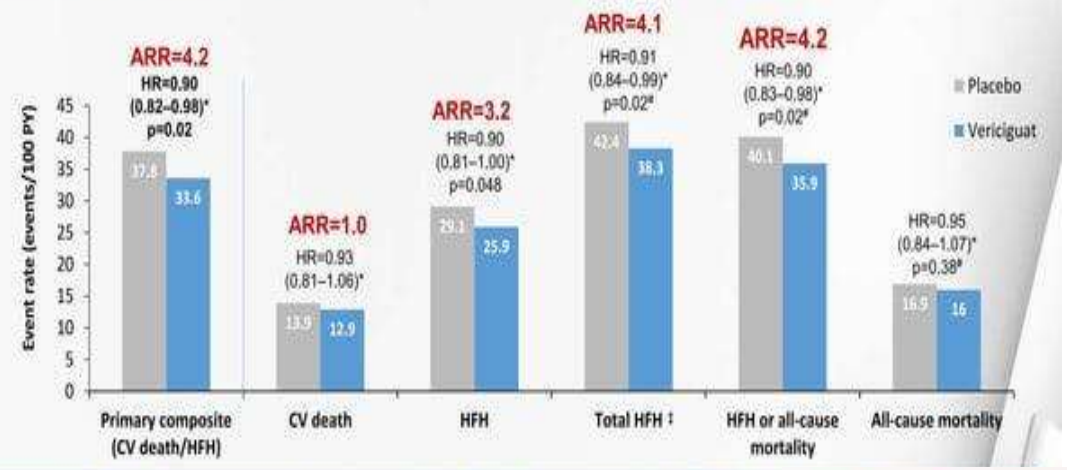
New guidelines focus is on adding drugs rapidly



While there has been considerable success in the past two decades in developing HF therapies, there remain significant unmet needs for improved implementation to address the substantial residual risk

Fabulous 5-Vericiguat

Vericiguat improved both primary and secondary outcomes in patients with chronic and worsening HF in VICTORIA



The primary composite outcome, total HFH and the composite of HFH or all
were significantly reduced with vericiguat vs placebo

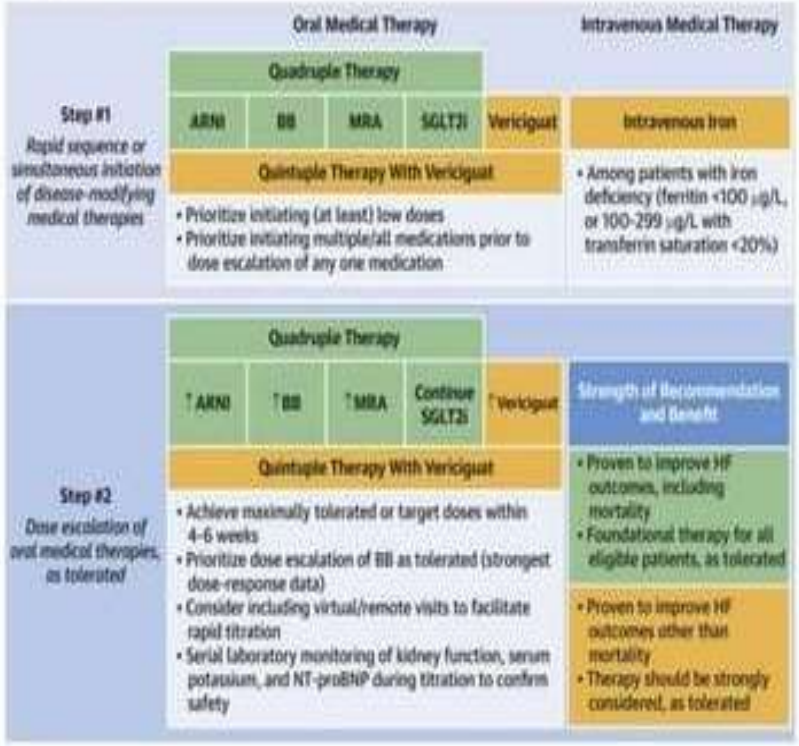
Vericiguat is recommended for patients with HFrEF following a worsening HF event[1–3]

Recommendation	Class of recommendation	Level of evidence
AHA/ACC/HFSA 2022 guidelines[2]		
In selected high-risk patients with HFrEF and **recent worsening of HF** already on GDMT, an oral sGC stimulator (vericiguat) may be considered to reduce HFH and CV death	2b	B–R*
ESC 2021 guidelines[3]		
Vericiguat may be considered in patients in NYHA class II–IV who have had **worsening HF** despite treatment with an ACEi (or ARNi), a beta blocker and an MRA to reduce the risk of CV mortality or HFH	IIb	B
CCS/CHFS 2021 guidelines[1]		
We recommend that vericiguat, an oral sGC stimulator, be considered in addition to optimal HF therapies for HFrEF patients with **worsening symptoms** and HFH in the past 6 months, to reduce the risk of subsequent HFH	Conditional[#]	Moderate quality

