HEART FAILURE

2021 UPDATE

The Canadian Cardiovascular Society

IS IT HEART FAILURE AND WHAT SHOULD I DO?

HEART FAILURE

Canadian Cardiovascular Society
Leadership. Knowledge. Community.

About this Pocket Guide

This pocket guide is a quick-reference tool that features diagnostic and management recommendations based on the CCS Heart Failure Comprehensive Guidelines (2017) and the CCS/CHFS Heart Failure Guidelines updates (2020 and 2021).

These recommendations are intended to provide a reasonable and practical approach to the care of patients with HF. The intended audience is primary care physicians, specialists, nurses and allied health professionals. Recommendations are subject to change as scientific knowledge and technology advance and practice patterns evolve, and are not intended to be a substitute for clinical judgment. Adherence to these recommendations will not necessarily produce successful outcomes in every case.

Please visit www.ccs.ca for more information or additional resources.

Acknowledgements

The CCS would like to thank the many Heart Failure Guideline Panel members who have contributed countless hours to guideline development as well as our knowledge translation program. We appreciate their dedication and commitment to the CCS and to this important heart failure management resource. A complete list of guideline authors can be found at www.ccs.ca and our Heart Failure Program co-chairs are listed below:

CCS Heart Failure Guideline Co-Chairs

Peter Liu (2006), J. Malcolm O. Arnold (2006-2008), Jonathan G. Howlett (2007-2010), Robert S. McKelvie (2009-2012), Gordon W. Moe (2011-2014), Justin A. Ezekowitz (2013-2017), Eileen O'Meara (2015-2020), Michael McDonald (2017-), Sean Virani (2019 -)

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Standard Assessment

When to Suspect Heart Failure?

Risk Factors	Symptoms	Signs	Key Electrocardiographic Findings	Chest X-ray (CXR)
• Hypertension • Ischemic heart disease (IHD) • Valvular heart disease • Diabetes mellitus • Heavy alcohol or substance use • Chemotherapy or radiation therapy • Family history of cardiomyopathy • Smoking • Hyperlipidemia	• Breathlessness • Fatigue • Leg swelling • Confusion* • Orthopnea • Paroxysmal nocturnal dyspnea *especially in the elderly	• Lung crackles • Elevated Jugular Venous Pressure (JVP) • Positive Abdominal jugular reflux (AJR) • Peripheral edema • Displaced apex • 3rd heart sound, 4th heart sound (S_3, S_4) • Heart murmur • Low blood pressure (BP) • Heart rate > 100 BPM	• Q Waves • Left Ventricular Hypertrophy (LVH) • Left Bundle Branch Block (LBBB) • Tachycardia • Atrial Fibrillation	• Cardiomegaly • Pulmonary venous redistribution • Pulmonary edema • Pleural effusion

If Heart Failure Diagnosis Remains in Doubt

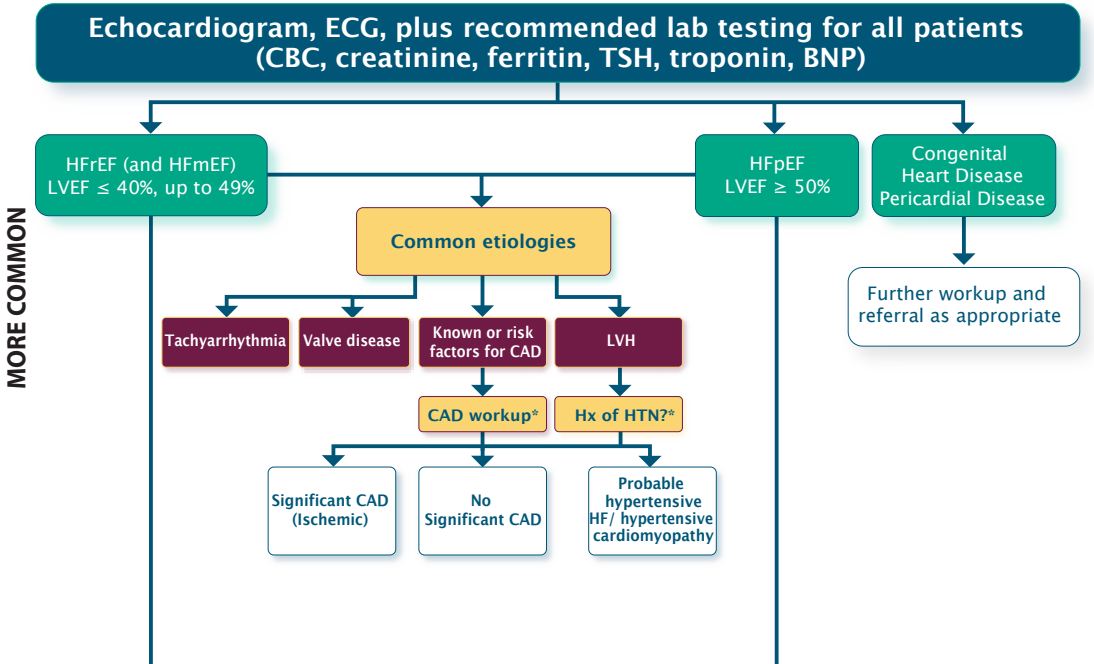
B-type Natriuretic Peptide (BNP) or NT-proBNP, if available

