Guideline-Based Management of Heart Failure and Arrhythmic Complications

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Disclosure

Jo Rodgers

Novartis: Advisory Board, Research Support

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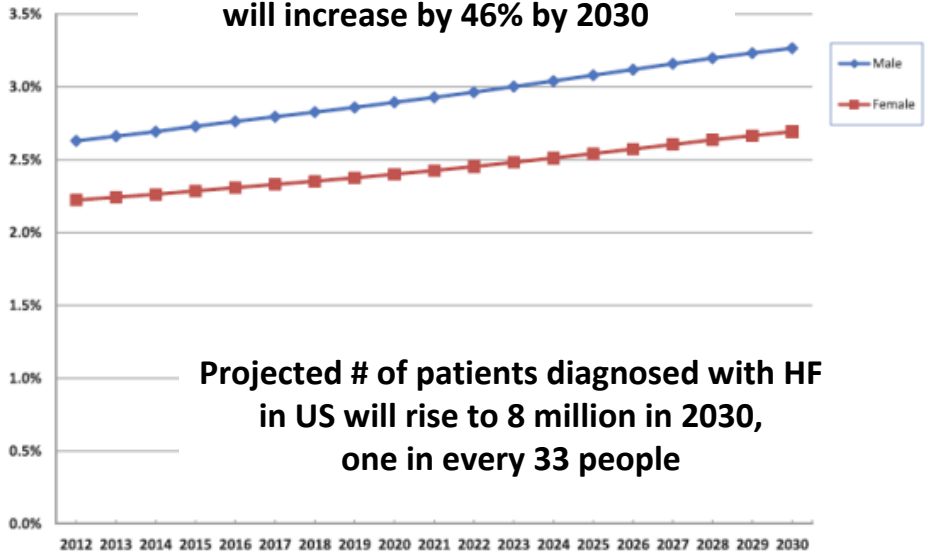
Learning Objectives

- Given a description of a specific patient with heart failure and reduced ejection fraction (HFrEF), develop a medication regimen that reflects guideline-directed medical therapy based on current evidence-based guidelines.
- Given a description of a specific patient with heart failure and preserved ejection fraction (HFpEF), develop a medication regimen that reflects guideline-directed medical therapy based on current evidence-based guidelines.

Projected Prevalence and Cost

Prevalence

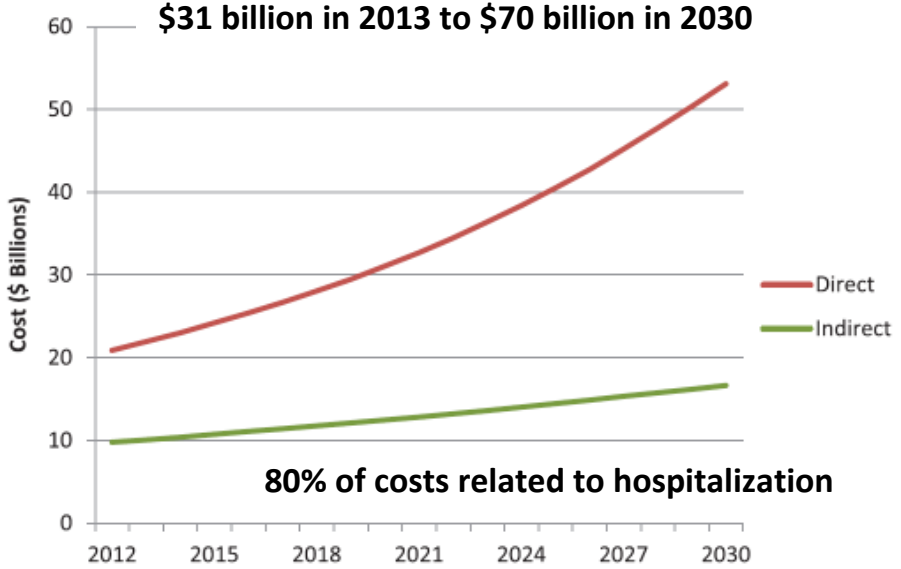
Projected # of patients with HF in US will increase by 46% by 2030



Projected # of patients diagnosed with HF in US will rise to 8 million in 2030, one in every 33 people

Cost

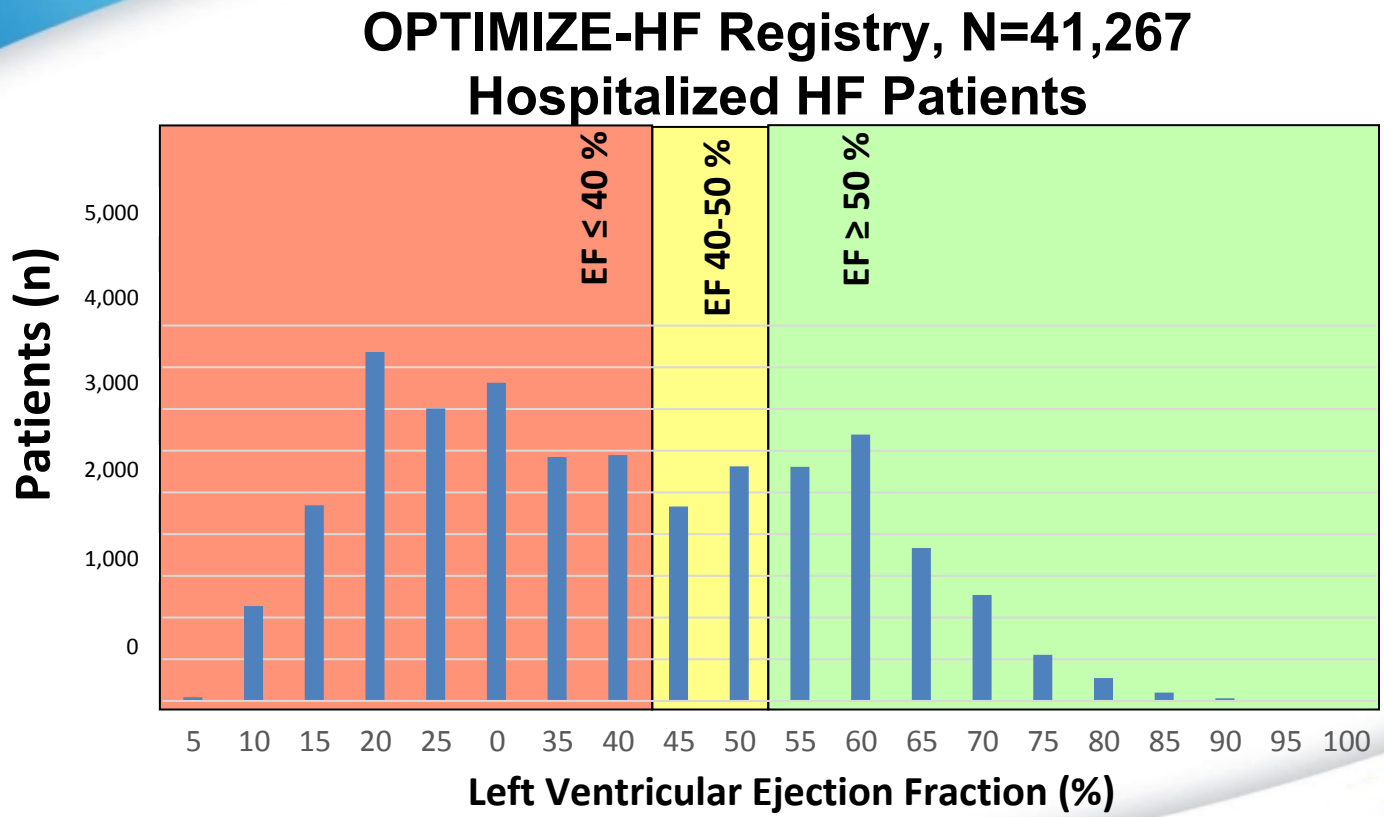
Projected doubling of costs in US from $31 billion in 2013 to $70 billion in 2030



