The Chattanooga Heart Institute
Cardiovascular Symposium

Congestive Heart Failure: Outpatient Management

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The Chattanooga Heart Institute
Memorial

Financial Conflicts of Interest

- None

Take Home Points

- Spironolactone
- Torsemide
- Think beyond the salt shaker
- Cardiology co-management

Take Home Points, cont.

- I despise PowerPoint

Epidemiology

- Your patients have heart failure
- People die (a lot) from heart failure
- Heart failure management is crazy expensive

Definitions

Classification	Ejection Fraction	Description
Heart Failure with Reduced Ejection Fraction (HF*r*EF)	≤40%	• AKA systolic HF • Only in these patients that efficacious therapies have been demonstrated to date
Heart Failure with Preserved Ejection Fraction (HF*p*EF)	≥50%	• AKA diastolic heart failure • To date, efficacious therapies have not been identified
HF*p*EF, borderline or HFmrEF	41% to 49%	• Borderline or intermediate group. • Characteristics, treatment patterns, and outcomes appear similar to those of patients with HF*p*EF

Classification

ACC/AHA Stages of HF		NYHA Functional Classification	
A	At high risk for HF but without structural heart disease or symptoms of HF.	None	
B	Structural heart disease but without signs or symptoms of HF.	I	No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF.
C	Structural heart disease with prior or current symptoms of HF.	I	No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF.
		II	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in symptoms of HF.
		III	Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes symptoms of HF.
		IV	Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest.
D	Refractory HF requiring specialized interventions.		

Initial Evaluation

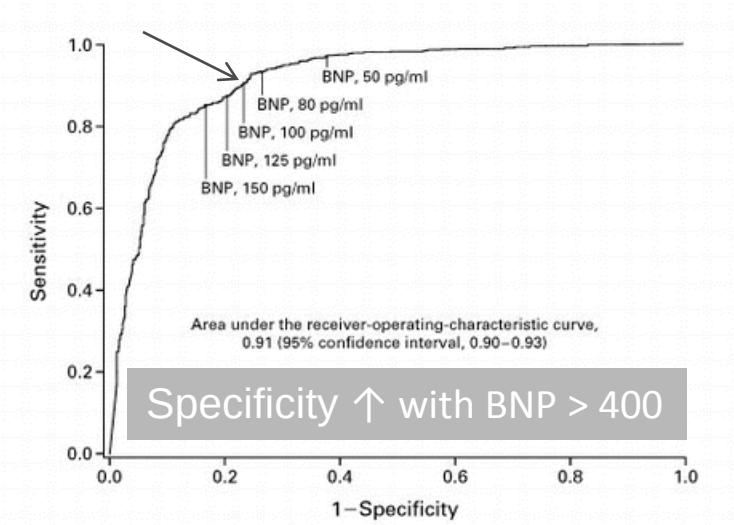
- History and Physical
- ECG
- CXR
- CBC, CMP, Mg++, TSH, Ferritin
- BNP (NT-proBNP)
- Echocardiogram

Recommendations	COR	LOE
Patients with suspected, acute, or new-onset HF should undergo a chest x-ray	I	C
A 2-dimensional echocardiogram with Doppler should be performed for initial evaluation of HF	I	C
Repeat measurement of EF is useful in patients with HF who have had a significant change in clinical status or received treatment that might affect cardiac function or for consideration of device therapy	I	C
Noninvasive imaging to detect myocardial ischemia and viability is reasonable in HF and CAD	IIa	C
Viability assessment is reasonable before revascularization in HF patients with CAD	IIa	B[281–285]
Radionuclide ventriculography or MRI can be useful to assess LVEF and volume	IIa	C
MRI is reasonable when assessing myocardial infiltration or scar	IIa	B[286–288]
Routine repeat measurement of LV function assessment should not be performed	III: No Benefit	B[289,290]

CAD indicates coronary artery disease; COR, Class of Recommendation; EF, ejection fraction; HF, heart failure; LOE, Level of Evidence; LV, left ventricular; LVEF, left ventricular ejection fraction; and MRI, magnetic resonance imaging.

Yancy CW, et al. JACC. 2013;62(16):1495-1539.