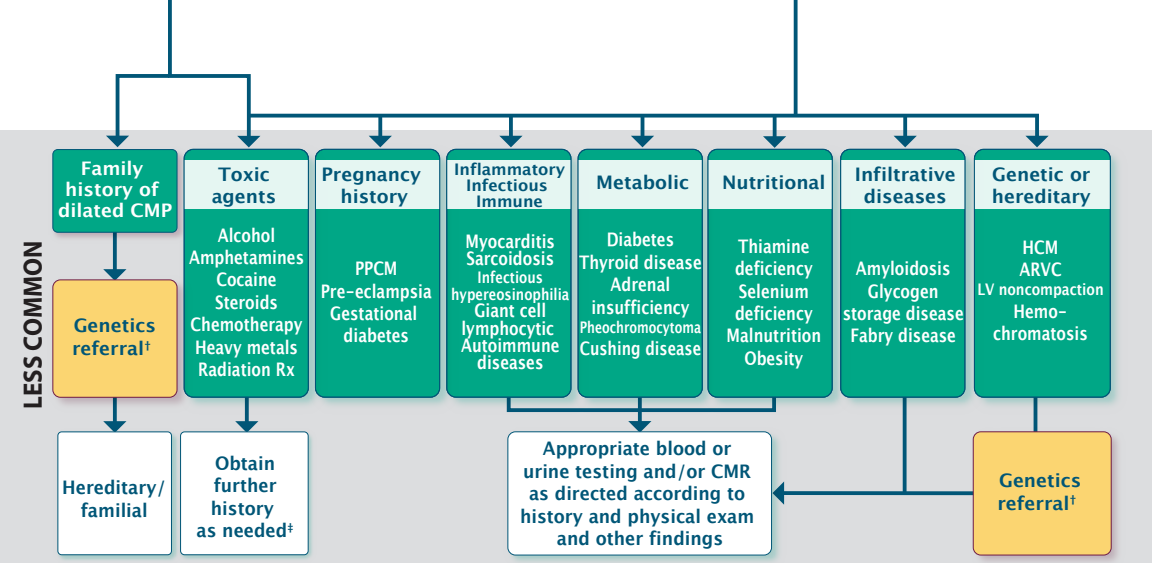
- **BNP***
  - < 100 pg/ml - HF unlikely
  - = 100-400 pg/ml - HF possible but other diagnoses need to be considered
  - > 400 pg/ml - HF likely
- **NT-proBNP***
  - < 300 pg/ml - HF unlikely
  - = 300-900 pg/ml - HF possible, but other diagnoses need to be considered (age 50-75)
  - = 300-1800 pg/ml - HF possible, but other diagnoses need to be considered (age > 75)
  - > 900 pg/ml - HF likely (age 50-75)
  - > 1800 pg/ml - HF likely (age > 75)

Values correspond to decompensated heart failure and do not apply for diagnosis of stable heart failure.

Echocardiogram (ECHO)

- Decreased left ventricular (LV) ejection fraction (EF)
- Increased LV end-systolic and end-diastolic diameter
- LVH
- Wall motion abnormalities and diastolic dysfunction
- Increased right ventricular (RV) size and/or RV dysfunction
- Valve dysfunction
- Elevated pulmonary arterial pressures (PAP)


Echocardiogram, ECG, plus recommended lab testing for all patients (CBC, creatinine, ferritin, TSH, troponin, BNP)
MORE COMMON
HFrEF (and HFmEF) LVEF ≤ 40%, up to 49%
HFpEF LVEF ≥ 50%
Congenital Heart Disease Pericardial Disease
Common etiologies
Tachyarrhythmia
Valve disease
Known or risk factors for CAD
LVH
CAD workup*
Hx of HTN?*
Significant CAD (Ischemic)
No Significant CAD
Probable hypertensive HF/ hypertensive cardiomyopathy
Further workup and referral as appropriate



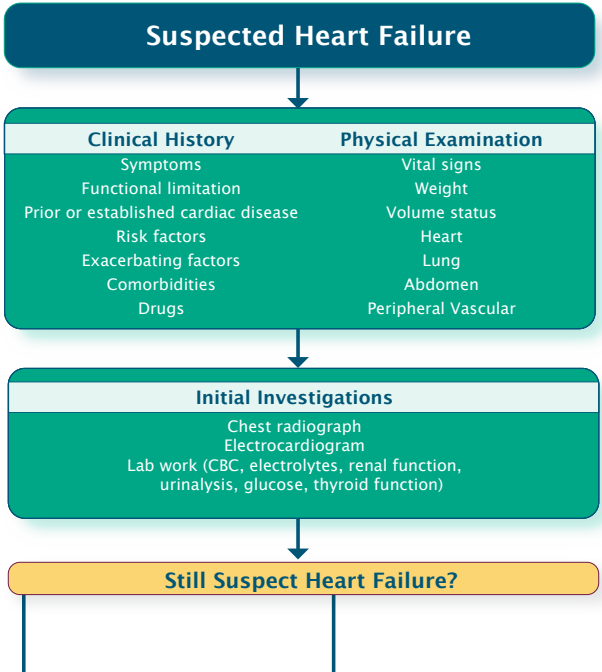
* Patients may have mixed etiology of HF

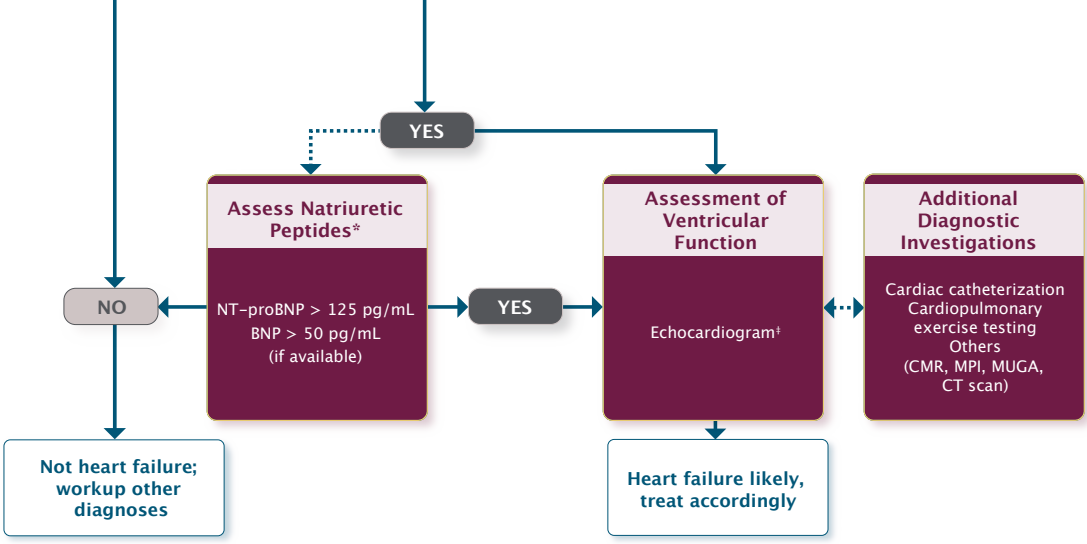
† A detailed medical and family history may guide investigations and should be completed in all patients (see recommendation 19)

‡ Direct testing based on pre-test probability, availability and expertise.

ARVC, arrhythmogenic right ventricular cardiomyopathy; CAD, coronary artery disease; CBC, complete blood count; CMP, cardiomyopathy; CMR, cardiac magnetic resonance; ECG, electrocardiogram; HCM, hypertrophic cardiomyopathy; HFmEF, HF with a mid-range ejection fraction; HFpEF, HF with preserved ejection fraction; HFrEF, HF with a reduced ejection fraction; HTN, hypertension; LV, left ventricle; LVEF, left ventricular ejection fraction; LVH, left ventricular hypertrophy; NP, natriuretic peptide; PPCM, peripartum cardiomyopathy; TSH, thyroid stimulating hormone.

