Sutter Health

Ambulatory Heart Failure Quick Guide

The Sutter Health Ambulatory Heart Failure Guideline is a comprehensive clinical guide to support best practice heart failure (HF) care throughout Sutter Health. It was created by a Sutter Health ambulatory HF guideline committee that included 40 subject matter experts from across the system (physicians, APCs, pharmacists, nurses, educators, dieticians, and many others) and is approved by the Office of Patient Experience (OPE) Ambulatory Quality Committee. This quick guide is meant to be used in combination with the heart failure full guideline which can be found at the following site: http://mysutter/Resources/SystemDepartments/ope/Pages/Clinical.aspx. It includes a brief summary of the core recommendations about the classification and categories of HF, the specific treatment recommendations for Heart Failure with reduced Ejection Fraction (HFrEF) – that category of heart failure most influenced by guideline-directed therapy – and recommendations about referrals and transitions of care. Please see the full heart failure guideline for much more detailed information about the HF management, abbreviations, citations and references.

I. Classification of Heart Failure

Table 2: Comparison of ACCF/AHA Stages of HF and NYHA Functional Classifications.[4]

Stage of HF[4]	Functional Class of HF[4]*
A At high risk for HF but without structural heart disease or symptoms of HF	None
B Structural heart disease but without signs or symptoms of HF	**I** No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF.
C Structural heart disease with prior or current symptoms of HF	**I** No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF.
	II Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in symptoms of HF.
	III Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes symptoms of HF.
	IV Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest.
D Refractory HF requiring specialized interventions	**IV** Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest.

II. Categories of Heart Failure

Table 1. Definitions of Heart Failure Based on Ejection Fraction

		Categories of HF[4]
EF (%)	**Acronym**	**Name**
EF ≤ 40	HFrEF	Heart Failure with reduced Ejection Fraction
EF 41-49		Heart Failure with borderline Ejection Fraction or Heart Failure with midrange Ejection Fraction
EF ≥ 50	HFpEF	Heart Failure with preserved Ejection Fraction
***EF ≥ 40 if previous < 40**		Heart Failure with recovered Ejection Fraction

III. Monitoring of HFrEF

- Patients should self-monitor status, esp. if they have had previous symptoms of congestion or hospitalization.
  - Home daily weights:[7]
    Tell patient to contact provider or care team if
    ≥ 2-3 lbs. in 2-3 days or
    ≥ 3-5 lbs. in a week
    → Note: *Individualize the exact amount based on patient characteristics and baseline weight*
    → Note: Weigh daily at same time with same or no clothing. Determine baseline ("dry") weight during period that patient is clinically stable.
  - Fatigue and exercise intolerance[7]
  - Respiratory symptom (SOB, orthopnea, # of pillows)
  - Edema[7]

Table 7: Summary of Tests New Diagnosis and Routine Monitoring

Initial Evaluation of New Diagnosis	Routine Monitoring
CBC, UA, Electrolytes, BUN/Cr, Glucose, Ca, Mg, A1C, Lipid panel, LFTs, TSH	Basic Metabolic Panel:* annually** and after medication changes**
BNP or NT-proBNP	BNP or NT-proBNP: individualized
Echo	Echo: 3 months after target GDMT and individualize by patient (if HFrEF consider every 1-3 years)
EKG	
CXR	
Ischemia work-up as indicated	

**May order either individual tests (Na, K, Cr) or BMP (preference varies by provider and affiliate)*
***If on Diuretic, ACE inhibitor or ARB, Aldosterone Antagonist, ARNi and/or digoxin*

IV. Nonpharmacological Treatment of HFrEF

- Initiate regular, ongoing, and repeat discussions about advance care planning[5].
- Refer to Cardiac Rehabilitation if indicated
- Consider limit dietary sodium – such as < 2000 mg/day
- Consider limit fluid intake if needed – such as < 2 liters/day
- CPAP if sleep apnea

