CCS/CHFS Heart Failure Guidelines

New Standard of Care for HFrEF

May 13, 2022

Margot Davis, MD, MSc
Clinical Associate Professor,
UBC Cardiology Director,
UBC Cardiology-Oncology Program
Vancouver, BC

Abhinav Sharma, MD, PhD
McGill University Health Centre
Heart Failure Fellowship Program Director
Montreal, QC

Disclosures of potential conflicts of interest

Margot Davis

- **Grants/research support**: Pfizer, Takeda, Boehringer-Ingelheim, Servier, Akcea
- **Consulting and Speaker Fees**: Bayer, Janssen, Novartis, Boehringer-
- Ingelheim, Takeda, Pfizer, Akcea, Alnylam, Amgen, Ferring

Abhinav Sharma

- **Grants/research support**: AstraZeneca, Boehringer Ingelheim, Medtronic, Novartis, Pfizer
- **Consulting and Speaker Fees**: AstraZeneca, Bayer, Boehringer Ingelheim, BMS/Pfizer Alliance, Medtronic, Merck, Novartis, Pfizer, Servier

Learning Objectives

- Review new evidence for pharmacological therapies for patients with HFrEF
- Discuss timing and clinical context for initiating novel pharmacologic therapies for the management of HFrEF
- Make clinical decisions and apply practical strategies to integrate the CCS/CHRS Heart Failure Guidelines into daily practice

Agenda

1) Review the new 2021 CCS Heart Failure Guidelines
2) Implementation around chronic, acute, and de novo heart failure
3) Case discussions
4) Questions

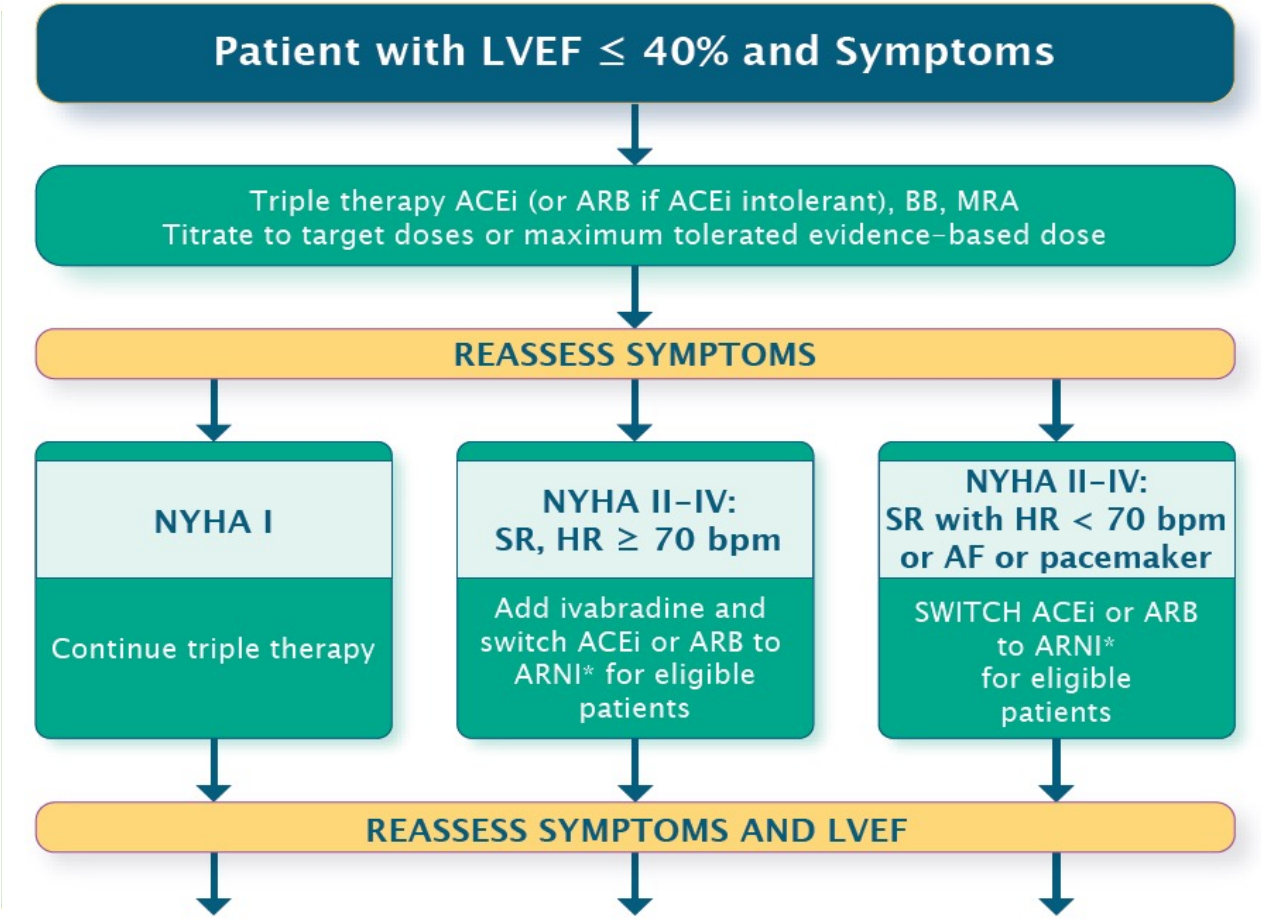
Canadian Cardiovascular Society

CCS/CHFS Heart Failure Guidelines Update: Defining a New Pharmacological Standard of Care for Heart Failure with Reduced Ejection Fraction

Primary Panel: Michael McDonald (Co-chair), Sean Virani (Co-Chair), Eileen O'Meara, Michael Chan, Anique Ducharme, Justin A. Ezekowitz, Nadia Giannetti, Adam Grzeslo, George A. Heckman, Jonathan G. Howlett, Sheri L. Koshman, Serge Lepage, Lisa Mielniczuk, Gordon W. Moe, Elizabeth Swiggum, Mustafa Toma, Shelley Zieroth

Secondary Panel: Kim Anderson, Sharon A. Bray, Brian Clarke, Alain Cohen-Solal, Michel D'Astous, Margot Davis, Sabe De, Andrew D. M. Grant, Jodi Heshka, Sabina Keen, Simon Kouz, Douglas Lee, Frederick A. Masoudi, Robert McKelvie, Marie-Claude Parent, Stephanie Poon, Miroslaw Rajda, Abhinav Sharma, Kyla Siatecki, Kate Storm, Bruce Sussex, Harriette Van Spall, Amelia Ming Ching Yip

Therapeutic approach to patients with HFrEF (circa 2017)



Ezekowitz et al, Can J Cardiol 2017

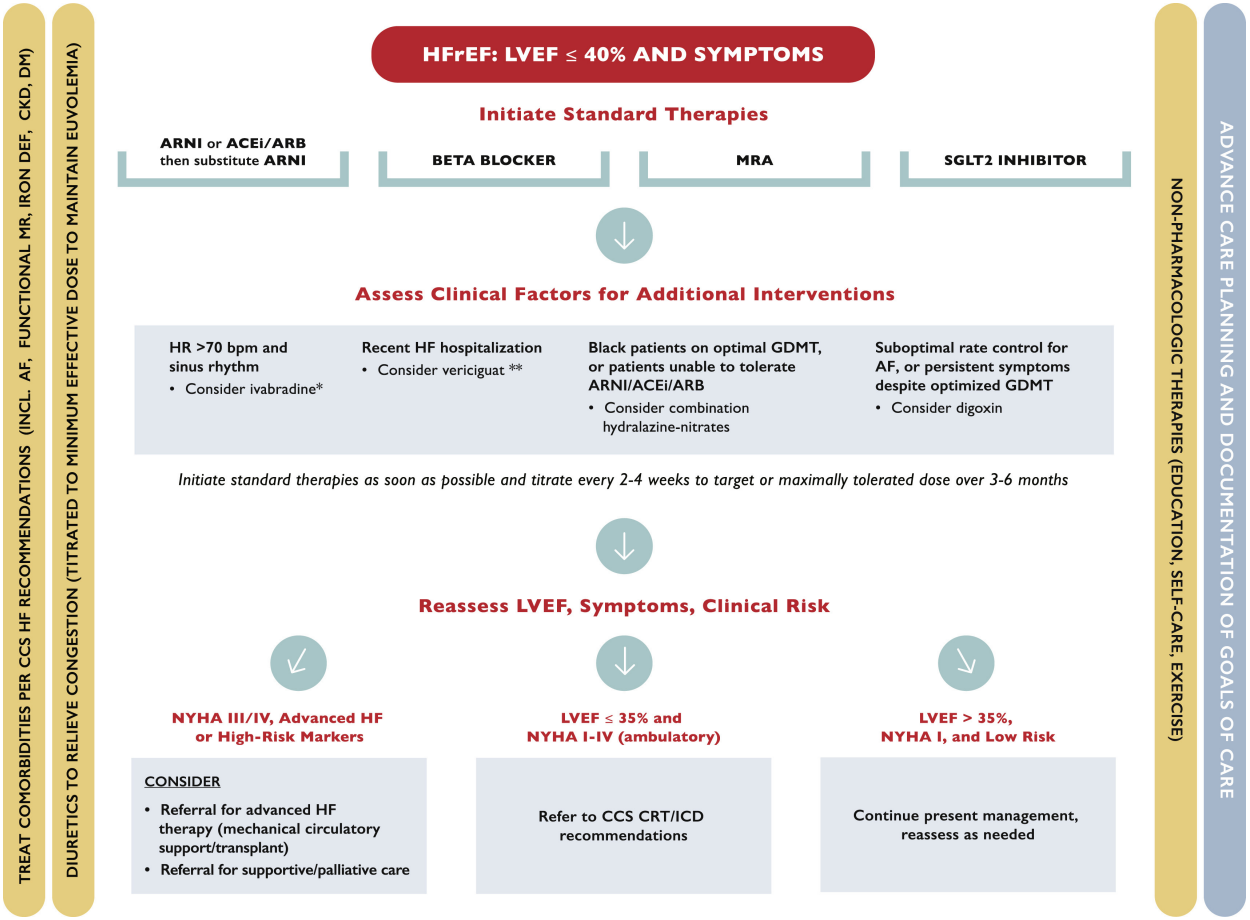
Canadian Cardiovascular Society

CCS/CHFS Heart Failure Guidelines Update: Defining a New Pharmacologic Standard of Care for Heart Failure With Reduced Ejection Fraction