Algorithm for the Diagnosis of Heart Failure (HF) in the Ambulatory Setting





* Natriuretic peptides are not available in all jurisdictions in Canada

‡ Includes both systolic and diastolic parameters (eg, numeric left ventricular ejection fraction, transmitral and pulmonary venous flow patterns, or mitral annulus velocities); a preserved ejection fraction on a routine echocardiogram does not rule out the clinical syndrome of heart failure and therefore clinical judgment is required if other indicators point to heart failure as a diagnosis.

A lower BNP cutoff for suspecting HF in the ambulatory setting facilitates earlier implementation of guideline directed care.

BNP, B-type natriuretic peptide; CBC, complete blood count; CMR, cardiac magnetic resonance; CT, computed tomography; MIBI, myocardial perfusion scan; MUGA,multigated acquisition scan; NT-proBNP, N-terminal propeptide B-type natriuretic peptide.

Educating Patients, Caregivers and Families about Heart Failure (HF)

Warning Signs and Symptoms	Lifestyle and Risk Factor Management	Drug and Device Treatment Regimen
• Dyspnea - With less exertion - During sleep - When lying flat • Fatigue with progressively less exertion • Dyspnea at rest • Increased abdominal swelling or pedal and leg edema • Weight gain (eg. > 2kg in 2 days) • Lightheaded/faint • Prolonged palpitations • Chest pain that does not go away with rest or with medicine or is worsening • Confusion	• Treat cardiovascular risk factors - Control hypertension - Control Diabetes Mellitus (DM) - Smoking cessation - Obesity counselling - Annual influenza vaccine and periodic pneumococcal pneumonia immunizations • Sodium restriction between 2g-3g/day is reasonable • Weigh daily if fluid retention	• Medical therapy that improves survival and reduces hospitalization such as ARNI, ACEi, ARB, Beta-blocker, MRA, SGLT2i, *If* inhibitors at guideline directed doses should be emphasized as targets • Combination drug regimen are the standard of care • Diuretics may need frequent adjustment/ re-adjustment • Target the lowest effective does of diuretic to achieve and maintain euvolemia • Most will be used long term and generally life long • Common side effects are manageable by adjusting medication timing and may require periodic laboratory testing • Consider device therapy with with persistently reduced LVEF and/or wide QRS (e.g. ICD, CRT) after guideline directed medical therapy has been optimized

Evidence-based Pharmacotherapies and Oral Doses as Shown in Large Clinical Trials

Drug Class	Specific Agent	Start Dose	Target Dose
ARNI	Sacubitril-valsartan	50-100 mg BID (dose rounded)	200 mg BID (dose rounded)
ACE inhibitor	Enalapril Lisinopril Perindopril Ramipri Trandalopril	1.25-2.5 mg BID 2.5-5 mg daily 2-4 mg daily 1.25-2.5 mg BID 1-2 mg daily	10 mg BID/20 mg BID in NYHA IV 20-35 mg daily 4-8 mg daily 5 mg BID 4 mg daily
ARB	Candesartan Valsartan	4-8 mg daily 40 mg BID	32 mg daily 160 mg BID
Beta-blocker	Carvedilol Bisoprolol Metoprolol (CR/XL)	3.125 mg BID 1.25 mg daily 12.2-25 mg daily	25 mg BID/50 mg BID (>85 kg) 10 mg daily 200 mg daily
MRA	Spironolactone Eplerenone	12.5 mg daily 25 mg daily	25-50 mg daily 50 mg daily
SGLT2 inhibitor	Dapagliflozin Empagliflozin Canagliflozin	10 mg daily 10 mg daily 100 mg daily	10 mg daily 10-25 mg daily 100-300 mg daily
Sinus node inhibitor (If inhibitors)	Ivabradine	2.5-5 mg BID	7.5 mg BID
sGC stimulator	Vericiguat	2.5 mg daily	10 mg daily
Vasodilator	Hydralazine/ Isosorbide dinitrate	10-37.5 mg TID/ 10-20 mg TID	75-100 mg TID or QID/ 40 mg TID
Cardiac glycosides	Digoxin	0.0625-0.125mg daily	N/A: monitor for toxicity

Initial Referral and Follow-up Frequency

INITIAL REFERRAL
Situational wait time benchmarks

ROUTINE, ELECTIVE REFFERAL

- Chronic HF disease management, NYHA II
- NYHA I – no symptoms

See within 12 weeks, ideally within 6

SEMIURGENT, INTERMEDIATE RISK

- New diagnosis of HF, stable, compensated
- NYHA II/III
- Worsening HF with therapy
- Mild symptoms with valvular or renal disease or hypotension

See within 6 weeks, ideally within 4

URGENT

- New diagnosis of HF, not improving with therapy (unstable decompensated)
- Progression to NYHA IV HF
- Posthospitalization or ER visit for HF
- Severe HF with valvular or renal disease or hypotension
- Postmyocardial infarction HF

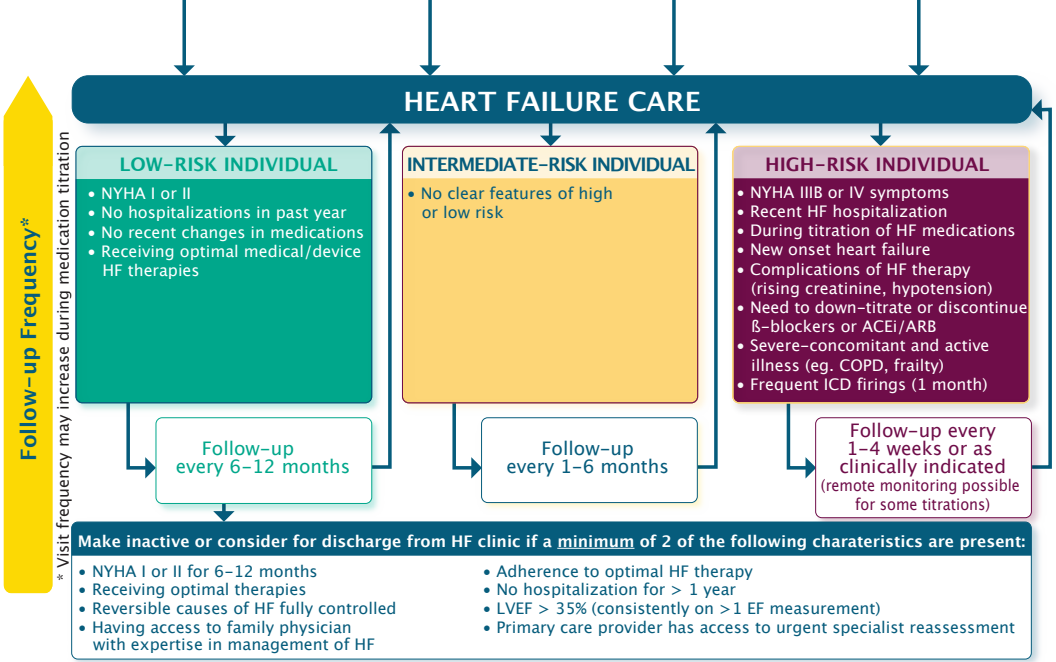
See within 2 weeks

EMERGENT

- Acute severe myocarditis
- Rapidly progressive heart failure/ cardiogenic shock
- Heart failure with ACS
- Transplant and device evaluation of unstable patient
- New-onset acute pulmonary edema