V. Medication Recommendations (GDMT) for HFrEF

- Treat HFrEF with Guideline Directed Medical Therapy (GDMT) to prevent admissions and reduce morbidity and mortality.
- Start at low doses and titrate about every 2 weeks to achieve target doses ("start low and go slow").
- Contact the patient frequently during titration.
- Treat to BP target < 130/80.
- Add as many appropriate components of GDMT as possible.
- Start with either ACE/ARB or beta blocker first
  - Initiate ACE inhibitor/ARB first if the patient is congested.
  - Initiate beta blockers first if the patient is not congested, has adequate resting HR and has no evidence of low cardiac output.
- If difficulty achieving GDMT consider:
  - separating the timing of medications
  - optimizing fluid status
  - optimizing other medications before reducing dose of GDMT
  - reducing doses of GDMT if needed before stopping GDMT medications
  - generally maintaining b-blocker at highest dose possible at the expense of other GDMT classes

VI. Guideline Directed Medication Therapy (GDMT) for HFrEF

Beta Blockers

Generic Name (Brand)	Initial Daily Dose	Target Doses
Metoprolol Succinate Extended Release (Toprol XL)	12.5 mg-25mg QD	150 mg QD
Carvedilol (Coreg)	3.12 mg BID	25 mg BID
Carvedilol Extended Release (Coreg CR) *(not commonly used)*	10 mg QD	80 mg QD
Bisoprolol *(not commonly used)*	1.25 mg QD	10 mg QD

- **Indications:** Use beta blocker for all patients with current or prior symptoms of HFrEF to reduce morbidity, mortality and risk of hospitalization. (Class I, LOE A) 4
- Use only approved GDMT beta blockers noted in table.
- Initiate only when patients are euvolemic with HR > 60 and not hypotensive
- Watch for; weight gain, edema, drop in HR, drop in BP and/or wheezing

Renin-Angiotensin System (RAS) Blockers

Angiotensin-Converting Enzyme (ACE) Inhibitors

Generic Name (Brand)	Initial Daily Dose	Target Doses
Single daily dosing (more preferred)		
Lisinopril (Prinivil, Zestril®)	2.5-5 mg QD	20-40 mg QD
Benazapril (Lotensin®)	5 BID or 10 mg QD	20 mg BID or 40 mg QD
Ramipril (Altace®)	1.25 to 5 mg QD	10 mg QD
Fosinopril (Monopril®)	5-10 mg QD	40 mg QD
Multiple daily dosing (less preferred)		
Enalapril (Vasotec®)	2.5 mg BID	10-20 mg BID
Quinapril (Accupril®)	5 mg BID	20 mg BID
Captopril (Capoten®)	6.25 mg TID	50 mg TID

Angiotensin II Receptor Blockers (ARB)

Recommended for use

Name (Brand)	Initial Daily Dose	Target Dose
Losartan (Cozaar®)	25-50 mg QD or divided BID	150 mg QD or divided BID
Valsartan (Diovan®)	40 mg BID	160 mg BID
Candesartan (Atacand®)	4-8 mg QD	32 mg QD

Angiotensin Receptor-Neprilysin Inhibitors (ARNi)

Name (Brand)	Initial Daily Dose	Maximum Total Daily Dose
Sacubiril/valsartan (Enresto®)	49/51 mg BID (therapy may be initiated at 24/26 mg BID)	97/103 mg BID

- **Indications:** Use ACE inhibitors, ARBS or ARNi in all patients with chronic HFrEF to reduce morbidity, mortality and risk of hospitalizations[a9]
  - Use ACE inhibitor over ARB if possible
  - Switch from ACE inhibitor/ARB to ARNi to further reduce mortality and re-hospitalization risk
  - May consider start ARNi in the hospital
- Initiate when not hypotensive or hyperkalemic (OK to start if congested)
- Monitor K, Cr, BP. Watch for angioedema.

Diuretics

Generic Name (Brand)	Initial Daily Dose	Maximum Total Daily Dose
Loop Diuretic		
Furosemide (Lasix®)	20-40 mg QD-BID	600 mg
Bumetanide (Bumex®)	0.5-1.0 mg QD-BID	10 mg
Torsemide (Demadex®)	10-20 mg QD	200 mg
Ethacrynic acid (Edecrin®) *(if severe Sulfa allergy – rarely used)*	50mg QD	400 mg
Thiazide Diuretic		
Metolazone	2.5 mg QD	20 mg
Hydrochlorothiazide	25 mg QD-BID	200 mg
Chlorthalidone	12.5-25 mg QD	100 mg

- **Indications:** Use diuretics in patients with HFrEF who have evidence of fluid retention to improve symptoms. (Class I LOE C) 4
- Loop diuretics are preferred. If the patient has signs of fluid overload, consider start furosemide 20 mg and adjust based on symptoms, weight change and kidney function (individualize based on patient characteristics, baseline dose, and response).
- Consider increase the diuretic by 50-100% for 3 days when the patient has signs or symptoms of increased congestion (see self-monitoring above):
  - → Note: congestion can mimic other conditions such as infection, bronchospasm, and gastroenteritis so maintain low index of suspicion for titration with diuretics
- May need to give K supplementation when taking loop diuretic. Monitor K, Na and Cr closely (check levels 3-7 days after dose change)
- Watch for low K, volume depletion and azotemia.

