Recent Advances in Heart Failure Management

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Disclosures

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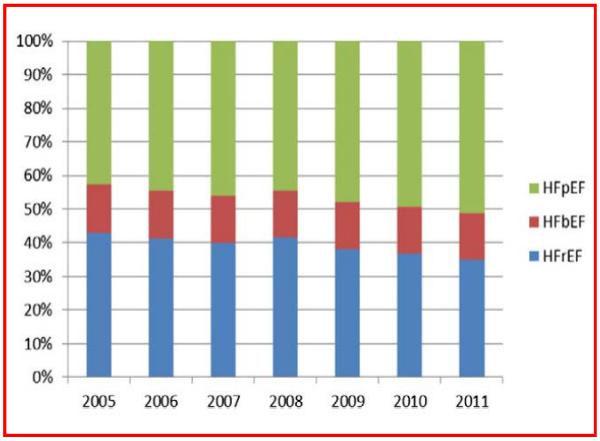
- Consulting Fees: AstraZeneca and Takeda Oncology

Objectives

- To provide guideline updates on management of HFrEF
- To provide guideline updates on management of HFpEF
- To provide guidance on management of acute decompensated HF

Distribution of EF in Pts. Hospitalized with HF

40,239 Medicare pts enrolled in GWTG-HF from 2005-11



Cheng et al. Am Heart J 2014;168:721-30.e3

HFpEF vs. HFrEF

- Older
- Female
- HTN
- CKD
- A Fib
- ↓ CAD

HFmrEF like HFpEF

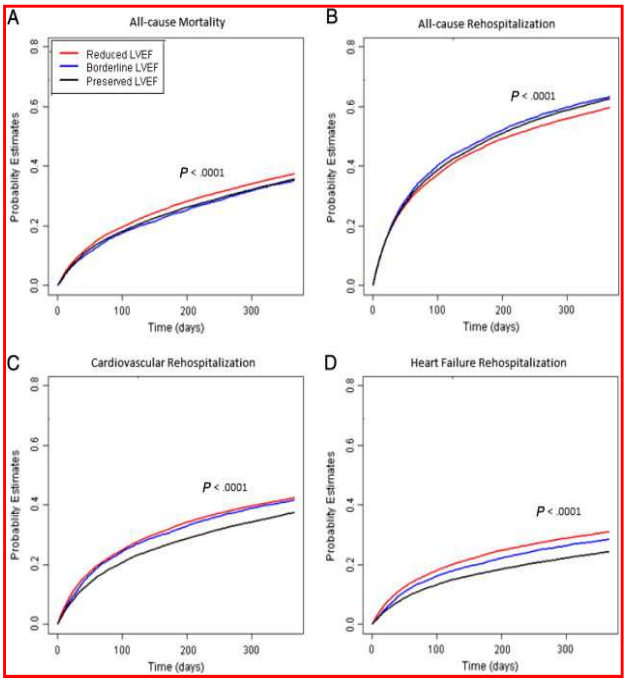
- ↑ CAD

Outcomes after HF Hospitalization, by EF

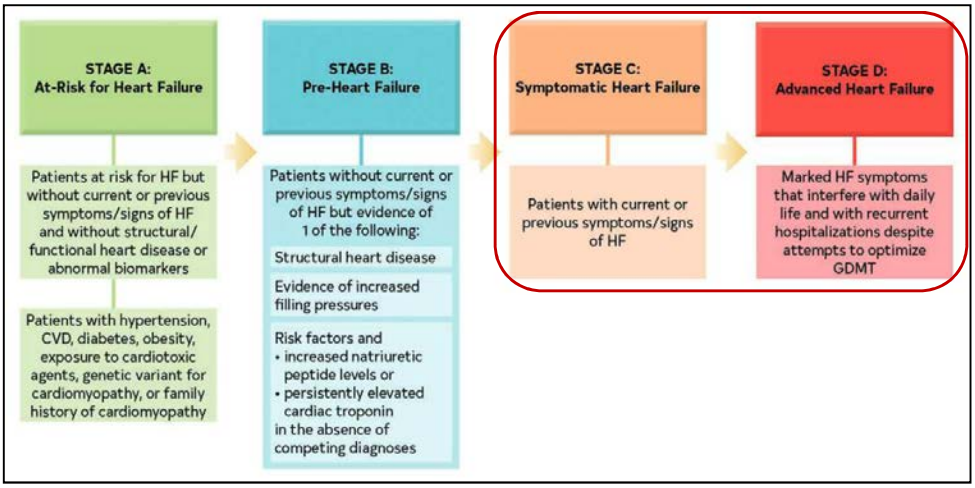
HFrEF vs. HFmrEFvs. HFpEF

- **Mortality:**
  - **30d: 9.5% vs. 8.2% vs. 8.5%**
  - **1 yr: 37.5% vs. 35.1% vs. 35.6%**
- **All-cause Readmission:**
  - **30d: 19.7% vs. 20.9% vs. 20.5%**
  - **1 yr: 59.6% vs. 63.2% vs. 62.5%**

Cheng et al. Am Heart J 2014;168:721-30.e3

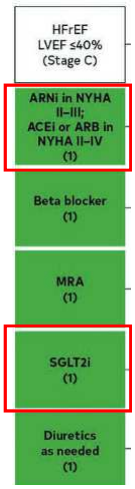


Stages of Heart Failure



Heidenreich et al. Circulation 2022;145:e876-894.

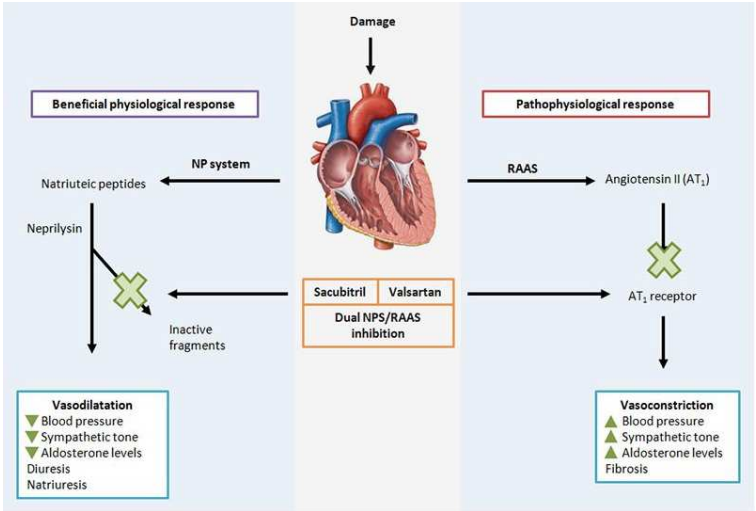
Stage C HF: Symptomatic HFrEF



bisoprolol, carvedilol, or metoprolol succinate

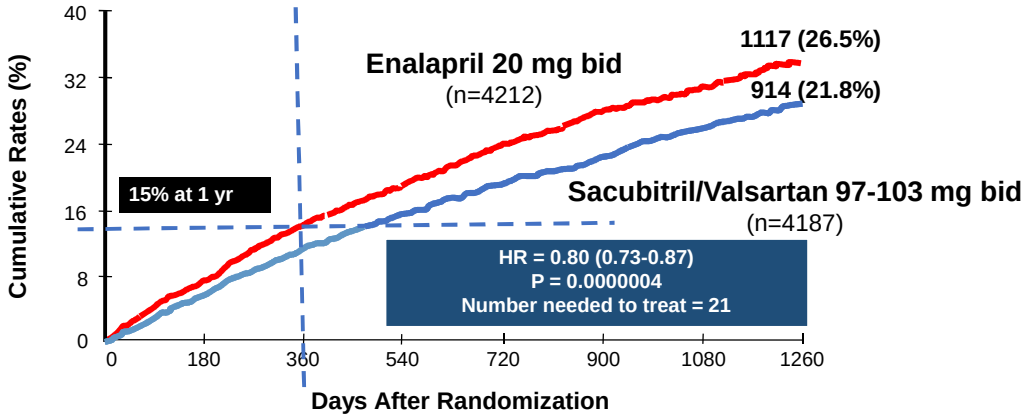
Heidenreich et al. Circulation 2022;145:e876-894.

Mechanism of ARNI



https://www.britishcardiovascularsociety.org/resources/editorials/articles/sacubitrilvalsartan-where-are-we-now

PARADIGM-HF: Primary Endpoint CV Death or HF Hospitalization



Major Side Effects: Hypotension, hyperkalemia, angioedema, renal dysfunction

McMurray JJ et al. N Engl J Med 2014;371:993-1004.