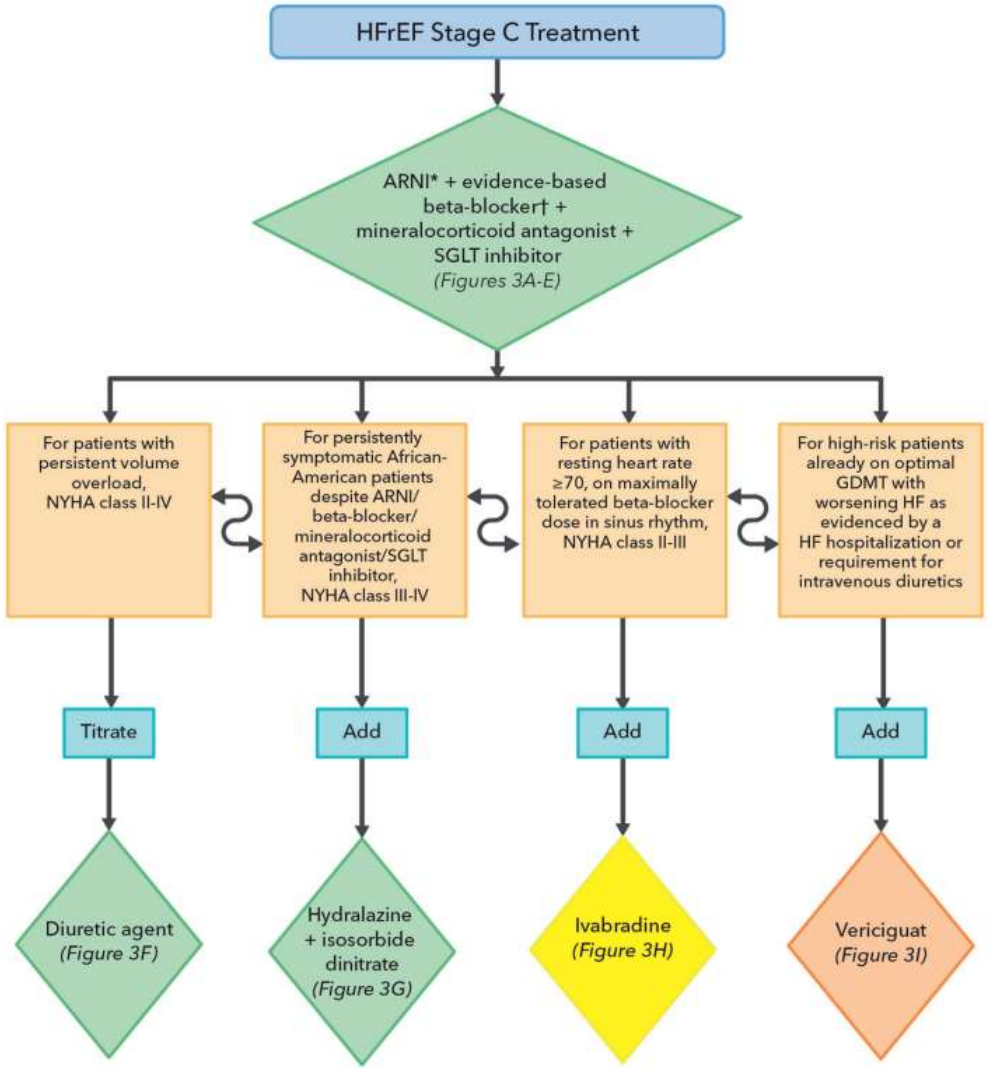
Flight of 6- Intravenous Iron therapy

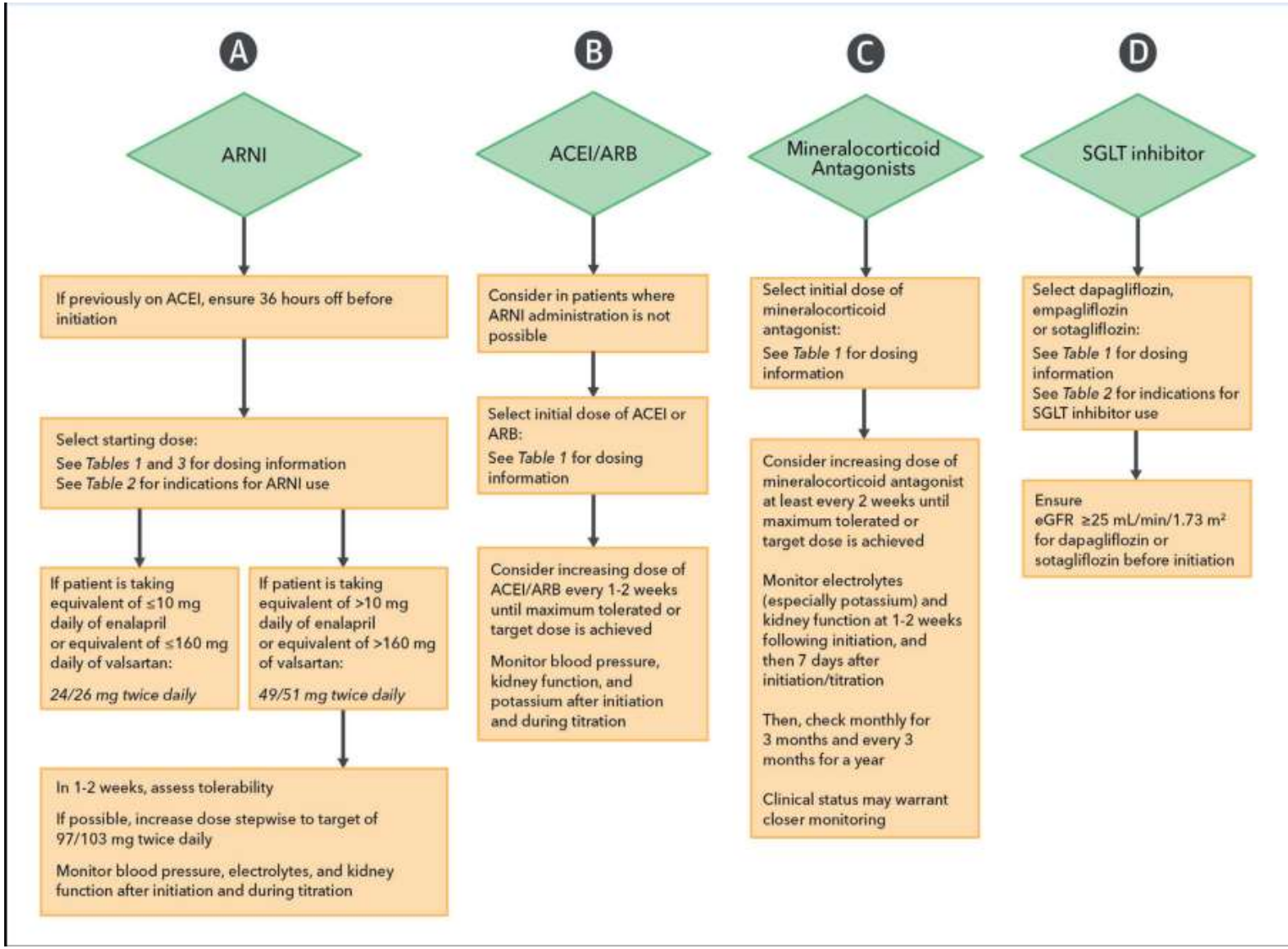
2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

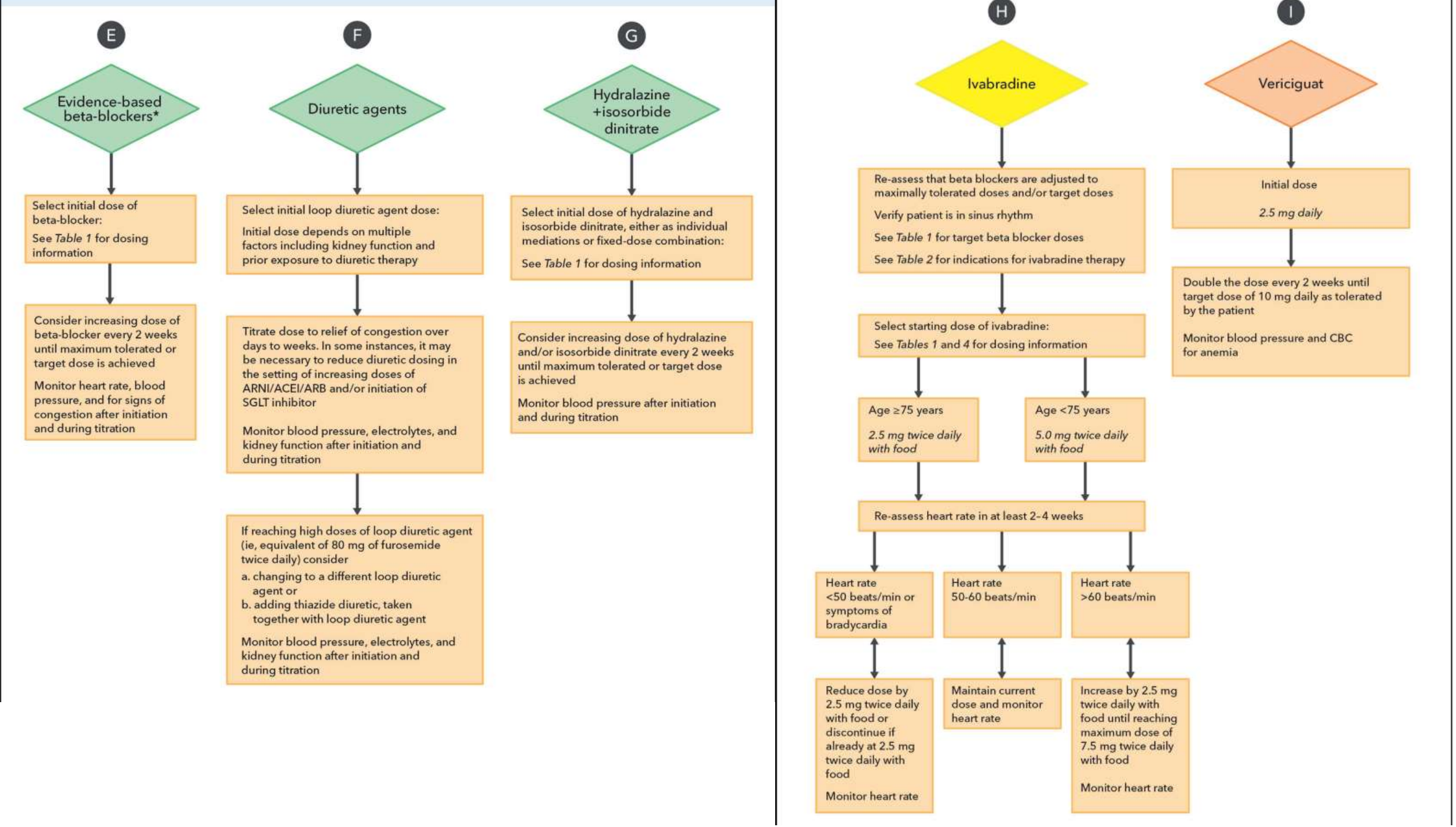
CENTRAL ILLUSTRATION: Medical Therapy for Worsening Heart Failure With Reduced Ejection Fraction



