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iCARDIO Alliance Global Implementation Guidelines on Heart Failure 2025

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POSITION STATEMENT

iCARDIO Alliance Global Implementation Guidelines on Heart Failure 2025

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Inconsistencies in healthcare access, varying infrastructure, resource constraints and diverse local practices as well as practical and political issues restrict the global applicability of currently available guidelines. There is a need for universal recommendations that address the unique challenges faced by patients and healthcare providers worldwide. Our iCARDIO Alliance Global Implementation Guidelines emphasize the incorporation of novel therapies, while integrating standard of care with the most up-to-date evidence to enable clinicians to optimize patient care. This document is about heart failure (HF), including acute and chronic heart failure, heart failure with reduced ejection fraction and heart failure with preserved ejection fraction as well as cardiomyopathies. Context-specific recommendations tailored to individual patient needs are highlighted providing a thorough evaluation of the risks, benefits, and overall value of each therapy, aiming to establish a standard of care that improves patient outcomes and reduces the burden of hospitalization in this susceptible population. These guidelines provide evidence-based recommendations that represent a group consensus considering the many other published guidelines that have reviewed many of the issues discussed here, but they also make new recommendations where new evidence has recently emerged. Most importantly these guidelines also provide recommendations on a number of issues where resource limitations may put constraints on the care provided to HF patients. Such "economic adjustment" recommendations aim to provide guidance for situations when "Resources are somewhat limited" or when "Resources are severely limited". Hence, this document presents not only a comprehensive but also concise update to HF management guidelines thereby aiming to provide a unified strategy for the pharmacological, non-pharmacological, invasive and interventional management of this significant global health challenge that is applicable to the needs of healthcare around the globe.

Keywords Heart failure • Chronic heart failure • Acute heart failure • Therapy • Guidelines • iCARDIO Alliance

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Preamble

The International CARDIO Alliance to Improve Disease Outcomes (iCARDIO Alliance: https://icardioalliance.org) aims to gather leading cardiovascular societies around the globe as partner organizations to improve the quality of cardiovascular care, from prevention and diagnosis to treatment and follow-up. The goal of these global implementation guidelines is to achieve global representation in writing panels and to produce concise and practical guidelines applicable to all cardiovascular care worldwide. In addition to clinical practice guidelines developed by other medical associations, the recommendations by iCARDIO Alliance take into account resource availability on at least 3 economic levels (with no economic consideration; resources somewhat limited; resources severely limited). They are written by a team including world-renowned experts with a maximum of 50% of the writing task force representing Europe and North America and 50% or more from the rest of the world. The peer review team is also made up of worldwide experts further enriching these documents and leading to a final phase of public review open to all. The viewpoints of persons with lived experience are embedded within this global implementation guideline process including also a public review phase. Through this innovative approach iCARDIO Alliance hopes to enhance guideline dissemination and implementation on a global scale.

Introduction

Heart failure (HF) is a leading public health challenge, with over 64 million prevalent cases worldwide [1]. Studies from the USA have projected a 46% increase in HF cases from 2012 to 2030 due to ageing population, with a significant rise in HF with preserved ejection fraction (HFpEF). In addition, healthcare costs associated with HF are expected to rise by approximately 127% [2]. By 2050, nearly 11 million adults are expected to be affected by HF in the USA [3]. To mitigate this growing public health threat, it is essential to improve the understanding of this condition, promote lifestyle modifications, and implement early detection strategies, and treatment modalities. In 1994, the US Agency for Healthcare Policy and Research published the first clinical guidelines for managing HF, which were subsequently followed by the American Heart Association and the American College of Cardiology guidelines in 1995 [4,5]. Since then, several countries- and region-specific guidelines have emerged, predominantly from Western countries, which influence decision-making across multiple stakeholders, including patients, clinicians, healthcare leaders, and payers [6–17]. However, uniform implementation of these guidelines across all regions remains a challenge due to variations in infrastructure and local practices [18]. Current evidence suggests that guideline-directed medical therapies (GDMT) significantly decrease mortality and hospitalizations among individuals with HF, particularly HF with reduced ejection fraction (HFrEF), and are therefore recommended as highly cost-effective interventions by the Disease Control Priorities Project [19]. Despite strong evidence supporting GDMT, its utilization remains limited in low- and middle-income countries (LMIC), where barriers at the health system, provider, and patient levels contribute to a 22% to 58% higher 1-year mortality rate compared to high-income countries [1,20,21].

Furthermore, there is a lack of substantial data to ascertain the relevance of current guidelines to diverse populations across the globe. Often, where evidence is strong, the recommendations are unlikely to adjust to accommodate economic constraints and availability [18]. For example, in the Middle East where economic constraints may not play a big role, but a particularly high burden of HF exists, even after accounting for variations in age demographics [22–24], there remains a huge gap in reaching the guideline-recommended doses for all the medications. We lack an understanding of the reasons behind this gap in practice [20,21]. Similarly, sub-Saharan Africa and Asia face significant challenges in HF management, with limited access to essential medications and therapies due to economic constraints, underdeveloped healthcare infrastructure, and a high prevalence of risk factors such as hypertension and rheumatic heart disease [1,25–27]. These global disparities underscore the need for new, universally applicable guidelines that can ensure both relevance and effectiveness in HF management.

Thus, this document strives to usher in a new era of practical guidelines that are responsive to unique challenges faced by individual patients and healthcare providers during HF management. By integrating past guidelines with the latest research and evidence, it offers an updated, comprehensive approach, that equips healthcare providers with the tools needed to address the evolving challenges in diagnosis, prevention, and management of acute and chronic HF. Lastly, HF management can be overwhelming due to economic burden, particularly in resource-limited countries with restricted access to advanced therapies. To address this, we have proposed alternative treatment strategies where recommended or strongly recommended grading was given. In cases of suggestive grading, we have not provided economic considerations as these were suggestions, and may be acceptable to forego in cases of economic limitations. These considerations ensure that the guidelines remain adaptable to diverse healthcare settings while maintaining their efficacy in improving patient outcomes.

Grading/Recommendations

Based on the available evidence and consensus among the committee members regarding the risks and benefits of interventions, the recommendations were classified as strongly recommend (SR), recommend (R), suggest (Su), and do not do (DND) (Table 1). To make the document more readable and concise, we decided to not reference each recommendation. Also, we acknowledge that there have been discussions whether to use the term “people with HF” or “patients

with HF". In this document, we will use "patients with HF" as this is more commonly used globally.

When recommendations were made, also more recent published evidence was taken into account, for instance regarding device therapies (i.e. on RESHAPE-HF2 and an M-TEER-meta-analysis, for MONITOR-HF, and the TRILUMINATE trial) [28–34], drug therapy in HF (FAIR-HF2, a meta-analysis on intravenous iron, ATTRibute-CM, HELIOS-B trial, FINEARTS-HF, 2 STEP-HFpEF trials, STEP-HFpEF meta-analysis, and the SUMMIT trial) [35–45]. On the issue of fluid restriction, we considered also the FRESH-UP trial [46].

Prevention of Heart Failure

Therapeutic interventions and lifestyle modification in patients at risk of HF have been associated with a decreased incidence of HF and the likelihood of hospitalization due to HF. Considering the available data, the following recommendations have been proposed for the prevention of HF (Figure 1, Table 2).

Diagnostics

The diagnosis of HF requires the presence of symptoms and/or signs of HF and objective evidence of cardiac dysfunction. Symptoms and signs lack sufficient accuracy to be used alone to make the diagnosis of HF, thus under- and misdiagnosis of HF can commonly occur. To address this, several diagnostic modalities should be utilized to diagnose or determine the prognosis of HF (Figure 1, Table 3).

Of note, this guideline diagnostically and therapeutically distinguishes between HFrEF and HFpEF. It is recognized that for all practical intents and purposes patients that elsewhere are considered as HF patients with "mid-range" or "mildly-reduced" LVEF (termed patients with "HFmrEF" and typically defined as patients with an LVEF of 40%–49%) are considered as patients with HFrEF. It is recognized that diagnostic certainty in these patients is somewhat reduced (due to the variability of LVEF assessment) and that the absolute benefit of GDMT may be somewhat less than in patients with LVEF <40%.

Treatment

Drugs

Pharmacological therapies have been shown to improve symptoms, reduce hospitalizations and reduce mortality in patients with HF by improving cardiac function and slowing the disease progression. Despite strong evidence supporting the benefits of certain medications for HFrEF, several other classes of medications still have either unproven benefits or potential risks of increased fluid retention, drug interactions, HF hospitalization, or mortality. Recommendations regarding the pharmacological therapies for patients with HF are summarized in Figure 2 and Figure 3 as well as in Table 4 focusing on drugs commercially available in major parts of the world.

Devices

A crucial role has been played by RCTs in shaping decisions regarding cardiac implantable devices such as implantable cardioverter-defibrillators (ICDs), and cardiac resynchronization therapy (CRT) over the past two decades. While subgroup analyses of these trials have provided additional insights, it is important to note that they were not the primary endpoints of these studies and should be interpreted cautiously. Recently, cardiac contractility modulation (CCM) and baroreflex activation therapy (BAT) have shown beneficial effects in patients with HF. Strategies and recommendations regarding device therapies are summarized in Table 5 and Figure 2.

Surgery and Trans-Catheter Procedures

Strategies for invasive management and device-based therapies for patients with severe valvular diseases or coronary artery diseases are mentioned in Table 6 and Figure 2.

Special Consideration

Heart failure management becomes more challenging in the presence of various comorbidities, such as amyloidosis. Moreover, in pregnancy, certain medications should be avoided due to potential risks to the fetus and other adverse effects. Recommendations about the management of HF in such special conditions are highlighted in Table 7 and Table 8, and Figure 4.