LIFE: Primary Endpoint NT-proBNP AUC

- N=335 pts, NYHA Class IV, EF ≤ 35%, BNP ≥ 250 or NT-proBNP ≥ 800 pg/ml, 3 mths of GDMT or intolerance, 1 sign of advanced HF (inotropes, EF ≤ 25%, ≥ 1 HF hospitalization, VO2 < 55% predicted, 6 min walk < 300 m)
- Exclusions: SBP < 90, eGFR < 20, K > 5.5

End point	Median (25th to 75th) Sacubitril/valsartan (n = 167)	Valsartan (n = 168)	R, OR, or difference between groups (95% CI)[b]	*P* value
No.	155	158	NA	NA
Secondary efficacy end points				
Days alive, out of hospital, and free from HF events, median (IQR)[c]	147.0 (9.0 to 164.0)	157.0 (53.5 to 164.0)	−11.2 (−26.4 to 4.0)	.15

ARNI not recommended in NYHA Class IV/patients with Stage D HF

Mann et al. JAMA Cardiol. 2022;7(1):17-25.

Guideline Update

2016 ACC/AHA/HFSA Focused Update on New Pharmacological Therapy for Heart Failure: An Update of the 2013 ACCF/AHA Guideline for the Management of Heart Failure

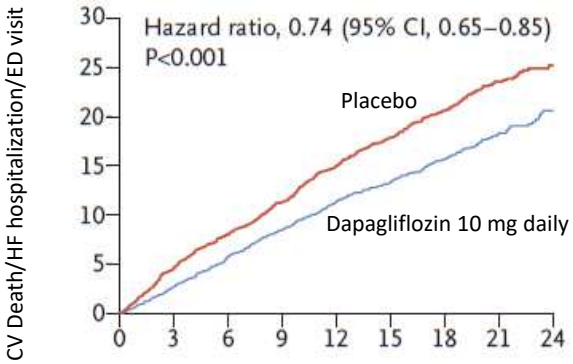
COR	LOE	Recommendations
I	B-R	ACEi OR ARB OR ARNI in conjunction with beta-blockers + MRA (where appropriate) is recommended for patients with chronic HFrEF to reduce morbidity and mortality.
I	B-R	In patients with chronic, symptomatic HFrEF NYHA class II or III who tolerate and ACE inhibitor or ARB, replacement by an ARNI is recommended to further reduce morbidity and mortality
III	B-R	ARNI should NOT be administered concomitantly with ACEi or within 36 hours of last ACEi dose
III	C=EO	ARNI should NOT be administered to patients with a history of angioedema

Yancy, et al. Circulation 2017;136:e137-161

SGLT-2i for Symptomatic HFrEF

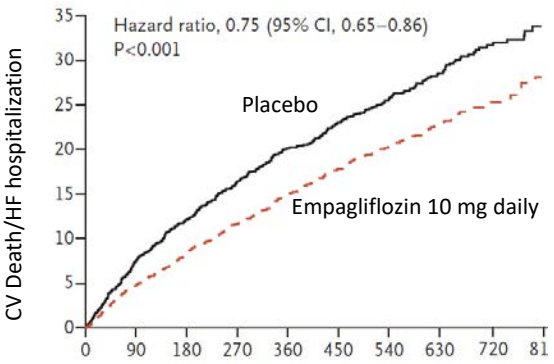
DAPA-HF:

N=4744, EF≤40% ± DM II, NYHA II-IV



EMPEROR-REDUCED:

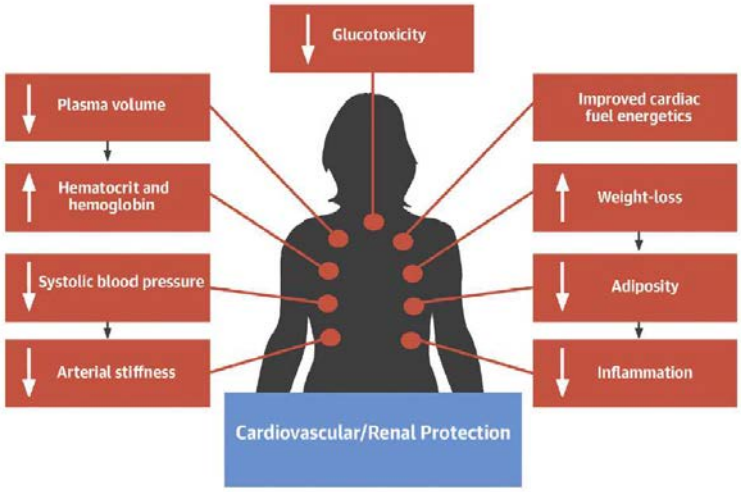
N=3730, EF≤40% ± DM II, NYHA II-IV



Also lower rate of decline of eGFR; Side Effects: Hypovolemia, UTI (Fungal), Balanitis, DKA

McMurray et al. NEJM 2019;381(21):1995; Packer et al. NEJM 2020;383:1413-24.

Potential Mechanisms for Cardiorenal Benefits of SGLT2i



Zelniker et al. JACC 2020;75(4):422

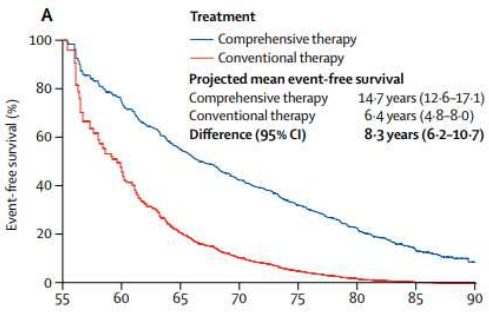
Guideline Update

COR	LOE	Recommendation
1	A	1. In patients with symptomatic chronic HFrEF, SGLT2i are recommended to reduce hospitalization for HF and cardiovascular mortality, irrespective of the presence of type 2 diabetes.[31,32]

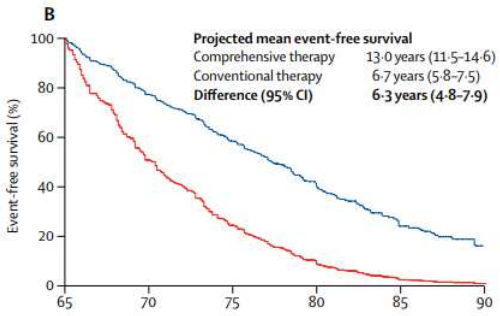
Heidenreich et al. Circulation 2022;145:e876-894.

Estimation of Lifetime Benefit of Comprehensive vs. Conventional HFrEF Therapy

Age ≥ 55 years



Age ≥ 65 years



Conventional: ACEi/ARB + beta-blocker
Comprehensive: ARNI + B-blocker + MRA + SGLT-2i

Vaduganathan et al. Lancet 2020;396:121-28.

Heart Failure Case

- 53 y.o. black man presents for f/u after 1st admission for ADHF
- Non-ischemic CMP (EF 25%, LVEDD 6.5 cm)
- Metoprolol succinate 200 mg daily, losartan 50 mg daily, spironolactone 25 mg daily, and furosemide 80 mg bid

- BP 120/50, HR 85
- JVP 10 cm water, mild HJR
- Clear lungs
- Nl s1, s2. + Soft MR m
- No hepatosplenomegaly
- No edema

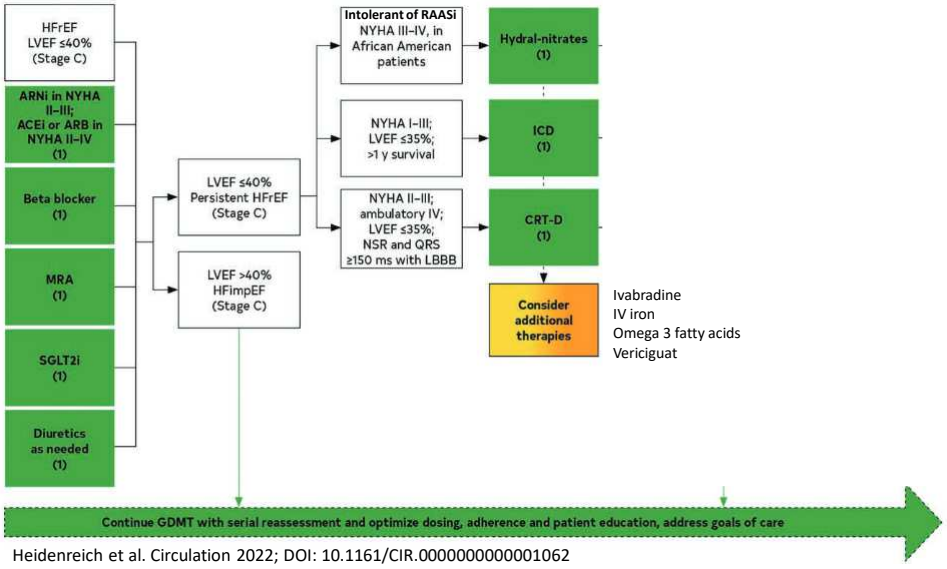
- Na 135, K 4.6, BUN 26, Cr 1.4
- HbA1c 5.4%

Question

- What is the next best step to lower his risk of HF hospitalization?