Recommendations for management of patients with HF and iron deficiency	
It is recommended that all patients with HF are periodically screened for anaemia and iron deficiency with a full blood count, serum ferritin concentration, and TSAT.	I
Intravenous iron supplementation with ferric carboxymaltose should be considered in symptomatic HF patients recently hospitalized for HF and with LVEF ≤50% and iron deficiency, defined as serum ferritin <100 ng/mL or serum ferritin 100–299 ng/mL with TSAT <20%, to reduce the risk of HF hospitalization.	IIa
Treatment of anaemia in HF with erythropoietin stimulating agents is not recommended in the absence of other indications for this therapy.	III


HFrEF Stage C Treatment
ARNI* + evidence-based beta-blocker† + mineralocorticoid antagonist + SGLT inhibitor (Figures 3A-E)
For patients with persistent volume overload, NYHA class II-IV
For persistently symptomatic African-American patients despite ARNI/ beta-blocker/ mineralocorticoid antagonist/SGLT inhibitor, NYHA class III-IV
For patients with resting heart rate ≥70, on maximally tolerated beta-blocker dose in sinus rhythm, NYHA class II-III
For high-risk patients already on optimal GDMT with worsening HF as evidenced by a HF hospitalization or requirement for intravenous diuretics
Titrate
Add
Add
Add
Diuretic agent (Figure 3F)
Hydralazine + isosorbide dinitrate (Figure 3G)
Ivabradine (Figure 3H)
Vericiguat (Figure 3I)


A
ARNI
If previously on ACEI, ensure 36 hours off before initiation
Select starting dose:
See Tables 1 and 3 for dosing information
See Table 2 for indications for ARNI use
If patient is taking equivalent of ≤10 mg daily of enalapril or equivalent of ≤160 mg daily of valsartan:
24/26 mg twice daily
If patient is taking equivalent of >10 mg daily of enalapril or equivalent of >160 mg of valsartan:
49/51 mg twice daily
In 1-2 weeks, assess tolerability
If possible, increase dose stepwise to target of 97/103 mg twice daily
Monitor blood pressure, electrolytes, and kidney function after initiation and during titration
B
ACEI/ARB
Consider in patients where ARNI administration is not possible
Select initial dose of ACEI or ARB:
See Table 1 for dosing information
Consider increasing dose of ACEI/ARB every 1-2 weeks until maximum tolerated or target dose is achieved
Monitor blood pressure, kidney function, and potassium after initiation and during titration
C
Mineralocorticoid Antagonists
Select initial dose of mineralocorticoid antagonist:
See Table 1 for dosing information
Consider increasing dose of mineralocorticoid antagonist at least every 2 weeks until maximum tolerated or target dose is achieved
Monitor electrolytes (especially potassium) and kidney function at 1-2 weeks following initiation, and then 7 days after initiation/titration
Then, check monthly for 3 months and every 3 months for a year
Clinical status may warrant closer monitoring
D
SGLT inhibitor
Select dapagliflozin, empagliflozin or sotagliflozin:
See Table 1 for dosing information
See Table 2 for indications for SGLT inhibitor use
Ensure eGFR ≥25 mL/min/1.73 m² for dapagliflozin or sotagliflozin before initiation


E
Evidence-based beta-blockers*
Select initial dose of beta-blocker:
See Table 1 for dosing information
Consider increasing dose of beta-blocker every 2 weeks until maximum tolerated or target dose is achieved
Monitor heart rate, blood pressure, and for signs of congestion after initiation and during titration
F
Diuretic agents
Select initial loop diuretic agent dose:
Initial dose depends on multiple factors including kidney function and prior exposure to diuretic therapy
Titrate dose to relief of congestion over days to weeks. In some instances, it may be necessary to reduce diuretic dosing in the setting of increasing doses of ARNI/ACEI/ARB and/or initiation of SGLT inhibitor
Monitor blood pressure, electrolytes, and kidney function after initiation and during titration
If reaching high doses of loop diuretic agent (ie, equivalent of 80 mg of furosemide twice daily) consider
a. changing to a different loop diuretic agent or
b. adding thiazide diuretic, taken together with loop diuretic agent
Monitor blood pressure, electrolytes, and kidney function after initiation and during titration
G
Hydralazine +isosorbide dinitrate
Select initial dose of hydralazine and isosorbide dinitrate, either as individual mediations or fixed-dose combination:
See Table 1 for dosing information
Consider increasing dose of hydralazine and/or isosorbide dinitrate every 2 weeks until maximum tolerated or target dose is achieved
Monitor blood pressure after initiation and during titration
H
Ivabradine
Re-assess that beta blockers are adjusted to maximally tolerated doses and/or target doses
Verify patient is in sinus rhythm
See Table 1 for target beta blocker doses
See Table 2 for indications for ivabradine therapy
Select starting dose of ivabradine:
See Tables 1 and 4 for dosing information
Age ≥75 years
2.5 mg twice daily with food
Age <75 years
5.0 mg twice daily with food
Re-assess heart rate in at least 2–4 weeks
Heart rate <50 beats/min or symptoms of bradycardia
Heart rate 50-60 beats/min
Heart rate >60 beats/min
Reduce dose by 2.5 mg twice daily with food or discontinue if already at 2.5 mg twice daily with food
Monitor heart rate
Maintain current dose and monitor heart rate
Increase by 2.5 mg twice daily with food until reaching maximum dose of 7.5 mg twice daily with food
Monitor heart rate
I
Vericiguat
Initial dose
2.5 mg daily
Double the dose every 2 weeks until target dose of 10 mg daily as tolerated by the patient
Monitor blood pressure and CBC for anemia

Indications for Use of an ARNI in HFrEF

- NYHA functional class II-IV HF
- Administered in conjunction with a background of GDMT for HF in place of an ACE inhibitor or ARB

Indications for Use of Ivabradine in HFrEF

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

Indications for Use of an SGLT Inhibitor in HFrEF

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

Indications for Use of Vericiguat

- HFrEF (LVEF <45%)
- On maximum tolerated GDMT
- Worsening HF symptoms

Population	Initial Dose
High-dose ACE inhibitor *>10-mg total daily dose of enalapril or therapeutically equivalent dose of another ACE inhibitor* *High-dose ARB* *>160-mg total daily dose of valsartan or therapeutically equivalent dose of another ARB*	**49/51 mg twice daily**
De novo initiation of ARNI *Low- or medium-dose ACE inhibitor* *≤10-mg total daily dose of enalapril or therapeutically equivalent dose of another ACE inhibitor* *Low- or medium-dose ARB* *≤160-mg total daily dose of valsartan or therapeutically equivalent dose of another ARB* *ACE inhibitor/ARB-naive* *Severe kidney impairment* (eGFR <30 mL/min/1.73 m^2)* *Moderate hepatic impairment (Child-Pugh class B)* *Elderly patients (age ≥75 y)*	**24/26 mg twice daily**