Conclusions

The recommendations provided in this document offer a comprehensive framework for HF management, drawing on the most recent evidence to support physicians in their practice. However, it is pertinent to note that they should not replace clinical judgment. Effective HF management requires adapting these guidelines to the unique circumstances of each patient and the resources available in their region. A comprehensive overview of the recommendations for management of patients with HFpEF and HFrEF is given in Figures 5 and 6. It is crucial for healthcare providers to offer personalized care tailored to each patient's specific clinical profile, symptoms, comorbidities, and individual preferences. Recognizing potential obstacles to implementing these recommendations, including resource constraints, access to particular interventions and technologies, cultural influences and local standards of care is essential for effective application of these guidelines. By integrating these recommendations with individualized patient care and addressing local healthcare dynamics, clinicians can optimize HF management and improve quality of life for patients.

Table 1 Grading and recommendations.

No.	Definition	Level of Recommendation
1-01	Evidence or consensus that a specific diagnostic test or treatment is effective, beneficial and valuable.	Strongly recommend (SR)
1-02	Majority of evidence or opinions support the benefits or effectiveness.	Recommend (R)
1-03	Usefulness or effectiveness is less clearly supported by evidence or opinion.	Suggest (Su)
1-04	Evidence or consensus suggests that it is ineffective and, in some cases, may even be harmful.	Do not do (DND)

Table 2 Recommendations for the prevention of heart failure.

No.	Guideline Statement	Level of Recommendation
2-01	Counsel against sedentary habits, tobacco, and alcohol abuse to decrease the risk of HF.	SR
2-02	Request genetic counseling and testing (if available) to facilitate early diagnosis and prevent or delay the progression of disease in family members of patients with non-ischemic cardiomyopathy.	R
2-03	Treat hypertension to recommended blood pressure targets to prevent subsequent HF.	SR
2-04	Use evidence-based SGLT2 inhibitors to reduce HF hospitalizations in patients with T2DM or CKD regardless of glycemic status.	SR
Resources severely limited	*Use empagliflozin, dapagliflozin or any regionally approved SGLT2 inhibitor to reduce HF hospitalization in patients with T2DM or CKD regardless of glycemic status.*	
2-05	Use evidence-based GLP-1 RA based therapies to reduce HF hospitalizations in patients with T2DM.	R
2-06	Use evidence-based SGLT2 inhibitors to reduce HF hospitalization in post-AMI patients with LVEF ≤45% and/or pulmonary congestion.	Su
2-07	Use finerenone in patients with T2DM and CKD to reduce the risk of HF hospitalization.	SR
Resources severely limited	*Use any MRA in patients with T2DM and CKD to reduce the risk of HF hospitalization.*	

Table 2 *(Continued).*

No.	Guideline Statement	Level of Recommendation
2-08	Use optimal therapies (i.e. statins, antihypertensives) in patients with CVD to prevent or delay the onset of HF and reduce the risk of HF hospitalization.	**SR**
2-09	Use ACEi (or ARB if intolerant to ACEi) in patients with/without MI and LVEF ≤40% to decrease the risk of symptomatic HF and mortality.	**SR**
2-10	Use HF-specific beta-blockers in patients with prior MI/ACS and LVEF ≤40%, to decrease the risk of HF.	**SR**
2-11	Use HF-specific beta-blockers in patients with LVEF ≤40% and no prior MI or ACS, to decrease the risk of symptomatic HF and mortality.	**SR**
2-12	Advise at least 5% weight loss in patients with severe obesity (BMI ≥35 kg/m^2) to decrease the risk of HF.	**R**
2-13	Use appropriate antibiotics in patients with Group A beta hemolytic streptococcal infection for primary and secondary prevention of RF and RHD, especially in LMIC.	**R**

Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; DND, do not do; ACEi, angiotensin-converting enzyme inhibitors; ACS, acute coronary syndrome; AMI, acute myocardial infarction; ARB, angiotensin receptor blocker; BMI, body mass index; CVD, cardiovascular disease; CKD, chronic kidney disease; GDMT, guideline-directed medical therapy; GLP-1RA, glucagon-like peptide 1 receptor agonist; HF, heart failure; LMIC, low- and middle-income countries; LVEF, left ventricular ejection fraction; MI, myocardial infarction; MRA, mineralocorticoid receptor antagonist; RHD, rheumatic heart disease; RF, rheumatic fever; SGLT2, sodium-glucose cotransporter-2; T2DM, type 2 diabetes mellitus.

Table 3 **Recommendations for the diagnostic tests in patients with heart failure.**

No.	Guideline Statement	Level of Recommendation
3-01	Inquire regarding family history, previous malignancy, acromegaly, hypo- or hyperthyroidism, exposure to metals or chemicals, alcohol, illicit drug use and exposure to HIV, chemotherapy, immunotherapy or cardiac irradiation in patients with suspected cardiomyopathy.	**SR**
3-02	Perform EKG and chest X-ray on all patients with suspected HF.	**SR**
3-03	Measure BNP or NT-proBNP or MR-proANP, where available, to make or exclude new diagnosis of HF in patients presenting with dyspnea. The best use for natriuretic peptides is to rule-out presence of heart failure.*	**SR**
Resources severely limited	*When use of natriuretic peptides is not covered or reimbursed, consider echocardiography and/or chest X-ray to aid diagnosis of HF and treatment decisions.*	
3-04	Perform serological tests to diagnose Chagas disease in patients with suspected HF, specifically in endemic areas such as Latin America.	**R**

Table 3 *(Continued).*

No.	Guideline Statement	Level of Recommendation
3-05	Perform TTE during the initial assessment (recommendation a), and 3-6 months after optimization of therapies for patients with HFrEF (b); to evaluate cardiac structure and function, and to guide management.	**(a): SR** **(b): R**
Resources somewhat limited	*Perform TTE during the initial assessment and diagnosis and then subsequently, only if there are significant changes to the patient's clinical status.*	
3-06	Perform CMR, where available/affordable, to evaluate myocardium in possible cases of inflammatory diseases like myocarditis or sarcoidosis, infiltrative diseases like amyloidosis or Fabry's disease, or iron overload/hemochromatosis, hypertrophic cardiomyopathy, and suspected previous infarction.	**R**
Resources somewhat limited	*Consider CMR focusing on patients where the diagnosis remains uncertain following initial clinical evaluation and patient's clinical status changes significantly despite being on GDMT to rule out infiltrative diseases.*	
3-07	Perform PET/CT scan in patients with suspected sarcoidosis.	**R**
3-08	Perform point of care ultrasound in patients with HF to monitor congestion.	**R**
3-09	Perform DPD/PYP/HMDP scintigraphy in patients with suspected TTR amyloidosis.	**SR**
3-10	Evaluate patients with HF for possible ischemic heart disease etiology to identify the cause of HF and assess the anatomy and functional status. The choice of evaluation method should depend on pre-test probability, availability of the diagnostic modality, and local expertise.	**SR**
3-11	Perform invasive hemodynamic monitoring to guide the management of selected patients with HF and persistent or worsening NYHA class III/IV symptoms, signs, or diagnostic parameters when hemodynamic status is uncertain.	**Su**
3-12	Perform endomyocardial biopsy in patients with HF, if a specific diagnosis is suspected that could affect the management and prognosis.	**Su**
3-13	Perform non-invasive home tele-monitoring in patients with HF, to decrease hospitalization for HF and risk of CV death.	**Su**
3-14	Perform CPET for selected patients with HF to help determine the cause and severity of exercise intolerance and eligibility for advanced therapies such as MCS and heart transplant.	**R**

Table 3 ***(Continued).***

No.	Guideline Statement	Level of Recommendation
Resources severely limited	*When resources are limited, the 6MWT can help determine the need for referral for advanced therapies such as MCS and heart transplant.*	
3-15	Perform RHC in patients with persistent right-sided HF to determine PAPI, PASP, PVR, transpulmonary gradient, PCWP, RVSWI and to exclude left-sided HF as underlying cause.	**R**
3-16	Consider genetic counselling and testing in patients with suspected non-ischemic cardiomyopathy and relevant family history or cardiomyopathy with arrhythmias.	**Su**
Resources somewhat limited	*Patients who have presentation or family history suggestive of genetic dilated cardiomyopathy but lack either the access or interest for genetic testing should nonetheless be counseled about screening family members with EKG and echocardiography*	
3-17	Perform a formal sleep study to determine the presence of CSA in patients being considered for positive pressure mask therapy of sleep apnea with HF.	**Su**

*Note: Best cut-offs to rule-out heart failure in the chronic setting using natriuretic peptides are for BNP: <35 pg/mL, for NT-proBNP: <125 pg/mL, and for MR-proANP: <120 pmol/L.

Abbreviations: SR, strongly recommend; R, Recommend; Su, suggest; DND, do not do; 6MWT, 6-minute walk test; BNP, B-type natriuretic peptide; CMR, cardiac magnetic resonance; CSA, central sleep apnea; CPET, cardiopulmonary exercise testing; CV, cardiovascular; DPD, 3,3-diphosphono1,2-propanodicarboxylic acid, GDMT, guideline-directed medical therapy; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; HMDP, hydroxymethylene diphoshonate; MCS, mechanical circulatory support; NT-proBNP, N-terminal prohormone of B-type natriuretic peptide; NYHA, New York Heart Association; PAPI, pulmonary artery pulsatility index; PASP, pulmonary artery systolic pressure; PCWP, pulmonary capillary wedge pressure; PET, positron emission tomography; PVR, pulmonary vascular resistance; PYP, pyrophosphate; TTE, transthoracic echocardiography; RHC, right heart catheterization; RVSWI, right ventricular stroke work index.