See within 24 hours

Initial Referral Urgency



ACEi/ARB, angiotensin-converting enzyme inhibitor/angiotensin receptor blocker; ACS, acute coronary syndrome; AHA/ACC, American Heart Association/American College of Cardiology; COPD, chronic obstructive pulmonary disease; D/C, hospital discharge; ER, Emergency Department; FC, functional class; hrs, hours; ICD, implantable cardioverter defibrillator; MI, myocardial infarction; NYHA, New York Heart Association.

HFrEF: LVEF ≤ 40% and Symptoms

Treat Comorbidities per CCS HF Recommendations (incl. AF, functional MR, iron def. CKD, DM)

Diuretics to Relieve Congestion (titrated to minimum effective dose to maintain euvolemia)

Initiate Standard Therapies

- **ARNI** or **ACEi/ARB** then substitute **ARNI**
- **Beta blocker**
- **MRA**
- **SGLT2 Inhibitor**

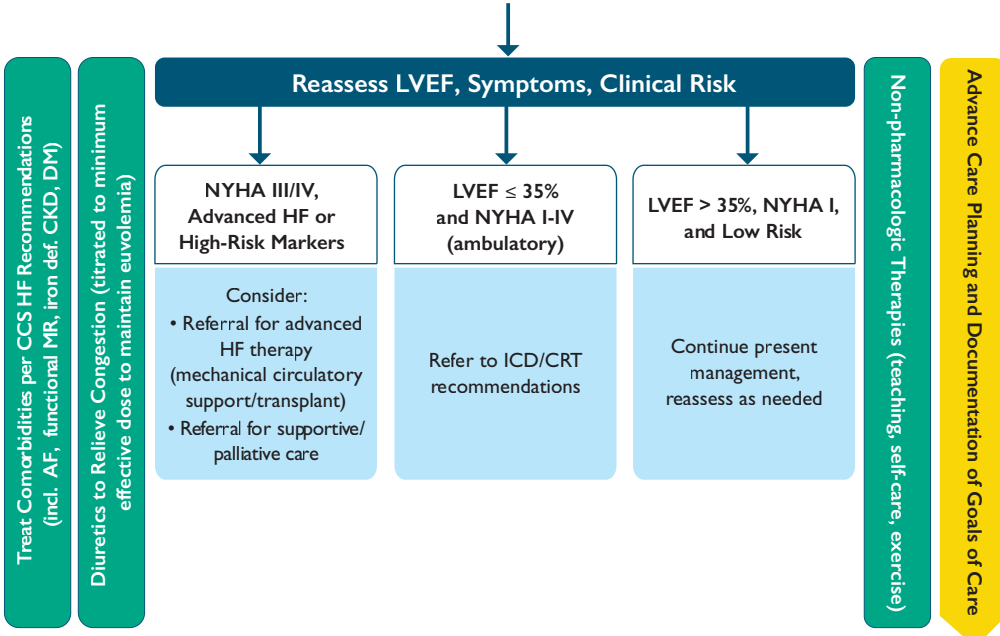
Assess Clinical Criteria for Individualized Therapies

- **HR >70 bpm and sinus rhythm**
  - Consider ivabradine*
- **Recent HF hospitalization**
  - Consider vericiguat**
- **Black patients on optimal GDMT, or patients unable to tolerate ARNI/ACEi/ARB**
  - Consider H-ISDN
- **Suboptimal rate control for AF, or persistent symptoms despite optimized GDMT**
  - Consider digoxin

Initiate standard therapies as soon as possible and titrate every 2-4 weeks to target or maximally tolerated dose over 3-6 months

Non-pharmacologic Therapies (teaching, self-care, exercise)

Advance Care Planning and Documentation of Goals of Care



* Health Canada has approved ivabradine for patients with HFrEF and heart rate (HR) 77 bpm in sinus rhythm.
** Vericiguat is not yet approved for use in Canada.

Drug	Clinical Factors for Consideration			Notes
	Main indication*	Heart Rate and Blood Pressure	Renal Function	
Ivabradine	• Sinus rhythm • HR ≥ 70 bpm despite beta blocker optimization	• Minimal effect on BP • Contraindicated in patients with bradycardia	• Use in patients with severe renal dysfunction not well studied • No safety data for patient on dialysis or eGFR <15mL/min/1.73m^2	• Subgroup with HR ≥ 77bpm most likely to benefit • Can be initiated in hospital prior to discharge once clinical stability has been achieved • Potential side effects incl. visual disturbances (phosphenes) and bradycardia
Vericiguat	• Worsening HF symptoms and heart failure hospitalization in prior 6 months	• Avoid in patients with SBP < 100 mmHg or symptomatic hypotension • Minimal effect on HR	• eGFR cutoff in the landmark VICTORIA trial was 15mL/min/1.73 m^2 • No safety data for patient on dialysis or eGFR <15mL/min/1.73m^2	• Should not be combined with nitrate therapy • Patients with very high NT-proBNP levels (>8000pg/mL) unlikely to benefit • Potential side effects incl. symptomatic hypotension, anemia

Hydralazine/ Isosorbide Dinitrate	• Intolerance to ARNI or ACEi/ARB due to worsening renal function or hyperkalemia • Additional therapy for black patients with high symptom burden, despite optimized GDMT	• Avoid in patients with symptomatic hypotension • Minimal effect on HR	• No contraindication based on renal function	• Use of hydralazine or nitrate therapy alone has not been shown to improve HF outcomes • Potential side effects incl. symptomatic hypotension, lupus-like syndrome with hydralazine
Digoxin	• High symptom burden despite optimization of other GDMT • Atrial fibrillation with poor rate control despite beta blocker optimization	• Minimal effect on BP • Avoid in the setting of AV nodal disease	• Generally contraindicated in patients with severe renal impairment	• Narrow therapeutic index • Potential side effects related to toxicity incl. nausea, emesis, AV block, ventricular arrhythmias

* Additional therapies should be considered for patient with HFrEF and persistent NYHA II-IV symptoms, despite optimization of ARNI/ACEi/ARB, beta blocker, MRA and SGLT2 inhibitor.