Primary Panel: Michael McDonald, MD (Co-chair) • Sean Virani, MD (Co-chair) • Michael Chan, MBBS • Anique Ducharme, MD • Justin A. Ezekowitz, MBBCh • Nadia Giannetti, MD • George A. Heckman, MD • Jonathan G. Howlett, MD • Sheri L. Koshman, Pharm D • Serge Lepage, MD • Lisa Mielniczuk, MD • Gordon W. Moe, MD • Eileen O'Meara, MD • Elizabeth Swiggum, MD • Mustafa Toma, MD • Shelley Zieroth, MD • **Secondary Panel:** Kim Anderson, MD • Sharon A. Bray, EdD • Brian Clarke, MD • Alain Cohen-Solal, MD • Michel D'Astous, MD • Margot Davis, MD • Sabe De, MD • Andrew D.M. Grant, MD • Adam Grzeslo, MD • Jodi Heshka, MD • Sabina Keen, MD • Simon Kouz, MD • Douglas Lee, MD, PhD • Frederick A. Masoudi, MD MSPH • Robert McKelvie, MD • Marie-Claude Parent, MD • Stephanie Poon, MD • Miroslaw Rajda, MD • Abhinav Sharma, MD • Kyla Siatecki, MN, NP • Kate Storm, NP • Bruce Sussex, MBBS • Harriette Van Spall, MD MPH • Amelia Ming Ching Yip, MD • Show less

DOI: https://doi.org/10.1016/j.cjca.2021.01.017 • Check for updates

New Paradigm in Heart Failure

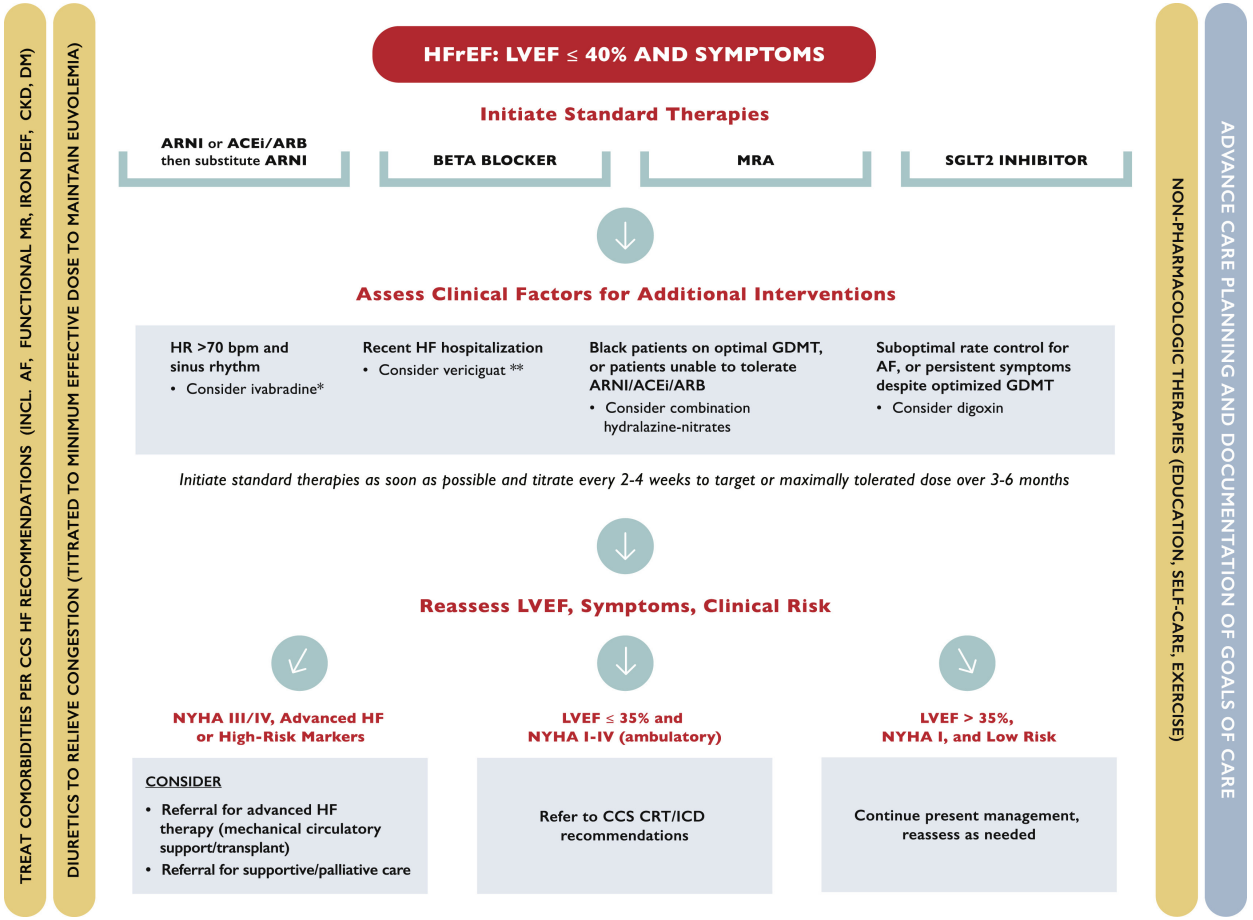


Some new evidence for decision making in HFrEF

Study	Drug	Patients	Primary Outcome	Study Implications
PIONEER-HF (and extension study)	Sac-val vs Enalapril	Stabilized after admission with with worsening HF; 35% with de novo HF	Change in NT-proBNP values at 8 weeks	Broader use of ARNI in hospitalized and de novo HF patients
DAPA HF	Dapagliflozin vs placebo	NYHA II-IV, chronic HF, with or without DM2	CV death or worsening HF	Addition of SGLT2 inhibitors improves outcomes in broad spectrum of HFrEF patients with or without DM2
EMPEROR Reduced	Empagliflozin vs placebo	High risk NYHA II-IV, chronic HF, with or without DM2	CV death or worsening HF	
VICTORIA	Vericiguat vs placebo	NYHA II-IV, recent worsening HF requiring admission or IV diuretic	CV death or worsening HF	Addition of vericiguat in stabilized high risk patients further improves outcomes

Opportunities, with some challenges

- Where do we now put ARNI… and SGLT2 inhibitors?
- Where do we put sGC stimulators?
- When should we refer for ICD and CRT?
- In-patient or out-patient treatment initiation



Updated Recommendations

- We recommend that an ARNI be used in place of an ACEI or ARB, in patients with HFrEF, who remain symptomatic despite treatment with appropriate doses of GDMT to decrease CV death, HF hospitalizations, and symptoms

  (Strong Recommendation; High- Quality Evidence)

- We recommend that patients admitted to hospital for acute decompensated HF with HFrEF should be switched to an ARNI, from an ACEI or ARB, when stabilized and before hospital discharge

  (Strong Recommendation; Moderate-Quality Evidence)

- We suggest that patients admitted to hospital with a new diagnosis of HFrEF should be treated with ARNI as first-line therapy, as an alternative to either an ACEI or ARB

  (Weak Recommendation; Moderate-Quality Evidence)

McDonald M, Virani S, et al. Can J Cardiol 2021

DAPA-HF and EMPEROR-Reduced

DAPA-HF

Outcome	Dapagliflozin	Placebo	
	Events/100 patient-yr	Events/100 patient-yr	HR (95%CI)
Primary outcome	11.6	15.6	0.74 (0.65-0.85)
HHF	6.9	9.8	0.70 (0.59-0.83)
CV death	6.5	7.9	0.82 (0.69-0.98)

EMPEROR-Reduced

Outcome	Empagliflozin	Placebo	
	Events/100 patient-yr	Events/100 patient-yr	HR (95%CI)
Primary outcome	15.8	21.0	0.75 (0.65-0.86)
HHF	10.7	15.5	0.69 (0.59-0.81)
CV death	7.6	8.1	0.92 (0.75-1.12)

- In these trials, dapagliflozin and empagliflozin, respectively, significantly reduced combined endpoint of CV death or HF hospitalization compared to placebo, with very few adverse events
- Differences in trials relate to baseline characteristics; EMPEROR Reduced patients with both higher risk and more aggressively treated with HF therapies
- Magnitude of benefit observed in both trials similar in patient WITH an WITHOUT diabetes

McMurray JJV, et al. N Engl J Med. 2019

Packer M, et al. N Engl J Med. 2020

Updated Recommendation

- We recommend an SGLT2 inhibitor, such as dapagliflozin or empagliflozin, be used in patients with HFrEF, with or without concomitant type 2 diabetes, to improve symptoms and quality of life and to reduce the risk of HF hospitalization and/or CV mortality