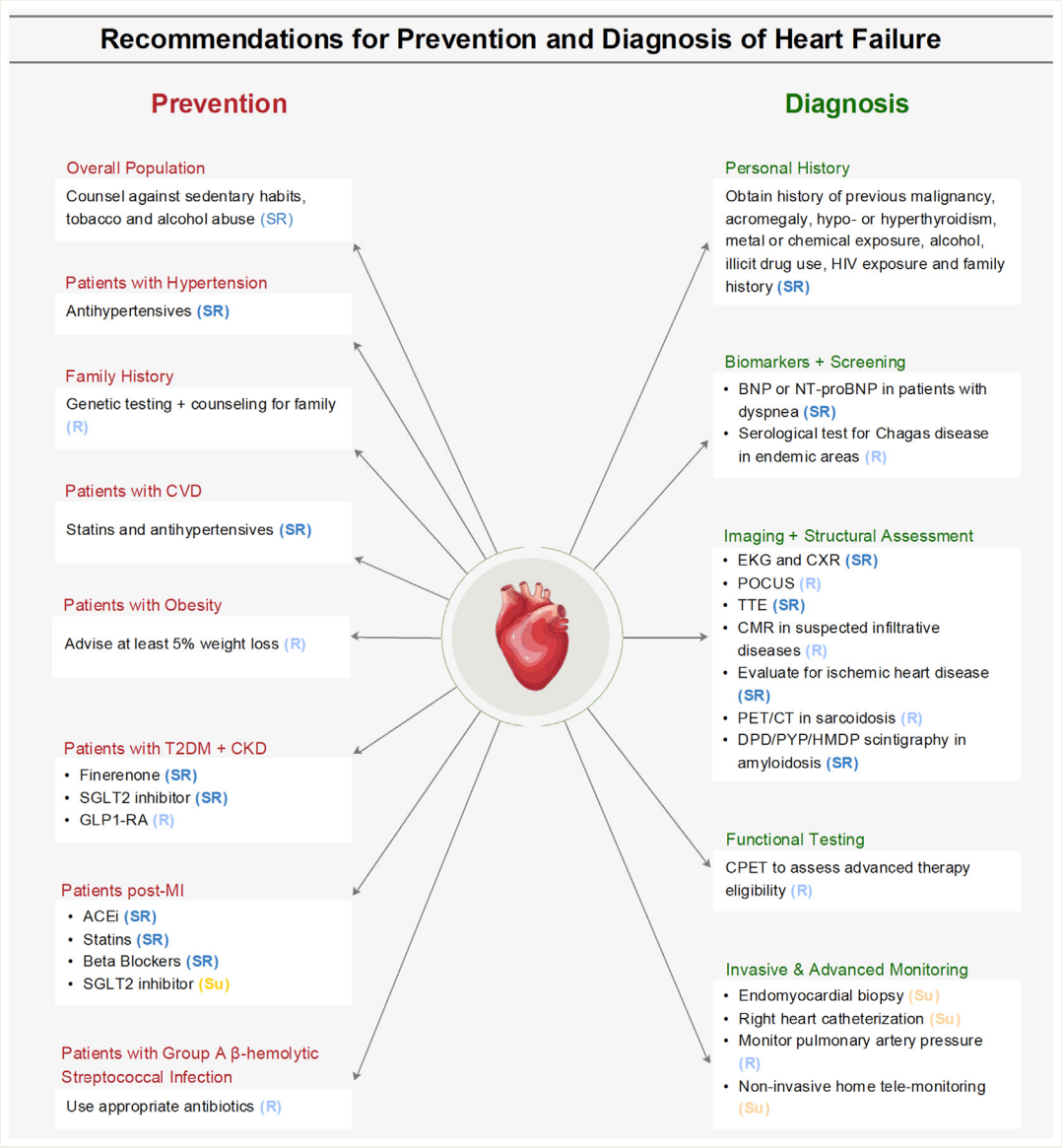

Figure 1 Recommendations for prevention and diagnosis of heart failure.
Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; and DND, Do not do. ACEi, angiotensin-converting enzyme inhibitors; ARB, angiotensin receptor blocker; BNP, brain natriuretic peptide; CMR, cardiac magnetic resonance; CPET, cardiopulmonary exercise training; CT, computed tomography; CVD, cardiovascular disease; CXR, chest X-ray; DPD, 3,3-diphosphono-1,2-propanodicarboxylic acid; GDMT, guideline-directed medical therapy; GLP-1RA, glucagon-like peptide 1 receptor agonist; HF, heart failure; HMDP, hydroxymethylene diphoshonate; NT-proBNP, N-terminal pro-B-type natriuretic peptide; POCUS, point of care ultrasound; PET, positron emission tomography; PYP, pyrophosphate; TTE, transthoracic echocardiography; SGLT2, sodium-glucose co-transporter 2.

Table 4 Recommendations for pharmacological therapies in patients with heart failure.

No.	Guideline Statement	Level of Recommendation
4-01	Use diuretics in patients with HF and signs and symptoms of congestion to alleviate symptoms, improve functional status and decrease the risk of HF hospitalization, irrespective of LVEF.	**SR**
4-02	Use higher dose of IV loop diuretics or addition of a second diuretic (thiazide, metolazone or acetazolamide) in patients hospitalized/non-hospitalized with HF when diuresis is inadequate to relieve signs and symptoms of congestion.	**R**
4-03	Among RAASi, use ARNI as first-line therapy in ambulatory patients with HFrEF to reduce mortality and morbidity. If ARNI is contraindicated, use ACEi or ARB.	**SR**
4-04	In patients with HFrEF and NYHA II and III class symptoms who can tolerate ACEi or ARB, use ARNI as a replacement therapy to reduce mortality and morbidity.	**SR**
Resources severely limited	*Any ACEi or ARB can be used instead of ARNI among patients with HFrEF and NYHA II and III class symptoms to reduce mortality and morbidity.*	
4-05	Do not use ARNI simultaneously with ACEi or within 36 hours of the last ACEi dose.	**DND**
4-06	Do not use ARNI or ACEi in patients with a history of angioedema.	**DND**
4-07	Use bisoprolol, carvedilol, nebivolol, or sustained-release metoprolol succinate in patients with HFrEF to reduce the risk of cardiovascular mortality and HF hospitalization.	**SR**
4-08	Use MRA in patients with HFrEF, eGFR>30 mL/min/1.73m^2 and potassium <5.0 mEq/L, to reduce morbidity and mortality.	**SR**
4-09	Do not use MRA in patients whose potassium cannot be maintained <5.5 mEq/L while on MRA, to prevent hyperkalemia-related adverse events.	**DND**
4-10	Use potassium binders (patiromer, sodium zirconium cyclosilicate) in patients with HF and hyperkalemia (>5.5mEq/L) who are unable to tolerate any dose of RAASi, (a) to enable at least one RAASi initiation and (b) MRA dose-up titration.	**(a): R** **(b): Su**
4-11	Use eplerenone (regardless of LVEF) or finerenone (in HFpEF) among patients who develop gynecomastia on spironolactone.	**SR**
Resources somewhat limited	*Use eplerenone in patients who develop gynecomastia on spironolactone.*	

Table 4 *(Continued).*

No.	Guideline Statement	Level of Recommendation
4-12	Use evidence based SGLT2 inhibitors in patients with HF regardless of LVEF, to reduce the risk of HF hospitalization and CV death.	**SR**
4-13	Optimize GDMT and attempt to achieve target doses to ensure maximum therapeutic benefits and improved patients' outcomes.	**SR**
Resources somewhat or severely limited	*Advocate for the use of affordable, generic medications and explore strategies to overcome barriers to drug access in resource-limited settings.*	
4-14	Use a combination of hydralazine and isosorbide dinitrate in Black patients with NYHA class III-IV symptoms, despite receiving optimal therapy, to improve QoL and decrease morbidity and mortality.	**Su**
4-15	Use ivabradine in patients with HFrEF (LVEF ≤35%), NYHA class II-IV symptoms, and sinus rhythm with a heart rate ≥70 bpm despite being on maximally tolerated GDMT, including beta-blockers, to reduce the risk of HF hospitalization and CV death.	**R**
4-16	Use oral soluble guanylate cyclase stimulator (vericiguat) to reduce HF hospitalization and CV death in high-risk patients with HFrEF and recent worsening of HF despite GDMT.	**Su**
4-17	Use oral soluble guanylate cyclase stimulator (vericiguat) to reduce HF hospitalization and CV death in high-risk patients with HFrEF and recent worsening of HF despite GDMT who have a NT-proBNP <5000 pg/mL.	**R**
4-18	Do not use soluble guanylate cyclase stimulator (vericiguat) simultaneously with PDE5 inhibitors.	**DND**
4-19	Use digoxin in patients with HFrEF who remain symptomatic despite GDMT as tolerated and without severe renal insufficiency (eGFR <30mL/min/1.73m^2) to decrease HF hospitalization.	**Su**
4-20	Continue GDMT even if patients are asymptomatic after improvement in LVEF (HFimpEF), to prevent relapse of HF and LV dysfunction.	**SR**
4-21	Use MRAs in patients with HFpEF to decrease HF hospitalization. (a) finerenone; (b) spironolactone	**(a): R** **(b): Su**
Resources severely limited	*Use spironolactone in patients with HFpEF to decrease HF hospitalization.*	
4-22	Use ACEi or ARB in patients with HFpEF, especially those at the lower end of the LVEF spectrum to reduce the risk of HF hospitalization.	**Su**