Approach for Converting a Patient from an ACEi/ARB to ARNI

ACEi	ARB	Initial Dose Sacubitril/Valsartan*	Titration
Higher dose of RAAS inhibitor		100 mg PO BID	Over 3-6 weeks, increase to target 200 mg PO BID
• Enalapril ≥ 10mg/d • Lisinopril ≥ 10mg/d • Perindopril ≥ 4mg/d • Ramipril ≥ 5 mg/d	• Candesartan ≥ 16 mg/d • Irbesartan ≥ 150 mg/d • Losartan ≥ 50 mg/d • Olmesartan ≥ 10 mg/d • Telmisartan ≥ 40 mg/d • Valsartan ≥ 160 mg/d		
Lower dose of RAAS inhibitor		50 – 100 mg PO BID	Over 6 weeks, increase to target 200 mg PO BID
Higher risk of hypotension (eg. low baseline SBP, poor renal function)		50 – 100 mg PO BID	

***Health Canada labelled dose of 50 mg BID is 24 mg sacubitril/26 mg valsartan, 100 mg BID is 49 mg sacubitril/51 mg valsartan and 200 mg is 97 mg sacubitril/103 mg valsartan.**

CONVERTING TO ARNI:

- **FROM ACEi:** Stop ACEi, **wait at least 36 h** after last dose (↑ risk of angioedema), then start ARNI
- **FROM ARB:** Stop ARB, no washout period necessary, start when next dose would have been due

Recommendations and Practical Tips for Heart Failure with Preserved Ejection Fraction (HFpEF)

- Minimum effective diuretic dose to maintain euvolemia
- Identification and treatment of underlying factors such as ischemia and valvular disease
- Treat hypertension according to current hypertension guidelines
- Usually loop diuretics are needed, renal function may be very volume dependant
- In most cases, an indication for ACEi, ARB and/or BB is present
- Patients with atrial fibrillation should be anticoagulated unless there is a contraindication
- Individuals with HFpEF, serum potassium < 5.0 mmol/L and eGFR >30mL/min, an MRA like spironolactone should be considered

Shortness of Breath and LVEF > 50%

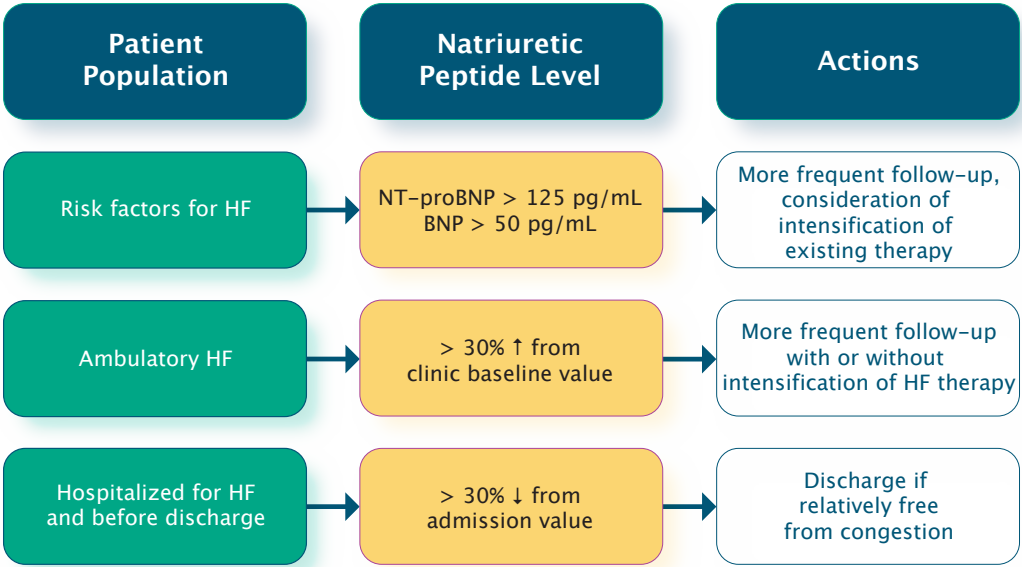
Cardiac causes

- Heart Failure with preserved ejection fraction (HFpEF)
- Other Cardiac Entities
  - Coronary artery disease
  - Valvular heart disease
  - Hypertrophic cardiomyopathy
  - Restrictive cardiomyopathy
  - Constrictive pericarditis
  - Intracardiac shunt

Non-cardiac causes

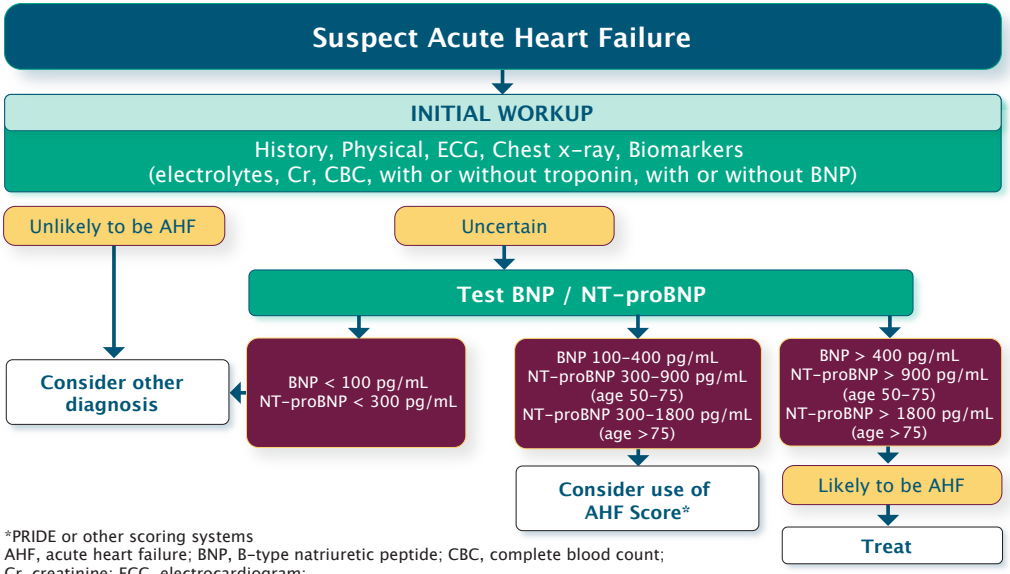
- Lung disease
- Hyperventilation
- Pulmonary arterial hypertension
- Extracardiac shunt
- Obesity
- Anemia
- Thyrotoxicosis
- Deconditioning