80% of costs related to hospitalization

Circ Heart Fail. 2013;6:606-619

Ejection Fraction Distribution



J Am Coll Cardiol. 2007;50:768-777

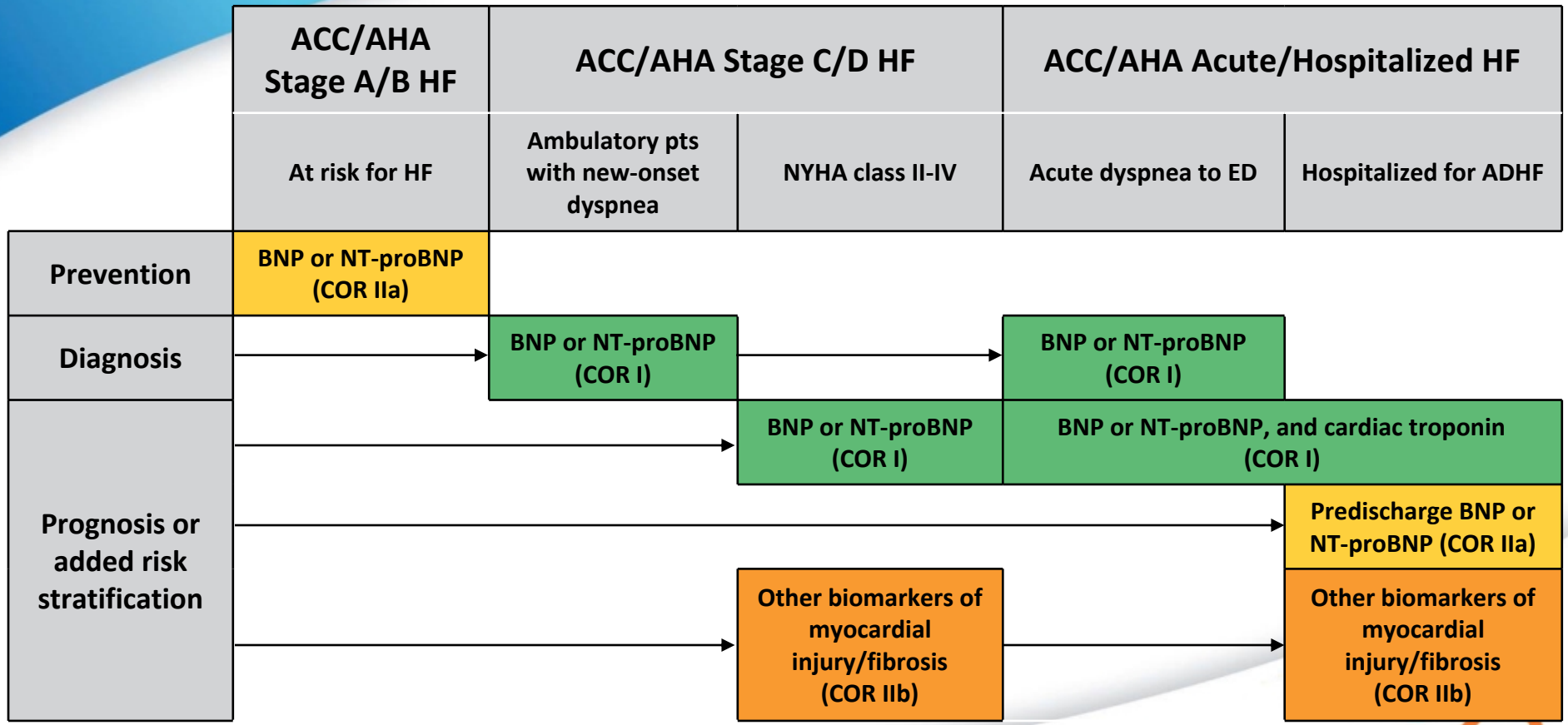
Classification of Recommendation and Level of Evidence

CLASS I (STRONG)	CLASS IIa (MODERATE)	CLASS IIb (WEAK)	CLASS III: NO BENEFIT (MODERATE)	CLASS III: HARM (STRONG)
Benefit >>> Risk	Benefit >> Risk	Benefit ≥ Risk	Benefit = Risk	Risk > Benefit

LEVEL A	Level B-R	Level B-NR	Level C-LD	Level C-EO
High-quality evidence (>1 RCT)	Moderate-quality evidence (≥1 RCT)	Well-designed, non-randomized (≥1 study)	Studies with limitations of design or execution	Expert Opinion

2017 ACC/AHA/HFSA HF Guidelines *Circ* 2017; 135:1-45

Biomarkers Indications for Use



2017 ACC/AHA/HFSA HF Guidelines *Circ* 2017; 135:1-45

GUIDE-IT Trial

- Prospective, randomized, multicenter clinical trial
- High-risk heart failure patients with HFrEF (n=1,100)
- Biomarker-guided therapy (goal NT-proBNP level <1,000 pg/ml) vs usual care
- Composite endpoint: time to CV death or first HF hospitalization
- Trial ended 18 months early due to no benefit

J Am Coll Card HF 2014; 2:457-65, https://dcri.org/dcri-announces-halt-guide-trial/

Therapy for Stage C HF*r*EF: Magnitude of Benefit Demonstrated in RCTs

GDMT	Relative Risk Reduction in Mortality	Number Needed to Treat for Mortality *
ACE inhibitor or ARB	17%	26
Beta blocker	34%	9
Aldosterone antagonist	30%	6
Hydralazine/nitrate	43%	7

*Standardized to 36 months

2013 ACC/AHA HF Guidelines *JACC* 2013; 128: e240-327

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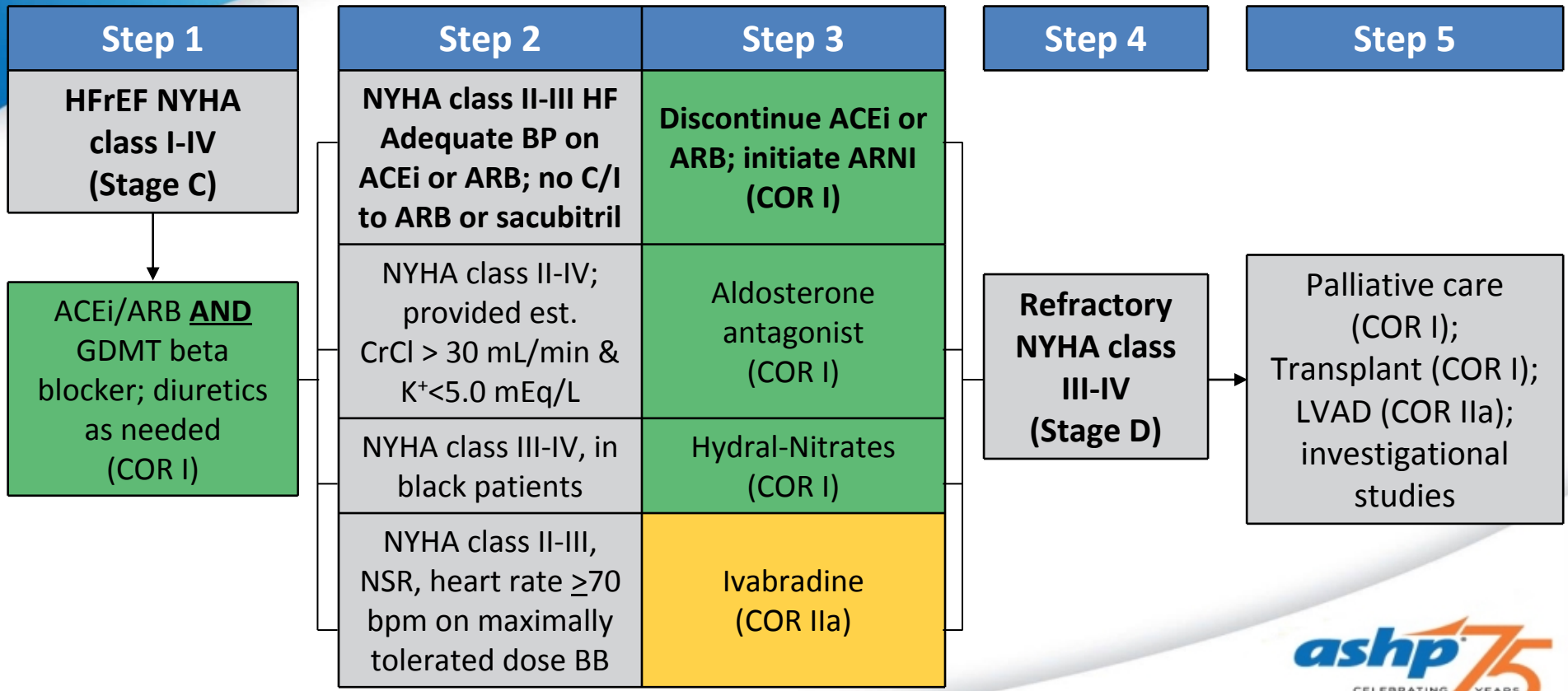
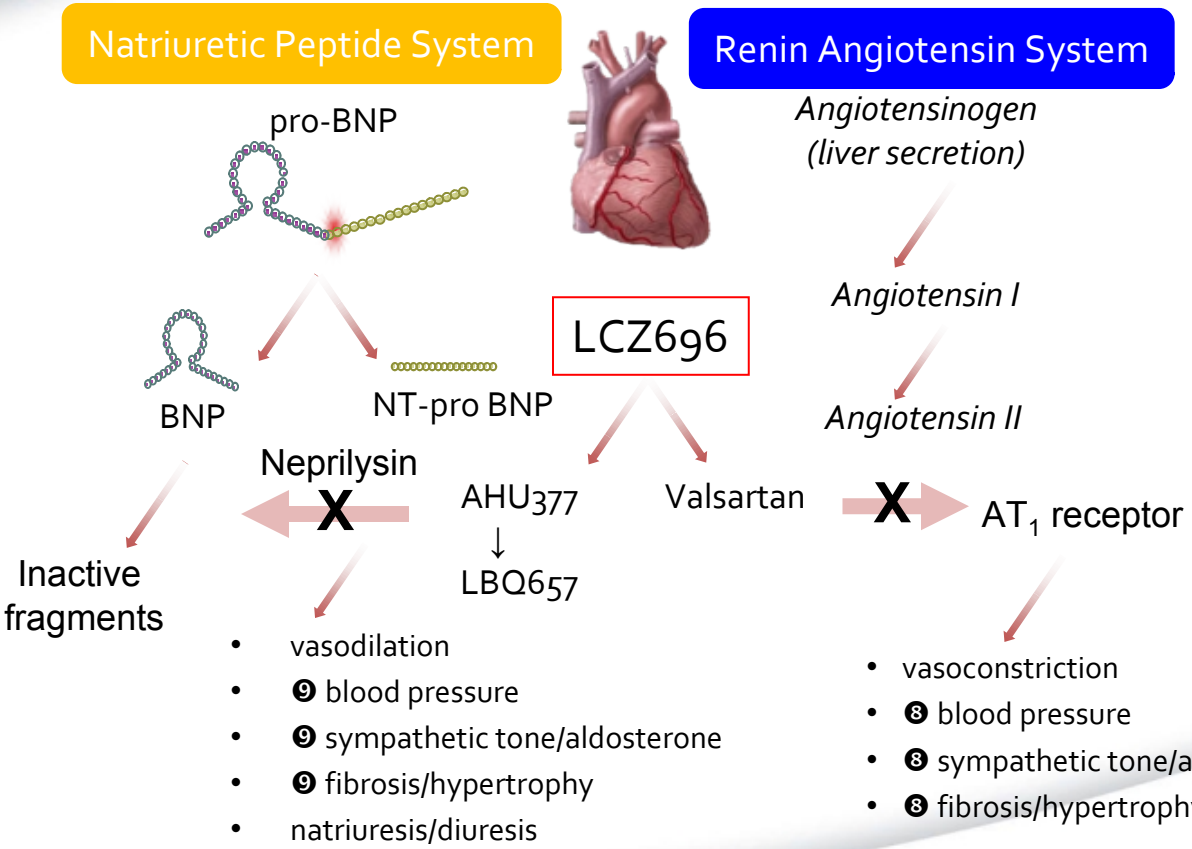
Treatment of HFrEF Stage C and D