Aldosterone Receptor Antagonists

Name (Brand)	Initial Daily Dose (only if K+ <5 mEq/L)	Maximum Total Daily Dose (after 4 weeks for K+ <5 mEq/L)
Spironolactone		
eGFR > 50	12.5-25 mg QD	25 mg QD-BID
eGFR: 30-49	12.5 mg QD-QOD	12.5-25 mg QD
Eplerenone		
eGFR > 50	25 mg QD	50 mg QD
eGFR: 30-49	25 mg QOD	25 mg QD

- **Indications:** Use aldosterone receptor antagonists in class II-IV patients with LVEF < 35% (LOE A) [4] or LVEF < 40% (post-MI or Diabetes) (LOE B) [4] reduce morbidity, mortality and risk of hospitalization.
- Only start if Cr < 2.5 (men) or < 2.0 (woman). Avoid if elevated K.
- Monitor K, Cr, and BP

Hydralazine and Isosorbide Dinitrate

Name (Brand)	Initial Daily Dose	Maximum Total Daily Dose
Hydralazine (Apresoline)	25-50 mg total, TID or QD	100 mg TID
Isosorbide dinitrate	20-30mg TID or QD	40 mg TID

- **Indications:** Use hydralazine and isosorbide dinitrate for HFrEF in African-American patients (Class I LOE: A) [4] and in HFrEF patients who cannot tolerate ACE inhibitor or ARB (Class IIa LOE: B) [4] reduce morbidity, mortality and risk of hospitalization.
- Watch for hypotension, headache, dizziness, peripheral neuritis, Lupus-like syndrome

SGLT2 Inhibitors

Name (Brand)	Initial Daily Dose	Maximum Total Daily Dose
Canagliflozin (Invokana®)	100 mg once daily	300 mg once daily
Dapagliflozin (Farxiga®)	5mg daily	10 mg once daily
Empagliflozin (Jardiance®)	10 mg daily	25mg once daily
Ertugliflozin (Steglatro™)	5 mg daily	15 mg daily

- **Indications:** Use SGLT2s in patients with HF (or at risk for HF) with type 2 diabetes[17] to reduce CVD mortality and risk of HF hospitalizations.
- Watch for volume depletion, hypotension, DKA, fungal infections, UTIs, and foot ulcers.

Digoxin

Generic Name (Brand)	Initial Dose	Max Dose
Digoxin*	0.125 mg QOD or QD	Determine by HR or digoxin level

- **Indications:** Digoxin can be beneficial in patients with HFrEF (Class IIa LOE: B) to decrease HF hospitalizations (Class IIa LOE: B) (Note: digoxin does not affect mortality.[4])
- Consider in AF for rate control if want to avoid lowering BP
- Avoid if AV block. Check level if signs of toxicity, confusion and/or depression

Ivabradine

Name (Brand)	Initial Daily Dose	Maximum Total Daily Dose
Ivabradine (Corlanor)	2.5 - 5mg BID	7.5mg BID

- **Indications:** Ivabradine can be beneficial to reduce risk of hospitalization for patients with symptomatic HFrEF on a beta blocker with a pulse > 70 at rest. (Class IIa LOE: B-R) [9]
- Watch for hypertension, symptomatic bradycardia, reversible visual effects, AF

VII. Device Therapy for HFrEF

Implantable Cardioverter Defibrillator (ICD)

Treat HFrEF with Guideline Directed Medical Therapy (GDMT) to prevent admissions and reduce morbidity and mortality.