A. Change metoprolol succinate to carvedilol
B. Change losartan to sacubitril/valsartan
C. Add hydralazine and isordil
D. Do not add SGLT-2i since he is not a diabetic

Stage C HF: Symptomatic HF



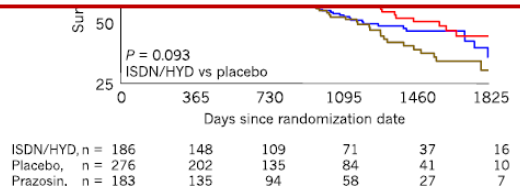
Heidenreich et al. Circulation 2022; DOI: 10.1161/CIR.0000000000001062

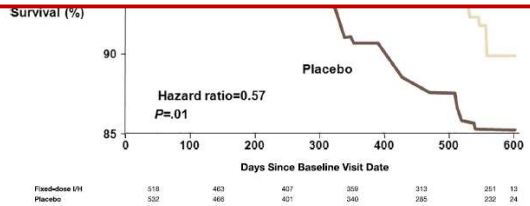
Hydralazine/Isordil in HFrEF

V-HEFT 1: Hydralazine/isordil vs placebo in HFrEF

A-HEFT: ACEi/BB + Hydralazine/isordil vs. placebo in Black pts w/ HFrEF

Consider hydralazine/isordil in pts unable to tolerate RAASi
Consider adding hydralazine/isordil in Black pts if BP can tolerate





Cohn NEJM 1986;314:1547-52; Taylor NEJM 2004;351:2049-57.

Additional Therapies to Reduce HF Hospitalizations, but *NOT Mortality,* in HFrEF

- Ivabradine
  - Inhibits I*f* channel in SA node
  - Lowers HR w/o affecting contractility

→ Sinus rhythm w/ resting HR ≥ 70 bpm despite max tolerated ß-blocker

- IV iron

→ Evidence of iron deficiency, independent of anemia

→ Ferritin < 100 *OR*
Ferritin 100-300 with T sat < 20%

- Vericiguat
  - Stimulates soluble guanylate cyclase and ↑ sensitivity to NO

→ Recent worsening HF and eGFR < 30 (*unable to tolerate RAASi or SGLT-2i*)

Heart Failure Case

- 53 y.o. black man presents 1 month later w/ ↑ SOB
- Non-ischemic CMP (EF 25%, LVEDD 6.5 cm)
- Metoprolol succinate 200 mg daily, sacubitril/valsartan 24-26 bid, spironolactone 25 mg daily, dapagliflozin 10 mg daily, and furosemide 80 mg bid

- BP 100/50, HR 90
- JVP < 10 cm water
- Clear lungs
- Irregularly, irregular. Nl s1, s2. II/VI sys m
- No HSM
- No edema

- Na 135, K 4.6, BUN 26, Cr 1.6
- Hb 10, Fe 25, TIBC 150, ferritin 300

Question

- What would be the next best step in his management?

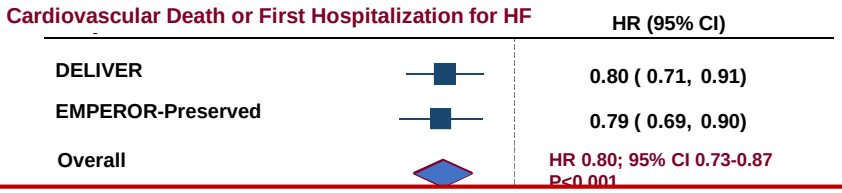
A. Add ivabradine
B. Give IV iron infusions
C. Add vericiguat
D. Start apixaban and plan for cardioversion in 3-4 weeks

Guideline Update for HFpEF

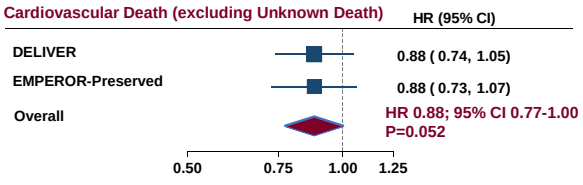
COR	LOE	Recommendations
1	C-LD	1. Patients with HFpEF and hypertension should have medication titrated to attain blood pressure targets in accordance with published clinical practice guidelines to prevent morbidity.[44–46]
2a	C-EO	2. In patients with HFpEF, management of AF can be useful to improve symptoms.
2a	B-R	1. In patients with HFpEF, SGLT2i can be beneficial in decreasing HF hospitalizations and cardiovascular mortality.[33]
2b	B-R	2. In selected patients with HFpEF, MRAs may be considered to decrease hospitalizations, particularly among patients with LVEF on the lower end of this spectrum.[38,42,43]
2b	B-R	3. In selected patients with HFpEF, ARNi may be considered to decrease hospitalizations, particularly among patients with LVEF on the lower end of this spectrum.[35,40]
3: No Benefit	B-R	4. In patients with HFpEF, routine use of nitrates or phosphodiesterase-5 inhibitors to increase activity or quality of life is ineffective.[49,50]

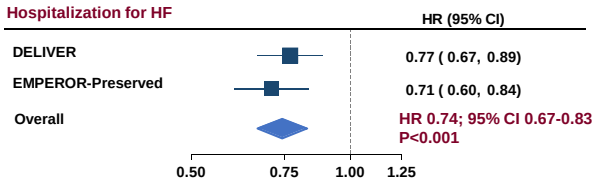
Heidenreich et al. Circulation 2022;145:e876-894

DELIVER and EMPEROR-Preserved Meta-Analysis: EF ≥ 40%



SGLT-2i reduce HF hospitalizations (and mortality) in HFpEF

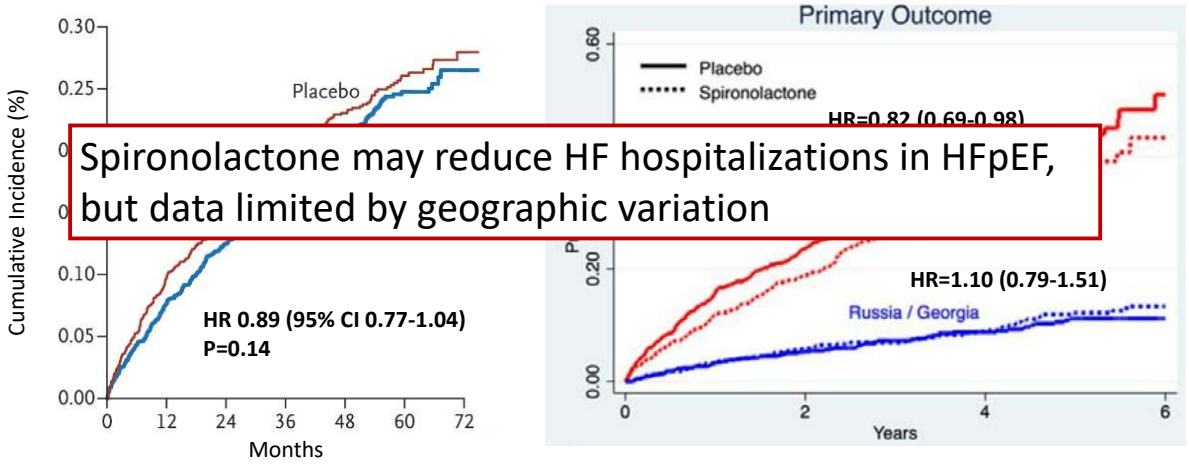




Vaduganathan M, et al. Lancet 2022

$P_{heterogeneity}$ >0.10 for all endpoints

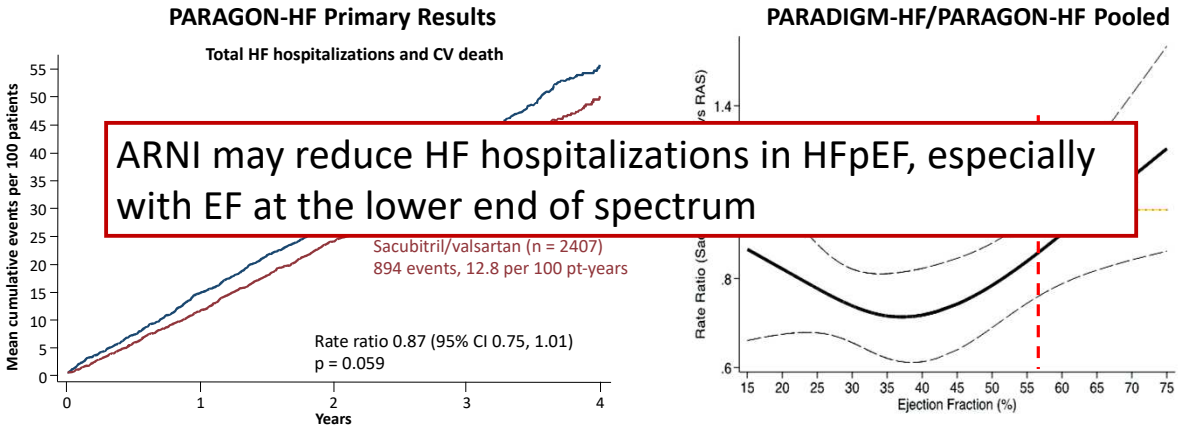
TOPCAT: Spironolactone in HFpEF (EF ≥ 45%)