Contraindications	Cautions
A. Sacubitril/Valsartan	
■ Within 36 h of ACE inhibitor use ■ Any history of angioedema ■ Pregnancy ■ Lactation (no data) ■ Severe hepatic impairment (Child-Pugh class C) ■ Concomitant aliskiren use in patients with diabetes ■ Known hypersensitivity to either ARBs or ARNIs	■ Kidney impairment: • Mild-to-moderate (eGFR 30-59 mL/min/1.73 m^2): no starting dose adjustment required • Severe* (eGFR <30 mL/min/1.73 m^2): reduce starting dose to 24 mg/26 mg twice daily; double the dose every 2-4 weeks to target maintenance dose of 97 mg/103 mg twice daily, as tolerated ■ Hepatic impairment: • Mild (Child-Pugh class A): No starting dose adjustment required • Moderate (Child-Pugh class B): Reduce starting dose to 24/26 mg twice daily; double the dose every 2-4 weeks to target maintenance dose of 97/103 mg twice daily, as tolerated ■ Renal artery stenosis ■ Systolic blood pressure <100 mm Hg ■ Volume depletion
B. SGLT Inhibitors	
■ Not approved for use in patients with type 1 diabetes due to increased risk of diabetic ketoacidosis ■ Known hypersensitivity to drug	■ For HF care, dapagliflozin or sotagliflozin, eGFR <25 mL/min/1.73 m^2 ■ Pregnancy ■ Increased risk of mycotic genital infections ■ May contribute to volume depletion. Consider altering diuretic agent dose if applicable ■ Ketoacidosis in patients with diabetes: • Temporary discontinuation for at least 3 days before scheduled surgery is recommended to avoid potential risk for ketoacidosis • Assess patients who present with signs and symptoms of metabolic acidosis for ketoacidosis, regardless of blood glucose level ■ Acute kidney injury and impairment in kidney function: Consider temporarily discontinuing in settings of reduced oral intake or fluid losses ■ Urosepsis and pyelonephritis: Evaluate patients for signs and symptoms of urinary tract infections and treat promptly, if indicated ■ Necrotizing fasciitis of the perineum (Fournier gangrene): Rare, serious, life-threatening cases have occurred in both female and male patients; assess patients presenting with pain or tenderness, erythema, or swelling in the genital or perineal area, along with fever or malaise
C. Ivabradine	
■ HFpEF ■ Presence of angina with normal EF ■ Hypersensitivity ■ Severe hepatic impairment (Child-Pugh class C) ■ Acute decompensated HF ■ Blood pressure <90/50 mm Hg ■ Sick sinus syndrome without a pacemaker ■ Sinoatrial node block ■ Second- or third-degree block without a pacemaker ■ Persistent AF or flutter ■ Atrial pacemaker dependence	■ Sinus node disease ■ Cardiac conduction defects ■ Prolonged QT interval ■ Resting heart rate <60 beats/min
D. Vericiguat	
■ Patients with concomitant use of other soluble guanylate cyclase stimulators ■ Pregnancy	■ Patients with anemia ■ Patients with symptomatic hypotension ■ Concomitant use with PDE-5 inhibitors is not recommended due to the potential for hypotension

Semaglutide for the treatment of heart failure with preserved ejection fraction (September 2024)

There is growing evidence that pharmacologic treatments that target metabolic pathways may reduce the burden of cardiovascular outcomes in patients with heart failure with preserved ejection fraction (HFpEF). In a recent meta-analysis that included over 3700 patients with HFpEF and obesity, treatment with the glucagon-like peptide (GLP-1) receptor agonist semaglutide lowered the rate of worsening HF events compared with placebo . A subgroup analysis suggested that patients with body mass index (BMI) ≥35 kg/m^2 were more likely to benefit from semaglutide than those with lower BMI. **In patients with HFpEF and obesity, we suggest therapy with a GLP-1 receptor agonist and lifestyle interventions for weight loss rather than lifestyle interventions alone; patients with a higher BMI may benefit more from GLP-1 agonist therapy than those with lower BMI.**

Aficamten therapy for hypertrophic cardiomyopathy and symptomatic left ventricular outflow tract obstruction (July 2024)

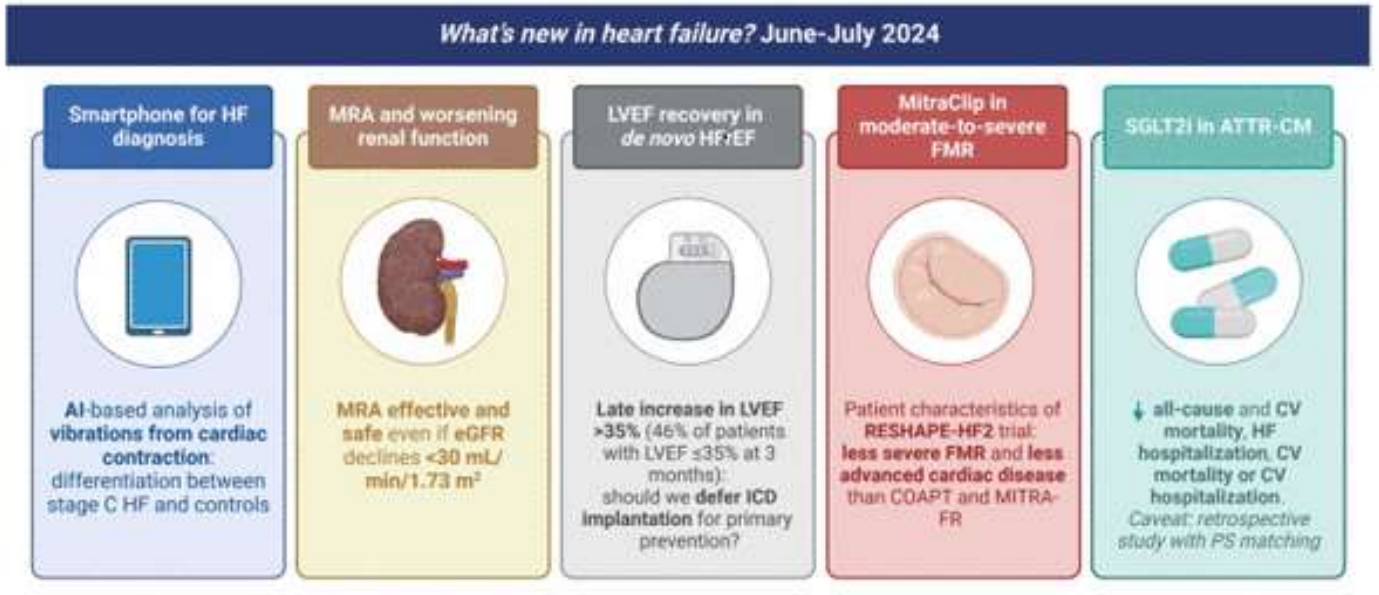
Patients with hypertrophic cardiomyopathy (HCM) may develop dyspnea or other symptoms caused by left ventricular outflow tract (LVOT) obstruction that were historically treated with negative inotropic drugs or septal reduction therapy (eg, surgical myectomy). In a randomized trial in nearly 300 patients with HCM and symptoms of LVOT obstruction, patients receiving aficamten (an investigational oral cardiac myosin inhibitor) had fewer severe heart failure symptoms and improved quality of life compared with those receiving placebo . Although there was concern that myosin inhibitors could increase the risk of atrial fibrillation (AF), rates of AF in this trial were similar between the groups. In patients with HCM and symptoms of LVOT obstruction refractory to initial therapy with a beta blocker, therapy with a myosin inhibitor may improve symptoms.

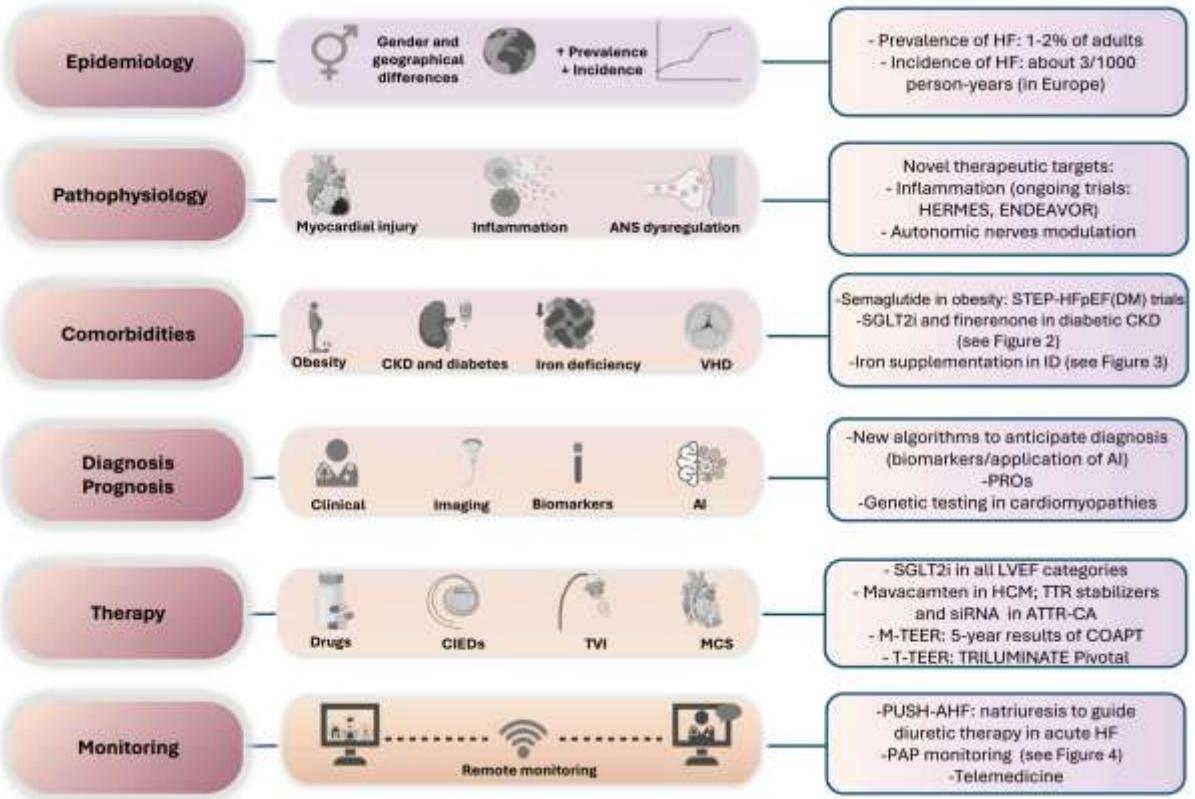
Acoramidis for the treatment of transthyretin cardiac amyloidosis (May 2024)