Table 4 *(Continued).*

No.	Guideline Statement	Level of Recommendation
4-23	Use ARNI in patients with HFpEF, especially those at the lower end of the LVEF spectrum. Particularly consider use in patients with LVEF <58% and in women.	**R**
4-24	Use GLP-1RA-based therapies (tirzepatide or semaglutide) in patients with obesity and HFpEF to achieve weight loss and to improve symptoms and QoL.	**SR**
4-25	Use GLP-1RA-based therapies (tirzepatide or semaglutide) in patients with obesity and HFpEF to reduce the risk of HF hospitalization.	**Su**
4-26	Use IV nitroglycerin or nitroprusside as an adjuvant therapy to diuretics in patients admitted with decompensated HF or pulmonary congestion, in the absence of systemic hypotension (SBP<90mmHg), to relieve dyspnea.	**Su**
4-27	Reduce digoxin dose or possibly discontinue in patients with acute renal injury or patients with severe renal insufficiency (eGFR<30 mL/min/1.73m^2), to prevent adverse events.	**SR**
4-28	Use intravenous iron supplementation with ferric carboxymaltose or ferric derisomaltose to improve symptoms, and exercise capacity in patients with HFrEF and iron deficiency with or without anemia.	**SR**
4-29	Use intravenous iron supplementation with ferric carboxymaltose or ferric derisomaltose to reduce the risk of HF hospitalization and CV death in patients with HFrEF and iron deficiency with or without anemia.	**R**
Resources somewhat limited	*Use iron sucrose,* ferric carboxymaltose *or* ferric derisomaltose (whichever is affordable) instead of the above.	
Resources severely limited	*Use of any non-dextran containing intravenous iron supplementation may be considered, whichever is accessible.*	
4-30	Initiate all 4 foundational therapies (ARNI, SGLT2 inhibitors, beta-blockers and MRA) in patients with HFrEF, at low doses once hemodynamically stabilized and then optimize dosages every 1-2 weeks, depending on symptoms, vitals and labs, and then at 3-4 months follow-up.	**R**
Resources somewhat limited	*Initiate the least expensive combination of quadruple therapy in patients with HFrEF, at low doses once hemodynamically stabilized and then optimize dosages every 1-2 weeks, depending on symptoms, vitals and labs, and then at 3-4 months follow-up.*	
Resources severely limited	*Use foundational triple therapy (ACEi/ARB, beta-blockers and MRA) at optimized doses and diuretics as needed.*	

Table 4 *(Continued).*

No.	Guideline Statement	Level of Recommendation
4-31	Refer patients with HF to cardiac rehabilitation program (for tailored exercises at least 30 minutes 3 times per week for 30 days) to improve symptoms and QoL.	**R**
4-32	Do not use thiazolidinediones and non-dihydropyridine calcium channel blockers in patients with HF and LVEF <50%, as they increase the risk of volume overload.	**DND**
4-33	Do not use DPP-4 inhibitors (saxagliptin and alogliptin) in patients with HF, T2DM and high CVD risk, as they increase this risk of HF hospitalization.	**DND**
4-34	Do not use NSAIDs or COX-2 inhibitors in patients with HF, as they increase the risk of worsening HF and HF hospitalization.	**DND**
4-35	Use GDMT before discharge in patients hospitalized with HF to improve outcomes and reduce HF hospitalization.	**SR**
4-36	Continue and optimize pre-existing GDMT in patients hospitalized with HFrEF (with no absolute contraindication) to improve outcomes.	**SR**
4-37	Do not routinely discontinue diuretics and other GDMT in patients experiencing mild decline in eGFR or asymptomatic reduction in blood pressure during HF hospitalization.	**SR**
4-38	Consider continuous IV inotropic therapy as "bridge therapy" for patients with advanced HF refractory to GDMT who are eligible and awaiting MCS or cardiac transplantation.	**Su**
4-39	Consider continuous intravenous inotropic therapy as palliative care for patients with advanced HF who are refractory to GDMT and device therapy and ineligible for MCS or heart transplantation.	**Su**

In patients with LVEF 40%−49%, diagnostic accuracy of test is less certain (due to the variability of LVEF assessments) and the absolute amount of therapeutic benefit of GDMT is somewhat less than in patients with LVEF <40%.

Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; DND, do not do; ACEi, angiotensin converting enzyme inhibitors; ACS, acute coronary syndrome; AMI, acute myocardial infarction; ARB, angiotensin receptor blocker; ARNI, angiotensin receptor neprilysin inhibitors; BPM, beats per minute; BNP, B-type natriuretic peptide; COX-2, cyclo-oxygenase-2; CV, cardiovascular; CVD, cardiovascular disease; DPP-4, dipeptidyl peptidase-4; eGFR, estimated glomerular filtration rate; GDMT, guideline-directed medical therapy; GLP-1RA, glucagon-like peptide 1 receptor agonist; HF, heart failure; HFimpEF, heart failure with improved ejection fraction; HFpEF, heart failure with preserved ejection fraction; heart failure with mildly reduced ejection fraction; HFrEF, heart failure with reduced ejection fraction; IV, intravenous; LVAD, left ventricular assist device; LVEF, left ventricular ejection fraction; MCS, mechanical circulatory support; MRA, mineralocorticoid receptor antagonist; NT-proBNP, N-terminal prohormone of B-type natriuretic peptide; NSAIDs, non-steroidal anti-inflammatory drugs; NYHA, New York Heart Association; PDE5, phosphodiesterase-5; QoL, quality of life; RAASi, Renin-angiotensin-aldosterone system inhibitors; SGLT2, sodium-glucose cotransporter-2; SP, systolic blood pressure; T2DM, type 2 diabetes mellitus; TSAT, transferrin saturation.

Table 5 **Recommendations for the device therapies in patients with heart failure.**

No.	Guideline Statement	Level of Recommendation
5-01	Evaluation for ICD candidacy for primary prevention of SCD in patients with HFrEF must not be made for at least 3 months of maximally tolerated quadruple GDMT as the LVEF improves in significant portion of patients thereby decreasing the need for ICD.	**SR**
5-02	Consider ICD therapy to decrease the risk of SCD and mortality in patients with ischemic/non-ischemic HFrEF; LVEF ≤35%; NYHA II or III symptoms on chronic GDMT and prognosis >1 year survival.	**(a): SR** **(b): R**
Resources severely limited	*Restrict use of ICD therapy to reduce the risk of SCD and total mortality in patients with ischemic/non-ischemic HFrEF; LVEF ≤35%; NYHA II or III symptoms on chronic GDMT, survival >1 year among patients who are at highest risk (e.g. arrhythmogenic cardiomyopathy) and most likely to benefit such as those with NYHA Class II symptoms, severely reduced LVEF and frequent NSVT, and who have low likelihood for reverse remodeling.*	
5-03	Use ICD therapy to decrease the risk of SCD and overall mortality in patients who are at least 40 days post-MI, have an LVEF ≤30%, and have a prognosis of >1 year survival.	**SR**
Resources severely limited	*Optimize GDMT before considering ICD, in patients who are at least 40 days post-MI, have an LVEF ≤30%, and have a prognosis of >1 year survival.*	
5-04	Use a wearable ICD for a limited period or as a bridge to an implanted device in patients with HF who are at high risk of SCD.	**Su**
5-05	Do not use ICD therapy in patients with NYHA class IV and severe symptoms unresponsive to medical therapy, unless they are eligible for CRT, a VAD, or cardiac transplantation.	**DND**
5-06	Use ICD in patients with genetic arrhythmogenic cardiomyopathy and LVEF <45% to decrease the risk of sudden death.	**Su**
5-07	Use CRT to reduce mortality, and HF hospitalization and improve symptoms and QOL in ambulatory patients with LVEF ≤35%; SR; LBBB with QRS ≥150ms; NYHA II-IV symptoms on maximally tolerated GDMT for at least 3 months.	**SR**
Resources severely limited	*Optimize GDMT maximally in patients with LVEF ≤35%; SR; LBBB with QRS ≥150ms; NYHA II-IV symptoms on GDMT, and then consider the least expensive available CRT/LBBB pacing device, whenever appropriate and consider recycling of cardiac implantable devices.*	

Table 5 *(Continued).*

No.	Guideline Statement	Level of Recommendation
5-08	Use CRT to reduce mortality and HF hospitalization, as well as to improve symptoms and QOL in patients with LVEF ≤35%; SR; non-LBBB pattern with QRS ≥150ms; and NYHA II-IV symptoms on maximally tolerated GDMT for at least 3 months.	**R**
5-09	Use CRT to reduce mortality and HF hospitalization, as well as improve symptoms and QOL in patients with high-degree or complete atrioventricular block and LVEF <50%.	**Su**
5-10	Use CRT to reduce mortality and HF hospitalization, as well as improve symptoms and QOL, for patients with LVEF ≤35%, SR, LBBB with a QRS duration of 130-149 ms, and NYHA class II-IV symptoms on maximally tolerated GDMT for at least 3 months.	**Su**
5-11	Use CRT in patients with LVEF ≤35% and have pre-existing RV pacing with symptoms of HF to reduce morbidity.	**R**
5-12	Use CRT to improve symptoms and QoL and reduce mortality and HF hospitalization in patients with AF and LVEF ≤ 35% on GDMT if: a) they need RV pacing of more than 20% or otherwise qualify for CRT, or b) AV nodal ablation or pharmacologic control will enable approximately 100% ventricular pacing with CRT.	**R**
5-13	Use CCM with the Optimizer Smart system to improve symptoms, QOL and exercise tolerance in patients with HF with LVEF 25-45% on GDMT not suitable for CRT.	**R**
5-14	Use baroreflex stimulation with the Barostim Neo System to improve symptoms, QOL and exercise tolerance in patients with HF and LVEF ≤35% on GDMT.	**Su**
5-15	Use phrenic nerve stimulation with the Remedē System to improve symptoms, sleep quality and QOL in adult patients (including those with HF) with central sleep apnea.	**Su**
5-16	Implant durable LVAD in patients with advanced HFrEF with NYHA class IV symptoms who are deemed to be dependent on continuous IV inotropes or temporary MCS or are either already taking or are intolerant to GDMT.	**SR**
5-17	Use long-term MCS in patients with advanced HFrEF who have NYHA class IV symptoms despite GDMT and not eligible for cardiac transplantation.	**R**
5-18	Use temporary MCS, including percutaneous and extracorporeal ventricular assist devices, as a bridge to recovery or a bridge to decision in patients with advanced HFrEF and hemodynamic compromise and shock.	**Su**
5-19	Use long-term MCS in patients with HFrEF refractory to medical and device therapy and waiting for cardiac transplantation, as a bridge to cardiac transplantation to improve symptoms.	**R**