2017 ACC/AHA/HFSA HF Guidelines *Circ* 2017; 135:1-45

Neprilysin Inhibitor/AT_1 Receptor Blocker



J Am Coll Card HF 2014; 2:663-70

PARADIGM-HF Trial: Entry Criteria

Inclusion Criteria

- Age ≥ 18 yrs
- NYHA Class II-IV
- LVEF ≤ 35%
- BNP ≥ 150 pg/mL or NT-proBNP ≥ 600 pg/mL
- Stable dose (4 wks) BB and ACEI/ARB equivalent to ≥ enalapril 10 mg/day

Exclusion Criteria

- Symptomatic hypotension
- SBP <100 mmHg
- eGFR < 30 mL/min/1.73 m^2
- Serum K^+ > 5.2 mmol/L
- Hx of angioedema
- Unacceptable side effects with ACEI/ARB

N Engl J Med 2014; 371:933-1004

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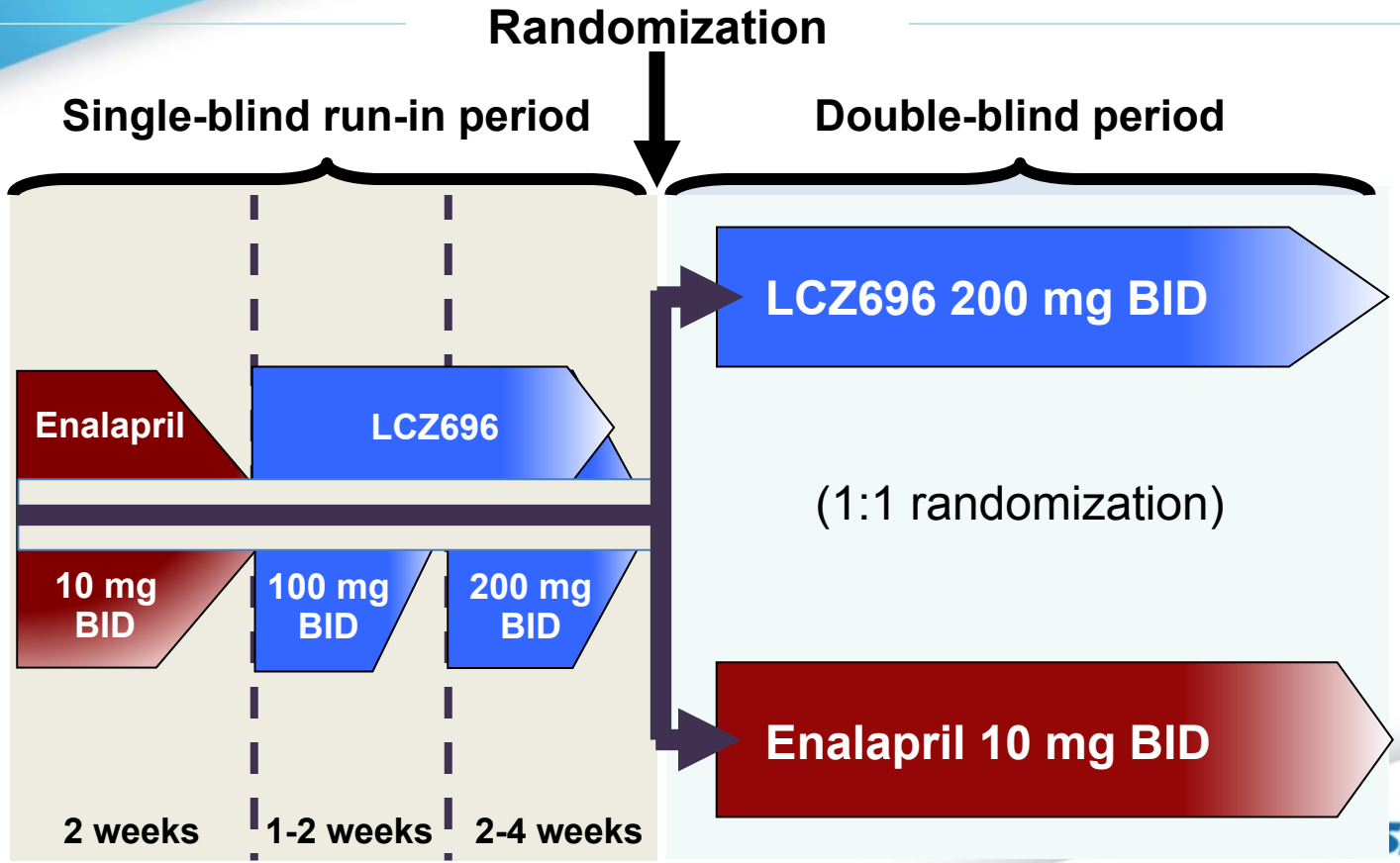
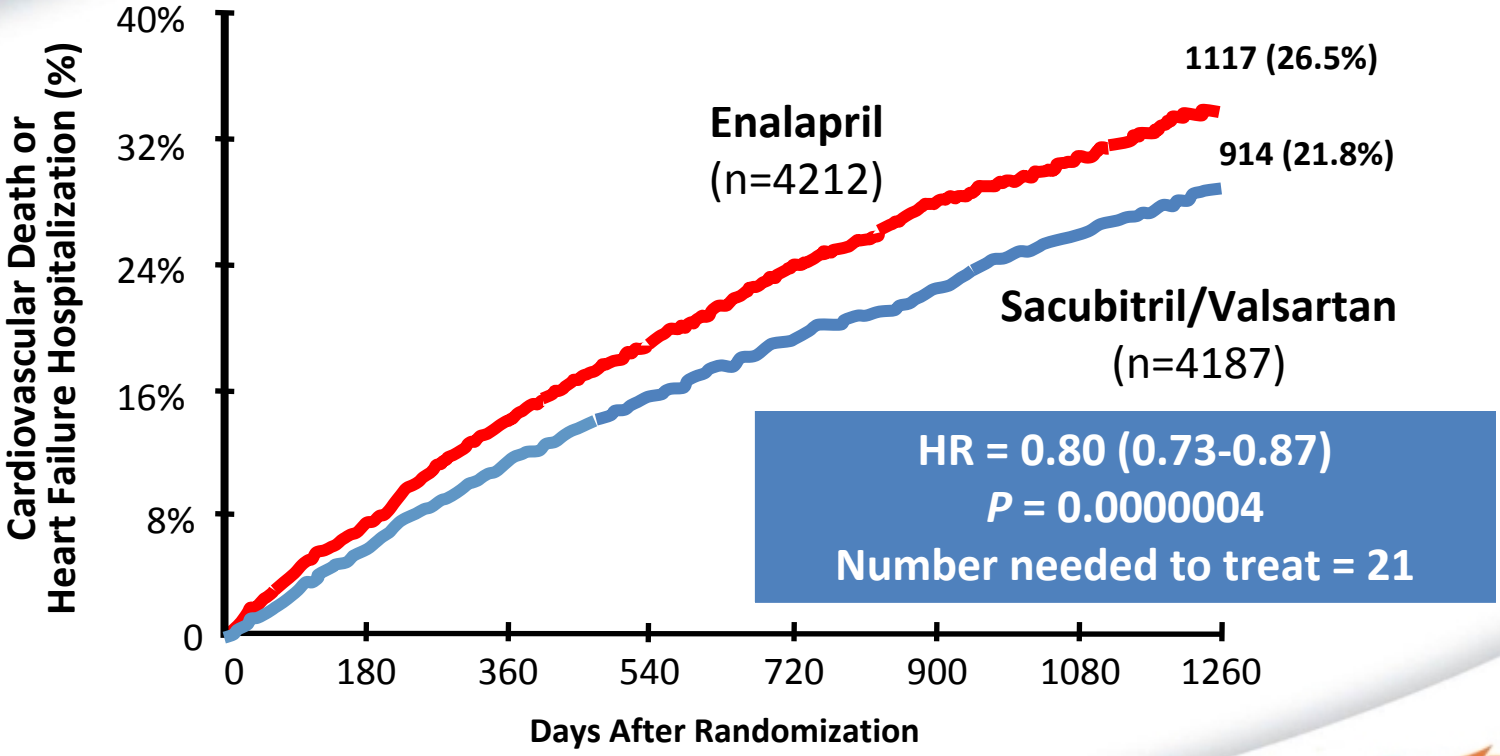
PARADIGM-HF Trial: Study Design



N Engl J Med 2014; 371:933-1004

PARADIGM-HF: Primary Endpoint



N Engl J Med 2014; 371:933-1004

PARADIGM-HF: Adverse Events

	Ernesto (n=4187)	Enalapril (n=4212)	p-value
Symptomatic hypotension	588 (14%)	388 (9.2%)	< 0.001
Serum potassium > 6.0 mmol/l	181 (4.3%)	236 (5.6%)	0.007
Serum creatinine ≥ 2.5 mg/dl	139 (3.3%)	188 (4.5%)	0.007
Cough	474 (11.3%)	601 (14.2%)	< 0.001
Angioedema	19 (0.4%)	10 (0.3%)	NS

N Engl J Med 2014; 371:933-1004

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Guideline Update: Sacubitril/Valsartan