Spironolactone may reduce HF hospitalizations in HFpEF, but data limited by geographic variation

Pitt et al. NEJM 2014; 370:1383-1392; Pfeffer et al. Circulation 2015;131:34-42.

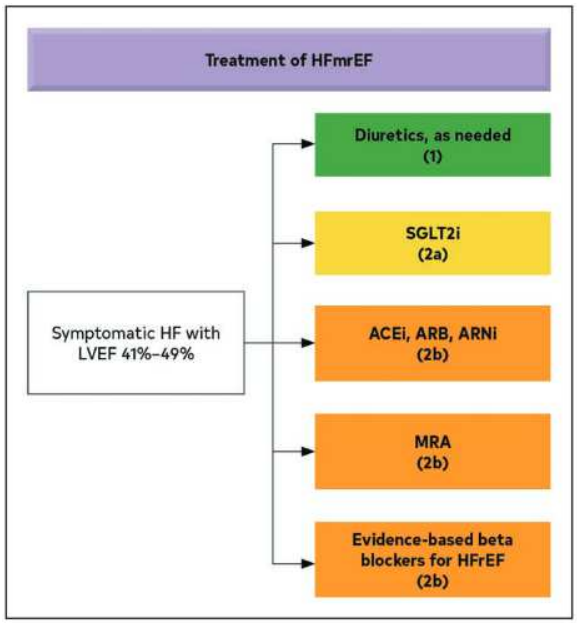
ARNI in EF ≥ 45%



ARNI may reduce HF hospitalizations in HFpEF, especially with EF at the lower end of spectrum

Solomon SD, et al. N Engl J Med 2019; Solomon SD, Circulation 2020

HF with Mid-Range LVEF
(41-49%)

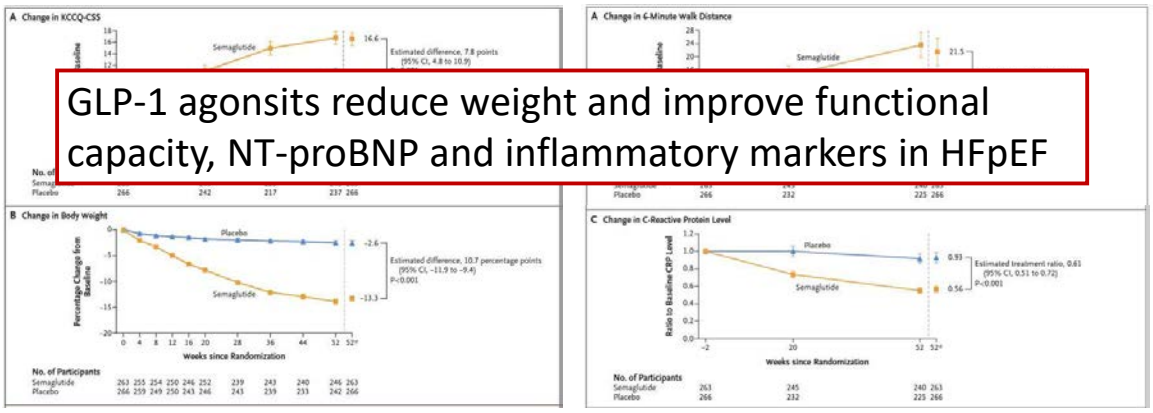


Heidenreich et al. Circulation 2022;145:e876-894

Novel Therapies for HFpEF

STEP-HFpEF: GLP-1 agonists in HFpEF

N=529 pts, symptomatic HFpEF (EF ≥ 45%), BMI ≥ 30
RTC: Semaglutide 2.4 mg weekly vs. placebo X 52 weeks



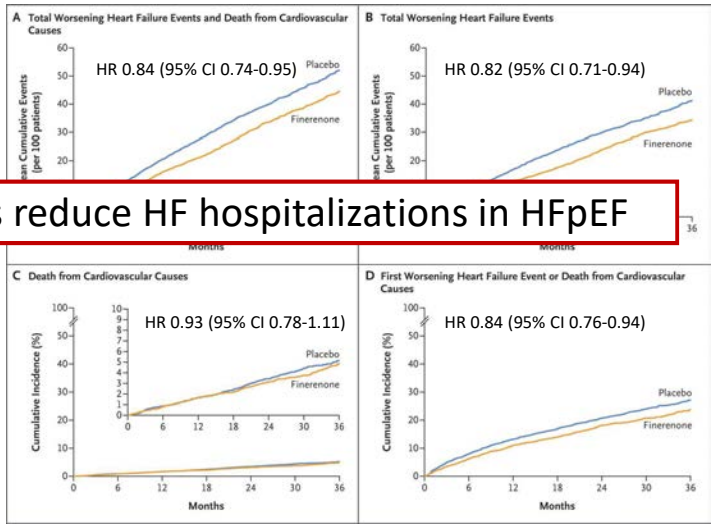
GLP-1 agonsits reduce weight and improve functional capacity, NT-proBNP and inflammatory markers in HFpEF

Kosiborod et al. N Engl J Med 2023;389:1069-84.

FINEARTS-HF: Fineranone in EF ≥ 40%

- 6001 pts
- Age ≥ 40 yrs, EF ≥ 40%, symptomatic HF and ↑ NPs
- RCT 1:1 fineranone 20-40 mg
- 83% on ß-blocker
- 80% onRAASi
- 14% on SGLT-2i

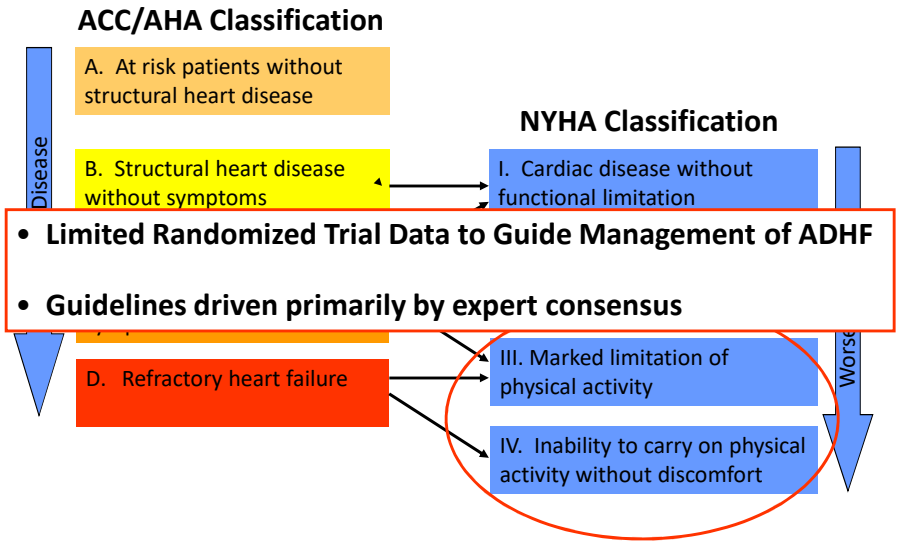
- Side effects:
  - ↑ hyperkalemia and Cr



Non-steroidal MRAs reduce HF hospitalizations in HFpEF

Solomon NEJM 2024; DOI: 10.1056/NEJMoa2407107

Stages of Heart Failure



Heart Failure Case

- He presents 3 mths later w/ dyspnea w/ minimal exertion and 10 lb weight gain despite doubling of diuretic dose
- Metoprolol succinate 200 mg daily, sacubitril/valsartan 24-26 bid, spironolactone 25 mg daily, dapagliflozin 10 mg daily, furosemide 160 mg bid, and apixaban 5 mg bid