Table 5 *(Continued).*

No.	Guideline Statement	Level of Recommendation
5-20	Use remote system HF monitoring/telemedicine devices to guide HF management.	R
5-21	Use CardioMems in eligible patients on GDMT to reduce the risk of HF hospitalization.	R

Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; DND, do not do; AV, atrioventricular; BAT, baroreflex activation therapy; CCM, cardiac contractility modulation; CRT, cardiac resynchronization therapy; GDMT, guideline-directed medical therapy; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; HCM, hypertrophic cardiomyopathy; ICD, implantable cardioverter-defibrillator; IV, intravenous; LAP, left atrial pressure; LBBB, left bundle branch block; LVAD, left ventricular assist device; LVEF, left ventricular ejection fraction; MCS, mechanical circulatory support; MI, myocardial infarction; NSVT, non-sustained ventricular tachycardia; NYHA, New York Heart Association; QoL, quality of life; SCD, sudden cardiac death; SR, sinus rhythm; VAD, ventricular assist device.

Table 6 Recommendations for the invasive management in patients with heart failure.

No.	Guideline Statement	Level of Recommendation
6-01	Perform surgical revascularization (CABG) plus GDMT in selected patients with HFrEF (LVEF ≤35%) and suitable coronary anatomy; and if they have multivessel disease, to improve symptoms, and reduce hospitalizations, and long-term all-cause mortality.	R
6-02	Optimize GDMT and device (CRT in LBBB patients) before intervention in patients with severe secondary MR and symptomatic HFrEF, to improve MR associated LV dysfunction, as it might decrease the need for intervention.	R
6-03	Perform M-TEER to improve symptoms and reduce HF hospitalization in patients with NYHA class II-IV symptoms, severe (4+) functional MR, suitable anatomy, LVEF of 20-50%, LVESD <70 mm, PASP <70 mmHg, and who are not eligible for surgery and do not require coronary revascularization	SR
Resources somewhat limited	*Instead of M-TEER, consider (a) Carillon device, (b) use rigorous GDMT and/or (c) reassess surgical alternatives.*	(a): R (b): R (c): Su
6-04	Perform M-TEER to improve symptoms and reduce HF hospitalization in patients with NYHA class II-IV symptoms, moderate (3+) functional MR, suitable anatomy and LVEF 20-50% who are not eligible for surgery.	Su
6-05	Perform mitral valve surgery in patients with secondary MR on GDMT, who are already undergoing CABG to improve symptoms.	Su
6-06	Use transcatheter indirect annuloplasty (Carillon device) in patients with moderate or higher functional MR when M-TEER seems not appropriate or feasible to improve symptoms.	Su

Table 6 *(Continued).*

No.	Guideline Statement	Level of Recommendation
6-07	Use medical therapy (diuretics, neurohormonal antagonists) in patients with HF and TR to reduce symptoms and severity.	R
6-08	Perform TEER in selected patients with TR to improve QoL and reduce HF hospitalization.	R
6-09	Perform tricuspid valve surgery in patients with severe TR to reduce symptoms.	Su
6-10	Perform TAVI or SAVR in patients with HF and severe AS to improve functional symptoms and decrease the risk of mortality.	SR
6-11	Use medical therapy (RAAS inhibitors) in patients with HF symptoms and severe AR to improve symptoms.	R
6-12	Perform aortic valve surgery in patients with HF and severe aortic regurgitation regardless of LVEF to reduce mortality and improve symptoms.	SR
6-13	Perform heart transplantation for patients with advanced HF that is unresponsive to medical or device therapy (with no absolute contraindications), to improve survival and QoL.	SR

Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; DND, do not do; AF, atrial fibrillation; AS, aortic stenosis; AR, aortic regurgitation; CABG, coronary artery bypass grafting; GDMT, guideline-directed medical therapy; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; LBBB, left bundle branch block; LVEF, left ventricular ejection fraction; LVESD, left ventricular end-systolic diameter; MR, mitral regurgitation; M-TEER, mitral transcatheter edge-to-edge repair; NYHA, New York Heart Association; PASP, pulmonary artery systolic pressure; QoL, quality of life; RAAS, Renin-angiotensin-aldosterone system; SAVR, surgical aortic valve replacement; TAVI, transcatheter aortic valve implantation; TEER, transcatheter edge-to-edge repair; TR, tricuspid regurgitation.

Table 7 **Recommendations for the special conditions in patients with heart failure.**

No.	Guideline Statement	Level of Recommendation
	Cardiac amyloidosis	
7-01	Use serum and urine immunofixation electrophoresis and serum free light chains in patients with increased pre-test likelihood of cardiac amyloidosis for screening.	SR
7-02	Use bone scintigraphy to confirm TTR amyloidosis in patients with clinical suspicion of amyloidosis without evidence of serum or urine monoclonal light chains.	SR

Table 7 *(Continued).*

No.	Guideline Statement	Level of Recommendation
7-03	Perform genetic testing for TTR gene sequencing, in patients with diagnosis of TTR cardiac amyloidosis, to differentiate hereditary from wild-type amyloidosis.	**SR**
Resources severely limited	*Strain echocardiogram could be used to diagnose cardiac amyloidosis in resource limited countries.*	
7-04	Use TTR tetramer stabilizer therapy (tafamidis [partial stabilizer], and acoramidis [near complete stabilizer]) to improve symptoms, and reduce cardiovascular death and HF hospitalizations in patients with wild or variant type TTR cardiac amyloidosis and NYHA class I to III symptoms.	**SR**
Resources severely limited	*Diflunisal, an alternative TTR stabilizer, is recommended when newer agents are cost prohibitive to relieve symptoms and improve mortality in patients with wild or variant type cardiac amyloidosis and NYHA class I to III HF symptoms.*	
7-05	Use hepatic TTR production inhibitor (vutrisiran) in patients with wild or variant type TTR cardiac amyloidosis and NYHA class I to III symptoms to improve symptoms, and reduce cardiovascular death and HF hospitalizations	**SR**
7-06	Use anticoagulation to prevent stroke in patients with cardiac amyloidosis and AF, regardless of CHA_2DS_2-VA score.	**R**
7-07	Refer to multidisciplinary team and/or referral to neurology due to systemic nature of TTR amyloidosis and need for specific therapies.	**R**
	Hypertrophic cardiomyopathy	
7-08	Use cardiac myosin inhibitors (mavacamten/aficamten) in patients with symptomatic obstructive HCM despite beta-blockers or non-dihydropyridine calcium channel blockers to improve QoL and decrease the need for septal reduction therapies.	**R**
7-09	Perform invasive therapies (septal reduction therapies) in patients with LVOT ≥50 mmHg (at rest or with provocation), and who are moderate to severely symptomatic despite optimal medical therapy to improve symptoms and QoL.	**R**
7-10	Do not use arterial and venous dilators (nitrates and PDE5 inhibitors), and digoxin in patients with HCM and LVOTO.	**DND**
7-11	Implantation of ICD for primary prevention of sudden cardiac death should be guided by family history of sudden death and other high risk factors as included in the specific HCM risk scores.	**R**

Table 7 *(Continued).*

No.	Guideline Statement	Level of Recommendation
7-12	Use anticoagulation to prevent stroke in patients with HCM and AF, regardless of CHA_2DS_2-VA score.	**R**
	Other co-morbidities	
7-13	Request screening for anemia and iron deficiency with complete blood count, serum ferritin concentration and TSAT in all patients with HF.	**SR**
7-14	Use the standard definition of iron deficiency in HF: ferritin <100 µg/L, and if ferritin 100-299 µg/L, then TSAT <20%.	**SR**
7-15	A simplified definition of iron deficiency can be used: TSAT<20%.	**R**
Resources severely limited	*TSAT alone may be used for iron deficiency diagnosis in HF.*	
7-16	Request a formal sleep assessment in patients with HF and suspicion of sleep-disordered breathing, to differentiate between obstructive and central sleep apnea.	**R**
7-17	Use CPAP/bi-PAP/adaptive servo-ventilation in patients with HF and obstructive sleep apnea, to improve symptoms, sleep quality and daytime sleepiness.	**Su**
7-18	Use Remede phrenic nerve stimulator in patients with HFrEF and predominant central sleep apnea, to improve symptoms, sleep quality and daytime sleepiness.	**Su**
7-19	Use GLP-1 RAs based therapies (tirzepatide or semaglutide) in patients with moderate-to-severe OSA and obesity, to reduce apnea-hypopnea index, body weight, and improved sleep-related patient-reported outcomes.	**SR**
7-20	Do not use adaptive servo-ventilation in patients with NYHA class II to IV HFrEF and central sleep apnea due to increased risk of all-cause and CV mortality.	**DND**
Resources severely limited	*Lifestyle interventions such as diet and exercise may be considered instead of semaglutide or tirzepatide among patients with morbid obesity to reduce weight and improve QoL and symptoms.*	
7-21	Use chronic anticoagulation to prevent stroke in patients with HF and permanent-persistent-paroxysmal AF based on CHA_2DS_2-VA score of ≥2, without differences by gender.	**SR**
7-22	Use long-term treatment with an oral anticoagulant in patients with HF and AF with a CHA_2DS_2-VA score of 1, without differences by gender, to decrease the risk of stroke.	**R**