COR	LOE	Guideline 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

2016 ACC/AHA HF Guideline Update *Circ* 2016; 134: e282-e293

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Sacubitril/Valsartan Dosing

Patient Population	Initial Dose	Target Dose (Maximum)
Most patients	49/51 mg twice daily	97/103 mg twice daily
Special populations - Not on ACEI or ARB - On low doses of ACEI or ARB - eGFR <30 mL/min/1.73 m^2 - Moderate hepatic impairment	24/26 mg twice daily	97/103 mg twice daily

- Do **NOT** administer within 36 hours of ACEI administration

Entresto™ (Sacubitril/Valsartan) Package Insert 2017

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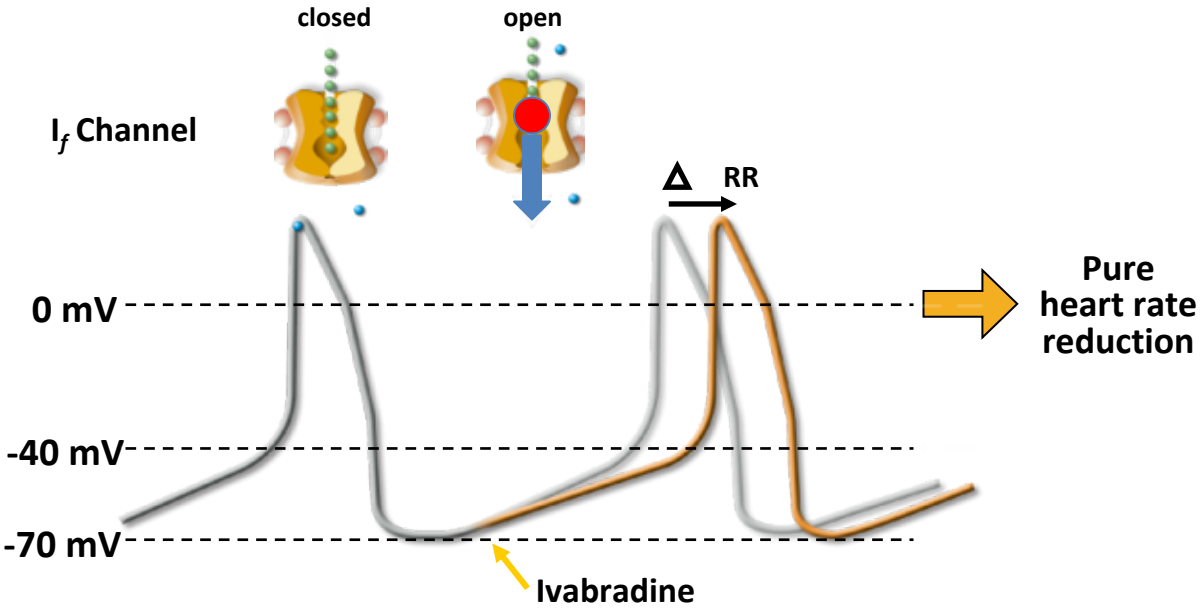
Ivabradine: Selective I_f Inhibitor

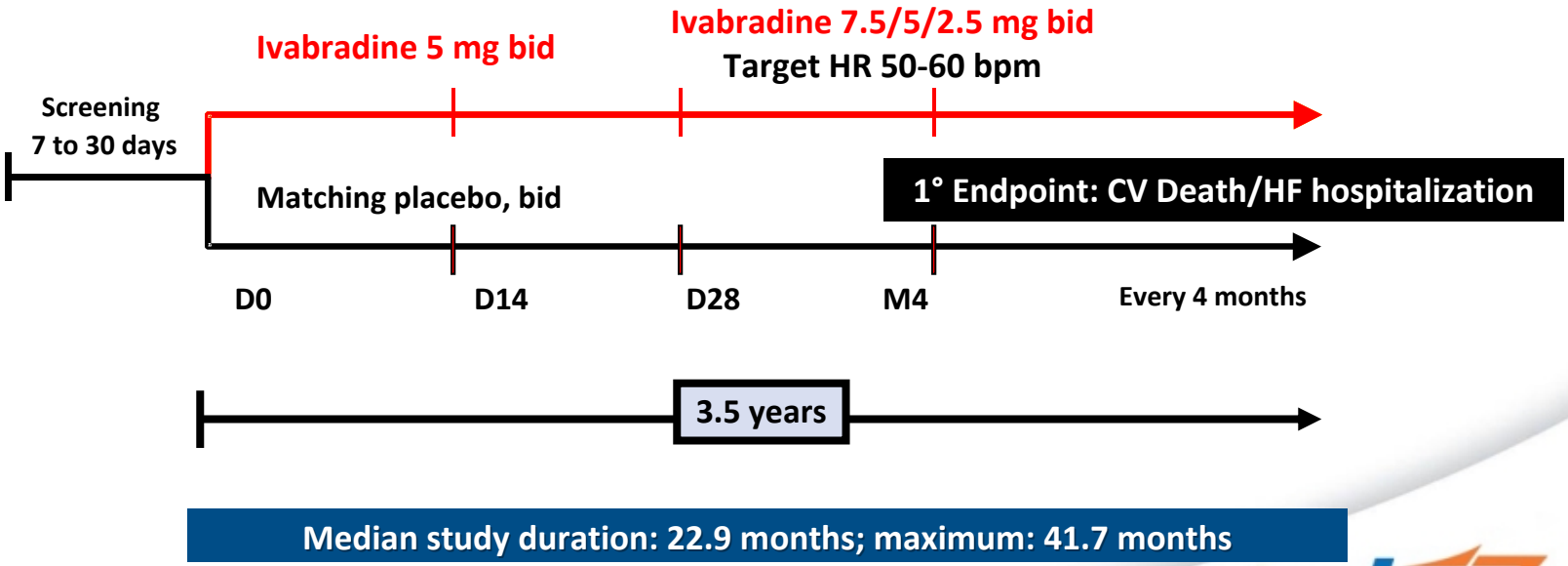


I_f inhibition reduces diastolic depolarization slope, thereby lowering HR

Br J Pharmacol. 1994;112:37-42

SHIFT Trial: Entry Criteria/Study Design

6558 patients with NYHA II-IV HF, LVEF ≤ 35%,
prior HF hospitalization (within 12 months) and HR ≥ 70 bpm in NSR



Lancet 2010; 376:875-885

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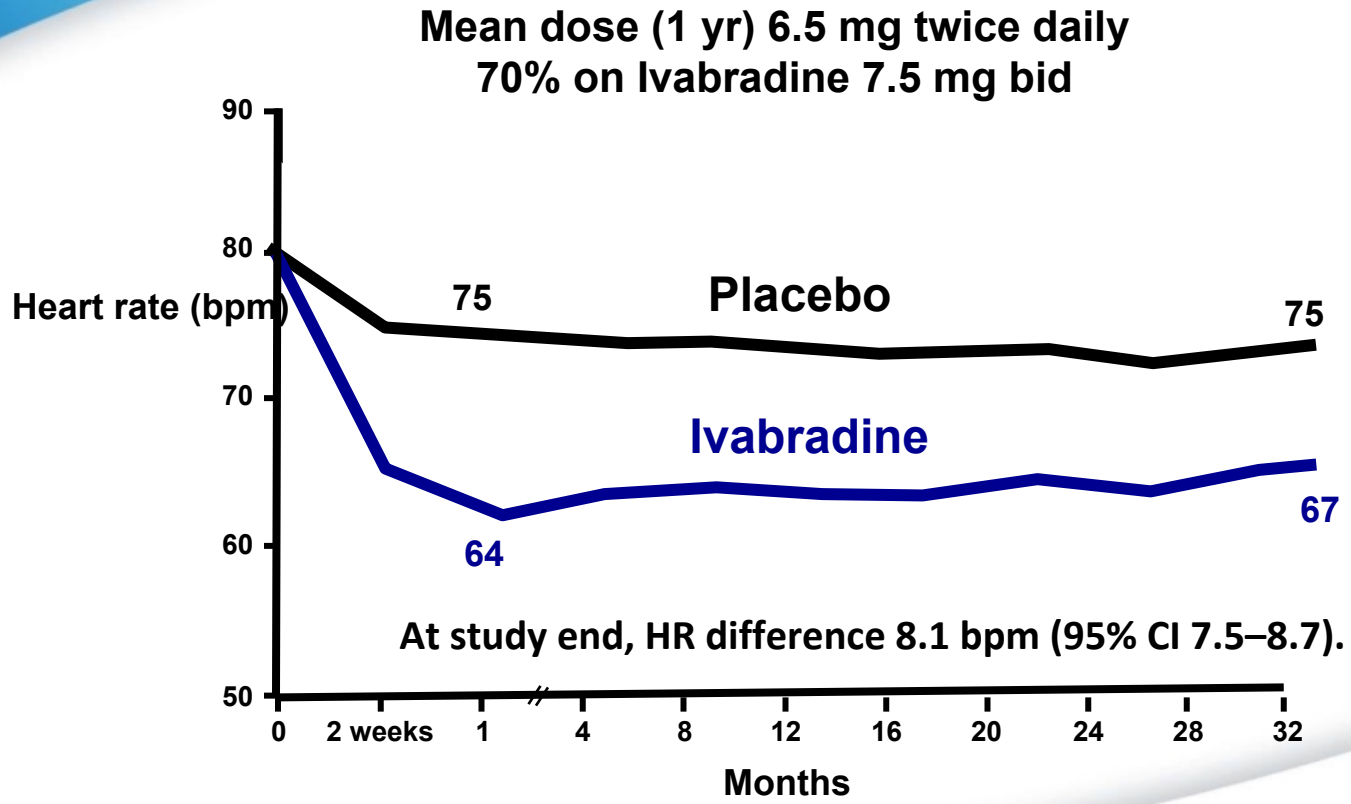
SHIFT Trial: Impact on Heart Rate