In patients with transthyretin (ATTR) cardiac amyloidosis and heart failure (HF) symptoms, treatment with an agent that prevents cleavage of ATTR tetramers has been shown to improve survival. In a recent trial in over 600 patients with ATTR cardiac amyloidosis and HF symptoms, patients randomly assigned to treatment with the ATTR stabilizer acoramidis had a lower rate of hospitalization over 30 months compared with placebo. In contrast with tafamidis, a drug with a similar mechanism of action, acoramidis did not reduce mortality compared with placebo. **For patients with ATTR cardiac amyloidosis and HF symptoms, we recommend treatment with tafamidis**.

Mineralocorticoid receptor antagonists for heart failure with preserved ejection fraction (September 2024)

The role of mineralocorticoid receptor antagonists (MRA) in the treatment of heart failure with preserved ejection fraction (HFpEF) has been unclear. In a recent randomized trial in over 6000 patients with heart failure (HF) and left ventricular ejection fraction ≥40 percent, patients receiving the MRA finerenone had a lower rate of acute HF episodes than those receiving placebo over a median of 32 months . Though the effect on worsening HF was small, these results are consistent with those previously reported from a controversial trial of spironolactone. In patients receiving optimal therapy with a diuretic and a sodium-glucose co-transporter 2 inhibitor with or without semaglutide and who have persistent New York Heart Association class II to III HF symptoms, we now suggest adding an MRA





ESC Heart Failure, First published: 28 May 2024, DOI: (10.1002/ehf2.14857)

	SGLT2i			FINERENONE
	DAPA-CKD	EMPA-KIDNEY	META-ANALYSIS	FIDELITY pooled analysis
POPULATION	CKD (eGFR 25-75 ml/min/m2 and ACR ratio ≥ 200 mg/g); with/without T2DM	CKD (eGFR 20-45 or 45-90 ml/min/m2 and ACR ratio ≥ 200 mg/g); with/without T2DM	4 trials: T2DM and high CV risk 5 trials: HF 4 trials: CKD	Patients with diabetic CKD (FIDELIO-DKD and FIGARO-DKD trials)
HF hospitalizations	HR for the composite of CV death or HFH: 0.71 (95% CI, 0.55-0.92)	HR for CV death or HFH: 0.84; 95% CI 0.67-1.07	- Overall HR for CV death or HFH: 0.77 (0.74–0.81) - Considering only CKD trials: HR 0.74 (0.66–0.82) and 0.95 (0.65–1.40) in patients with and without T2DM, respectively	HFH: HR 0.78 (0.66–0.92) CV composite (CV death, non-fatal MI, non-fatal stroke, or HFH): HR 0.86 (0.78 – 0.95)
CV death		HR for CV death: 0.84 (0.60-1.19)	Overall HR for CV death: 0.86 (0.81–0.92)	CV death: HR 0.88 (0.76–1.02)
Kidney Outcomes	Sustained decline in eGFR of ≥50%, ESKD*, CV or renal death: HR 0.61 (0.51 – 0.72)	Progression of CKD or CV death: HR 0.72 (0.64 – 0.82)	RR for the risk of kidney disease progression: 0.63 (0.58-0.69), with similar RRs in patients with and without T2DM	Kidney failure, sustained ≥57% decrease in eGFR from baseline over ≥4 weeks, or renal death: HR 0.78 (0.66 – 0.92)

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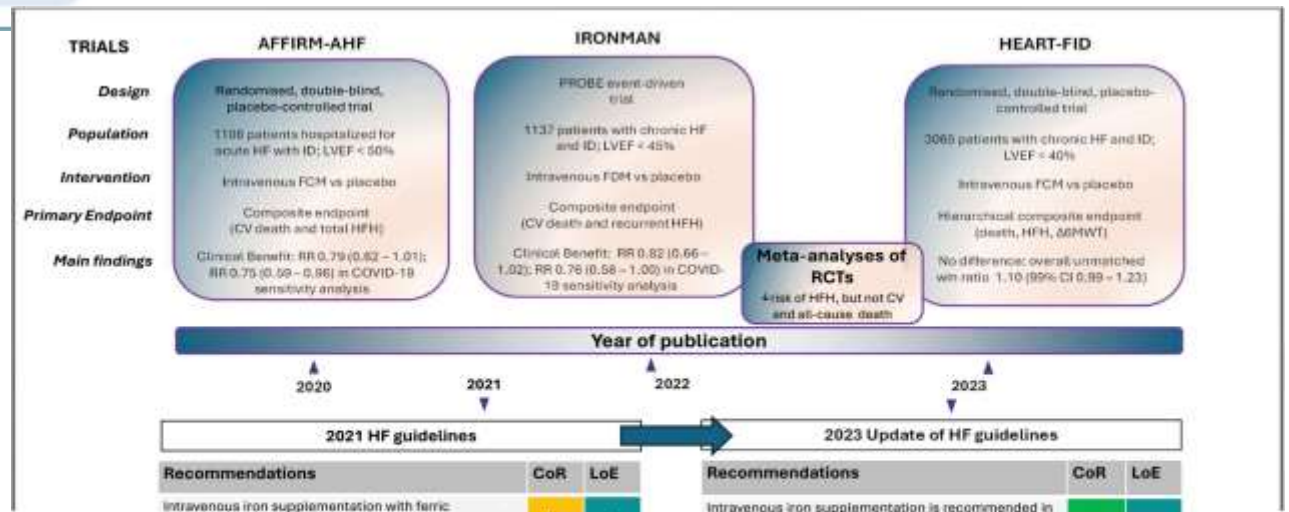