- BP 90/70, HR 90
- JVD to angle of jaw
- Clear lungs
- RRR. Nl s1, s2. + s3, MR, TR
- Liver edge 2 cm below costal margin
- Trace edema, lukewarm to touch, 2+ distal pulses

- Na 128, K 4.6, BUN 30, Cr 1.8

Treatment Goals in ADHF

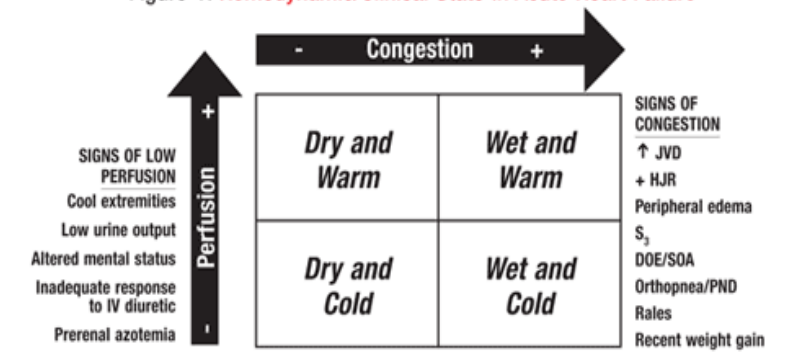
- Address precipitating factors
- Optimize volume status and perfusion
- Optimize oral heart failure regimen
- Manage Related Risks (e.g. SCD, VTE)
- Patient Education
- Initiate Longitudinal Disease Management

Precipitating Factors

- Acute coronary syndromes/coronary ischemia
- Uncontrolled hypertension
- Atrial or ventricular arrhythmias
- Acute Infection (e.g. URI, pneumonia, UTI)
- Medications (e.g. NSAIDs, steroids, TZDs, L-type CCBs)
- Nonadherence (eg. sodium and fluid restriction, medications)
- Excessive alcohol intake or illicit drug use
- Hypo/hyperthyroidism
- Other cardiac dz (acute endocarditis, acute dissection, acute myopericarditis)

Symptomatic HF is a Clinical Diagnosis

Figure 1. Hemodynamic/Clinical State in Acute Heart Failure



↑: increased; +: positive; -: negative; DOE: dyspnea on exertion; HJR: hepatojugular reflux; JVD: jugular venous distention; PND: paroxysmal nocturnal dyspnea; S_3: ventricular filling murmur; SOA: shortness of air.
Source: References 10, 11.

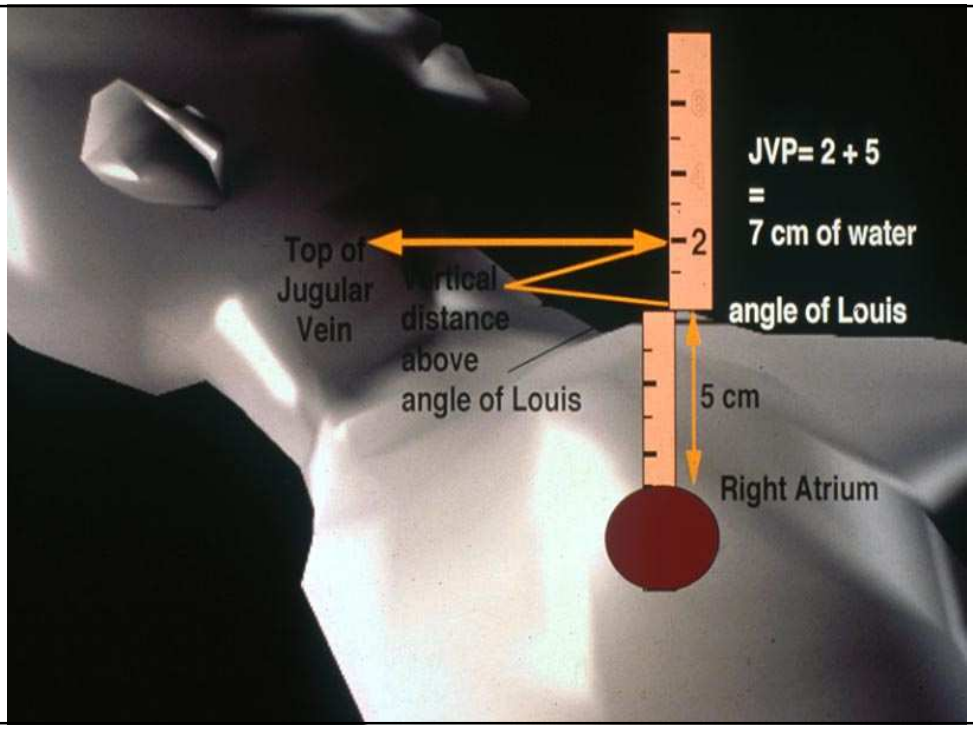
Nohria et al. JACC 2003;41:1797-1804.

Accuracy of Physical Findings for Elevated LV Filling Pressure

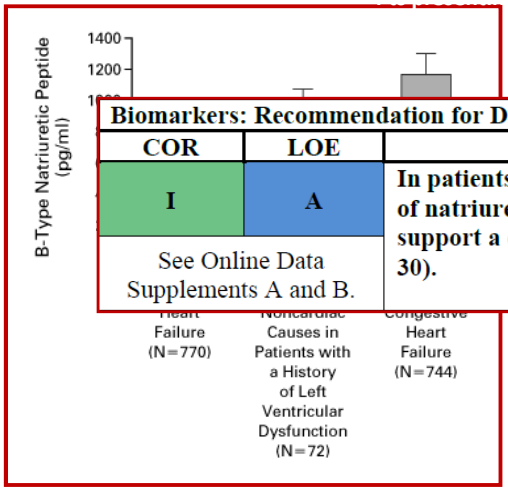
Finding	Sensitivity	Specificity
Orthopnea (≥2 pillows)	85%	24%
Rales (≥1/3 lungs fields)	15 %	89%
S3	63%	34%
Edema (>1+)	41%	67%
Elevated JVP (>10 cm)	67%	72%

Sensitivity and specificity for predicting PCWP > 22 mm Hg

Drazner M et al. Circ Heart Fail 2008;1:170



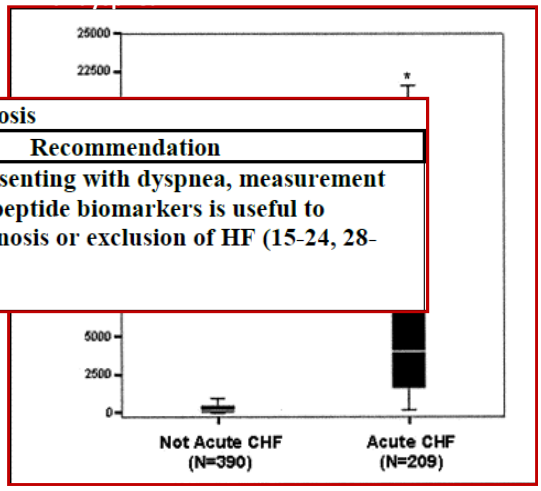
BNP to Assist Diagnosis of HF



Biomarkers: Recommendation for Diagnosis

COR	LOE	Recommendation
I	A	In patients presenting with dyspnea, measurement of natriuretic peptide biomarkers is useful to support a diagnosis or exclusion of HF (15-24, 28-30).

See Online Data Supplements A and B.



Maisel AS, et al. NEJM 2002;347:161; Januzzi J et al. Am Heart J 2005;149:744.

Diagnostic Limitations of Natriuretic Peptides

- Imperfect surrogate for filling pressures
  - Levels increase with age, female gender, pressure overload, renal failure
- **Measurement of NPs is most useful when there is diagnostic uncertainty or for prognostic indications**
- Only NT-proBNP predictive w/ Valsartan-Sacubitril

Redfield et al., JACC 2002; Raymond et al. Heart 2003; McCullough et al., AJKD 2003; Wang et al., Circulation 2004; Januzzi et al. Am J Cardiol 2005; Maisel et al., NEJM 2002; Wu et al. Eur J Heart Failure 2003; Shah et al. J Card Fail 2011.