B-type Natriuretic Peptide



BNP pg/ml	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value	Accuracy
	(95 percent confidence interval)				
50	97 (96–98)	62 (59–66)	71 (68–74)	96 (94–97)	79
80	93 (91–95)	74 (70–77)	77 (75–80)	92 (89–94)	83
100	90 (88–92)	76 (73–79)	79 (76–81)	89 (87–91)	83
125	87 (85–90)	79 (76–82)	80 (78–83)	87 (84–89)	83
150	85 (82–88)	83 (80–85)	83 (80–85)	85 (83–88)	84

Maisel AS et al. N Engl J Med. 347 2002:161-167.

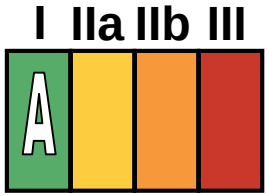
BNP- or NT-proBNP guided HF therapy can be useful to achieve optimal dosing of GDMT in select clinically euvolemic patients followed in a well-structured HF disease management program.

The usefulness of serial measurement of BNP or NT-proBNP to reduce hospitalization or mortality in patients with HF is not well established.

HFrEF
Goal Directed Medical Therapy

Yancy CW, et al. JACC.

HFrEF Stage A



Hypertension and lipid disorders should be controlled in accordance with contemporary guidelines to lower the risk of HF.

Other conditions that may lead to or contribute to HF, such as obesity, diabetes mellitus, tobacco use, and known cardiotoxic agents, should be controlled or avoided.

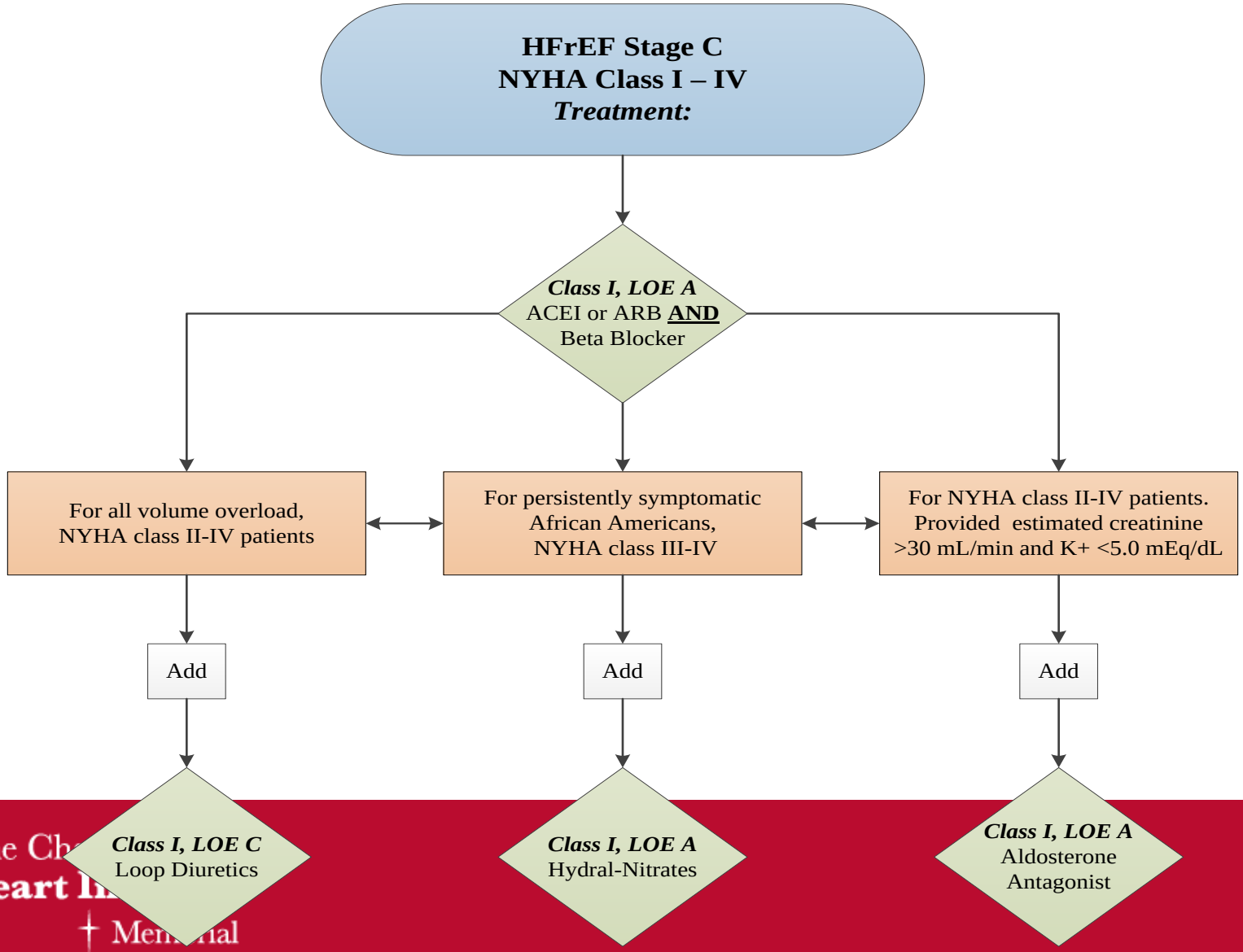
Yancy CW, et al. JACC.