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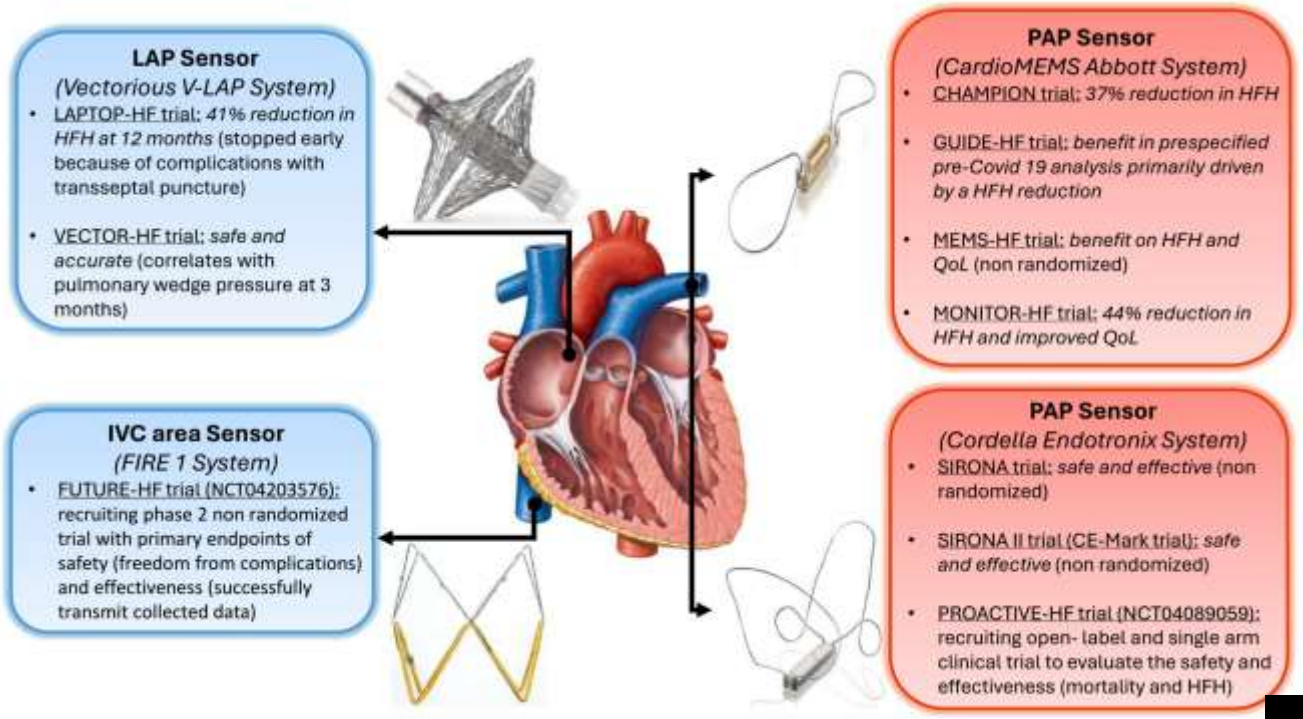

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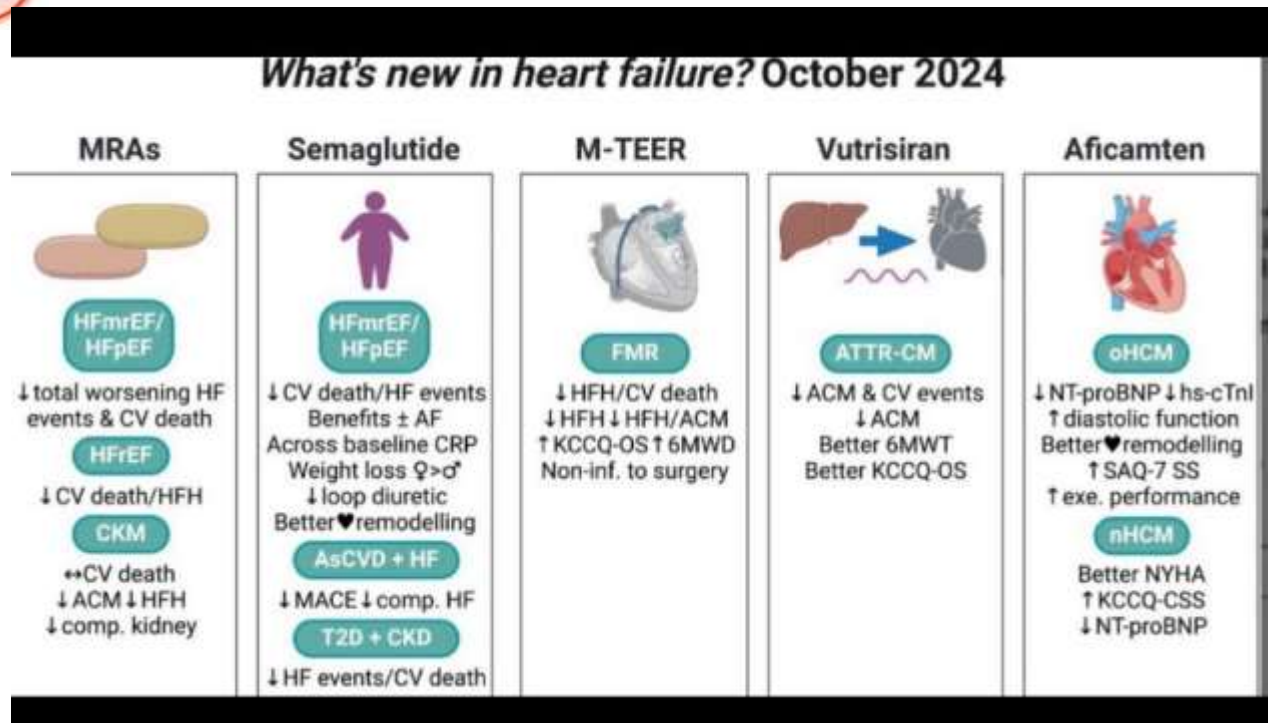
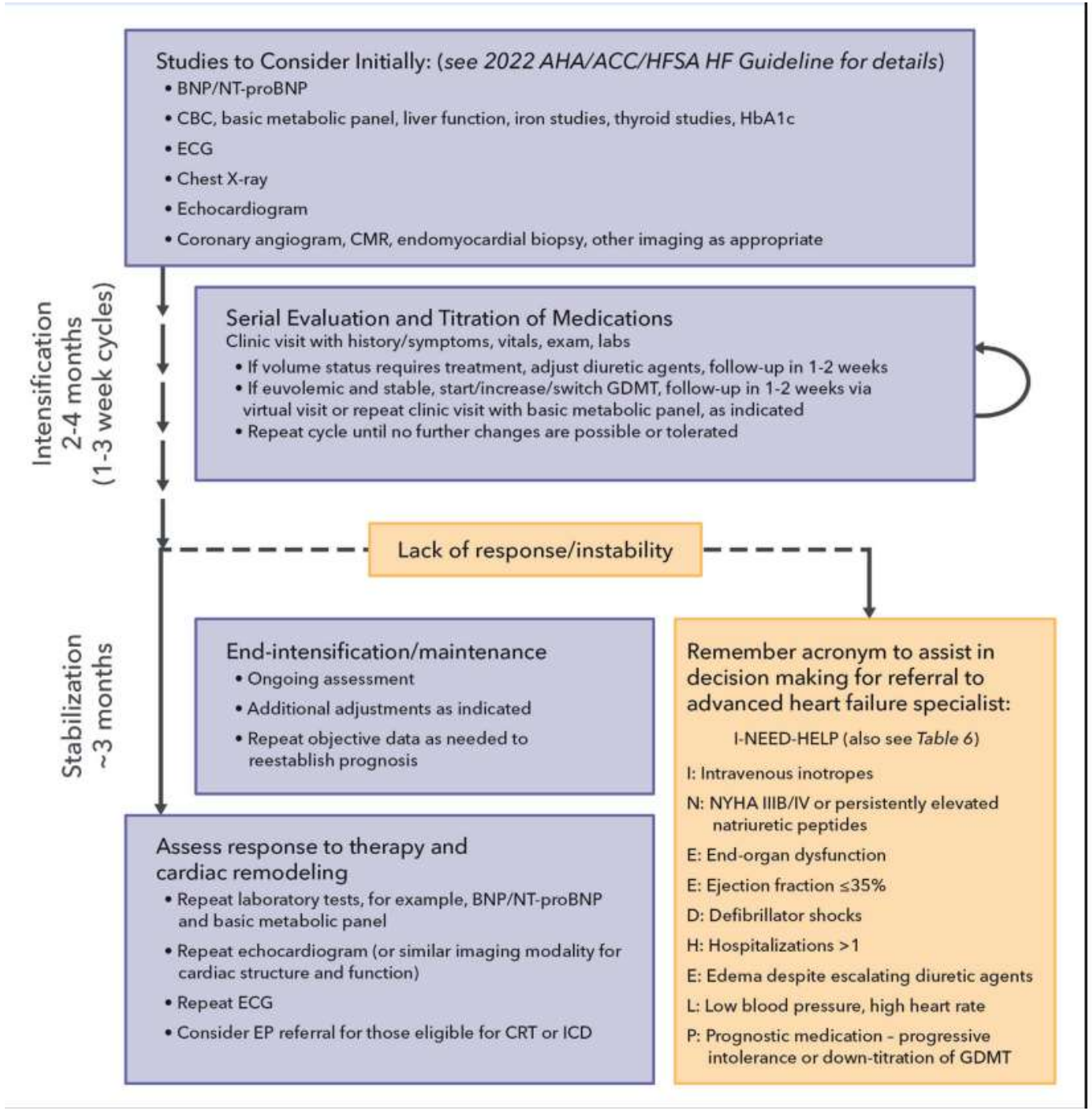


