Heart Failure

PURPOSE

The purpose of the Heart Failure pathway is to provide EBM-based guidelines in the care and/or disposition of patients with heart failure related diagnoses in the ED or CDU.

CDU INCLUSION CRITERIA

- Acceptable vital signs (SBP >100mm Hg, P <110, RR <24)
- No evidence of impending respiratory failure (e.g. Requiring bipap, acute altered mental status)
- O2 saturation >90% on RA/baseline home O2 after initial ED therapy
- Plan of care established and feasible within 24 hours

CDU EXCLUSION/ INPATIENT INCLUSION CRITERIA

- Unstable vital signs
- Requiring IV infusions being actively titrated (e.g. nitroglycerin)
- Associated clinical/ECG/biomarkers suggestive of ACS
- Requiring NIPPV, intubation
- Plan of care not feasible within 24 hours
- Suggested other **[Ref 1]**

INTERVENTIONS AS INDICATED

- Oxygen, cardiac and pulse oximetry monitoring
- Serial exams, vital signs, intake/output, non-estimated actual weight documented
- ECGs, laboratory and imaging studies (e.g. TnT levels x 2) **[Ref 2a,b]**
- Echocardiogram **[Ref 2c]**
- Medications (e.g. IV diuretics-typically IV BID dosing, ACE-I/ARB, antiplatelet therapy, B-blocker) **[Ref 3a,b]**
- Consultations (e.g. Cardiology)
- Smoking cessation counseling
- Patient education and discharge planning
- Case manager evaluation for home care
- Caring healing practices

Heart Failure

ED/CDU DISPOSITION

Home

- Acceptable vital signs and laboratory studies
- Clinical improvement
- Pulse oximetry > 94% on RA/baseline home O2 requirement
- No evidence for ACS
- Adequate follow-up plan established

Hospital

- Worsening condition or positive findings requiring hospitalization
- New dysrhythmias or evidence for ACS
- Pulse oximetry < 94% on RA/baseline home O2 requirement
- No significant improvement in clinical status or inadequate response to therapy (e.g. Requiring inotropic therapy, inadequate diuresis, persistent dyspnea)
- Physician discretion

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Ref 1

Hollenberg SM. 2019 ACC Expert Consensus Decision Pathway on Risk Assessment, Management, and Clinical Trajectory of Patients Hospitalized With Heart Failure. J Am Coll Cardiol 2019;74:1966–2011.

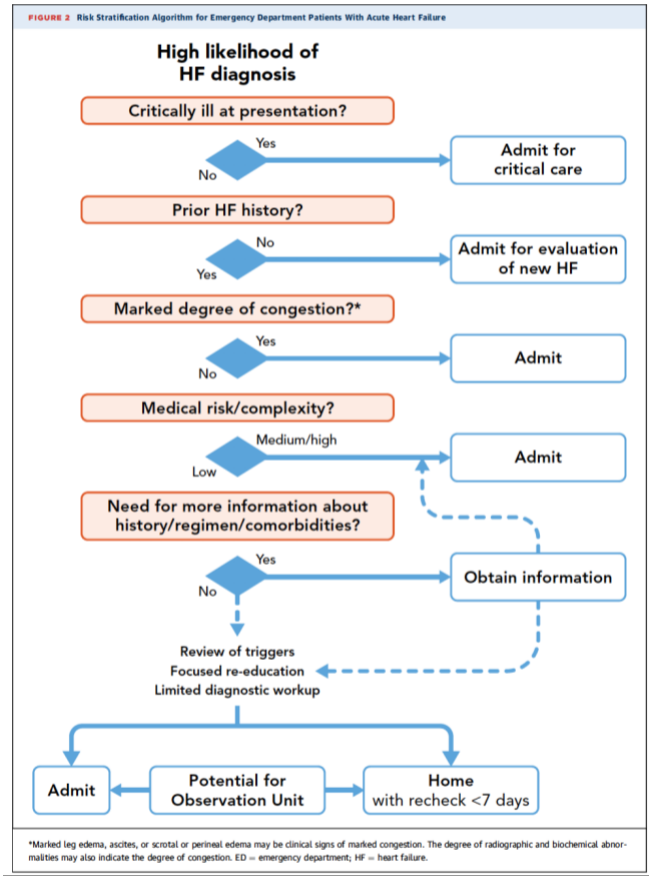
Not Good CDU Candidates

a) ***Critically ill-*** in addition to above: 'Cold and Wet' profile: Congestion + hypoperfusion (narrow pulse pressure, cool extremities, oliguria) >> *Admit* as will likely need inotrope e.g. milrinone

b) ***New onset HF*** + low EF on POCUS or s/s of ACS >> *Admit*

c) ***Marked degree of congestion:***
e.g. extensive pitting edema, ascites, anasarca or large pleural effusions >>*Admit* (reflect large #extravascular fluid that may take many days to mobilize)

d) **Medium/high Medical risk/complexity** e.g. concurrent anemia requiring transfusion, A-fib w/RVR, worsening renal dysfunction, sepsis, baseline low BP (likely need inotrope too)