Algorithm for Management of Different Stages of Heart Failure (HF) Using Natriuretic Peptides

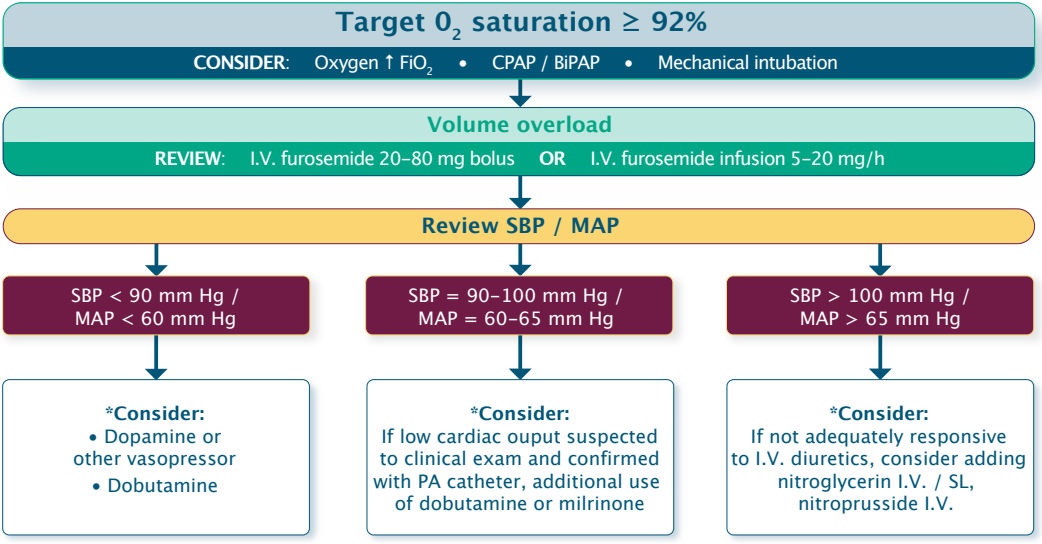


BNP, B-type natriuretic peptide; HF, heart failure; NTproBNP, amino-terminal fragment propeptide B-type natriuretic peptide.

Acute Heart Failure (AHF) Decision Support Tools - Diagnosis



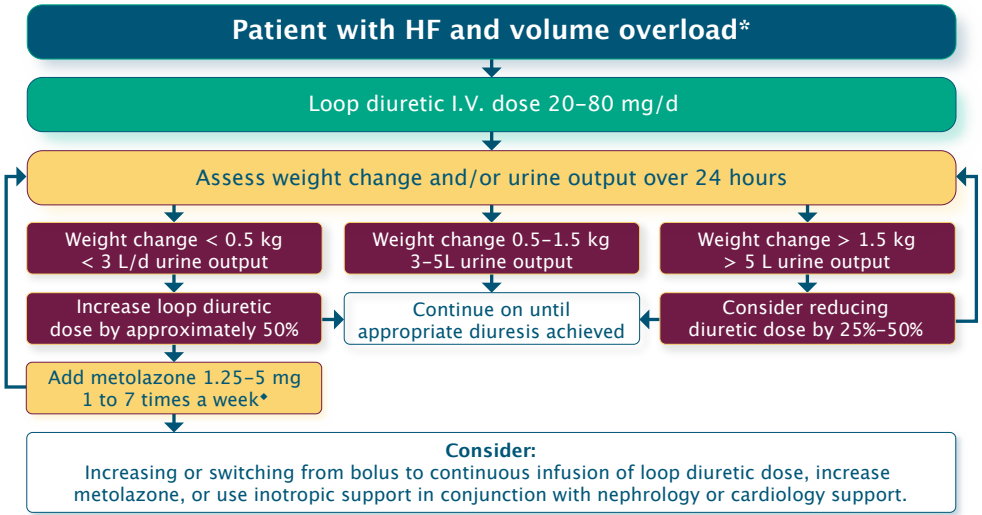
*PRIDE or other scoring systems
AHF, acute heart failure; BNP, B-type natriuretic peptide; CBC, complete blood count;
Cr, creatinine; ECG, electrocardiogram;
NTproBNP, amino-terminal fragment propeptide B-type natriuretic peptide.



* See table 27 for dosing (CCS 2017 Heart Failure Guidelines)

BiPAP, bilevel positive airway pressure; BP, blood pressure; CPAP, continuous positive airway pressure; I.V., intravenous; MAP, mean arterial pressure; PA, pulmonary artery; PCWP, pulmonary capillary wedge pressure; SBP, systolic blood pressure.

Acute Heart Failure (AHF) Decision Support Tools - Diuretic Dosing



* **Assumes:** 1) Volume assessment with each step
2) Monitoring of electrolytes, renal function, symptoms and vital signs
3) Daily weights
4) Urine output not often accurate or obtainable

◆ Titrate progressively, according to the degree of hypervolemia, furosemide doses and creatinine/kidney function

Therapeutic Goals for Patients with AHF

- Understanding the etiology of patient's cardiomyopathy and precipitating factors for decompensation
- Alleviate presenting symptoms
- Optimize all indicated evidence-based treatment interventions
- Provide patient education
- Establish a transition of care plan and outpatient follow-up
- Establish euvolemia

When Response to Diuretic is Suboptimal

- Reevaluate the need for additional diuresis by frequent assessment of volume status
- Restrict sodium and fluid (Na+/H2O) intake
- Review diuretic dosing. Higher bolus doses will be more effective than more frequent lower doses. Diuretic infusions (eg, furosemide 20-40 mg bolus then 5-20 mg/h) can be a useful strategy when other options are not available
- Add another type of diuretic with different site of action (thiazides, spironolactone). Thiazide diuretics (eg oral metolazone 1.25-5 mg 1-7 times a week or hydrochlorothiazide 25-50 mg) can be used with caution
- Consider hemodynamic assessment and/or positive inotropic agents if clinical evidence of poor perfusion coexists with diuretic resistance
- Refer for hemodialysis, ultrafiltration, or other renal replacement strategies if diuresis is impeded by renal insufficiency

Acute Heart Failure (AHF) Decision Support Tools - Admit or Discharge from the Emergency Department

Variable	Consider for Hospital Admission	Consider for Discharge Home with Close Follow-up
Current clinical status	NYHA III / IV	NYHA II
Amount of improvement	Minimal or modest	Significant
0_2 saturation on room air	≤ 91%	≥ 92%
Systolic blood pressure	< 90 - 100 mmHg	> 100 mmHg or similar to prior
Heart rate	> 90 bpm	< 90 bpm
Respiratory rate	> 20 breaths/minute	≤ 20 breaths/minute
ECG findings	Active ischemia; ventricular arrhythmia; atrial arrhythmia not under control	Baseline
Renal function	Worsening	Stable
Comorbidity	Other comorbid condition requiring admission; syncope; pneumonia	Comorbidities under control
Other	New diagnosis of HF	Established etiology and precipitant
Follow-up	Uncertain	Established / Organized