HFrEF Stage B

Recommendations	COR	LOE
In patients with a history of MI and reduced EF, ACE inhibitors or ARBs should be used to prevent HF	I	A
In patients with MI and reduced EF, evidence-based beta blockers should be used to prevent HF	I	B
In patients with MI, statins should be used to prevent HF	I	A
Blood pressure should be controlled to prevent symptomatic HF	I	A
ACE inhibitors should be used in all patients with a reduced EF to prevent HF	I	A
Beta blockers should be used in all patients with a reduced EF to prevent HF	I	C
An ICD is reasonable in patients with asymptomatic ischemic cardiomyopathy who are at least 40 d post-MI, have an LVEF ≤30%, and on GDMT	IIa	B
Certain calcium channel blockers (verapamil, diltiazem) may be harmful in patients with low LVEF	III: Harm	C

Yancy CW, et al. JACC.

HFrEF Stage C



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Yancy CW, et al. JACC.

Evidence

GDMT	RR Reduction in Mortality	NNT for Mortality Reduction (Standardized to 36 mo)	RR Reduction in HF Hospitalizations
ACE inhibitor or ARB	17%	26	31%
Beta blocker	34%	9	41%
Aldosterone antagonist	30%	6	35%
Hydralazine/nitrate	43%	7	33%

Yancy CW, et al. JACC. 2013;62(16):1495-1539.