Lancet 2010; 376:875-885

SHIFT Trial: Endpoints

Outcomes	Ivabradine (n=3241)	Placebo (n=3264)	HR (95% CI)	p value
CV death or HF hospitalization	793 (24%)	937 (29%)	0.82 (0.75–0.90)	<0.0001
CV death	449 (14%)	491 (15%)	0.91 (0.80-1.03)	0.128
HF hospitalization	514 (16%)	672 (21%)	0.74 (0.66–0.83)	<0.0001

Lancet 2010; 376:875-885

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SHIFT Trial: Adverse Events

	Ivabradine N=3232, n (%)	Placebo N=3260, n (%)	*p* value
All adverse events	2439 (75%)	2423 (74%)	0.303
Heart failure	804 (25%)	937 (29%)	0.0005
Symptomatic bradycardia	150 (5%)	32 (1%)	<0.0001
Asymptomatic bradycardia	184 (6%)	48 (1%)	<0.0001
Atrial fibrillation	306 (9%)	251 (8%)	0.012
Nervous system disorders	130 (4%)	178 (5%)	0.007
Phosphenes	89 (3%)	17 (1%)	<0.0001

Lancet 2010; 376:875-885

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Guideline Update: Ivabradine

COR	LOE	Recommendations
IIa	B-R	Ivabradine can be beneficial to reduce HF hospitalization for patients with symptomatic (NYHA class II-III), stable, chronic HFrEF (LVEF<=35%) who are receiving GDMT , including a beta-blocker at maximally tolerated dose, and who are in sinus rhythm with a HR>=70 bpm at rest

2016 ACC/AHA HF Guideline Update *Circ* 2016; 134: e282-e293

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Ivabradine Dosing

Starting dose: 5 mg twice daily with meals

- At 2 weeks, adjust dose to achieve a resting HR 50-60 bpm
- Thereafter, adjust dose as needed based on resting HR and tolerability
- Max dose 7.5 mg twice daily
- If history of conduction defects, or other patients in whom bradycardia could lead to hemodynamic compromise, initiate at 2.5 mg twice daily

Corolan® (Ivabradine) Package Insert 2017

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BC is a 63 year old Caucasian female with HF (LVEF 32%, NYHA class III) who presents for her routine clinic visit.

Medications: furosemide 40 mg twice daily, lisinopril 20 mg daily, metoprolol XL 150 mg daily, digoxin 0.125 mg MWF.

PE/Vitals/Labs: No signs/symptoms of volume overload, BP 122/76 mmHg, HR 62 bpm, RR 14, K^+ 5.2 mmol/L, BUN 45 mg/dL, sCr 2.2 mg/dL, and SDC 0.7 ng/mL

How should BC's HF regimen be optimized?

1. Add spironolactone 25 mg daily
2. Increase to metoprolol XL 200 mg daily
3. Add ivabradine
4. Change lisinopril to sacubitril/valsartan

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Therapy for Stage C HFpEF

Recommendations	COR	LOE
Systolic and diastolic BP control	I	B
Diuretics for relief of volume overload	I	C
Coronary revascularization for patients with CAD	IIa	C
Management of atrial fibrillation	IIa	C
Use of beta-blockers, ACEIs, and ARBs for HTN	IIa	C
ARBs might be considered to reduce hospitalizations	IIb	B
Nutritional supplementation is not recommended	III: No Benefit	C

2013 ACC/AHA HF Guidelines *JACC* 2013; 128: e240-327

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Therapy for Stage C HFpEF

COR	LOE	Recommendations	Comment/ Rationale
IIb	B-R	In appropriately selected* patients with HF*p*EF (elevated BNP or HF admission within 1 yr), ARAs might be considered to reduce hospitalizations.	NEW: Current recommendation reflects new RCT data.
III: No Benefit	B-R	Routine use of nitrates or phosphodiesterase-5 inhibitors to increase activity or QoL in patients with HF*p*EF is ineffective.	NEW: Current recommendation reflects new data from RCTs.

*eGFR > 30 mL/min, sCr < 2.5 mg/dL, K < 5 mEq/L

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TOPCAT Trial

- Spironolactone vs placebo in HFpEF
- Primary endpoint: CV death, cardiac arrest, or HF hospitalization
  - HR 0.89 (95% CI, 0.77-1.04); p = 0.14

Region (n)	Spironolactone	Placebo	HR (95% CI)	P value
Americas (1767)	242 (27.3%)	280 (31.8%)	0.82 (0.69-0.98)	0.026
Russia/Georgia (1678)	78 (9.3%)	71 (8.4%)	1.10 (0.79-1.51)	0.058

Regional differences: p < 0.001

Circ 2015; 131:34-42

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Treating Hypertension in HF*r*EF and HFpEF

COR	LOE	Recommendations	Comment/ Rationale
I	C-EO (HFrEF) C-LD (HFpEF)	Patients with HF*r*EF and HFpEF and HTN should be prescribed GDMT titrated to attain SBP < 130 mm Hg.	NEW: Recommendation has been adapted from recent clinical trial data but not specifically tested per se in a randomized trial of patients with HF.

2017 ACC/AHA/HFSA HF Guidelines *Circ* 2017; 135:1-45

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SPRINT Trial

- ≥ 50 YO, SBP 130-180 mm Hg and increased risk of CV events
- Intensive Trt: SBP < 120 mmHg vs Standard Trt: SBP < 140 mmHg
- Primary Endpoint: MI, other ACS, stroke, HF or death from CV causes

Outcome	Intensive Trt (n=4678)	Standard Trt (n=4683)	HR (95% CI)	P value
Primary outcome	243 (5.2%)	319 (6.8)	0.75 (0.64-0.89)	< 0.001
Heart failure	62 (1.3)	100 (2.1)	0.62 (0.45-0.84)	0.002
CV death	37 (0.8)	65 (1.4)	0.57 (0.38-0.85)	0.005
All-cause death	155 (3.3)	210 (4.5)	0.73 (0.6-0.9)	0.003

N Engl J Med 2015;373:2103-16

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RT is a 47 year old African American male with HFpEF (LVEF 55-60%) who presents for his routine clinic visit.

Medications: bumetanide 2 mg twice daily, lisinopril 20 mg daily, amlodipine 10 mg daily, HCTZ 25 mg daily, HYD 75 mg three times daily.

PE/Vitals/Labs: No signs/symptoms of volume overload, BP 167/89 mmHg, HR 72 bpm, RR 14, K^+ 4.2 mmol/L, BUN 27 mg/dL, sCr 1.2 mg/dL

How should RT's HF regimen be optimized?

1. Increase to lisinopril 40 mg daily
2. Increase to amlodipine 20 mg daily
3. Add ISMN 30 mg daily
4. Add spironolactone 25 mg daily

Anemia

COR	LOE	Recommendations	Comment/ Rationale
IIb	**B-R**	In patients with NYHA class II-III HF and iron deficiency*, IV iron might be reasonable to improve functional status and QoL.	NEW: New evidence consistent with therapeutic benefit.

*Ferritin < 100 ng/mL or 100 to 300 ng/mL if transferrin saturation is <20%

2017 ACC/AHA/HFSA HF Guidelines *Circ* 2017; 135:1-45

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Key Takeaways

- Key Takeaway #1
  - Sacubitril-valsartan and ivabradine should be incorporated into GDMT for patients with HFrEF.
- Key Takeaway #2
  - Spironolactone may be considered to reduce hospitalizations in select patients with HFpEF.
- Key Takeaway #3
  - Patients with HF*r*EF and HFpEF and HTN should be prescribed GDMT titrated to attain SBP < 130 mm Hg.
- Key Takeaway #4
  - In patients with NYHA class II-III HF and iron deficiency, IV iron might be reasonable to improve functional status and QoL.

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Learning Objectives

- Given a description of a specific patient with heart failure and **atrial fibrillation**, develop a medication regimen that reflects guideline-directed medical therapy based on current evidence-based guidelines.
- Given a description of a specific patient with heart failure and **ventricular tachycardia**, develop a medication regimen that reflects guideline-directed medical therapy based on current evidence-based guidelines.

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Epidemiology of Atrial Fibrillation in Heart Failure

- ~ 40% of patients with HF develop AF
- 51% of Medicare beneficiaries with AF also have HF
- 59% of Medicaid beneficiaries with AF also have HF

J Am Coll Cardiol 2014;64:e1-e76.

Epidemiology of Atrial Fibrillation in Heart Failure

NYHA Functional Class	Prevalence of AF
I	4%
II-III	10-15%
III-IV	26-30%
IV	50%

Am J Cardiol 2003;91 (suppl):2D-8D.

Impact of Atrial Fibrillation on Heart Failure Mortality

Outcome	Hazard Ratio (95% CI)
Mortality	2.7 (1.9-3.7) (Framingham) 1.3 (1.2-2.1) (Meta-analysis)

Circulation 2003;107:2920.
Eur J Heart Fail 2009;11:676-683.

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Mechanisms by Which Heart Failure Can Cause Atrial Fibrillation and Vice Versa

How HF Can Cause AF	How AF can Cause HF
Promotes heterogeneity of atrial conduction by: • Increasing atrial filling pressures • Neurohormonal activation • Ion channel dysregulation (I_{Na}, I_{kr}, I_{ks}, $I_{Ca,L}$) • Atrial fibrosis	Reduces cardiac output by: • Tachycardia-induced cardiomyopathy • Loss of AV synchrony • Absent atrial contraction
Promotes atrial remodeling	Increases left ventricular end diastolic pressure
Increases pulmonary vein automaticity	Promotes mitral and tricuspid regurgitation
	Neurohormonal activation

Heart Fail Clin 2014;10:305-318.