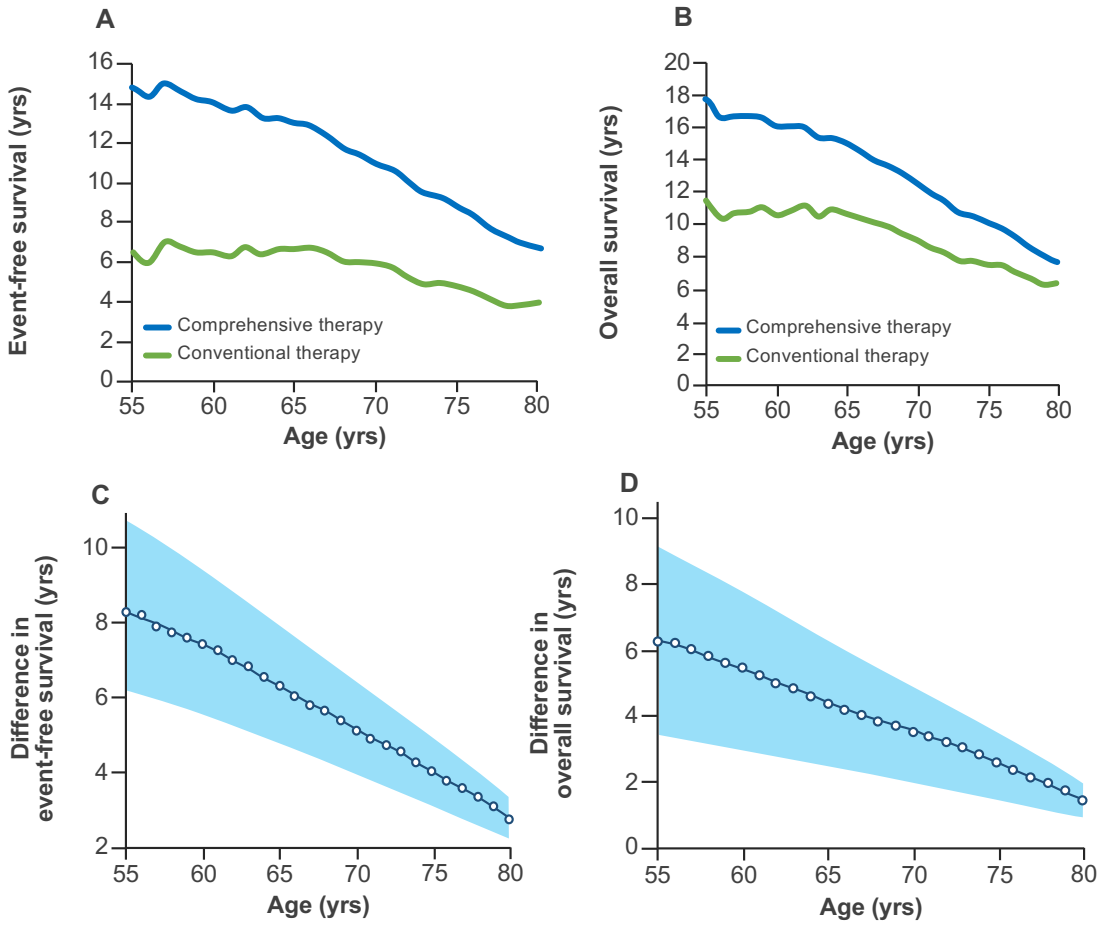
  (Strong Recommendation; High-Quality Evidence).

McDonald M, Virani S, et al. Can J Cardiol 2021

Why guideline therapy matters: Comprehensive treatment improves survival in HFrEF

- In HFrEF, treatment effects of comprehensive therapy (ARNI, beta-blocker, MRA, SGLT2i) was compared to conventional therapy (ACEI/ARB, beta-blocker) in cross trial analyses

- In a 55-year-old man, comprehensive therapy would improve event-free survival by **8.3 years** and overall survival by **6.3 years**



Vaduganathan M et al. Lancet 2020

What people are talking about: how best to prescribe ?

STATE-OF-THE-ART REVIEW

Optimizing Foundational Therapies in Patients With HFrEF

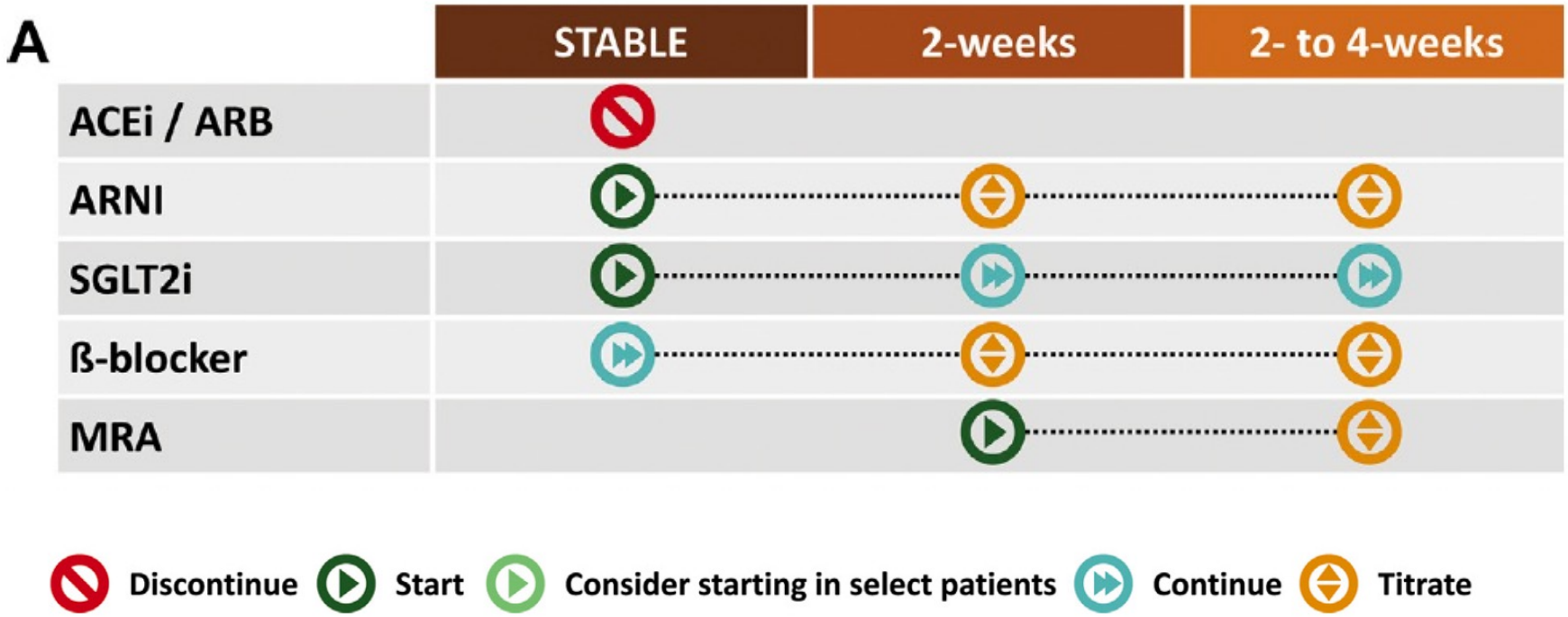
How Do We Translate These Findings Into Clinical Care?

Abhinav Sharma, MD, PhD,[a] Subodh Verma, MD, PhD,[b] Deepak L. Bhatt, MD, MPH,[c] Kim A. Connelly, MBBS, PhD,[d] Elizabeth Swiggum, MD,[e] Muthiah Vaduganathan, MD, MPH,[f] Shelley Zieroth, MD,[g] Javed Butler, MD, MPH, MBA[h]

J Am Coll Cardiol Basic Trans Science. Mar 02, 2022. Epublished DOI: 10.1016/j.jacbts.2021.10.018

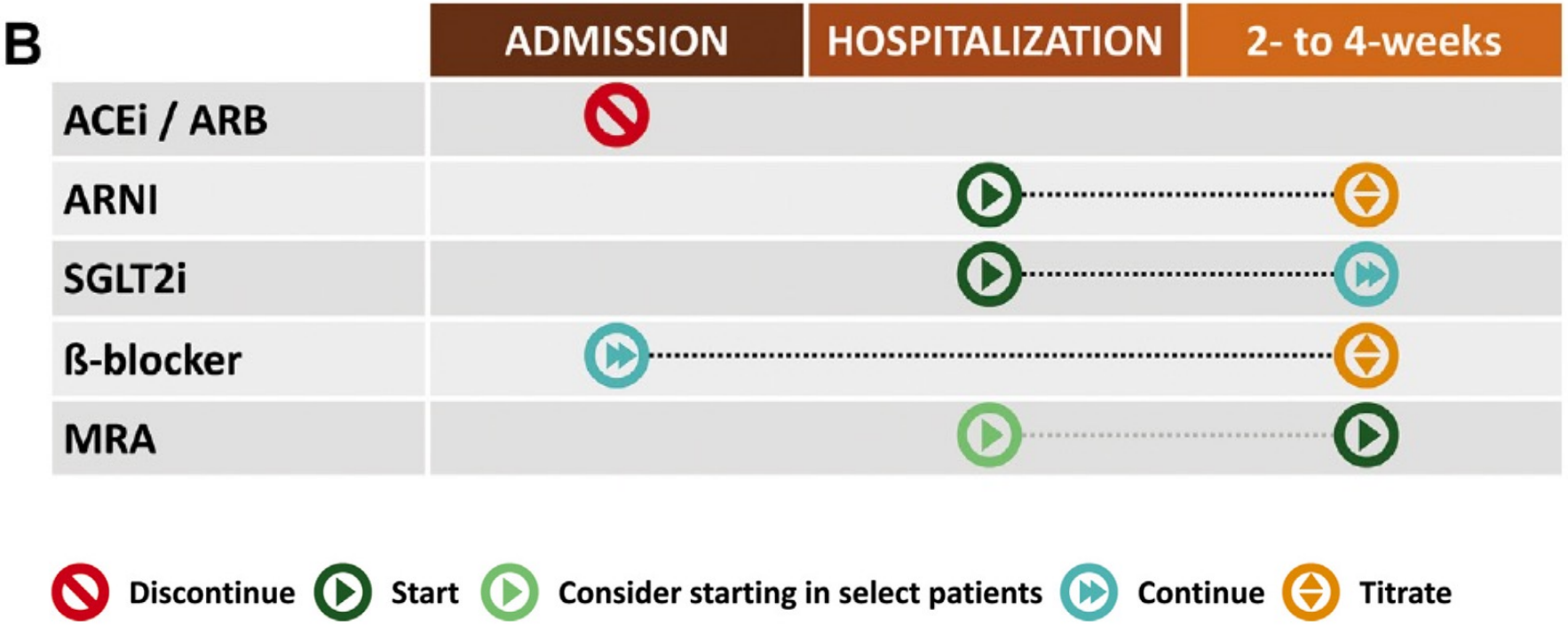
What people are talking about: how best to prescribe ?