Table 7 *(Continued).*

No.	Guideline Statement	Level of Recommendation
7-23	Use beta-blockers in patients with HFrEF and AF with high ventricular rate (unless congested), to improve symptoms and control ventricular rate.	**R**
7-24	Use digoxin in patients with HF and AF with high ventricular rate despite beta-blockers or if beta-blockers are contraindicated, to improve the symptoms and control ventricular rate.	**Su**
7-25	Use bolus of amiodarone or digoxin in patients with AF with high ventricular rate in NYHA class IV HF, in addition to treatment for AHF, to reduce the ventricular rate.	**Su**
7-26	Perform catheter ablation in patients with HFrEF and symptoms attributable to AF despite medical therapy, to improve symptoms and QoL.	**R**
7-27	Perform AV nodal ablation in patients with HF and LVEF <50%, if rhythm control fails/not desired and ventricular rate remains rapid despite medical therapy, to improve outcomes.	**Su**
7-28	Do not use class IC antiarrhythmic medications and dronedarone in patients with HFrEF and AF due to increased risk of mortality.	**DND**
	Cardio-oncology	
7-29	Use ACEi or ARB or ARNI, SGLT2 inhibitors and beta-blocker in asymptomatic patients with cancer-therapy-related cardiomyopathy with LVEF <50%, with the aim to decrease the risk of HF and improve cardiac function.	**Su**
7-30	Establish pretherapy baseline cardiac function in patients with CV risk factors or known cardiac disease who are being considered for potentially cardiotoxic anticancer therapies, to help in selection of cancer therapy.	**Su**
7-31	Monitor LV function/ global longitudinal strain, LV mass, and cardiac biomarkers (NT-proBNP, troponin, etc.) regularly to allow early detection and management of cardiotoxicity in patients with CV risk factors or known cardiac disease being considered for potentially cardiotoxic anticancer therapies.	**Su**

Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; and DND, do not do; ACEi, angiotensin-converting enzyme inhibitors; AHF, acute heart failure; ARB, angiotensin receptor blocker; ARNI, angiotensin receptor neprilysin inhibitors; AF, atrial fibrillation; AS, aortic stenosis; AV, atrioventricular; biPAP, bilevel positive airway pressure; CPAP, continuous positive airway pressure; CV, cardiovascular; GDMT, guideline-directed medical therapy; GLP-1RA, glucagon-like peptide 1 receptor agonist; HCM, hypertrophic cardiomyopathy; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; ICD, implantable cardioverter defibrillator; LV, left ventricular; LVEF, left ventricular ejection fraction; LVOT, left ventricular outflow tract; LVOTO, left ventricular outflow tract obstruction; MRA, mineralocorticoid receptor antagonist; NYHA, New York Heart Association; NSAIDs, non-steroidal anti-inflammatory drugs; NT-proBNP, N-terminal prohormone of B-type natriuretic peptide; OSA, obstructive sleep apnea, PDE5, phosphodiesterase-5; QoL, quality of life; SGLT2, sodium-glucose cotransporter-2; T2DM, type 2 diabetes mellitus; TSAT, transferrin saturation; TTR, transthyretin.

Table 8 Recommendations for special considerations.

No.	Guideline Statement	Level of Recommendation
	HF and pregnancy	
8-01	Counsel related to contraception and risks of cardiovascular deterioration during pregnancy in women with a history of HF or cardiomyopathy, including previous peripartum cardiomyopathy.	**SR**
8-02	Do not use ACEi, ARB, ARNI, MRA, SGLT2 inhibitors, cardiac myosin inhibitors, ivabradine and vericiguat in women with HF or cardiomyopathy, who are pregnant or currently planning for pregnancy because of unclear safety.	**DND**
8-03	Use LMWH in the 1st and 3rd trimester, and VKA or LMWH for the 2nd trimester in pregnant women with AF and HF.	**R**
8-04	Do not use DOACs in pregnant women with HF and AF, due to unclear safety.	**DND**
8-05	Continue beta-blocker in women with HF or cardiomyopathy who are pregnant or currently planning for pregnancy.	**R**
8-06	Adjust diuretic dosing in women with HF or cardiomyopathy who are pregnant or currently planning for pregnancy, to minimize the risk of placental hypoperfusion.	**R**
	Miscellaneous	
8-07	Use fluid restriction to ~2L/d and daily monitoring of body weight in patients with HF and fluid retention not easily controlled with diuretics, to reduce symptoms related to congestion. Avoid a very low target for fluid restriction of 1.5L/d, particularly when patients frequently complain of thirst.	**R**
8-08	Administer pneumococcal and influenza vaccines in patients with HF to reduce the risk of hospitalization for HF.	**SR**
8-09	Advise exercise training in patients with HF to improve exercise capacity, QoL and reduce the risk of HF hospitalization, if possible.	**SR**
8-10	Recommend multidisciplinary team care (including a cardiologist, HF nurse, dietitians, and community workers) for high-risk patients with HF during discharge to optimize care.	**R**
8-11	Counsel and educate patients with HF about the climate/temperature changes, their effects on CV health and mortality, and strategies to reduce those risks.	**R**

Table 8 *(Continued).*

No.	Guideline Statement	Level of Recommendation
	Goals of care	
8-12	Use palliative and supportive care focusing on effective communication, conveying prognosis, clarifying goals of care, shared decision-making, symptom management, and caregiver support for HF patients to improve QoL and relieve suffering.	**SR**

Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; DND, do not do; ACEi, angiotensin converting enzyme inhibitors; ARB, angiotensin receptor blocker; ARNI, angiotensin receptor neprilysin inhibitors; CV, cardiovascular; CVD, cardiovascular disease; DOACs, direct oral anticoagulants; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; LMWH, low molecular weight heparin; MRA, mineralocorticoid receptor antagonist; QoL, quality of life; SGLT2, sodium-glucose cotransporter-2; VKA, vitamin K antagonist.