Ref 2

Specific CDU Interventions

a) ID exacerbation precipitating factor: medication/diet non-compliance, not on guideline-directed medical therapy (GDMT), other (e.g. smoking, drug/etoh use), Table 2.

b) Coordinate with Cardiology to **ensure patient on GDMT**

c) Echocardiogram: order if last echo > 6 mos ago to assess for EF, new valvular disease; Limited echo if want to evaluate EF mainly.

**Stress Tests contraindicated in pts with acute Heart Failure!

TABLE 2 Common Factors That Can Contribute to Worsening Heart Failure

Acute myocardial ischemia
Uncontrolled hypertension
Atrial fibrillation and other arrhythmias
Nonadherence with medication regimen, sodium, or fluid restriction
Medications with negative inotropic effect
Medications that increase sodium retention (NSAIDs, thiazolidinediones, steroids)
Excessive alcohol intake or illicit drug use
Anemia
Hyper or hypothyroidism
Acute infections (upper respiratory infection, pneumonia, urinary tract infections)
Additional acute cardiovascular diagnoses (aortic valve disease, endocarditis, myopericarditis)

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Ref 3.

2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines *Circulation Vol 145, Issue 18, 3 May 2022; Pages e895-e1032*
https://www.ahajournals.org/doi/epub/10.1161/CIR.0000000000001063

Classes of Heart Failure based on LVEF

Type of HF According to LVEF	Criteria
HFrEF (HF with reduced EF)	LVEF ≤40%
HFimpEF (HF with improved EF)	Previous LVEF ≤40% and a follow-up measurement of LVEF >40%
HFmrEF (HF with mildly reduced EF)	LVEF 41%–49% Evidence of spontaneous or provokable increased LV filling pressures (eg, elevated natriuretic peptide, noninvasive and invasive hemodynamic measurement)
HFpEF (HF with preserved EF)	LVEF ≥50% Evidence of spontaneous or provokable increased LV filling pressures (eg, elevated natriuretic peptide, noninvasive and invasive hemodynamic measurement)

3a. Goal-Directed Medical Therapy (GDMT)

GDMT for HFrEF

HFrEF
LVEF ≤40%
(Stage C)

ARNi in NYHA II–III; ACEi or ARB in NYHA II–IV (1)

Beta blocker (1)

MRA (1)

SGLT2i (1)

Diuretics as needed (1)

1. **ACE inhibitor, ARB or ARNI = angiotensin receptor/neprilysin inhibitor**
   - Entresto [sacubitril/valsartan]: should not be administered with ACEi, within 36 hours of the last dose of an ACE inhibitor or with a h/o any angioedema
2. **Beta-Blocker**
   - Only Coreg (Carvedilol or Carvedilol CR), Ziabeta (bisoprolol) or Toprol XL/CR (metoprolol succinate) proven to reduce mortality
3. **MRA = mineralocorticoid receptor antagonist**
   - Spironolactone (K+ sparing, can't use in renal pts Cre >2.5, K+ >5)
4. **SGLT2 Inhibitor (sodium–glucose co-transporter 2)**
   - Jardiance (Empagliflozin)
   - Farxiga (Dapagliflozin)
5. **Diuretics**
   - Loop diuretics: Lasix (furosemide), Bumex (bumetanide), Demedex (torsemide)

Recommendations for Hydralazine and Isosorbide Dinitrate

COR	LOE	Recommendations
1	A	1. For patients self-identified as African American with NYHA class III-IV HFrEF who are receiving optimal medical therapy, the combination of hydralazine and isosorbide dinitrate is recommended to improve symptoms and reduce morbidity and mortality.[1,2]

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GDMT for HFmrEF
(HF moderately reduced HF)