How to Achieve Optimal Therapy Given Multiple Drugs for HF, Including Augmented Clinical Assessment That May Trigger Additional Changes in GDMT (eg, Imaging Data, Biomarkers, and Filling Pressures

- Target Doses
- Barriers to Medication Titration
- Clinical Assessment
- When to Order an Echocardiogram
- Biomarkers—When to Order Natriuretic Peptides
- Filling Pressure Assessment—When and How to Measure Filling Pressures


Studies to Consider Initially: (see 2022 AHA/ACC/HFSA HF Guideline for details)
• BNP/NT-proBNP
• CBC, basic metabolic panel, liver function, iron studies, thyroid studies, HbA1c
• ECG
• Chest X-ray
• Echocardiogram
• Coronary angiogram, CMR, endomyocardial biopsy, other imaging as appropriate
Intensification
2-4 months
(1-3 week cycles)
Serial Evaluation and Titration of Medications
Clinic visit with history/symptoms, vitals, exam, labs
• If volume status requires treatment, adjust diuretic agents, follow-up in 1-2 weeks
• If euvolemic and stable, start/increase/switch GDMT, follow-up in 1-2 weeks via virtual visit or repeat clinic visit with basic metabolic panel, as indicated
• Repeat cycle until no further changes are possible or tolerated
Lack of response/instability
Stabilization
~3 months
End-intensification/maintenance
• Ongoing assessment
• Additional adjustments as indicated
• Repeat objective data as needed to reestablish prognosis
Assess response to therapy and cardiac remodeling
• Repeat laboratory tests, for example, BNP/NT-proBNP and basic metabolic panel
• Repeat echocardiogram (or similar imaging modality for cardiac structure and function)
• Repeat ECG
• Consider EP referral for those eligible for CRT or ICD
Remember acronym to assist in decision making for referral to advanced heart failure specialist:
I-NEED-HELP (also see Table 6)
I: Intravenous inotropes
N: NYHA IIIB/IV or persistently elevated natriuretic peptides
E: End-organ dysfunction
E: Ejection fraction ≤35%
D: Defibrillator shocks
H: Hospitalizations >1
E: Edema despite escalating diuretic agents
L: Low blood pressure, high heart rate
P: Prognostic medication – progressive intolerance or down-titration of GDMT

When to Refer to an HF Specialist

Clinical Scenario	1. New-onset HF (regardless of EF): Refer for evaluation of etiology, guideline-directed evaluation and management of recommended therapies, and assistance in disease management, including consideration of advanced imaging, endomyocardial biopsy, or genetic testing for primary evaluation of new-onset HF
	2. Chronic HF with high-risk features, such as development or persistence of 1 or more of the following risk factors: • Need for chronic intravenous inotropes • Persistent NYHA functional class III-IV symptoms of congestion or profound fatigue • Systolic blood pressure ≤90 mm Hg or symptomatic hypotension • Creatinine ≥1.8 mg/dL or BUN ≥43 mg/dL • Onset of atrial fibrillation, ventricular arrhythmias, or repetitive ICD shocks • 2 or more emergency department visits or hospitalizations for worsening HF in the prior 12 months • Inability to tolerate optimally dosed beta-blockers and/or ARNI/ACE inhibitors/ARBs and/or mineralocorticoid antagonists • Clinical deterioration, as indicated by worsening edema, worsening symptoms, rising biomarkers (BNP, NT-proBNP, others), worsened exercise testing, decompensated hemodynamic status, or evidence of progressive remodeling on imaging • High mortality risk using a validated risk model, such as the Seattle Heart Failure Model, for further assessment and consideration of advanced therapies
	3. Persistently reduced LVEF ≤35% despite GDMT for ≥3 months: Refer for consideration of device therapy in those patients without prior placement of ICD or CRT, unless device therapy is contraindicated or inconsistent with overall goals of care
	4. Second opinion needed regarding etiology of HF; for example: • Coronary ischemia and the possible value of revascularization • Valvular heart disease and the possible value of valve repair • Suspected myocarditis • Established or suspected specific cardiomyopathies (eg, hypertrophic cardiomyopathy, arrhythmogenic right ventricular dysplasia, Chagas disease, restrictive cardiomyopathy, cardiac sarcoidosis, amyloid, aortic stenosis)
	5. Annual review needed for patients with established advanced HF in which patients/caregivers and clinicians discuss current and potential therapies for both anticipated and unanticipated events, possible HF disease trajectory and prognosis, patient preferences, and advanced care planning
	6. Assessment of patient for possible participation in a clinical trial

How to Optimize Care Coordination

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 (eg, diet, exercise), education, and monitoring
- Access to genetic testing and counseling programs
- Psychological and social support assessment, treatment, and monitoring
- Palliative and end-of-life counseling and care
- Coordination of care for concomitant comorbidities
- Nutritional counselling

Potential Infrastructure Components to Support Team-Based HF Care

Modality	Potential Benefits	Challenges
Electronic health records	■ Reduction in errors ■ Decision support (eg, ACC TreatHF mobile app) ■ Accurate medication reconciliation to facilitate guideline adherence ■ Patient portal to facilitate patient/caregiver engagement, including patient-reported outcomes and other patient-generated data (if available)	■ Ease of access ■ Interoperability with other electronic data repositories ■ Data accuracy, including missing data
Patient monitoring devices: (eg, scales, implanted devices, bioimpedance devices, wearable hemodynamic sensors)	■ Early warning and a reduction in morbidity	■ Accuracy ■ False alert ■ Cost-effectiveness ■ Infrastructure/resource needs, including accurate data management and triage
Wearable activity monitors	■ Physical activity coaching/adherence ■ Early detection of arrhythmias (eg, AF)	■ Accuracy
Smartphones or other mobile technologies	■ Activity tracking ■ Dietary records ■ Weight management ■ Communication with HF team ■ Prompts for medication and lifestyle adherence	■ Need for more useful apps or other mobile technologies, including support systems in place for providing equipment and training for use ■ Potential privacy issues

How to Improve Adherence

Reasons for Nonadherence

Patient	■ Perceived lack of effect ■ Poor health literacy ■ Disabilities without affording appropriate accommodations ■ Mental health disorders (depression, anxiety) ■ Social isolation ■ Cognitive impairment (eg, dementia)
Medical condition	■ High HF regimen complexity ■ Impact of comorbidities (eg, depression) ■ Polypharmacy due to multiple comorbidities
Therapy	■ Frequency of dosing (eg, hydralazine, nitrates) ■ Polypharmacy ■ Side effects
Socioeconomic	■ Difficult access to pharmacy ■ Lack of social support ■ Homelessness
Health system	■ Poor communication ■ Silos of care ■ No automatic refills ■ Difficulty navigating patient assistance programs ■ Unaffordable cost of care, including medication costs