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Goals of Therapy of Atrial Fibrillation in Patients with Heart Failure

- Prevention of stroke & systemic thromboembolism
- Ventricular rate control
- Conversion to sinus rhythm
- Maintenance of sinus rhythm

Goals of Therapy of Atrial Fibrillation in Patients with Heart Failure

- **Prevention of stroke & systemic thromboembolism**
- Ventricular rate control
- Conversion to sinus rhythm
- Maintenance of sinus rhythm

Prevention of Stroke and Thromboembolism in Patients with Atrial Fibrillation and Heart Failure

Components of Score	CHA_2DS_2-VASc Score
Congestive heart failure	1
Hypertension	1
Age ≥ 75 years	2
Diabetes mellitus	1
History of **s**troke, TIA, or thromboembolism	2
Vascular disease (prior MI, PAD, or aortic plaque)	1
Age 65-74 years	1
Sex **c**ategory (female sex)	1
Maximum score	9

J Am Coll Cardiol 2014;64:e1-e76.

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Prevention of Stroke and Thromboembolism in Patients with Atrial Fibrillation and Heart Failure

Heart Failure as a Risk Factor for Stroke in Patients with AF

Study	n	HF definition	P
Am J Cardiol 1990;65:1112-6.	272	Cardiomyopathy	0.037
Ann Intern Med 1992;116:6-12.	568	LV dysfunction	0.03
Arch Intern Med 1994;154:1449-57.	1593	HF	NS
J Stroke Cerebrovasc Dis 1995;5:147-57.	854	LV fractional shortening < 25%	0.2
JAMA 1998;279:1273-7.	892	HF	NS
Am J Cardiol 1998;82:119-21.	312	LVEF < 50%	0.03
Arch Intern Med 1998;158:1316-20.	1066	LV dysfunction (moderate-severe)	<0.001

Heart Fail Clin 2014;10:305-318.

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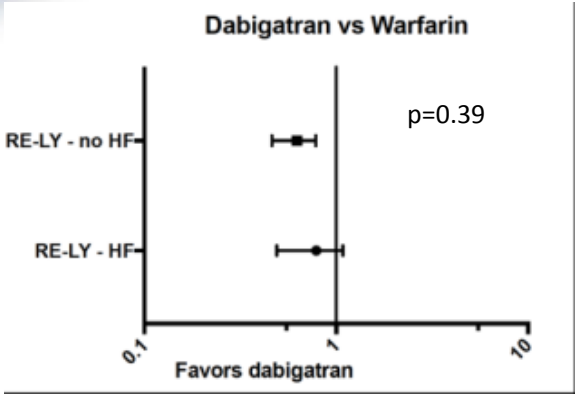
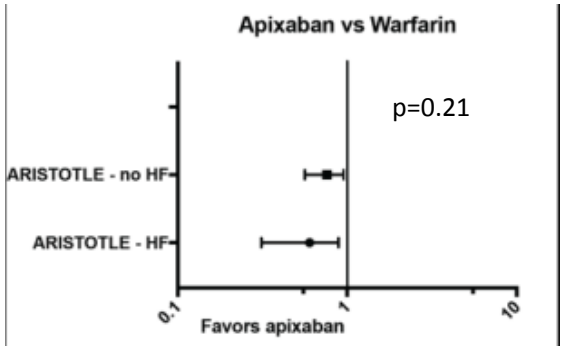
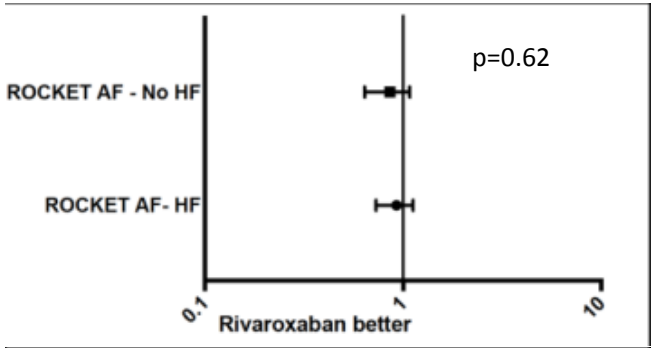
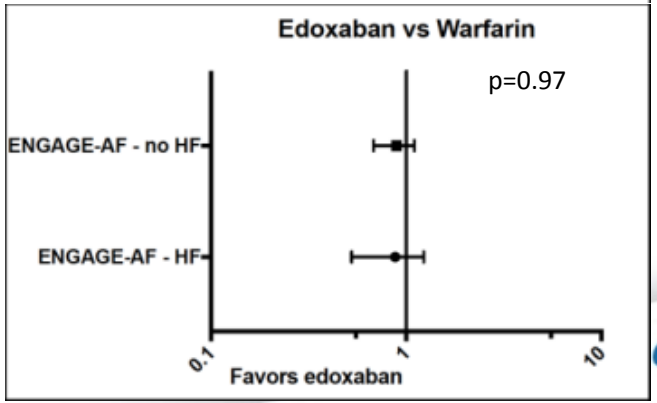
Prevention of Stroke and Thromboembolism in Patients with Atrial Fibrillation and Heart Failure

Efficacy of Non-Vitamin K Anticoagulants in Patients with Heart Failure









Arch Cardiovasc Dis 2016;109:641-650.

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Prevention of Stroke and Thromboembolism in Patients with Atrial Fibrillation and Heart Failure

CHA_2DS_2-VASc Score	Recommended Strategy for Prevention of Stroke and Systemic Thromboembolism
0	Antithrombotic therapy not recommended
1	No antithrombotic therapy, or Treatment with an oral anticoagulant or aspirin may be considered
≥ 2	Oral anticoagulation recommended. Options include: Warfarin (INR 2.0-3.0) Apixaban Dabigatran Rivaroxaban Edoxaban

J Am Coll Cardiol 2014;64:e1-e76.

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Goals of Therapy of Atrial Fibrillation in Patients with Heart Failure

- Prevention of stroke & systemic thromboembolism
- **Ventricular rate control**
- Conversion to sinus rhythm
- Maintenance of sinus rhythm

Ventricular Rate Control in Patients with Atrial Fibrillation and Heart Failure (HFrEF)

Drug Therapy Recommendations

Drug Therapy	HFrEF	HFpEF
Beta-blockers	✓*	✓
CCB (Diltiazem or verapamil)	X	✓
Digoxin	✓ †	X
Amiodarone	✓ †	✓
Dronedarone	X	X

*Caution in ADHF

† First-line therapy for acute rate control in patients with ADHF, but not for long-term oral therapy

J Am Coll Cardiol 2014;64:e1-e76.

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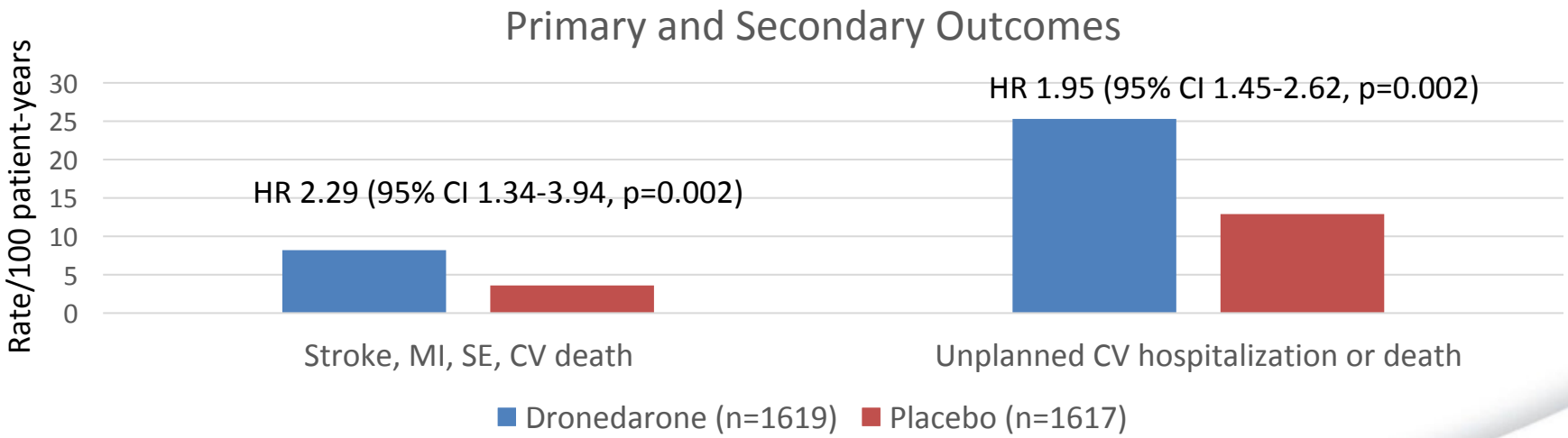
Ventricular Rate Control in Patients with Atrial fibrillation and Heart Failure

Dronedarone in High Risk Permanent Atrial Fibrillation (PALLAS)



Terminated prematurely; median follow-up 3.5 months

N Engl J Med 2011;365:2268-2276.

Ventricular Rate Control in Patients with Atrial Fibrillation and HFrEF

Acute Ventricular Rate Control

HFrEF

↓

IV Digoxin
or
IV Amiodarone

↓

IV Beta-blocker

J Am Coll Cardiol 2014;64:e1-e76.

Ventricular Rate Control in Patients with Atrial Fibrillation and HFpEF

Acute Ventricular Rate Control

HFpEF

↓

IV Beta-blocker

or

IV CCB (Diltiazem, verapamil)

↓

IV Amiodarone

J Am Coll Cardiol 2014;64:e1-e76.

Ventricular Rate Control in Patients with Atrial Fibrillation and HFrEF

Long Term Ventricular Rate Control

HFrEF

↓

Oral Beta-blocker

↓

Oral Beta-blocker plus Digoxin

↓

Oral Amiodarone

J Am Coll Cardiol 2014;64:e1-e76.

Ventricular Rate Control in Patients with Atrial Fibrillation and HFpEF

Long Term Ventricular Rate Control

HFpEF

↓

Oral Beta-blocker

or

Oral CCB

↓

Add Digoxin

↓

Oral Amiodarone

J Am Coll Cardiol 2014;64:e1-e76.