Acute Heart Failure (AHF) Decision Support Tools - Admit or Discharge (continued)

Criteria for Discharge

- Presenting symptoms resolved
- Vital signs resolved and stable for > 24 hrs, especially blood pressure & heart rate
- Returned to "dry" weight and stable for > 24 hours on oral diuretics
- Inter-current cardiac illness adequately diagnosed and treated
- Inter-current non-cardiac illness adequately diagnosed and treated
- Chronic oral HF therapy initiated, titrated and optimized (or outpatient plan for same)
- Education initiated, understood by patient and caregivers, continued education planned
- Discharge plan includes clear requirements for follow-up labs, office appointments and further testing
- Timely communication to primary care provider and/or specialist physician and/or multi-disciplinary disease management program is essential

Acute Heart Failure (AHF) - Daily Follow-up

Question/Query	How To Assess	
Have the patients symptoms improved?	• Dyspnea • Overall well-being	• Other symptoms improved (fatigue, orthopnea, paroxysmal nocturnal dyspnea, etc.)
What are the clinical findings compared with baseline?	• Blood pressure • Respiratory rate • Oxygen saturation • Weight and net fluid balance	• Heart rate • Physical examination findings (*especially JVP, S_3, rales, lower extremity edema)*
What are the pertinent laboratory findings?	• Creatinine • Potassium • BNP or NT-proBNP	• Hemoglobin • Blood urea nitrogen • Sodium

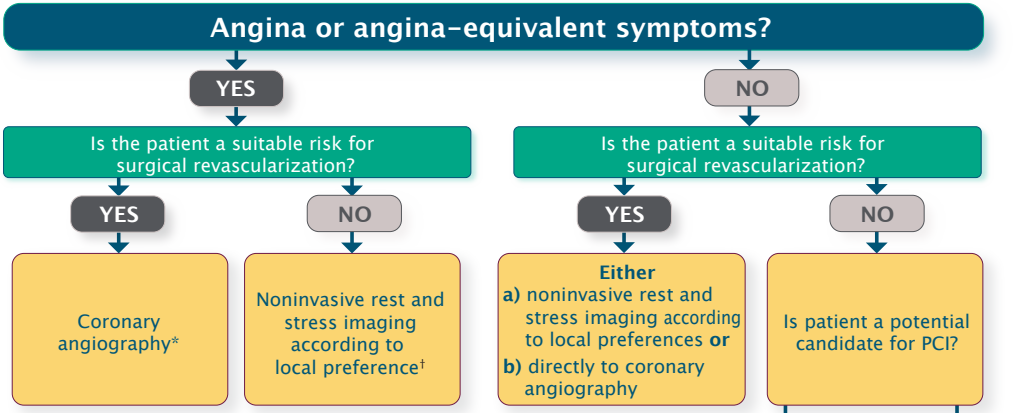
JVP, Jugular venous pressure: S_3 third heart sound.

Approach to Exercise Modalities According to Clinical Scenario

Exercises	Discharged with Heart Failure	NYHA I-III	NYHA IV
Flexibility Exercises	Recommended	Recommended	Recommended
Aerobic Exercises	Recommended	Recommended	Recommended
Suggested modality	• Selected population only • Supervision by an expert team needed (see text)	• Walk • Treadmill • Ergocycle • Swimming	• Selected population only • Supervision by an expert team needed (see text)
Intensity		**Continuous training:** Moderate intensity: • RPE scale 3-5, or • 65%-85% HRmax, or • 50%-75% peak VO2 Moderate intensity aerobic interval might be incorporated in selected patients • Intervals of 15-30 minutes with an RPE scale of 3-5 • Rest intervals of 15-30 minutes	
Frequency		• Starting with 2-3 days per week • Goal: 5 days per week	
Duration		• Starting with 10-15 minutes • Goal: 30 minutes	
Isometric / Resistance Exercises		Recommended	
Intensity		• 10-20 repetitions of 5 to 10-pound free weights	
Frequency		• 2-3 days per week	

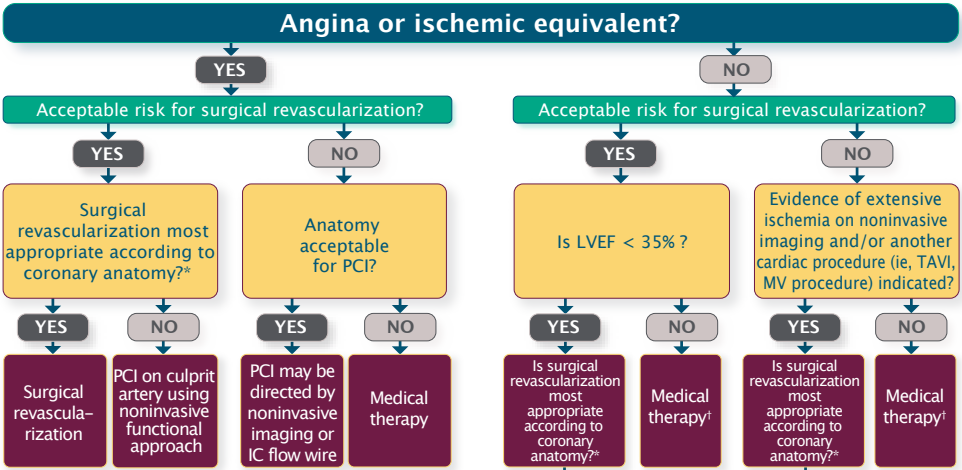
HRmax, maximal heart rate; NYHA, New York Heart Association; RPE, rating perceived exertion; VO2, peak oxygen uptake.

Approach to Assessment for CAD in Patients with Heart Failure (HF)



* Some centres might additionally perform noninvasive imaging, especially when coronary anatomy is not optimal.
† If imaging indicates features of high risk, progression to coronary angiography is expected.
‡ Noninvasive imaging might be performed in certain centres for risk stratification or diagnosis.
CAD, coronary artery disease; PCI, percutaneous coronary intervention.