Ten Considerations to Improve Adherence

1. Capitalize on opportunities when patients are most predisposed to adherence
   - In-hospital/predischarge initiation following decompensation
2. Consider the patient's perspective
   - Start with the goals of therapy (feeling better and living longer) and then discuss how specific actions (medication initiation, intensification, monitoring, and adherence) support those goals (example: ACC's My Heart Failure Action Plan)
   - Use decision aids when available (example: CardioSmart Heart Failure Resources)
   - Ask patient how they learn best and provide education accordingly
   - Use culturally sensitive patient education materials
   - Focus on a patient-centered outcome (ie, treatment satisfaction, treatment burden, and mental health)
3. Simplify medication regimens whenever possible, especially in older adults
4. Consider costs and access
   - Become familiar with and advocate for systems that help make cost-sharing automatic, immediate, and transparent
   - Prescribe lower-cost medications if of similar efficacy
   - Facilitate access to copay assistance upon prescription
   - Address prior approvals upon prescription (Document the frequency of these issues, delays in care, and adverse events to help change public policies.)
   - Discuss out-of-pocket copays proactively
   - Prescribe 90-day quantities for refills
5. Communicate with other clinicians involved in care, ideally facilitated by electronic health records
6. Educate using practical, patient-friendly information
   - Provide a written explanation of the purpose of each medication prescribed
   - Plan pharmacist visits for complex medication regimens
   - Use the "teach-back" principle to reinforce education
   - Education the patient and their identified social network
7. Recommend tools that support adherence in real time
   - Pill boxes to be filled by patient or care partner a week at a time
   - Alarms for each time of the day medications are due
   - Smartphone or other mobile health applications that provide an interactive platform for education, reminders, warnings, and adherence tracking
   - Use of telehealth to increase access to care
8. Consider behavioral supports
   - Motivational interviewing
   - Participate in engaged benefit designs
9. Anticipate problems
   - Communicate common adverse effects
   - Provide instructions on when to call for refills or report problems
   - Remind patients using pharmacy assistance programs that refills/reorders are not automatic
   - Request pharmacy to synchronize refills
   - Incorporate social support or caregivers in the management
10. Monitor adherence and target patients at risk
    - Inquire patients directly (eg, "How many times in a week do you miss taking your medications?" "Have you run out of your medications recently?")
    - Carry out medicine reconciliation at visits, with focus on discrepancies
    - Ask the patient to bring all the pill bottles to the office visit
    - Assess remaining dosage units (ie, count excess remaining tablets)
    - Monitor pharmacy fills, using available clinical databases, or automated alerts for failed fills and refills
    - Review available drug levels (eg, digoxin, INR) or concentrations of BNP/NT-proBNP
    - Plan home-based nursing visits for appropriate patients

What is Needed in Specific Patient Cohorts: African-American Populations, Older Adults, and Patients Living With Frailty

Patient Cohorts	Description	Evidence-based Recommendations	Risks	Uncertainties
African-American patients	Self-identified	GDMT	■ ACE inhibitors and ARBs: possibly higher risk of angioedema compared with White patients ■ ARNI: Risk of angioedema may not be different from White patients.	Expected outcomes of ARNI, SGLT inhibitors, and/or ivabradine in those treated with HYD/ISDN; ARNI remains recommended as first-line therapy before HYD/ISDN.
Older adults	Age ≥75 y	■ GDMT, but recognize that this population is excluded from many trials supporting GDMT ■ Consider starting with lower doses of GDMT	■ Potential falls ■ Worsening of kidney function ■ Polypharmacy ■ Comorbidity ■ Depression ■ Financial toxicity	■ Efficacy of lower-dose GDMT on outcomes ■ Greater risk of hypotension? ■ Greater risk of hyperkalemia?
Patients living with frailty	Meets established frailty criteria[187]	GDMT as tolerated	■ Uncertain response to GDMT ■ Possibly increased risk for adverse drug reactions	Unclear impact on natural history among patients with pre-existing frailty

How to Manage Common Comorbidities

Cardiovascular

Coronary artery disease	Strong	Strong	■ Revascularize in appropriate patients with HFrEF and suitable coronary anatomy
Atrial fibrillation/ flutter	Strong	Strong	■ Anticoagulate if indicated ■ Consider AF ablation[223] or AV nodal ablation with CRT implantation in selected patients ■ Treat according to the current ACC/AHA/ACCP/HRS Guideline for the Diagnosis and Management of Atrial Fibrillation[224]
Mitral regurgitation	Strong	Intermediate	■ Multidisciplinary management, including structural heart team[225,226] ■ Consider transcatheter intervention in carefully selected patients with symptomatic HF and secondary MR after GDMT optimization[227] ■ Treat according to the current ACC/AHA Guideline for the Management of Patients with Valvular Heart Disease[225] and ACC ECDP on the Management of MR[226]
Aortic stenosis	Strong	Strong	■ Multidisciplinary management, including structural heart team ■ Treat according to current ACC/AHA Guideline for the Management of Patients with Valvular Heart Disease[225]
Hypertension	Uncertain	Strong for prevention	■ Treat according to current ACC/AHA/Multisociety Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults[228]
Dyslipidemia	Uncertain	Strong for prevention	■ Treat according to current AHA/ACC/Multisociety Guideline on the Management of Blood Cholesterol[229] and the ACC ECDP on the Role of Nonstatin Therapies for LDL-Cholesterol Lowering in the Management of ASCVD Risk[230]
Peripheral vascular disease	Moderate	None	■ Treat according to current AHA/ACC Guideline on the Management of Patients With Lower Extremity Peripheral Artery Disease[231]
Cerebrovascular disease	Moderate	Weak	■ Treat according to current ASA/AHA Guideline for the Early M agement of Patients with Acute Ischemic Stroke[232]

Diabetes	Strong	Strong	■ Consider consult with endocrinologist ■ Monitor serum creatinine and albuminuria at least yearly ■ Treat with SGLT inhibitor for management of hyperglycemia ■ Treat according to the current ACC ECDP on Novel Therapies for CV Risk Reduction in Patients with T2D[117] and ADA Standards of Medical Care in Diabetes[233]
Chronic kidney disease	Strong	Strong	■ Optimize RAAS inhibitor therapy ■ Use hydralazine/ISDN if an ARNI/ACE inhibitor/ARB cannot be used ■ Treat with SGLT inhibitor if GFR allows ■ Consider nephrology consult
Sleep disordered breathing	Strong	Intermediate; note that in patients with symptomatic HFrEF and central sleep apnea, adaptive servo-ventilation is harmful[234]	■ Refer for sleep study to confirm diagnosis ■ Treat obstructive sleep apnea ■ Consider referral to sleep medicine specialist
Iron deficiency (with or without anemia)	Strong	Intermediate	■ Consider intravenous iron replacement for symptom improvement
Malnutrition	Strong	Intermediate to Strong	■ Poor nutrition may result in worse HF outcomes. In line with the 2019 ACC/AHA Primary Prevention Guidelines, a low salt, plant-forward diet has robust evidence to aid in the management of HFrEF patients, including their common morbidities.[235]
Anemia	Moderate	Weak; note that in patients with HF and anemia, use of erythropoietin-stimulating agents is harmful[236]	■ Evaluate secondary causes ■ Consider transfusion in severe cases
Hyperkalemia	Uncertain; may limit initiation and titration of GDMT	Weak	■ Recommend dietary modifications ■ Consider treating with patiromer or sodium zirconium cyclosilicate
Obesity	Moderate (inverse association)	Weak	■ Data are suggestive of symptomatic benefit from treatment of obesity using glucagon-like peptide receptor agonist-1 in HFpEF[237]; however, additional data needed regarding safety and efficacy of weight-loss agents in HFrEF

Chronic lung disease	Strong	Weak	■ Smoking cessation ■ Optimize therapy ■ Consider pulmonary consultation
Thyroid disorder (hypo or hyper)	Strong	Weak	■ Evaluate and initiate treatment ■ Consider referral to endocrinologist
Viral infection (eg, COVID-19, RSV, or influenza)	Strong	Strong	■ Encourage vaccination per the Standards for Adult Immunization Practice[154]

Guiding Principles

- GDMT is the foundation of HF care, and the GDMT with the highest expected benefit should be prioritized.
- Target doses are associated with best outcomes.
- Start GDMT immediately and titrate during each encounter.
- Attention to the clinical, social, and financial barriers to achieving GDMT should be prioritized.
- Diligent management of volume status will reduce patient symptoms
- Tolerability and side effects depend, in part, on how and when GDMT is prescribed

- Primary prevention ICDs and CRT should be considered after consistent use of optimal doses of all GDMTs for at least 3 to 6 months, followed by reassessment of EF and other indications for device therapy
- Transcatheter mitral valve repair may be considered in symptomatic patients with chronic, moderate-severe to severe MR despite optimal doses of all GDMTs.
- Focus on the patient's symptoms, functional capacity, and cardiac function
- The value of a therapy to a patient is the combination of benefits and burdens as they relate to that patient's values, goals, and preferences
- Team-based care is critical to optimizing GDMT and may include frequent follow-up visits, telehealth visits, and remote monitoring.