- AHA Indication: to reduce sudden cardiac death in the following patients:(Class I LoE: A) [4]
  - EF ≤ 35%, NYHA Class II-III
  - EF ≤ 30%, NYHA Class I, ischemic etiology
  - EF ≤ 40%, non-sustained ventricular tachycardia (NSVT), ischemic cardiomyopathy, inducible at electrophysiology studies (EPS)
  - Previous sudden cardiac death (SCD)

Cardiac resynchronization therapy (CRT)

- AHA Indication: to improve symptoms, improve survival, and reduce sudden cardiac death in the following patients:(Class I LoE: A)
  - EF <35%, Class II, LBBB and QRS >120 (Class IIa LoE: B) [4]
  - EF <35%, Class II, non-LBBB and QRS >150 (Class IIb LoE: B) [4]
  - EF <30%, Class I, ischemic cardiomyopathy, LBBB, QRS >150 (Class IIb LoE: C) [4]

VIII. Referral to a Heart Failure Specialist

Refer to a HF specialist (such as a HF clinic) when patients have one or more of the following characteristics (**I Need Help**)[8].

I Need Help:

I IV Inotropes: Need for chronic IV inotropes [8, 5]

N NYCA Class: Persistent NYCA class III–IV symptoms, profound fatigue, or six-minute walk distance < 300 m 8, 5 or increasing Natriuretic peptides (BNP or NT-proBNP).[5]

E Ejection Fraction: EF ≤ 35% despite GDMT for ≥ 3 months for consideration of device therapy[8]

E End Organ Dysfunction: Worsening renal or hepatic function,[5, 8] persistent high K, low Na, cachexia, and/or worsening right HF with secondary pulmonary hypertension.[5]

D Defibrillator shocks: Onset of AF or ventricular arrhythmias, or repetitive ICD shocks[8]

H Hospitalization: Two or more emergency department visits or hospitalizations for worsening HF in prior 12 months[8, 5] High mortality risk risk using risk model [5, 8]

E Edema: Clinical deterioration – Worsening Edema, exercise testing, or hemodynamics and/or evidence of progressive remodeling on imaging [8]

L Low Systolic BP: SBP ≤ 90 mm Hg or symptomatic hypotension or high pulse [8]

P Progressive Intolerance of GDMT: or need to down-titrate of GDMT such as inability to tolerate optimally dosed beta blockers, ACE inhibitor/ARB/ARNi and/or aldosterone antagonists [8, 5]

IX. Referral to Palliative Care Services

Proactively refer HF patients to palliative services (such as palliative care, AIM or hospice) when patients have progressive HF symptoms despite optimized, comprehensive guideline-directed therapy.

- Provide the patient information about clinical trajectory to help the patient make timely decisions
- Determine referral based on needs and symptoms (not based on estimate of remaining life expectancy) [5,4]
- Streamline, optimize and facilitate referral process (key to achieving goals)
- Offer shared-decision making for complex decisions that weigh benefit vs burden of treatment[8]
- Consider deactivate ICD and stop other therapies (such as dialysis)
- Make decision about resuscitation plans and desired location of death

X. Transitions of Care Recommendations

Before Discharge:

- Volume status, BP, and renal function are stable or on a trajectory of clinical improvement and comorbid conditions are managed[4, 15]
- Underlying cause of HF addressed and clinically stable or on a trajectory of clinical improvement [4, 15]
- Minimal symptoms on patient ambulation walk test
- Medication Reconciliation
- Evaluated by discharge coordinator to ensure needs, barriers to care and limitations in support are being addressed.
- Educated about HF, self-care, and emergency care using the teach back method and using health literate education materials [4, 15]

At Discharge:

- Comprehensive care plan created to optimize GDMT after discharge.
- Discharge summary with easily-available information (including volume status, response to diuretics in the hospital, BP, renal status, most recent echo results and exit BNP) provided to follow-up clinicians
- Follow-up orders given to home health and discharge care teams.
- Consider risk predictor tool to help determine plan of care
- Prescriptions reviewed with patient and filled at or before discharge.
- Follow-up appointments booked before discharge.

After Discharge:

- Post-discharge care management program provided
- Follow-up with cardiologists within 1 week (or earlier depending on risk) and/or with primary care physician within 1 week.[15]
- Referral to cardiac rehab done if eligible.
- Assist with appointment needs such as transportation
- Track discharge from home health so other support services can be provided as needed once complete.
- Address psychosocial, behavioral, and socioeconomic issue