Chronic heart failure

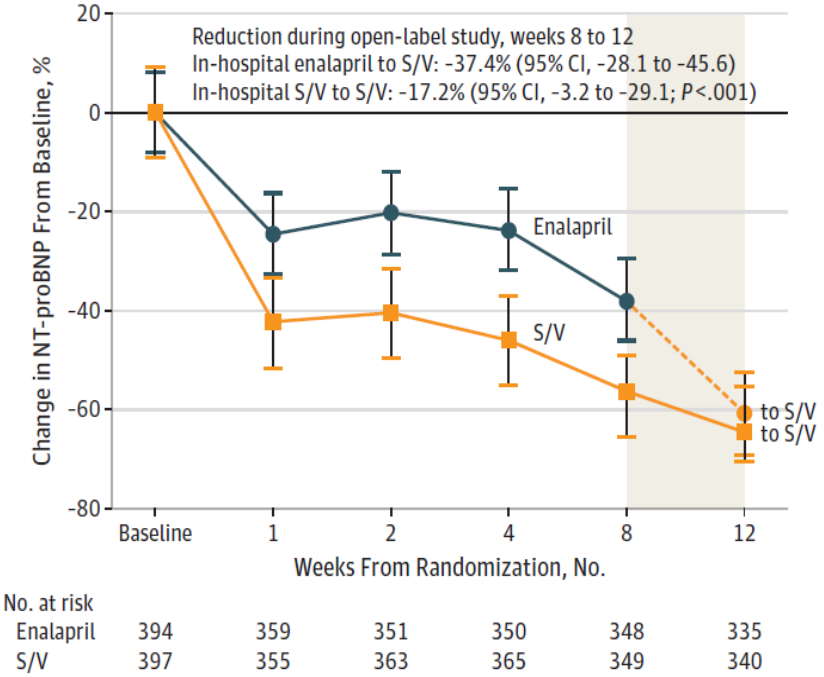


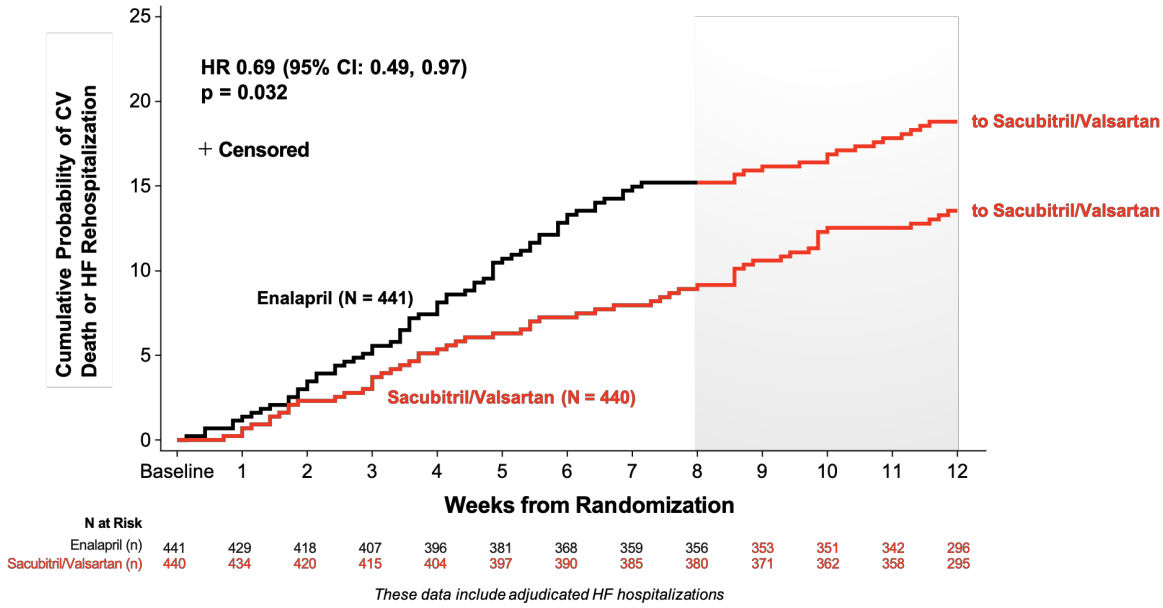
What people are talking about: how best to prescribe ?

Acute heart failure



PIONEER-HF Study and Open label extension



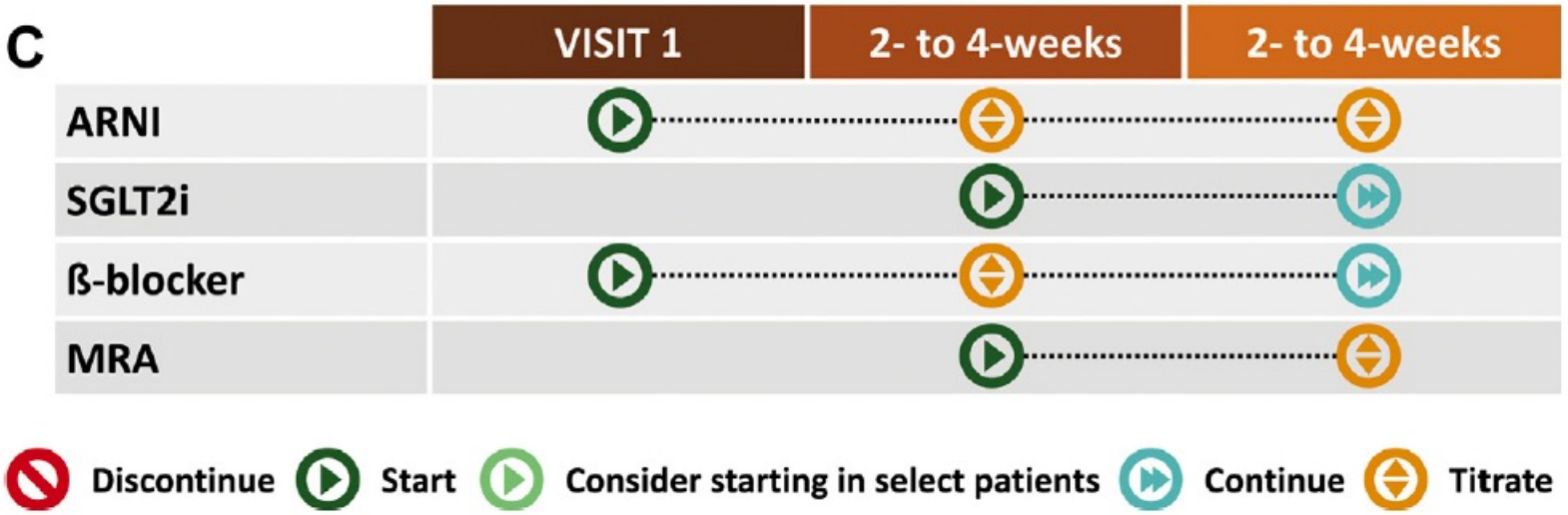


- Open label extension:
  - Further reduction in NTproBNP (both groups)
  - In-hospital sac-val group experienced lower incidence of death or re-hospitalization over 12 weeks follow-up

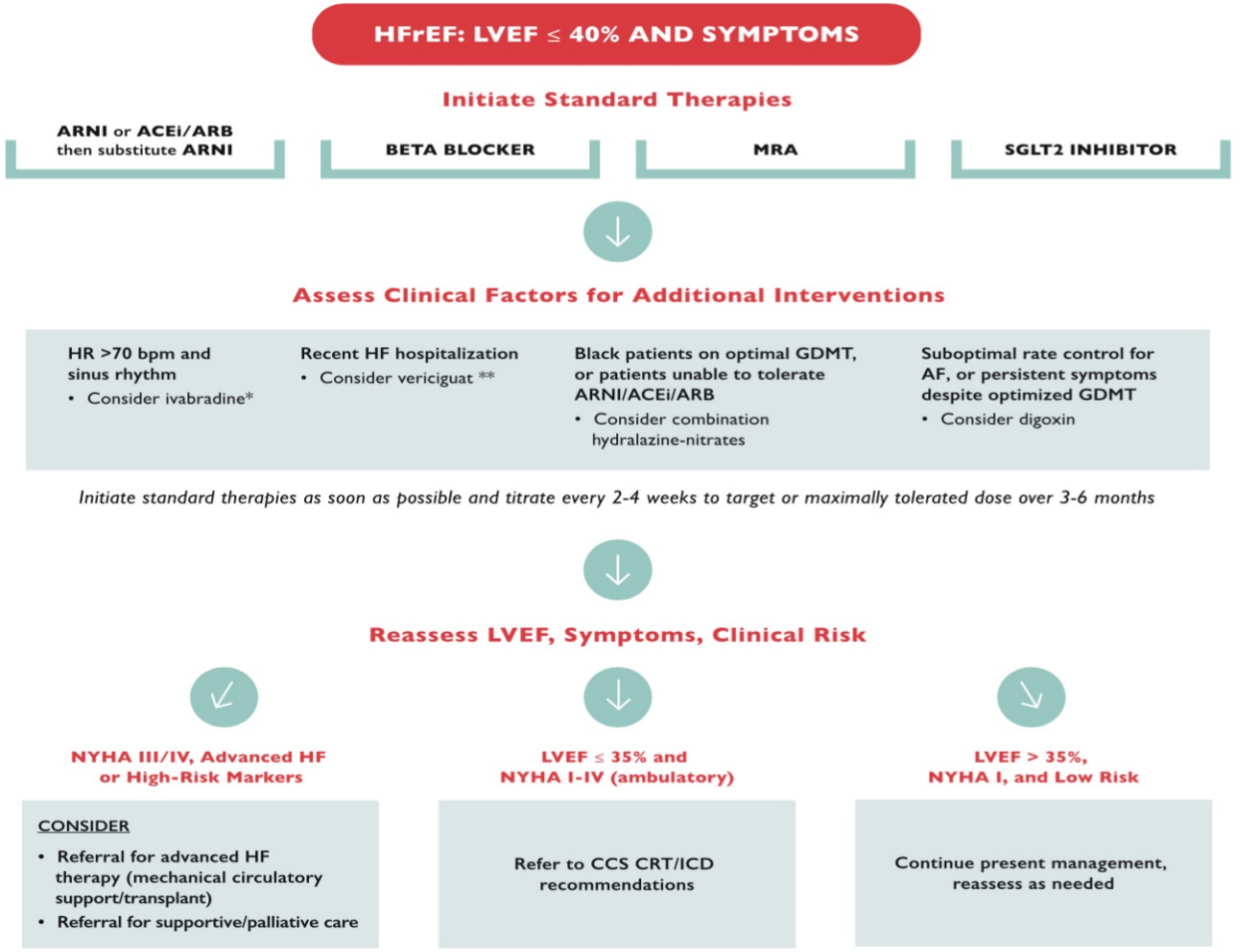
Velazquez et al, N Engl J Med 2019
Devore et al, JAMA Cardiol 2020

What people are talking about: how best to prescribe ?