Diuresis in ADHF

- Loop diuretics: IV bolus or continuous infusion
  - Furosemide, torsemide, bumetanide
    - 80 mg po furosemide = 40mg IV furosemide = 20 mg po/IV torsemide = 1 mg po/IV bumetanide
- Initiate diuretics rapidly at dose ≥ oral regimen
  - i.e. if home dose 80 mg p.o. furosemide, give 80 mg I.V. furosemide
  - Give at frequent intervals
    - At least b.i.d. or t.i.d.
  - Give higher doses in pts with elevated BUN
- ***Aldosterone antagonists are weak diuretics and used mostly for K-sparing and neurohormonal effects***

DOSE Trial

- N=308 pts with ADHF, < 24 hrs admission

	Low Dose	High Dose
HIGH vs. LOW DOSE Diuretic		
Continuous	1X oral	2.5X oral

Safe to use high-dose diuretics to promote decongestion, even at the risk of transient WRF

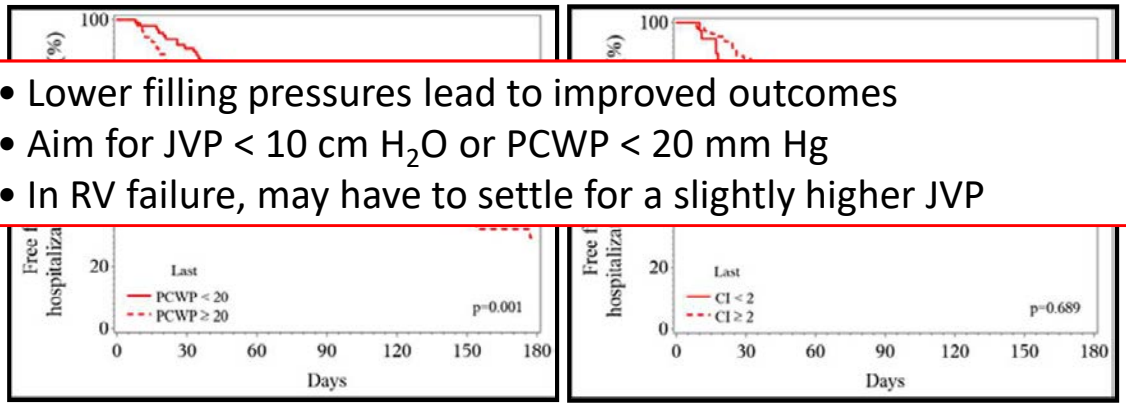
- ↑ proportion w/ WRF (↑Cr > 0.3 mg/dL)
- No diff in death, re-hospitalization, or ED visits @ 60d

BOLUS vs. CONTINUOUS Diuretic Infusion

- No difference in any outcomes

Felker et al. NEJM 2011;364:797-805.

PCWP, not CI, Predicts Outcomes After HF Hospitalization: ESCAPE Trial



- Lower filling pressures lead to improved outcomes
- Aim for JVP < 10 cm H_2O or PCWP < 20 mm Hg
- In RV failure, may have to settle for a slightly higher JVP

Cooper LB et al. J Cardiac Fail. 2016;22;182-9.

TRANSFORM-HF: Torsemide vs. Furosemide

N=2859, HF hospitalization, LVEF < 40% or ↑ Natriuretic peptides

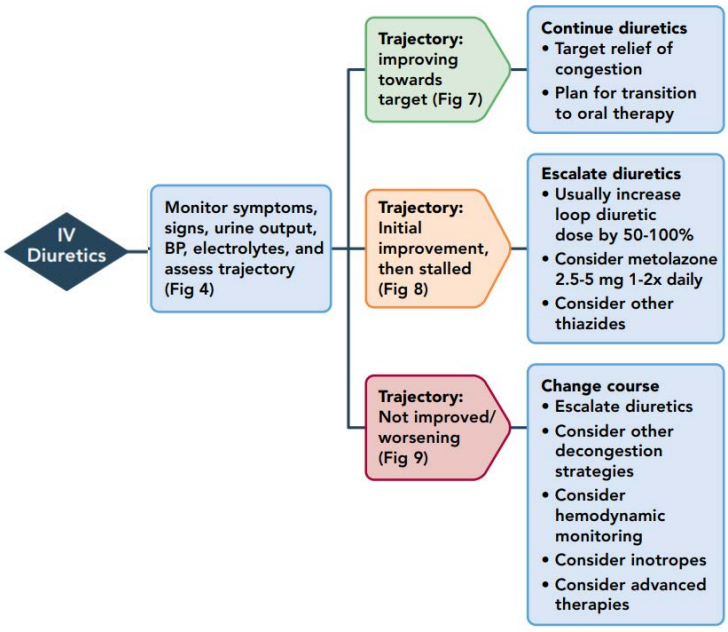
Variable	Torsemide (n = 1431) No. (%)	Torsemide (n = 1431) Events per 100 patient-years	Furosemide (n = 1428) No. (%)	Furosemide (n = 1428) Events per 100 patient-year	Risk reduction (95% CI)[a]	HR (95% CI)[b]	*P* value[b]
Primary outcome							
All-cause mortality	373 (26.1)	17.0	374 (26.2)	17.0	0.12 (−2.85 to 3.14)	1.02 (0.89 to 1.18)	.76
Secondary outcomes							
All-cause mortality or all-cause hospitalization (over 12 mo)	677 (47.3)	99.2	704 (49.3)	107.6	1.99 (−1.79 to 5.56)	0.92 (0.83 to 1.02)	
Total hospitalizations (over 12 mo)	940	106.3	987	111.9		RR, 0.94 (0.84 to 1.07)	
All-cause mortality or all-cause hospitalization (over 30 d)	149 (10.4)	147.2	157 (11.0)	157.5	0.58 (−1.80 to 2.75)	0.94 (0.75 to 1.18)	

Mentz et al. JAMA 2023;329 (3):214-223.

Hospital Course

- Day 1:
  - 200 mg IV furosemide b.i.d.
  - Net urine output 1000 ml
- Day 2:
  - 200 mg IV furosemide b.i.d.
  - Net urine output 300 ml
  - BUN/Cr 30/1.8 → 40/2.2

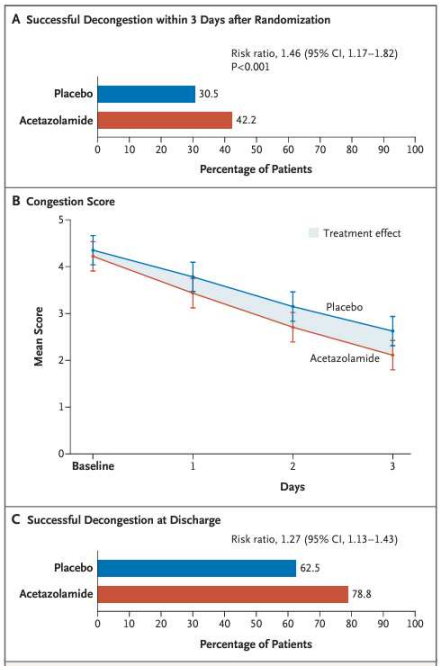
Diuretic Therapy in Different Clinical Trajectories



Hollenberg et al. JACC 2019;74(15):1966-2011

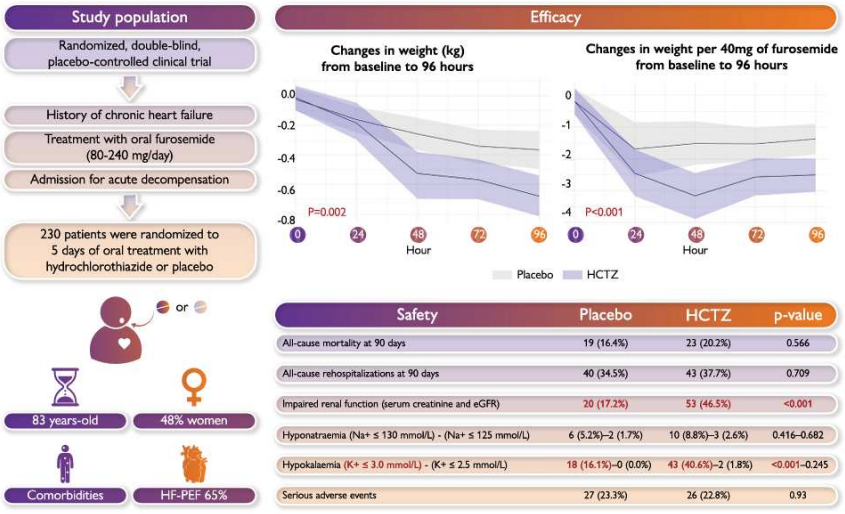
ADVOR: Diuretics ± Acetozolamide for ADHF

- N=519 pts
- ADHF
- HFpEF + HFrEF
- NT-proBNP > 1000 pg/ml *or* BNP > 250 pg/ml
- *IV Lasix ≤ 80 mg/day*
- *No SGLT-2i*



Mullens et al. N Engl J Med 2022;387:1185-95.