Decision Regarding Coronary Revascularization in Heart Failure (HF)

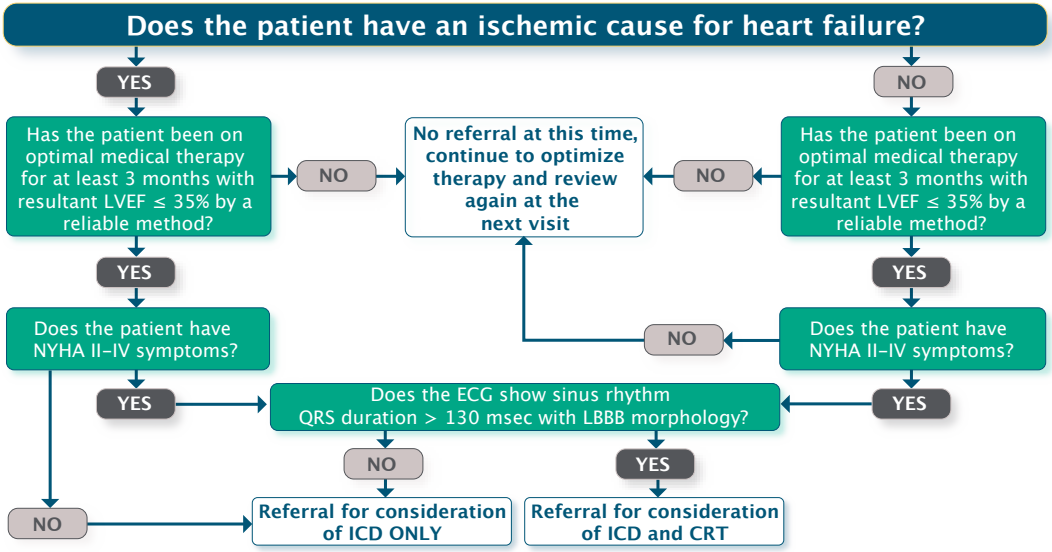


* Coronary anatomy suitable for CABG includes
Multivessel disease > 70% stenosis
Left main stem stenosis >50%
Or diabetes with left anterior descending artery stenosis >70%

† In selected cases in which there is non-invasive imaging evidence of extensive cardia ischemia, PCI might be considered.

IC, intracoronary; LVEF, left ventricular ejection fraction; MV, mitral valve; PCI, percutaneous coronary intervention; TAVI, transcatheter aortic valve implantation.

Referral Pathway for Device Therapy in Patients with Heart Failure (HF)



*ICDs should generally not be considered in patients with NYHA IV symptoms and poor one-year survival, unless concomitant CRT is planned (where CRT would be expected to improve symptoms), or in patients who are being considered for advanced therapies such as cardiac transplantation

CRT, cardiac resynchronization therapy; ECG, electrocardiogram; ICD, implantable cardioverter-defibrillator; LBBB, left bundle branch block; LVEF, left ventricular ejection fraction; NYHA, New York Heart Association.

Classifying Advanced Heart Failure

To be considered for advanced HF management strategies (cardiac transplantation, MCS, palliative care, etc.) patients with advance HF must, despite optimal treatment, continue to exhibit progressive/persistent NYHA III or IV HF symptoms and accompanied by more than one of the following:

- LVEF < 25% and, if measured, peak exercise oxygen consumption < 14 mL/kg/min (or < 50% predicted)
- Evidence of progressive end organ dysfunction due to reduced perfusion and not to inadequate ventricular filling pressures
- Recurrent HF hospitalizations (≥ 2 in 12 months) not due to a clearly reversible cause
- Need to progressively reduce or eliminate evidence based HF therapies such as ACEis, MRAs, or B-blockers, because of circulatory-renal limitations such as renal insufficiency or symptomatic hypotension.
- Diuretic refractoriness associated with worsening renal function
- Requirement for inotropic support for symptomatic relief or to maintain end organ function
- Worsening right HF (RHF) and secondary pulmonary hypertension
- Six-minute walk distance < 300 m
- Increased 1-year mortality (eg, > 20%-25%) predicted by HF risk scores
- Progressive renal or hepatic end organ dysfunction
- Persistent hyponatremia (serum sodium < 134 mmol/L)
- Cardiac cachexia
- Inability to perform activities of daily living

Note: most patients will have a number of the listed criteria and there is no single criterion that determines candidacy for cardiac transplantation, MCS, or palliative care. Patient preferences should be incorporated into the decision process when assessing further choices.

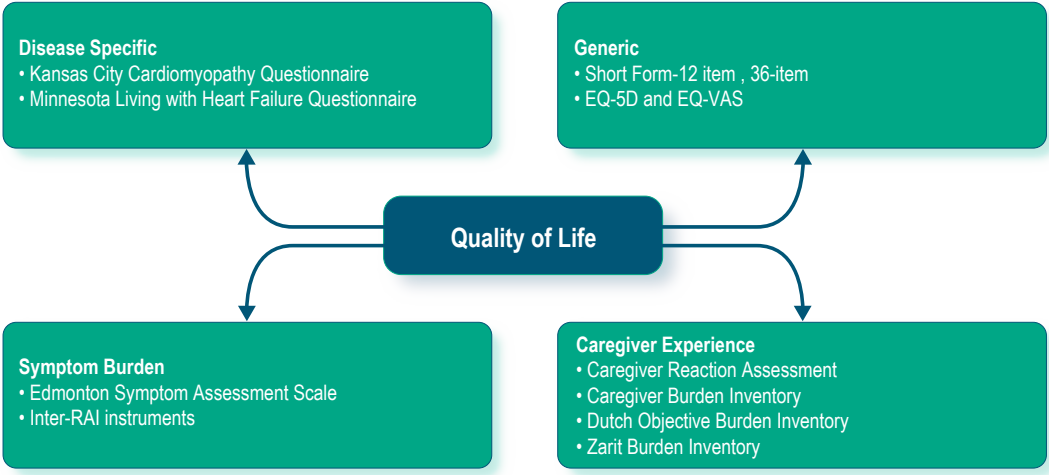
Advance Care Planning

Practical Tips

- Although the course of HF in individual patients can be unpredictable, a high symptom burden and high mortality rates should be anticipated, and advance care planning discussions should be initiated early in the course of illness.
- Triggers for discussion:
  - After important clinical events such as hospitalization
  - When considering invasive therapies
  - When requested by the patient/family
- Discussions should focus on the values and goals of the individual patient what they find valuable and important in their lives and what they hope for in the future (eg, attending an important upcoming family event).
- Discussions are dynamic and evolve over time; ongoing and repeated discussions are often necessary.

Visit http://www.advancecareplanning.ca/ for tools and resources to help patients and families with advance care planning.

Validated Tools in HF



The above is not intended to be an exhaustive list of such instruments, but identifies those most used and evaluated in the context of heart failure. There is no clear evidence to recommend one tool over another.

EQ-5D, Euro QOL 5 dimensions; EQ-VAS, Euro QOL-Visual Analogue Scale

Notes

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