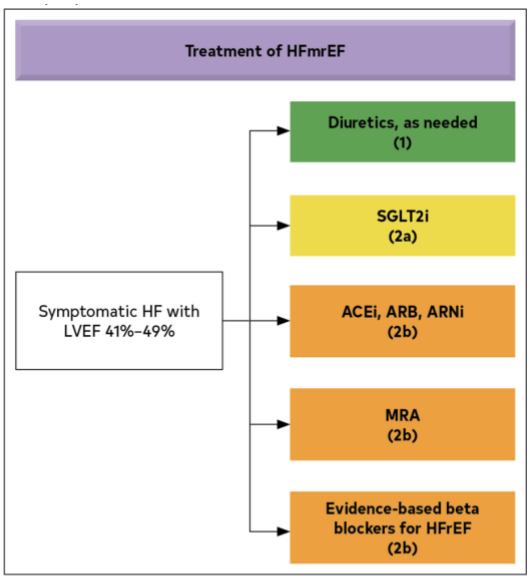

Figure 11. Recommendations for Patients With Mildly Reduced LVEF (41%–49%). Colors correspond to COR in Table 2. Medication recommendations for HFmrEF are displayed. ACEi indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; ARNi, angiotensin receptor-neprilysin inhibitor; HFmrEF, heart failure with mildly reduced ejection fraction; HFrEF, heart failure with reduced ejection fraction; LVEF, left ventricular ejection fraction; MRA, mineralocorticoid receptor antagonist; and SGLT2i, sodium-glucose cotransporter 2 inhibitor.

GDMT for HFpEF

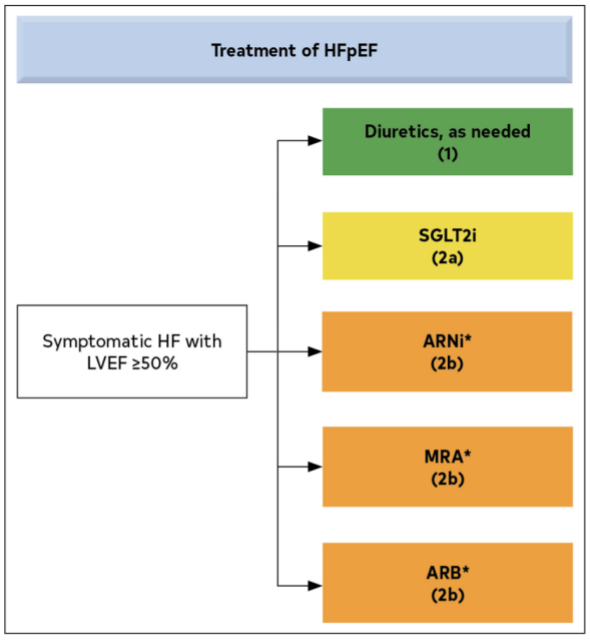

Figure 12. Recommendations for Patients With Preserved LVEF (≥50%). Colors correspond to COR in Table 2. Medication recommendations for HFpEF are displayed. ARB indicates angiotensin receptor blocker; ARNi, angiotensin receptor-neprilysin inhibitor; HF, heart failure; HFpEF, heart failure with preserved ejection fraction; LVEF, left ventricular ejection fraction; MRA, mineralocorticoid receptor antagonist; and SGLT2i, sodium-glucose cotransporter-2 inhibitor. *Greater benefit in patients with LVEF closer to 50%.

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3b. Recommendations for Drugs of Unproven Value or That May Worsen HF:
CCB, Class 1C antiarrhythmics and dronedarone, thiazolidinediones (e.g. Actos), dipeptidyl peptidase 4 (DPP-4) inhibitors (e.g. Januvia) and NSAIDS

COR	LOE	Recommendations
3: No Benefit	A	1. In patients with HFrEF, dihydropyridine calcium channel-blocking drugs are not recommended treatment for HF.[1,2]
3: No Benefit	B-R	2. In patients with HFrEF, vitamins, nutritional supplements, and hormonal therapy are not recommended other than to correct specific deficiencies.[3–9]
3: Harm	A	3. In patients with HFrEF, nondihydropyridine calcium channel-blocking drugs are not recommended.[10–13]
3: Harm	A	4. In patients with HFrEF, class IC antiarrhythmic medications and dronedarone may increase the risk of mortality.[14–16]
3: Harm	A	5. In patients with HFrEF, thiazolidinediones increase the risk of worsening HF symptoms and hospitalizations.[17–21]
3: Harm	B-R	6. In patients with type 2 diabetes and high cardiovascular risk, the dipeptidyl peptidase-4 (DPP-4) inhibitors saxagliptin and alogliptin increase the risk of HF hospitalization and should be avoided in patients with HF.[22–24]
3: Harm	B-NR	7. In patients with HFrEF, NSAIDs worsen HF symptoms and should be avoided or withdrawn whenever possible.[25–28]