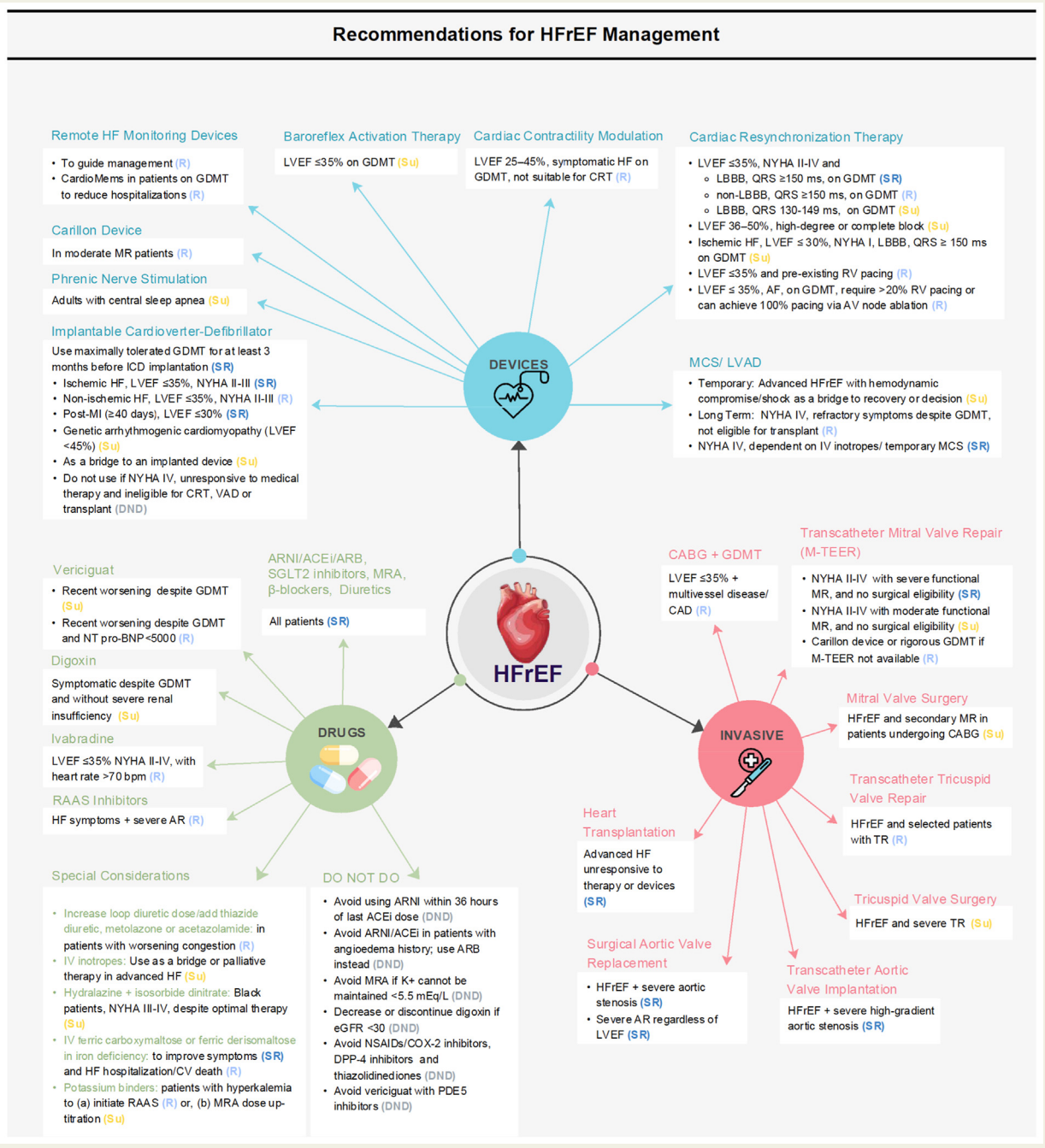

Figure 2 Recommendations for the management of heart failure with reduced ejection fraction.
Note: In patients with LVEF 40%–49%, diagnostic accuracy of test is less certain (due to the variability of LVEF assessments) and the absolute amount of therapeutic benefit of GDMT is somewhat less than in patients with LVEF <40%.
Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; and DND, Do not do. ACEi, angiotensin-converting enzyme inhibitors; AF, atrial fibrillation; ARB, angiotensin receptor blocker; AHF, acute heart failure; AR, aortic regurgitation; AS, aortic stenosis; AV, atrioventricular; ARNI, angiotensin receptor neprilysin inhibitor; CAD, coronary artery disease; CABG, coronary artery bypass grafting; COX-2, cyclo-oxygenase-2; CRT, cardiac resynchronization therapy, DPP-4, dipeptidyl peptidase-4; eGFR, estimated glomerular filtration rate; GDMT, guideline-directed medical therapy; HCM, hypertrophic cardiomyopathy; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; ICD, implantable cardioverter-defibrillator; LBBB, left bundle branch block; LVAD, left ventricular assist device; LVEF, left ventricular ejection fraction; MI, myocardial infarction; MR, mitral regurgitation; MRA, mineralocorticoid receptor antagonist; M-TEER, mitral transcatheter edge-to-edge repair; NSAIDs, non-steroidal anti-inflammatory drugs; NT-proBNP, N-terminal prohormone of B- type natriuretic peptide; NYHA, New York Heart Association; PDE5, phosphodiesterase-5;RAAS, Renin-angiotensin-aldosterone system; RV, right ventricle; SGLT2, sodium-glucose co-transporter 2; TSAT, transferrin saturation; TR, tricuspid regurgitation; VAD, ventricular assist device.

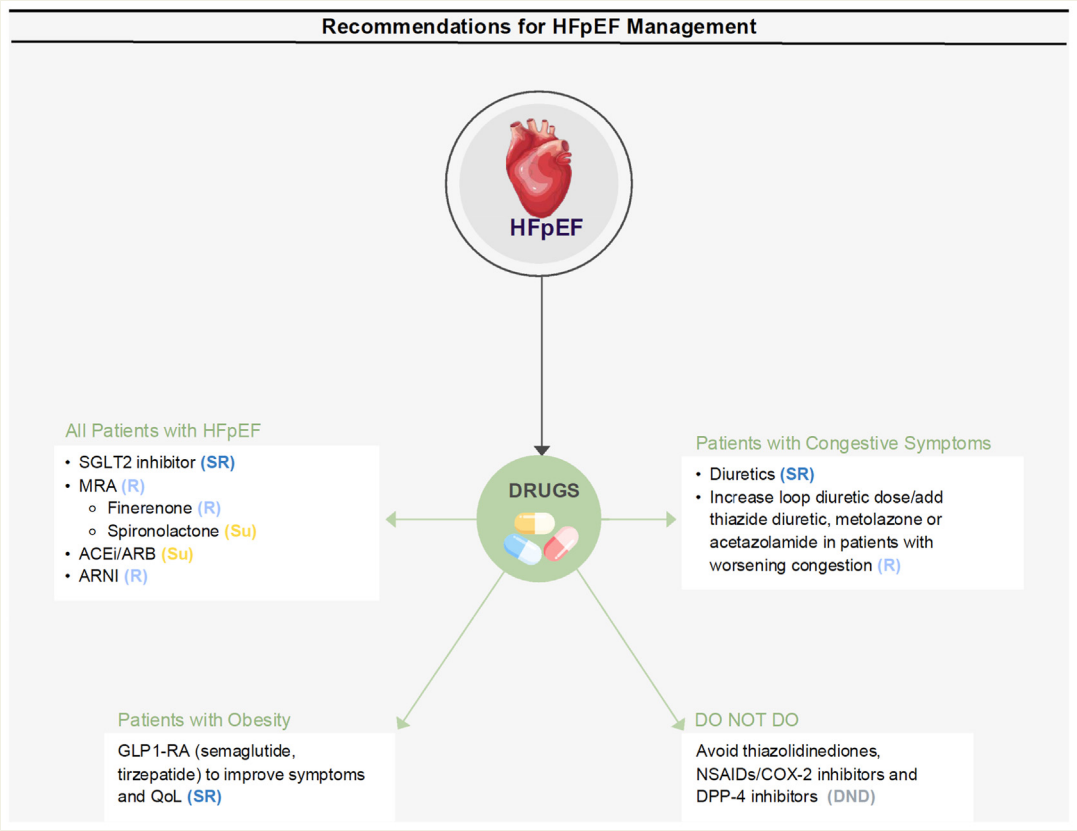

Figure 3 Recommendations for the management of heart failure with preserved ejection fraction.
Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; and DND, Do not do. ACEi, angiotensin-converting enzyme inhibitors; ARB, angiotensin receptor blocker; ARNI, Angiotensin receptor neprilysin inhibitor; COX-2, cyclo-oxygenase-2; DPP-4, dipeptidyl peptidase-4; GDMT, guideline-directed medical therapy; GLP-1RA, glucagon-like peptide 1 receptor agonist; HF, heart failure; HFpEF, heart failure with preserved ejection fraction; NSAIDs, non-steroidal anti-inflammatory drugs; MRA, mineralocorticoid receptor antagonist; SGLT2, sodium-glucose co-transporter 2.