De novo heart failure



The new CCS HFrEF Treatment Algorithm



Step 1

Step 2

Step 3

New Recommendation:

We recommend that in the absence of contraindications, patients with HFrEF be treated with combination therapy including 1 evidence-based medication from each of the following categories:

a. ARNI (or ACEI/ARB);

b. beta-blocker;

c. MRA;

d. SGLT2 inhibitor

(Strong Recommendation; Moderate-Quality Evidence).

Case

- 56 year-old woman with non-ischemic CMO
  - NYHA II for past year
  - No previous hospitalizations
  - LVEF 28%
- Meds:
  - Ramipril 5 mg BID
  - Carvedilol 12.5 mg BID

- At baseline HR 81 bpm, BP 104/73
- Euvolemic
- Baseline SCr 160 µmol/L, K^+ 4.9
- ECG shows NSR with QRS of 112ms

- Presents to ED after flu-like illness
- More SOBOE, weight up 3kg
- HR 108bpm, BP 103/78
- JVP elevated, moderate edema to shins
- NT-proBNP 2900, SCr 220 µmol/L
- Admitted for IV lasix

How can we further optimize in this setting?

New Recommendation:

We recommend that in the absence of contraindications, patients with HFrEF be treated with combination therapy including 1 evidence-based medication from each of the following categories:

a. ARNI (or ACEI/ARB);

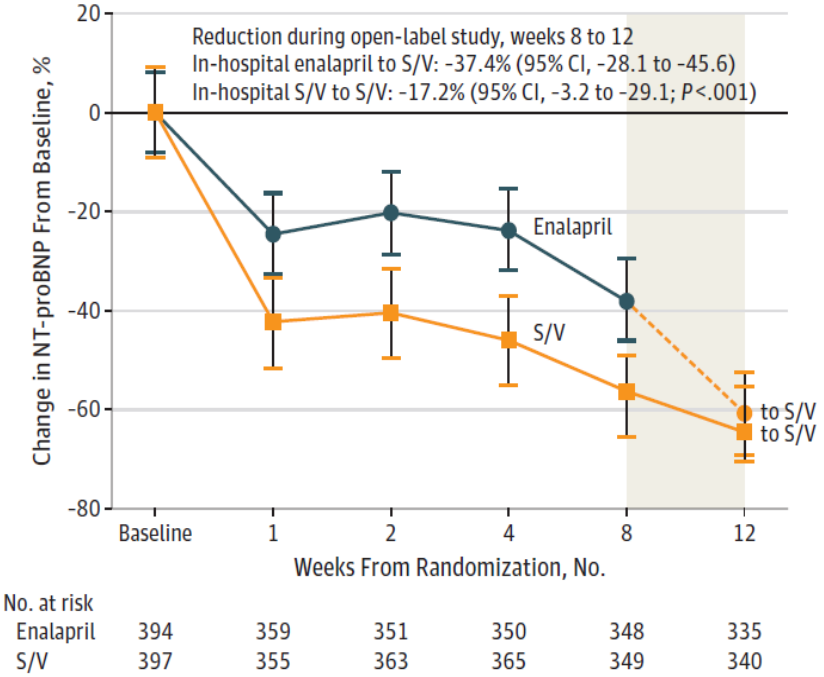
b. beta-blocker;

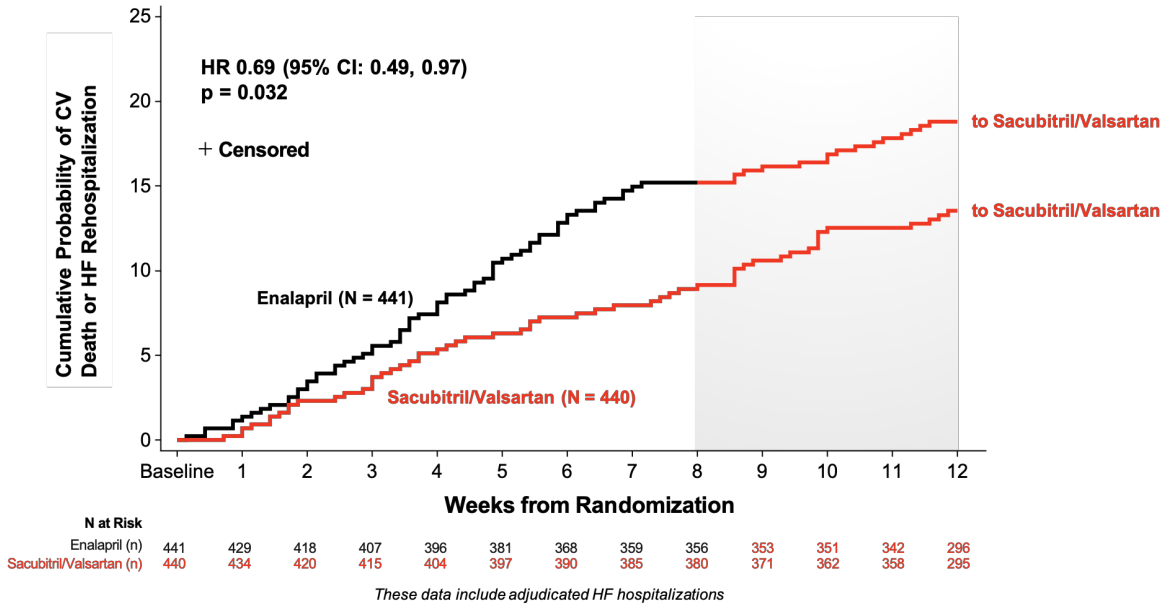
c. MRA;

d. SGLT2 inhibitor

(Strong Recommendation; Moderate-Quality Evidence).

PIONEER-HF Study and Open label extension



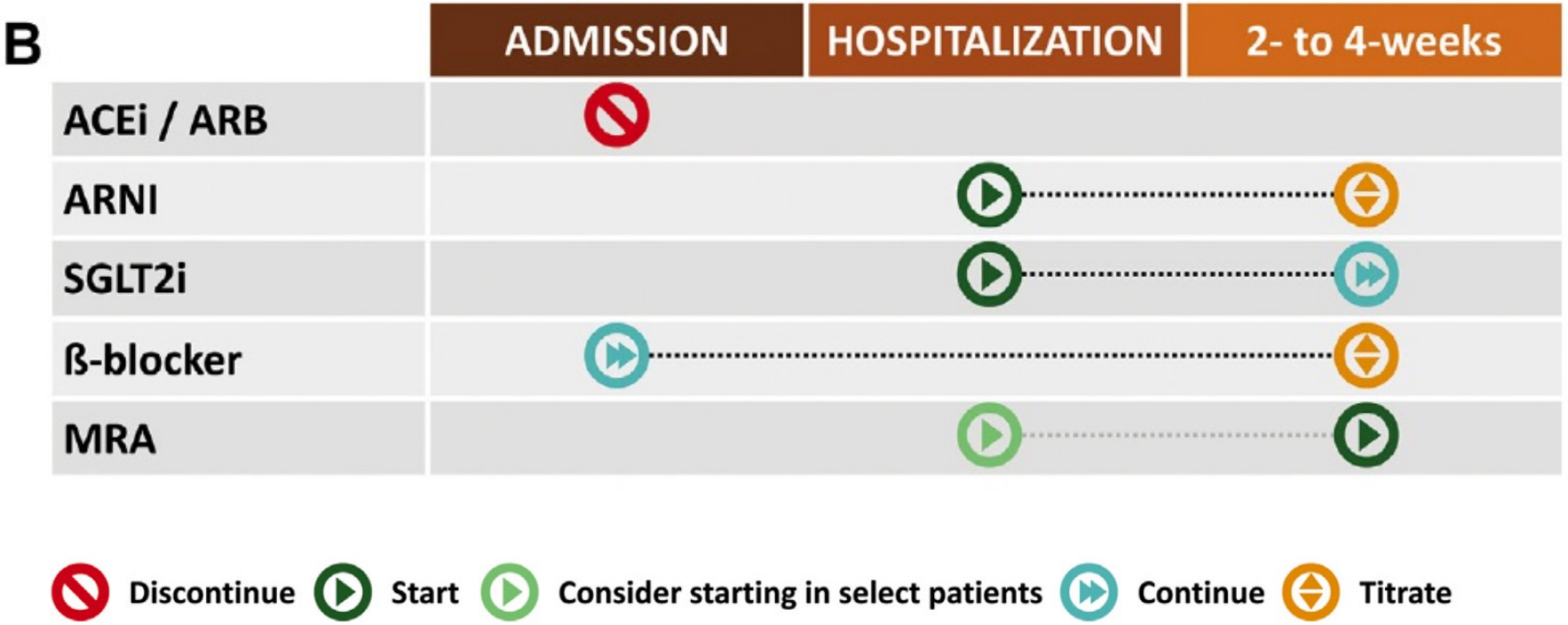


- Open label extension:
  - Further reduction in NTproBNP (both groups)
  - In-hospital sac-val group experienced lower incidence of death or re-hospitalization over 12 weeks follow-up

Velazquez et al, N Engl J Med 2019
Devore et al, JAMA Cardiol 2020

What people are talking about: how best to prescribe ?