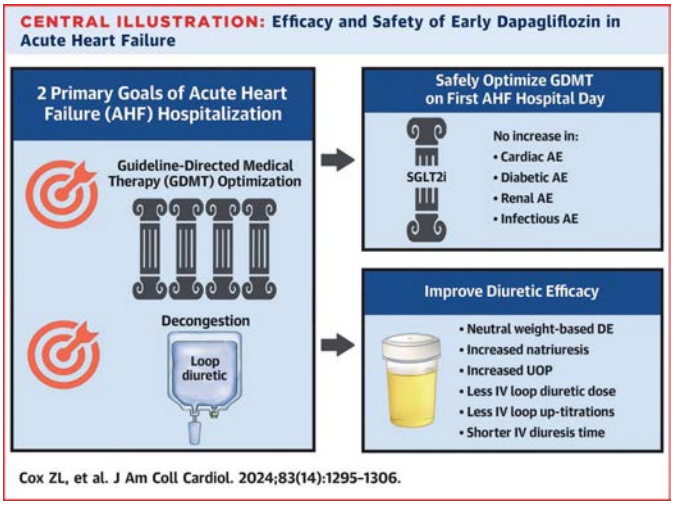
CLOROTIC Trial: Diuretics ± HCTZ for ADHF



Safety	Placebo	HCTZ	p-value
All-cause mortality at 90 days	19 (16.4%)	23 (20.2%)	0.566
All-cause rehospitalizations at 90 days	40 (34.5%)	43 (37.7%)	0.709
Impaired renal function (serum creatinine and eGFR)	20 (17.2%)	53 (46.5%)	<0.001
Hyponatraemia (Na+ ≤ 130 mmol/L) - (Na+ ≤ 125 mmol/L)	6 (5.2%)–2 (1.7%)	10 (8.8%)–3 (2.6%)	0.416–0.682
Hypokalaemia (K+ ≤ 3.0 mmol/L) - (K+ ≤ 2.5 mmol/L)	18 (16.1%)–0 (0.0%)	43 (40.6%)–2 (1.8%)	<0.001–0.245
Serious adverse events	27 (23.3%)	26 (22.8%)	0.93

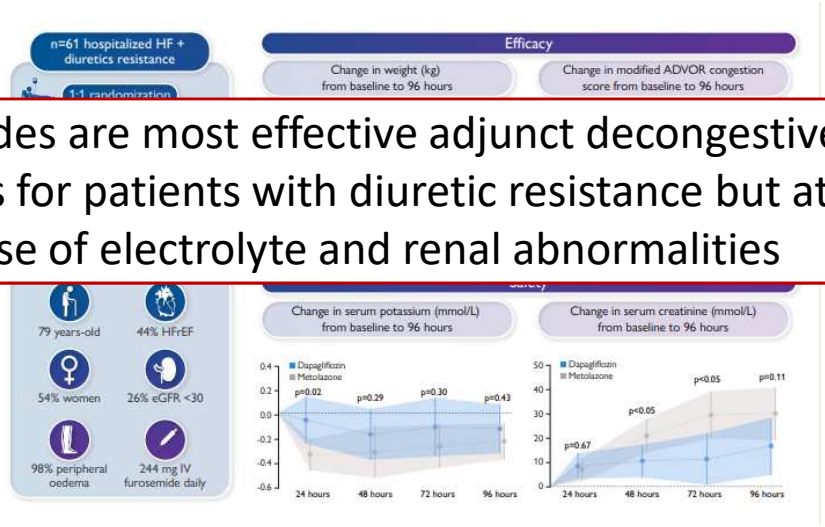
Trullas et al. Eur Heart J 2023;44:411-21.

DICTATE-AHF: Early Initiation of Dapagliflozin in Acute HF



Cox ZL, et al. J Am Coll Cardiol. 2024;83(14):1295-1306.

DAPA-RESIST: Dapagliflozin vs. Metolazone for Diuretic Resistance

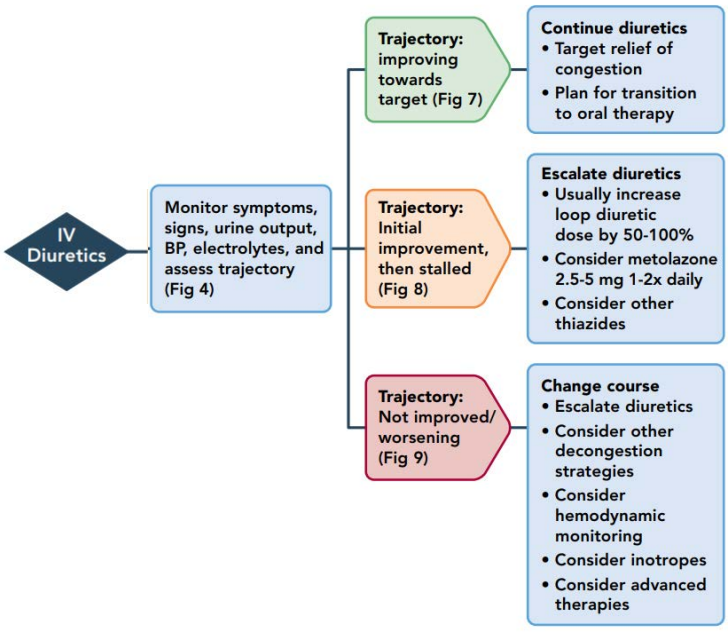


Thiazides are most effective adjunct decongestive agents for patients with diuretic resistance but at the expense of electrolyte and renal abnormalities

Hospital Course

- Day 3:
  - IV furosemide drip @ 20 mg/h + metolazone 5 mg x 1
  - Net urine output 1000 ml
  - BUN 50, Cr 3.1
  - Transient drop in SBP to 75 mm Hg
- Day 4:
  - Weaned off metoprolol w/out improvement
- Day 5:
  - Stopped valsartan-sacubitril w/out improvement

Diuretic Therapy in Different Clinical Trajectories



Hollenberg et al. JACC 2019;74(15):1966-2011

ROSE-AHF

- 360 pts admitted with ≥ 1 symptom and sign of ADHF (HFrEF or HFpEF)
- eGFR 15-60 ml/min
- Randomized to nesiritide, dopamine, or placebo within 24 hrs
- Primary end-points: urine volume and change in cystatin C at 72 hrs

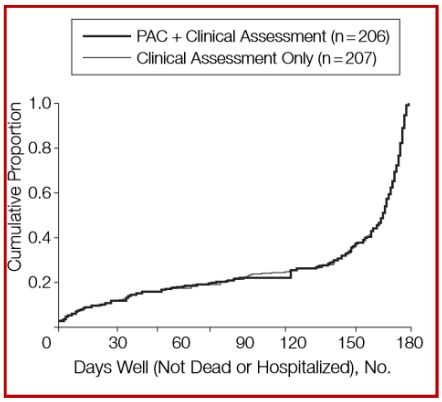
Table 2. Coprimary End Points: Effect of Low-Dose Dopamine vs Placebo or Low-Dose Nesiritide vs Placebo on Cumulative Urine Volume During 72 Hours and Change in Cystatin C Level From Baseline to 72 Hours

	Mean (95% CI)			
	Placebo	Drug	Treatment Difference	*P* Value
Dopamine strategy	Placebo (n = 119)	Dopamine (n = 122)		
Cumulative urine volume from randomization to 72 h, mL	8296 (7762 to 8830)	8524 (7917 to 9131)	229 (−714 to 1171)	.59
Change in cystatin C level from randomization to 72 h, mg/L	0.11 (0.06 to 0.16)	0.12 (0.06 to 0.18)	0.01 (−0.08 to 0.10)	.72
Nesiritide strategy	Placebo (n = 119)	Nesiritide (n = 119)		
Cumulative urine volume from randomization to 72 h, mL	8296 (7762 to 8830)	8574 (8014 to 9134)	279 (−618 to 1176)	.49
Change in cystatin C level from randomization to 72 h, mg/L	0.11 (0.06 to 0.16)	0.07 (0.01 to 0.13)	−0.04 (−0.13 to 0.05)	.36

JAMA. 2013;310(23):2533-2543

When to consider PA Catheter?