Ventricular Rate Control in Patients with Atrial fibrillation and Heart Failure

Recommended Heart Rate Targets

Type of patient	Heart rate target	Class of recommendation	Level of Evidence
HFrEF or symptomatic HFpEF	Strict (< 80 bpm)	IIa	B
Asymptomatic **and preserved LV systolic function**	Lenient (< 100 bpm)	IIb	B

J Am Coll Cardiol 2014;64:e1-e76.

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Digoxin and Mortality in Patients with AF and HF

Meta-analysis of digoxin and mortality in AF and HF
n=16 studies of patients with AF
n=111,978 digoxin users
N=389,643 non-digoxin users

	All patients HR (95% CI)	Patients with AF & no HF HR (95% CI)	Patients with AF & HF HR (95% CI)
All-cause mortality	1.27 (1.19-1.36)	1.47 (1.25-1.73)*	1.21 (1.07-1.36)*
CV mortality	1.21 (1.12-1.30)	--	--

*Interaction p = 0.06

Cardiol J 2016;23:333-343.

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BC is a 63 year old Caucasian female with HF (LVEF 32%, NYHA class III) who presents to the Emergency Department complaining of dizziness and feeling heart her "fluttering."

Medications: furosemide 40 mg twice daily, lisinopril 20 mg daily, metoprolol XL 150 mg daily, digoxin 0.125 mg MWF.

PE/Vitals/Labs: No signs/symptoms of volume overload, BP 112/72 mmHg, HR 132 bpm, RR 14, K^+ 5.2 mmol/L, BUN 45 mg/dL, sCr 2.2 mg/dL, and SDC 0.7 ng/mL. ECG reveals atrial fibrillation.

How should BC's ventricular rate be controlled?

1. IV amiodarone 300 mg over 1 hour, then 20 mg/hour infusion
2. IV digoxin 0.25 mg every 4 hours to max dose of 1.5 mg over 24 hours
3. IV diltiazem 0.25 mg/kg bolus over 2 min, then 10 mg/hour infusion
4. IV esmolol 50 mcg bolus then 50 mcg/kg/min infusion

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Goals of Therapy of Atrial Fibrillation in Patients with Heart Failure

- Prevention of stroke & systemic thromboembolism
- Ventricular rate control
- **Conversion to sinus rhythm**
- Maintenance of sinus rhythm

Conversion to Sinus Rhythm in Patients with Atrial fibrillation and Heart Failure

Cardioversion is known to be safe (AF < 48 hours or negative TEE or therapeutically anticoagulated for ≥ 3 weeks)

↓

Consider DCC

↓

If DCC unfeasible, undesirable, or unsuccessful

↓

Amiodarone
Dofetilide
Ibutilide*

J Am Coll Cardiol 2014;64:e1-e76.

*Avoid if LVEF < 30%

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BC is a 63 year old Caucasian female with HF (LVEF 32%, NYHA class III) who presents to the Emergency Department complaining of dizziness and feeling heart her "fluttering." She was admitted to hospital and now her ventricular rate is controlled.

Medications: furosemide 40 mg twice daily, lisinopril 20 mg daily, metoprolol XL 150 mg daily, digoxin 0.125 mg MWF.

PE/Vitals/Labs: No signs/symptoms of volume overload, BP 122/76 mmHg, HR 75 bpm, RR 14, K^+ 5.2 mmol/L, BUN 45 mg/dL, sCr 2.2 mg/dL, and SDC 0.7 ng/mL. ECG reveals atrial fibrillation.

How should BC's AF be terminated?

1. Immediate direct current cardioversion
2. IV ibutilide 1 mg over 10 minutes
3. Oral dofetilide 125 mcg twice daily
4. TEE then direct current cardioversion if no LA clot

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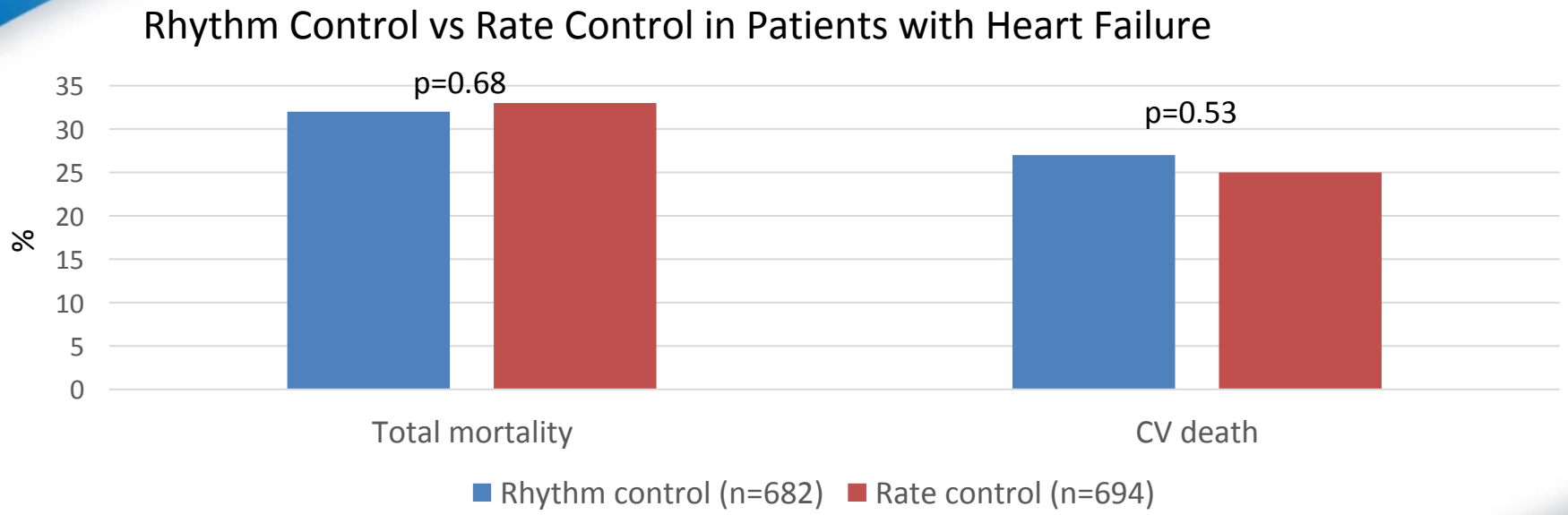
Goals of Therapy of Atrial Fibrillation in Patients with Heart Failure

- Prevention of stroke & systemic thromboembolism
- Ventricular rate control
- Conversion to sinus rhythm
- **Maintenance of sinus rhythm**

Maintenance of Sinus Rhythm in Patients with Atrial Fibrillation and Heart Failure



N Engl J Med 2008;358:2667-2677.

Maintenance of Sinus Rhythm in Patients with Atrial Fibrillation and Heart Failure

Treatment Recommendations

Drug Therapy	HFrEF
Amiodarone	✓
Dofetilide	✓
Catheter ablation	✓
Dronedarone	X
Flecainide	X
Propafenone	X
Sotalol	X

J Am Coll Cardiol 2014;64:e1-e76.

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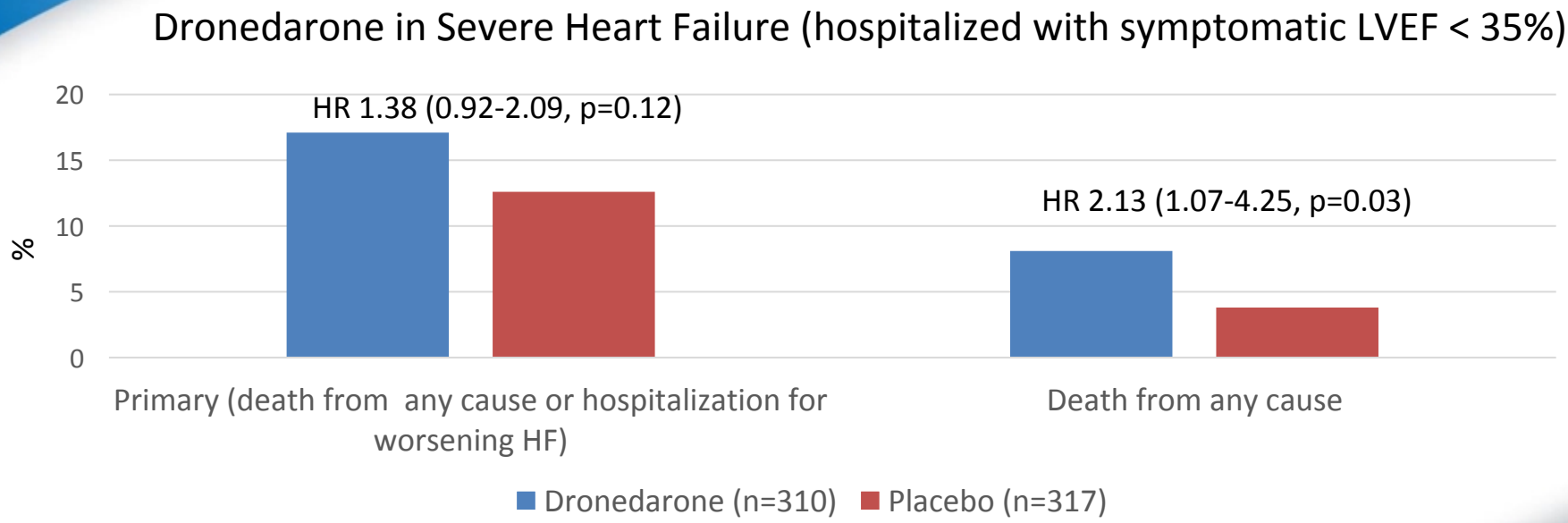
Maintenance of Sinus Rhythm in Patients with Atrial Fibrillation and Heart Failure



N Engl J Med 2008;358:2667-2677.