Acute heart failure



Case

- 56 year-old woman with non-ischemic CMO
  - NYHA II for past year
  - No previous hospitalizations
  - LVEF 28%
- Meds:
  - Ramipril 5 mg BID
  - Carvedilol 12.5 mg BID

- At baseline HR 81 bpm, BP 104/73
- Euvolemic
- Baseline SCr 160 µmol/L, K^+ 4.9
- ECG shows NSR with QRS of 112ms

- Presents to ED after flu-like illness
- More SOBOE, weight up 3kg
- HR 108bpm, BP 103/78
- JVP elevated, moderate edema to shins
- NT-proBNP 2900, SCr 220 µmol/L
- Admitted for IV lasix

- Discharged after 8 days
  - Ramipril stopped, started on Sac-Val 49/51 BID after 2 day washout and improvement in renal function
  - Furosemide 80mg daily added
  - Dapagliflozin 10 mg daily added
  - Hyperkalemic with spironolactone so stopped after short trial
  - SCr 180 µmol/L at discharge, K^+ 4.9
  - Back to NYHA II

Case

- Seen in HFC 2 weeks later
  - Meds:
    - Carvedilol 12.5 mg BID
    - Sac-Val 49/51 mg BID
    - Dapagliflozin 10 mg daily
    - Furosemide 80 mg daily
  - NYHA 2
  - Euvolemic
  - HR 82, BP 101/68
  - SCr 168, K 4.6
  - NT-proBNP 1600
- Carvedilol increased to 25 mg BID
- 2 weeks later, Sac-Val increased to 97/103 mg BID, Lasix reduced to 40 mg daily
- 2 months later, seen again in clinic
  - HR 78, BP 99/65
  - SCr 165, K 4.9
  - Repeat echo:
    - LVEF 30%, moderate MR

How can we further optimize in this setting?

Optimizing Treatment Beyond “Foundational” Therapies

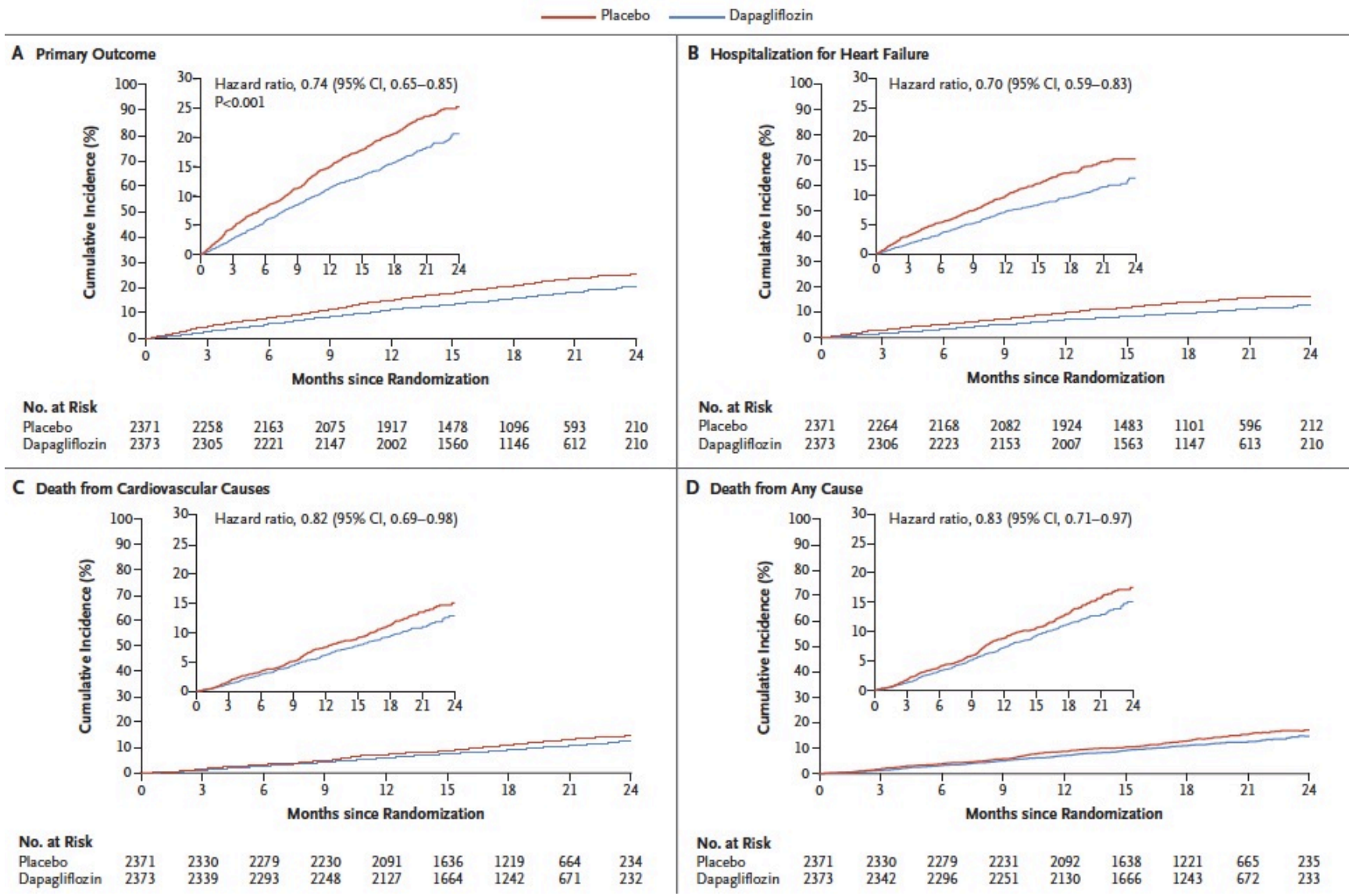
- Quadruple Therapy is an important first step in achieving GDMT, but where applicable additional therapies must be considered:
  - (1) There is a significant residual risk of adverse events even when quadruple therapy is utilized
  - (2) Not all patients will be able to achieve (or tolerate) all four therapies at target doses
- We must consider additional approaches and treatments to mitigate risk

Baseline Medical and Device Therapies
SGLT2i Heart Failure Trials

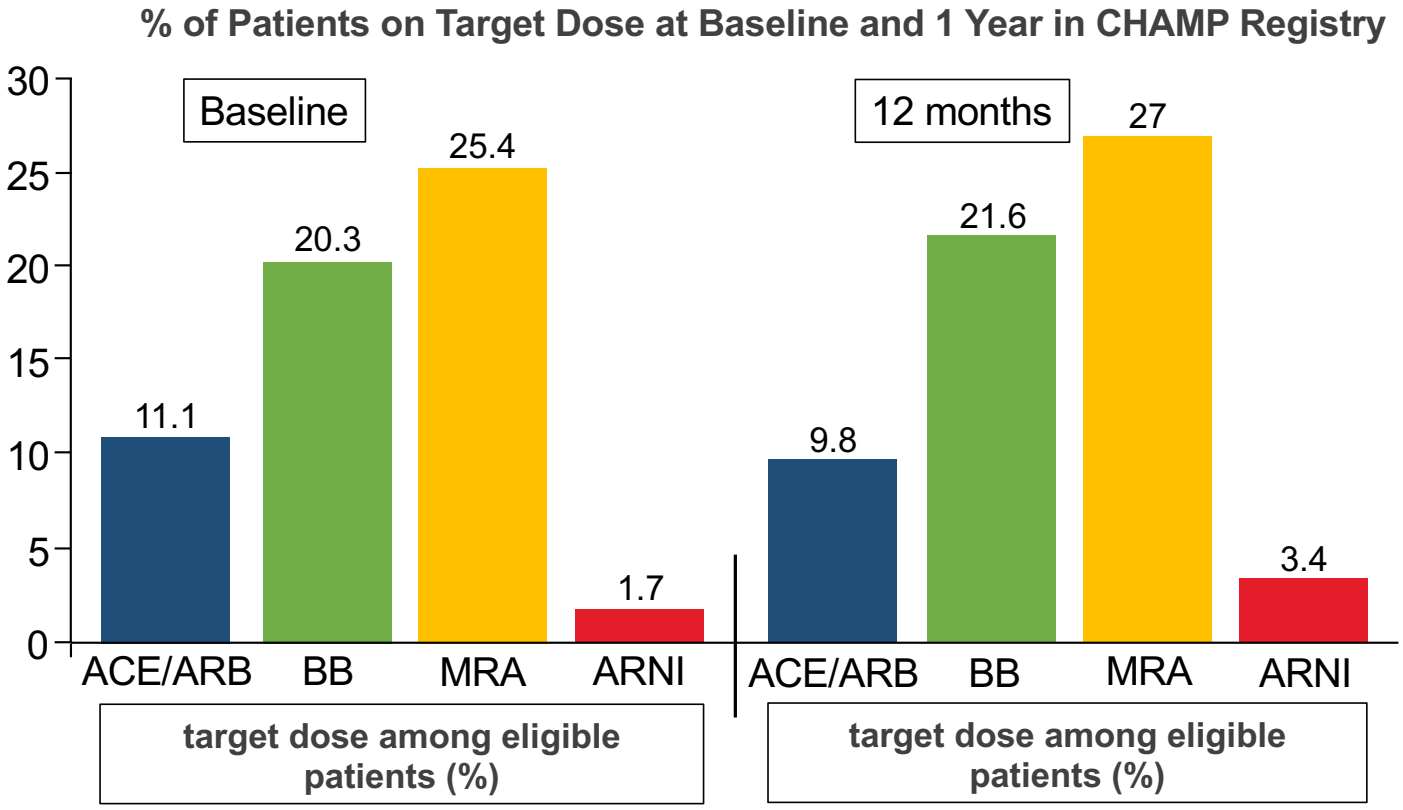
	EMPEROR-Reduced		DAPA-HF	
	Empagliflozin	Placebo	Dapagliflozin	Placebo
Heart failure medications				
ACE inhibitor	867 (46·5%)	836 (44·8%)	1332 (56·1%)	1329 (56·1%)
ARB	451 (24·2%)	457 (24·5%)	675 (28·4%)	632 (26·7%)
Mineralocorticoid receptor antagonist	1306 (70·1%)	1355 (72·6%)	1696 (71·5%)	1674 (70·6%)
ARNI	340 (18·3%)	387 (20·7%)	250 (10·5%)	258 (10·9%)
Device therapy				
ICD or CRT-D	578 (31·0%)	593 (31·8%)	622 (26·2%)	620 (26·1%)
CRT-D or CRT-P	220 (11·8%)	222 (11·9%)	190 (8·0%)	164 (6·9%)