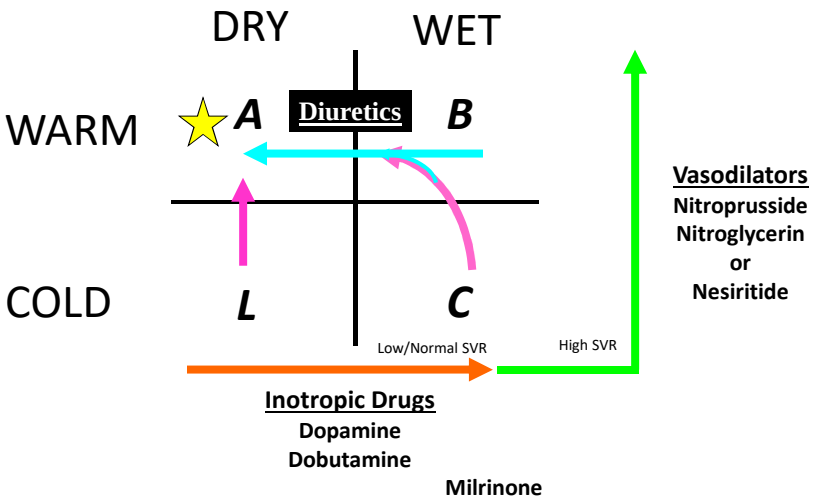
ESCAPE Trial



Binanay et al. 2005;294(13):1625-1633.

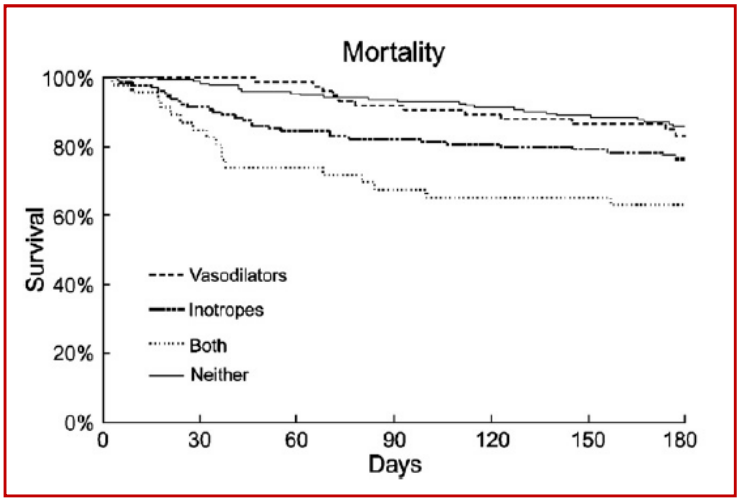
- Hypotension or worsening renal function with empiric therapy
- Presumed cardiogenic shock
- Apparent inotrope dependence or refractory symptoms
- Evaluation for VAD or transplant candidacy
- Evaluation of pulmonary arterial hypertension

Treatment of Acute Decompensated HF



Stevenson LW. Eur J Heart Failure 1999

Inotropes Increase Mortality in ADHF



Elkayam et al. Am Heart J 2007;153:98-104.

Hospital Course

- PA catheter: RA 16, PCW 34, CI 1.5, SVR 1800
- Did not tolerate IV nitroprusside due to hypotension
- Started on IV milrinone with improved urine output and renal function
- Attempts to wean milrinone unsuccessful
- Plans to discharge on home IV milrinone

High Risk Features In Hospitalized Pts

At Admission	During Hospitalization	At Discharge
Advanced age Co-morbidities Frailty	Low spot urine after 1st IV diuretic Diuretic resistance Discontinuation of ACEi/ARB/ARNI	Residual Congestion < 30% reduction in NP levels from admission
Renal Dysfunction Hyponatremia Higher NP levels		

Discuss prognosis/goals of care
Consider referring to HF specialist for consideration of advanced therapies

Hollenberg et al. JACC 2019;74(15):1966-2011

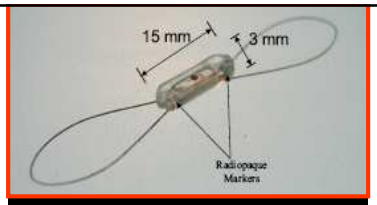
Hospital Discharge

- Ensure adequate decongestion (JVP < 10 cm H_2O)
- Institute evidence-supported therapies prior to d/c
- Careful discharge planning, including written instructions for
  - Discharge medications
  - Diet (2 gm Na and 2 L fluid restriction)
  - Weight monitoring
  - What to do if symptoms worsen
  - Follow-up appointment with 1 week of discharge
- Disease Management Program

Impact of Various Transitional Care Interventions on HF Outcomes

Intervention	Outcome at 3–6 Months	N Studies	N Subjects	Finding	Relative Risk (95% CI)
Home-visiting programs	All-cause readmission	9	1563	⇩	0.75 (0.68 to 0.86)
	HF-specific readmission	1	282	⇩	0.51 (0.31 to 0.82)
	Composite endpoint**	4	824	⇩	0.78 (0.65 to 0.94)
	Mortality	8	1693	⇩	0.77 (0.60 to 0.997)
	Number of hospital days at readmission	3	403	⇩	WMD, -1.17 (-2.44 to 0.09)
Structured telephone support	All-cause readmission	8	2166	⇔	0.92 (0.77 to 1.10)
	HF-specific readmission	7	1790	⇩	0.74 (0.61 to 0.90)
	Composite endpoint	3	977	⇔	0.81 (0.58 to 1.12)
	Mortality	7	2011	⇩	0.74 (0.56 to 0.97)
	Number of hospital days at readmission	5	1189	⇩	WMD, -0.95 (-2.43 to 0.53)
Telemonitoring	All-cause readmission	3	434	⇔	1.11 (0.87 to 1.42)
	HF-specific readmission	1	182	⇔	1.70 (0.82 to 3.51)
	Mortality	3	564	⇔	0.93 (0.25 to 3.48)
Multidisciplinary-HF clinic	All-cause readmission	2	336	⇩	0.70 (0.55 to 0.89)
	HF-specific readmission	1	106	–	0.70 (0.29 to 1.70)
	Composite endpoint	2	306	⇔	0.80 (0.43 to 1.01)
	Mortality	3	536	⇩	0.56 (0.34 to 0.92)
Nurse-led HF clinic	All-cause readmission	2	264	⇔	0.88 (0.57 to 1.37)
	HF-specific readmission	1	158	–	0.95 (0.68 to 1.32)
	Composite endpoint	1	106	–	0.66 (0.43 to 1.01)
	Mortality	2	264	⇔	0.59 (0.12 to 3.03)
Primarily educational interventions	All-cause readmission	1	200	–	1.14 (0.84 to 1.54)
	HF-specific readmission	1	223	–	0.53 (0.31 to 0.90)
	Composite endpoint	2	423	⇔	0.92 (0.58 to 1.47)
	Mortality	2	423	⇔	1.20 (0.52 to 2.76)

AHRQ Pub. No. 14(15) – EHC021-3-EF Oct. 2015

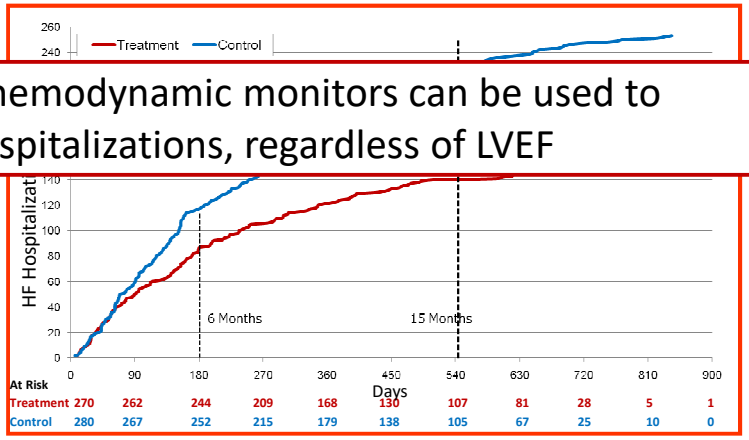


PA pressure Sensor

CHAMPION

Heart Failure Management Guided by Implantable PA pressure Sensor vs. Usual Care (N=550)

Implantable hemodynamic monitors can be used to reduce HF hospitalizations, regardless of LVEF



Abraham WT, et al. *Lancet* 2011; 377: 658–66

Summary

- Optimize GDMT to improve outcomes in HFrEF, including consideration of ARNI and SGLT-2i
- Consider ivabradine, IV iron and vericiguat to reduce HF hospitalizations
- Therapy for HFpEF remains limited but SGLT-2i (*and fineranone*) reduce hospitalizations
- GLP-1 agonists result in weight loss and improve QOL in obese pts with HFpEF
- ADHF is a clinical diagnosis, but BNP can be useful when there is diagnostic uncertainty
- Treatment of HF should be targeted at optimization of volume status
- Patients should be diuresed to JVP < 10 cm H_2O when possible and routine use of inotropes should be avoided
- Initiate lifesaving therapies prior to hospital discharge and coordinate longitudinal follow-up
- Patients with refractory/recurrent symptoms that are resistant to standard therapy or those with high-risk features should be referred to HF specialist