BC was discharged home on her heart failure meds and dabigatran 150 mg twice daily. Her AF recurred intermittently, and she was symptomatic despite treatment with her beta-blocker and digoxin.

Medications: furosemide 40 mg twice daily, lisinopril 20 mg daily, metoprolol XL 150 mg daily, digoxin 0.125 mg MWF.

PE/Vitals/Labs: No signs/symptoms of volume overload, BP 122/76 mmHg, HR 75 bpm, RR 14, K^+ 5.2 mmol/L, BUN 45 mg/dL, sCr 2.2 mg/dL, and SDC 0.7 ng/mL. ECG reveals atrial fibrillation.

Which of the following is the optimal therapy for reducing the frequency of recurrence of BC's AF episodes?

1. Amiodarone 400 mg orally daily for 2 weeks, then 200 mg once daily
2. Dronedarone 400 mg orally twice daily
3. Flecainide 150 mg orally every 12 hours
4. Sotalol 80 mg orally once daily

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Prevention of Atrial Fibrillation in Patients with Heart Failure

Recommendation	Class of recommendation	Level of evidence
An ACE inhibitor or ARB is reasonable for primary prevention of new-onset AF in patients with HFrEF	IIa	B

J Am Coll Cardiol 2014;64:e1-e76.

RAS Inhibition for Prevention of AF in Patients with HF

Meta-analysis

Study	OR (95% CI)
SOLVD (n=374)	0.18 (0.09-0.37)
CHARM (n=6,379)	0.81 (0.66-1.00)
Val-HeFT (n=4,395)	0.63 (0.49-0.80)
Total (n=11,148)	**0.52 (0.31-0.87)**

J Am Coll Cardiol 2010;55:2299-2307.

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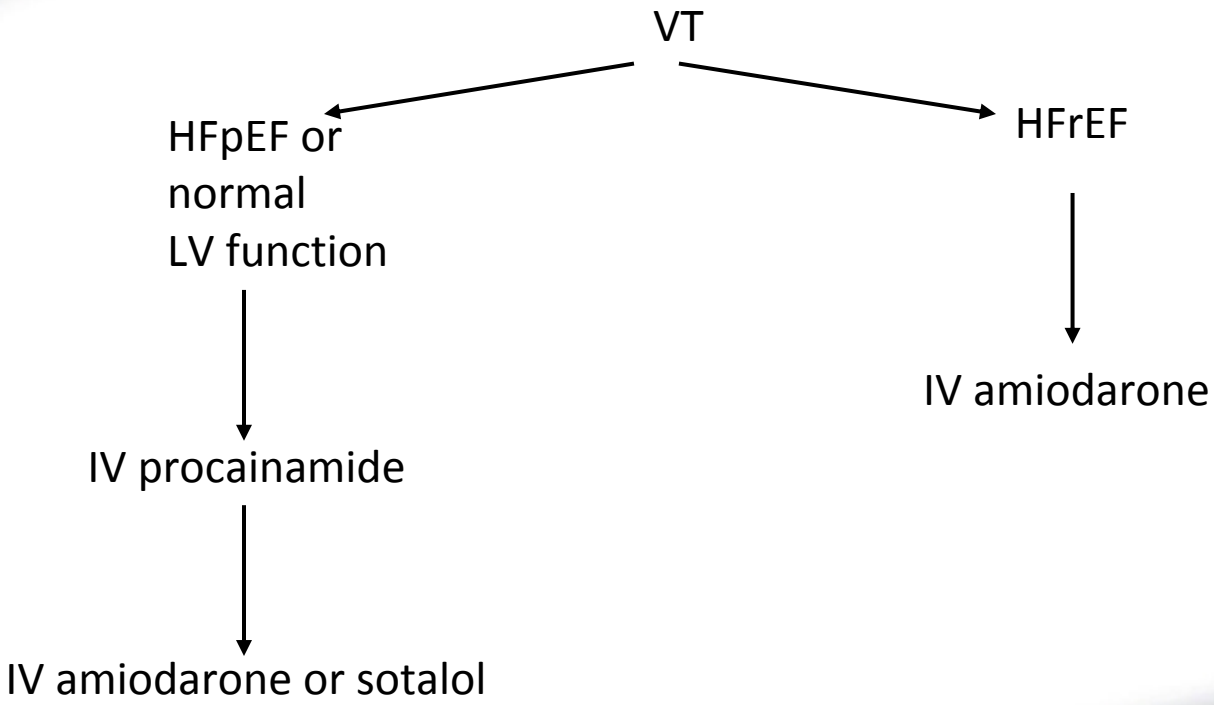
Epidemiology of Ventricular Arrhythmias in Heart Failure

- ~ 20% of patients with HF die of sudden cardiac death annually
- Roughly half of HF deaths are due to arrhythmias

Acute Management of Hemodynamically Stable Ventricular Tachycardia in Heart Failure



Circulation 2010;122(suppl 3):S729-S767.

ICD Recommendations for Secondary Prevention of SCD in HF

Recommendations	COR	LOE
Survivors of cardiac arrest due to VF or hemodynamically unstable VT	I	A
Spontaneous sustained VT, hemodynamically stable or unstable	I	B
Syncope of undetermined origin with sustained VT or VF induced during EP study	I	B
Nonsustained VT due to prior MI, LVEF ≤ 40% and inducible VF or sustained VT during EP study	I	B
Unexplained syncope, significant LV dysfunction and nonischemic DCM	IIa	C

Circulation 2013; 127: e283-e352

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ICD Recommendations for Primary Prevention in Stage C HF

Recommendations	COR	LOE
Primary prevention of SCD to reduce total mortality in selected patients ≥ 40 days post-MI with LVEF ≤ 30% and NYHA class I symptoms on GDMT with expected meaningful survival > 1 year	I	A
Primary prevention of SCD to reduce total mortality in selected patients with nonischemic DCM or IHD ≥ 40 days post-MI with LVEF ≤ 35% and NYHA class II or III symptoms on GDMT with expected meaningful survival > 1 year	I	B
An ICD is of uncertain benefit to prolong meaningful survival in patients with high risk of nonsudden death such as frequent hospitalizations, frailty or severe comorbidities	IIb	B

2013 ACC/AHA HF Guidelines *JACC* 2013; 128: e240-327

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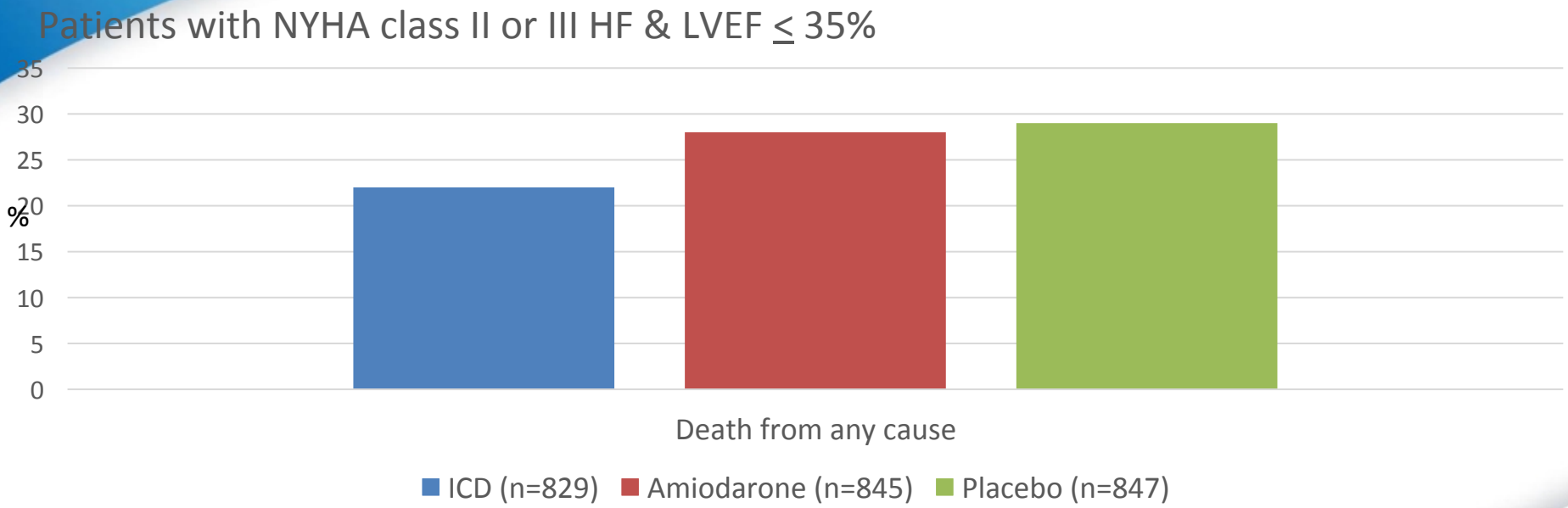
ICD vs Amiodarone for Primary Prevention of SCD in HF



Amiodarone vs placebo: HR 1.06 (0.86-1.30, p=0.56)
ICD vs placebo: HR 0.77 (0.62-0.96, p=0.007)

N Engl J Med 2005;352:225-237.

Key Takeaways

- Key Takeaway #1
  - Atrial fibrillation is common in patients with heart failure and is associated with increased mortality
- Key Takeaway #2
  - Specific antiarrhythmic drugs should be avoided in patients with HFrEF due to negative inotropic activity, increased risk of drug-induced arrhythmias, and/or increased mortality:
    - CCBs (diltiazem, verapamil)
    - Dronedarone
    - Flecainide
    - Propafenone
    - Sotalol
- Key Takeaway #3
  - IV amiodarone is the preferred drug for hemodynamically stable VT in patients with HFrEF
- Key Takeaway #4
  - Many patients with heart failure require ICD implantation to reduce the risk of sudden cardiac death

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