Zannad F et al: Lancet Aug 30

Canadian Cardiovascular Society



Therapeutic inertia:
Missed opportunity to optimize medical therapy



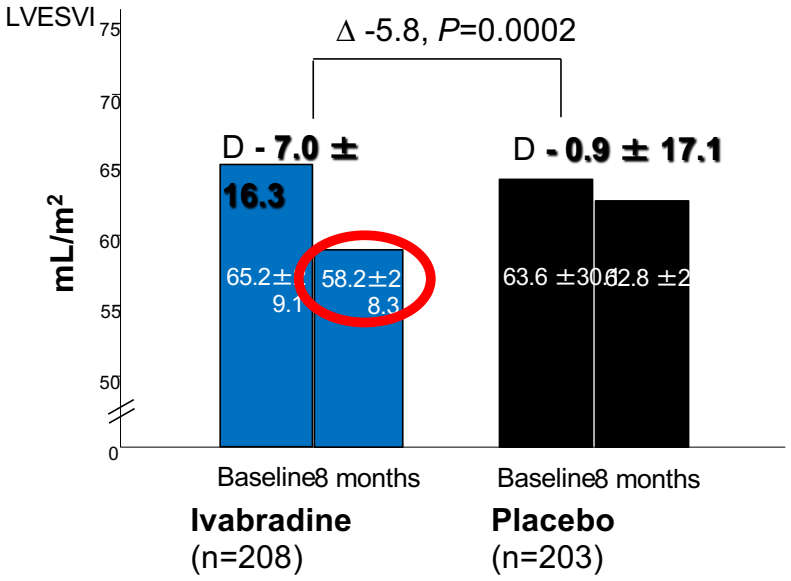
Bozkurt B. J Am Coll Cardiol 2019.

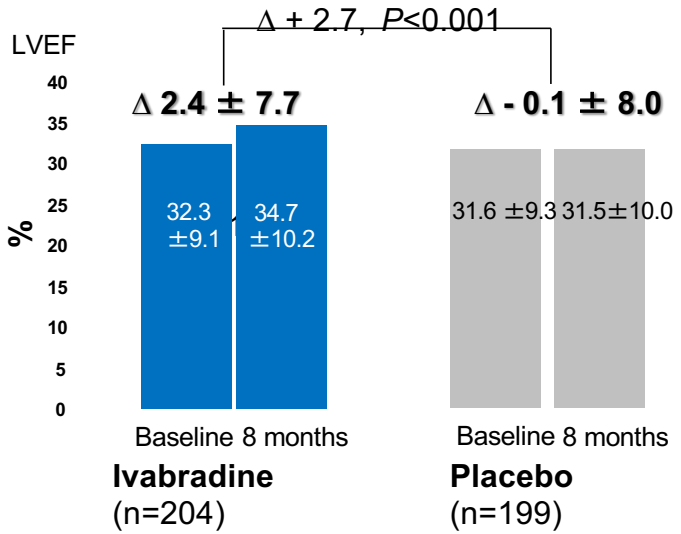
Clinical Factors for Consideration with Individualized Therapies

Drug	Main Indication	Heart Rate and Blood Pressure	Renal Function	Notes
Ivabradine	• Sinus rhythm • HR ≥ 70 bpm despite beta-blocker optimization	• Minimum effect on blood pressure • Contraindicated in bradycardia	• Use in patients with severe renal dysfunction not well studied • No safety data for patients 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 include visual disturbances (phosphenes) and bradycardia
Vericiguat	• Worsening HF symptoms and/or heart failure hospitalization in prior 6 months	• Avoid in patients with SBP <100mmHg or symptomatic hypotension • Minimal effect on HR	• No contraindication • No safety data for patient on dialysis or eGFR <15mL/min/1.73 m^2	• Should not be combined with nitrate therapy • Patients with very high NT-proBNP levels (>8000pg/mL) unlikely to benefit • Potential side effects include symptomatic hypotension and anemia

CCS HF Booklet 2021

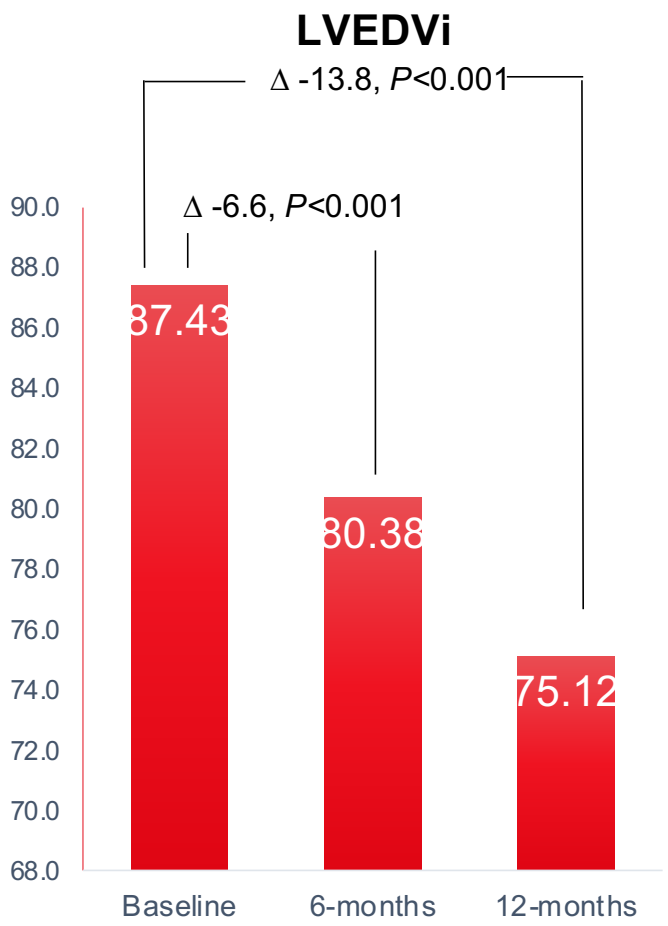
SHiFT: Echo Sub-study

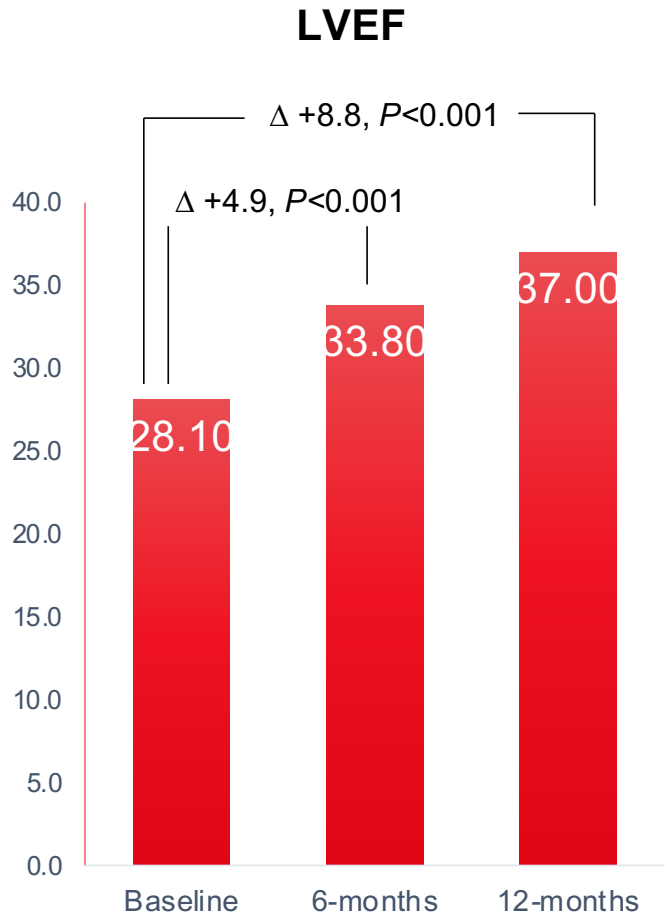




Tardif JC, O'Meara E, Komajda M, et al. *Eur Heart J.* 2011;32(20):2507-15

PROVE-HF: ARNI





Januzzi JL, et al. *JAMA* 2019; DOI: 10.1001/jama.2019.1282 Januzzi JL, et al. Late Breaker ESC 2019. Paris, France August 31-September 4, 2019

Recommendation

- We recommend that after a diagnosis of HFrEF, standard medical therapy should be initiated and titrated to target or maximally tolerated doses with a repeat assessment of LVEF prior to referral for ICD or CRT

  Strong Recommendation; Moderate-Quality Evidence

Practical tips:

- Reassessment of ejection fraction should be performed 3 months after the achievement of target or maximally tolerated doses of GDMT.
- An assessment of arrhythmic and non-arrhythmic SCD risk should be performed to estimate the risk/benefit of an ICD/CRT.
- Specific HF therapies may contribute to improvements in LVEF and should be considered prior to referral for ICD or CRT:
  - For eligible patients, switching to ARNI therapy should be considered prior to referral for ICD or CRT.
  - Adding ivabradine, where otherwise indicated after beta-blocker optimization, should be considered prior to referral for ICD or CRT.
- Referral for ICD or CRT should not be unduly delayed if timely titration of pharmacologic therapies is infeasible or impractical.