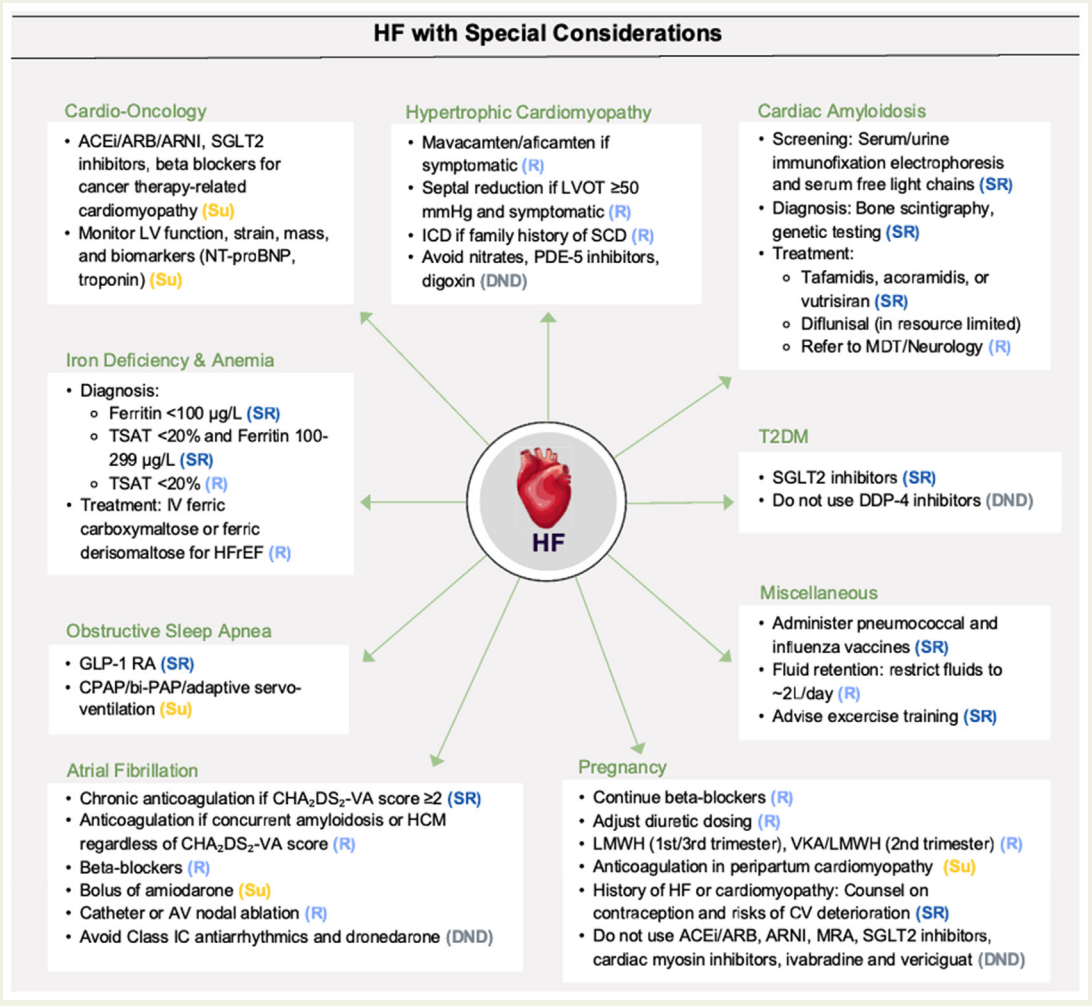

Figure 4 Recommendations for the management of special conditions in patients with heart failure.
Note: In patients with LVEF 40%-49%, diagnostic accuracy of tests is less certain (due to the variability of LVEF assessments) and the absolute amount of therapeutic benefit of GDMT is somewhat less than in patients with LVEF <40%.
Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; and DND, Do not do. ACEi, angiotensin-converting enzyme inhibitors; AF, atrial fibrillation; ARB, angiotensin receptor blocker; ARNI, angiotensin receptor neprilysin inhibitor; bi-PAP, bilevel positive airway pressure; CPAP, continuous positive airway pressure; DPP-4, dipeptidyl peptidase-4; GDMT, guideline-directed medical therapy; GLP-1RA, glucagon-like peptide 1 receptor agonist; HCM, hypertrophic cardiomyopathy; HF, heart failure; HFrEF, heart failure with reduced ejection fraction;, heart failure with mildly reduced ejection fraction; ICD, implantable cardioverter defibrillator; LV, left ventricle; LVOT, left ventricular outflow tract; LVEF, left ventricular ejection fraction; LMWH, low molecular weight heparin; MRA, mineralocorticoid receptor antagonist; NT-proBNP, N-terminal prohormone of B-type natriuretic peptide; PDE5, phosphodiesterase-5; SCD, sudden cardiac death; SGLT2, sodium-glucose co-transporter 2, T2DM, type 2 diabetes mellitus; TSAT, transferrin saturation; VKA, vitamin K antagonist.

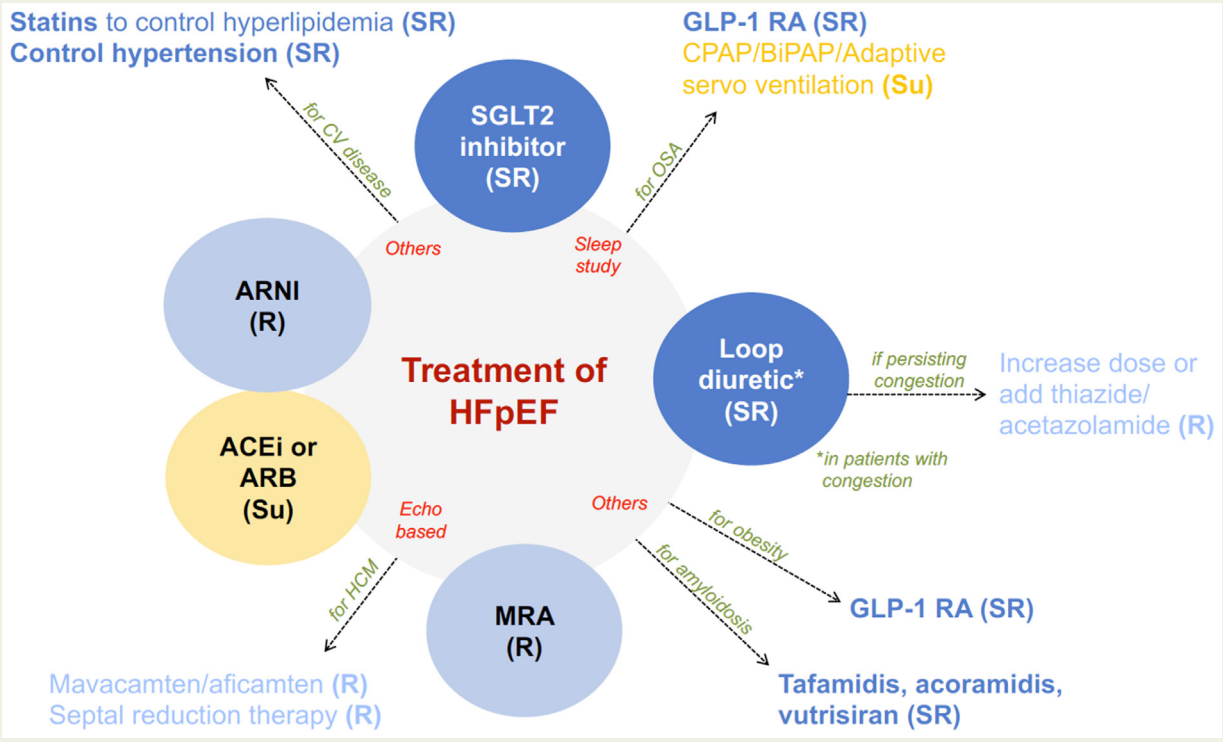

Figure 5 Overview of HFpEF management.

Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; and DND, Do not do. ACEi, angiotensin-converting enzyme inhibitors; ARB, angiotensin receptor blocker; ARNI, angiotensin receptor neprilysin inhibitor; bi-PAP, bilevel positive airway pressure; CV, cardiovascular; CPAP, continuous positive airway pressure; GLP-1RA, glucagon-like peptide 1 receptor agonist; HCM, hypertrophic cardiomyopathy; HFpEF, heart failure with preserved ejection fraction; MRA, mineralocorticoid receptor antagonist; OSA, obstructive sleep apnea; SGLT2, sodium-glucose co-transporter 2.

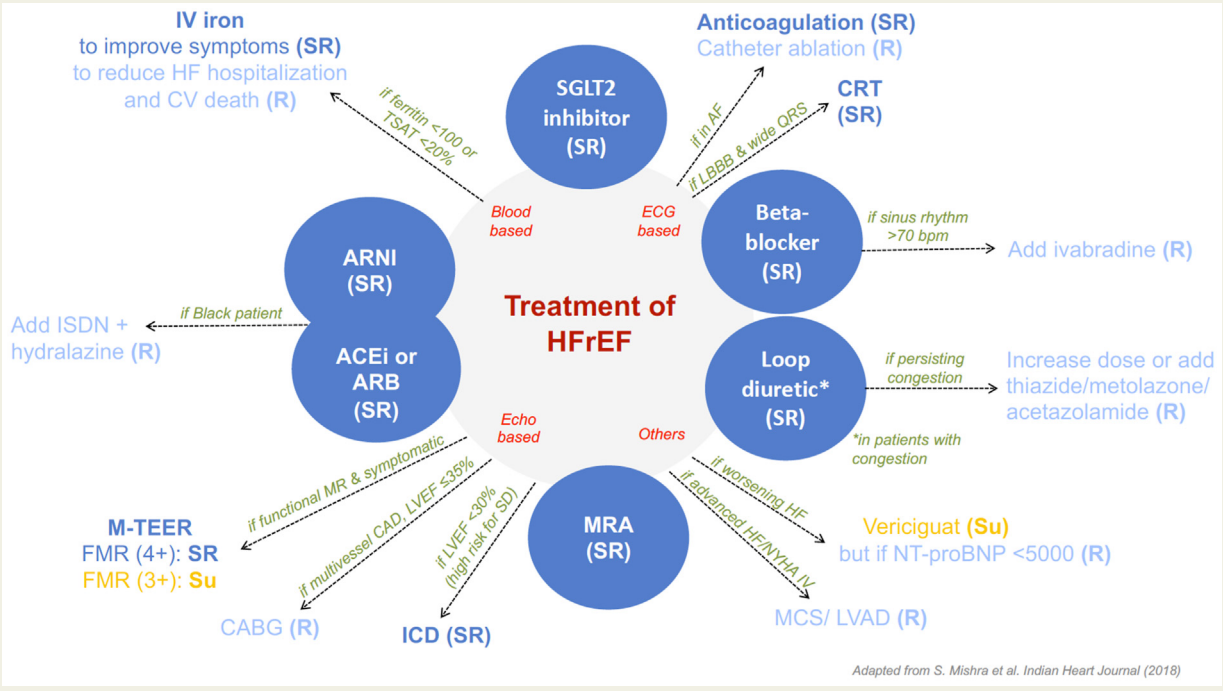

Figure 6 Overview of HFrEF management. Adapted from S. Mishra et al. Indian Heart Journal (2018).

Note: In patients with LVEF 40%-49%, diagnostic accuracy is less certain (due to the variability of LVEF assessments) and the absolute amount of therapeutic benefit of GDMT is somewhat less than in patients with LVEF <40%.

Abbreviations: SR, strongly recommend; R, recommend; Su, suggest; and DND, Do not do. ACEi, angiotensin-converting enzyme inhibitors; AF, atrial fibrillation; ARB, angiotensin receptor blocker; ARNI, angiotensin receptor neprilysin inhibitor; bi-PAP, bilevel positive airway pressure; CPAP, continuous positive airway pressure; CAD, coronary artery disease; CABG, coronary artery bypass grafting; CRT, cardiac resynchronization therapy, GLP-1RA, glucagon-like peptide 1 receptor agonist; HCM, hypertrophic cardiomyopathy; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; ICD, implantable cardioverter- defibrillator; ISDN, isosorbide dinitrate; LBBB, left bundle branch block; LVEF, left ventricular ejection fraction; LVAD, left ventricular assist device; MCS, mechanical circulatory support; MR, mitral regurgitation; MRA, mineralocorticoid receptor antagonist; M-TEER, mitral transcatheter edge-to-edge repair; NT-proBNP, N-terminal prohormone of B-type natriuretic peptide; NYHA, New York Heart Association; OSA, obstructive sleep apnea; SD, sudden death; SGLT2, sodium-glucose co-transporter 2; T2DM, type 2 diabetes mellitus; and TSAT, transferrin saturation.

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Declaration of Competing Interests

Author disclosures are included in the Appendix.

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Appendix

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