McDonald, Virani, et al, Can J Cardiol 2021

Case

- Seen in HFC 2 weeks later
  - Meds:
    - Carvedilol 12.5 mg BID
    - Sac-Val 49/51 mg BID
    - Dapagliflozin 10 mg daily
    - Furosemide 80 mg daily
  - NYHA 2
  - Euvolemic
  - HR 82, BP 101/68
  - SCr 168, K 4.6
  - NT-proBNP 1600
- Carvedilol increased to 25 mg BID
- 2 weeks later, Sac-Val increased to 97/103 mg BID, Lasix reduced to 40 mg daily
- 2 months later, seen again in clinic
  - HR 78, BP 99/65
  - SCr 165, K 4.9
  - Repeat echo:
    - LVEF 30%, moderate MR
- Ivabradine 2.5 mg BID started, then uptitrated to 5 mg BID (HR 60)
- 3 months later, repeat echo shows LVEF 38%
- 6 months later, hospitalized again with HF, NT-pro BNP 2400
- Diuresed and discharged home on same meds

How can we further optimize in this setting?

VICTORIA Trial

- To assess whether vericiguat reduces the primary composite outcome of cardiovascular (CV) death or first HF hospitalization
- Secondary outcomes were:
  - Components of the primary composite endpoint
  - Total HF hospitalizations; first and recurrent
  - Composite of all-cause mortality or first HF hospitalization
  - All-cause mortality
- To evaluate the safety and tolerability of vericiguat in this high-risk population with HF with reduced EF (HFrEF)

Armstrong et al. NEJM 2020, doi: 10.1056/NEJMoa1915928

Hospitalization remains a major risk factor for adverse events

"Chronic HF"

- NYHA class II–IV
- **LVEF < 45%**
- Guideline based HF therapies

after

"Worsening event"

- Recent HFH or IV diuretic use
- With very elevated natriuretic peptides (BNP or NT-proBNP)

  BNP ≥ 300 & pro-BNP ≥ 1000 pg/ml NSR
  BNP ≥ 500 & pro-BNP ≥ 1600pg/ml AF

Armstrong et al. JACC Heart Fail. 2018 Feb;6(2):96-104. doi: 10.1016/j.jchf.2017.08.013.

VICTORIA: Outcomes

	Vericiguat (N=2526)		Placebo (N=2524)		Treatment Comparison	
	%	Events/ 100 Pt-Yrs	%	Events/ 100 Pt-Yrs	HR (95%)*	P-value†
PRIMARY COMPOSITE OUTCOME	35.5	**33.6**	38.5	**37.8**	0.90 (0.82–0.98)	**0.019**
HF hospitalization	27.4		29.6			
Cardiovascular death‡	8.2		8.9			
SECONDARY OUTCOMES						
Cardiovascular death	16.4	**12.9**	17.5	**13.9**	0.93 (0.81–1.06)	0.269
HF hospitalization	27.4	**25.9**	29.6	**29.1**	0.90 (0.81–1.00)	**0.048**
Total HF hospitalizations		**38.3**		**42.4**	0.91 (0.84–0.99)	**0.023**
Secondary composite outcome	37.9	**35.9**	40.9	**40.1**	0.90 (0.83–0.98)	**0.021**
HF hospitalization	27.4		29.6			
All-cause mortality‡	10.5		11.3			
All-cause mortality	20.3	**16.0**	21.2	**16.9**	0.95 (0.84–1.07)	0.377

Armstrong et al. NEJM 2020, doi: 10.1056/NEJMoa1915928

New Recommendation

- We recommend that vericiguat, an oral soluble guanylate cyclase stimulator, be considered in addition to optimal heart failure therapies for HFrEF patients with worsening symptoms and hospitalization for HF in the past 6 months, to reduce the risk of subsequent heart failure hospitalization
  - (Conditional Recommendation; Moderate-Quality Evidence)

- Practical Tip
  - Subgroup analysis from the VICTORIA Trial suggests that clinical response to vericiguat may be attenuated in patients with very elevated natriuretic peptide levels.

McDonald M, Virani S, et al. Can J Cardiol 2021

Case

- Seen in HFC 2 weeks later
  - Meds:
    - Carvedilol 12.5 mg BID
    - Sac-Val 49/51 mg BID
    - Dapagliflozin 10 mg daily
    - Furosemide 80 mg daily
  - NYHA 2
  - Euvolemic
  - HR 82, BP 101/68
  - SCr 168, K 4.6
  - NT-proBNP 1600
- Carvedilol increased to 25 mg BID
- 2 weeks later, Sac-Val increased to 97/103 mg BID, Lasix reduced to 40 mg daily
- 2 months later, seen again in clinic
  - HR 78, BP 99/65
  - SCr 165, K 4.9
  - Repeat echo:
    - LVEF 30%, moderate MR
- Ivabradine 2.5 mg BID started, then uptitrated to 5 mg BID (HR 60)
- 3 months later, repeat echo shows LVEF 38%
- 6 months later, hospitalized again with HF, NT-pro BNP 2400
- Diuresed and discharged home on same meds

How can we further optimize in this setting?

Canadian Cardiovascular Society

Reassess LVEF, Symptoms, Clinical Risk

NYHA III/IV, Advanced HF or High-Risk Markers

CONSIDER

- Referral for advanced HF therapy (mechanical circulatory support/transplant)
- Referral for supportive/palliative care

LVEF ≤ 35% and NYHA I-IV (ambulatory)

Refer to CCS CRT/ICD recommendations

LVEF > 35%, NYHA I, and Low Risk

Continue present management, reassess as needed

Recommendation

- We recommend that after a diagnosis of HFrEF, standard medical therapy should be initiated and titrated to target or maximally tolerated doses with a repeat assessment of LVEF prior to referral for ICD or CRT
  - (Strong Recommendation; Moderate-Quality Evidence)

- Practical Tips
  - Reassessment of ejection fraction should be performed 3 months after the achievement of target or maximally tolerated doses of GDMT.
  - An assessment of arrhythmic and non-arrhythmic SCD risk should be performed to estimate the risk/benefit of an ICD/CRT.
  - Specific HF therapies may contribute to improvements in LVEF and should be considered prior to referral for ICD or CRT:
    - For eligible patients, switching to ARNI therapy should be considered prior to referral for ICD or CRT.
    - Adding ivabradine, where otherwise indicated after beta-blocker optimization, should be considered prior to referral for ICD or CRT.
  - Referral for ICD or CRT should not be unduly delayed if timely titration of pharmacologic therapies is infeasible or impractical.

McDonald M, Virani S, et al. Can J Cardiol 2021

Summary

(1) These guidelines are remarkable for highlighting the breadth and depth of existing therapies for HFrEF

- There is still more to come, both in terms of new agents/technologies and new indications/clinical settings
- For the first time, in a long time, we will have lots of tools in the tool box and clinicians will need guidance on how to “mix and match”

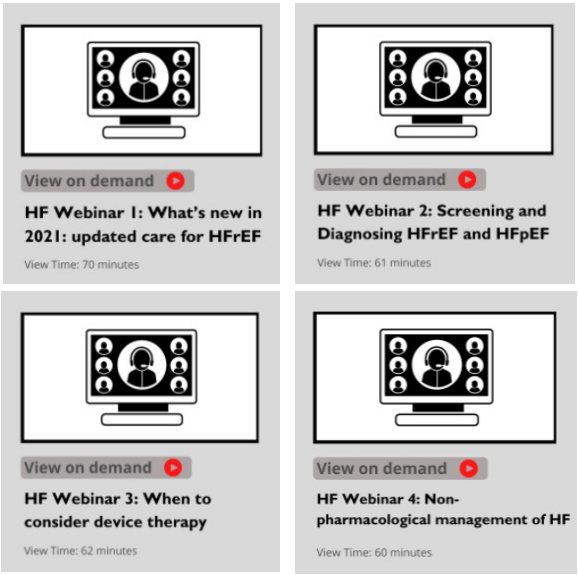
(2) These guidelines serve as a reminder to clinicians about the evidence basis for treatment initiation by clinical setting

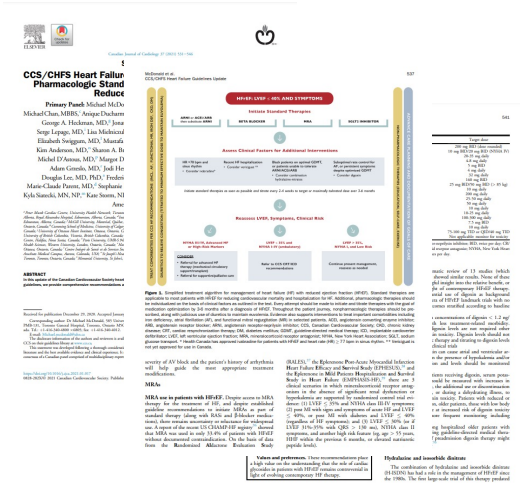
(3) These guidelines represent a more nuanced and personalized treatment strategy, which represents a “transitional” approach to HFrEF management

- A hybrid approach which aims to balance population health with personalized care

HF Guideline Resources at CCS.ca

- Stay up to date with the latest pocket guide! **CCS.ca/pocketguides**
- View the HF Webinar Series On-Demand: **CCS.ca/On-Demand-Guideline-Webinars/**
- Check out the full Guideline: **CCS.ca/guidelines-and-position-statement-library/**





McDonald, Virani, et.al., *Canadian Journal of Cardiology*: https://doi.org/10.1016/j.cjca.2021.01.017