* Longer t 1/2 and/or ↑

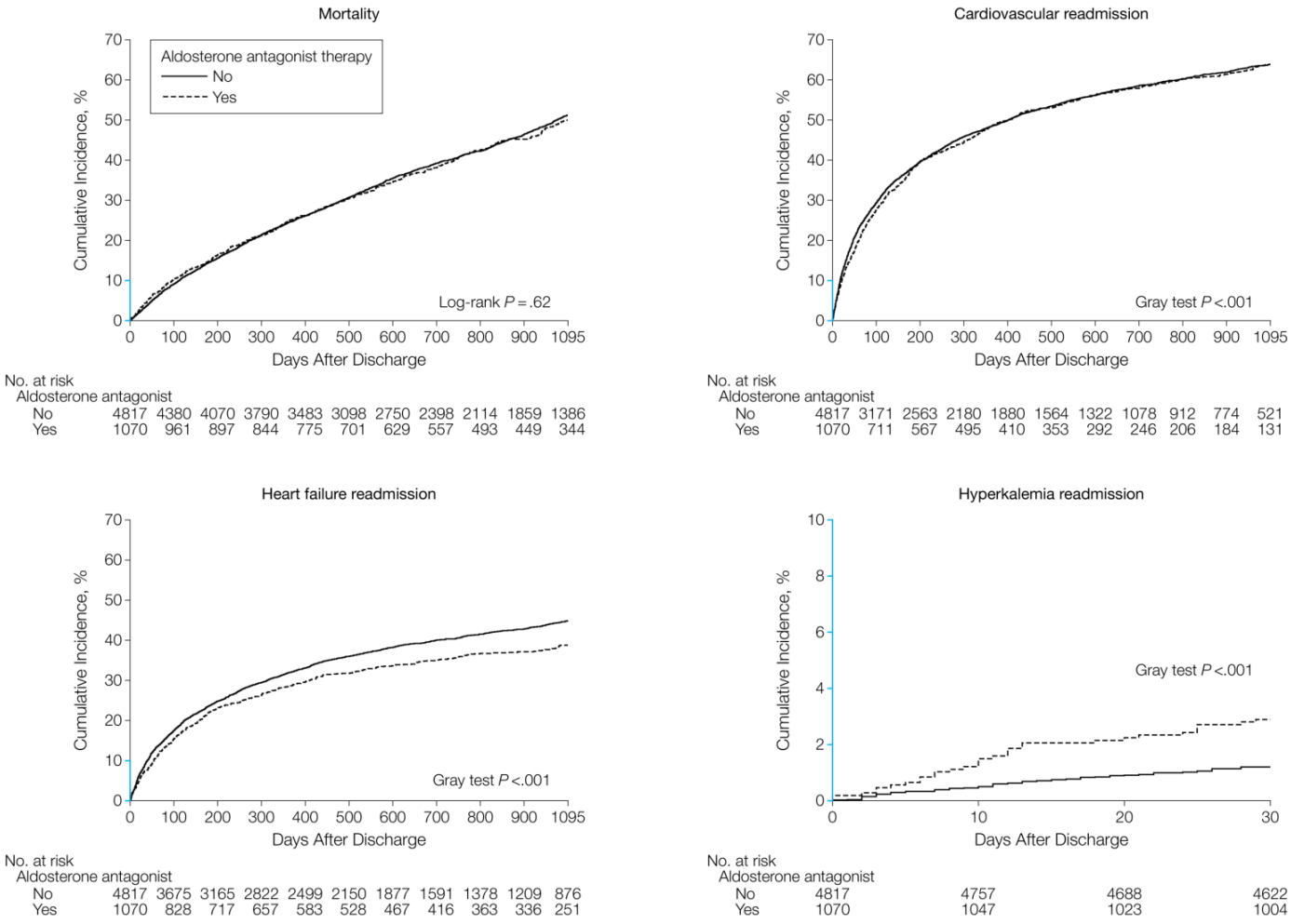
Diuretics

- Loop Diuretics (1C)
  - Lasix 20-40mg daily/BID (max 600mg)
  - Torsemide* 10-20mg daily/BID (max 200mg)
  - Bumetanide* 1-2mg daily/BID (max 10mg)

*** Longer t 1/2 and ↑ bioavailablity**

Yancy CW, et al. JACC. 2013;62(16):1495-1539.

Aldosterone Antagonist (Efficacy vs. effectiveness)



COMPARE-HF

N=5887
Medicare Claims
2005-2010

Side Effects:

Hyperkalemia
Risk of ↑ K^+ with
("NNH-23")
GFR < 60
DM2
ACE-I or ARB

Gynecomastia

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Hernandez AF et al. JAMA. 2012; 308(20):2097-2107.

Starting spironolactone

- ACC/AHA Class C
- Cr < 2.5
- K < 5
- Check BMP in 2 and then 6 weeks
- Document

Treatment Odds and Ends

- Sacubitril/valsartan
- Ivabradine
- Digoxin
- Nutritional Supplementation
- Adjunctive statins

PARADIGM-HF

- Valsartan-sacubitril (Entresto)
- N=8442, LVEF < 40% and NYHA II-IV
- Excluded
  - Hypotension (SBP < 100)
  - GFR < 30
  - K^+ > 5.2-5.4
  - Angioedema

HFpEF

- "Diastolic" HF
- Complex patients
  - Advanced Age
  - Multiple Comorbidities
    - HTN, DM2, CAD, PAD, AFIB, CKD, OSA
    - Volume sensitive
  - Dyspnea is a difficult symptom to quantify
  - Difficult to prove incremental benefit

HFpEF

Recommendations	COR	LOE
Systolic and diastolic blood pressure should be controlled according to published clinical practice guidelines	I	B
Diuretics should be used for relief of symptoms due to volume overload	I	C
Coronary revascularization for patients with CAD in whom angina or demonstrable myocardial ischemia is present despite GDMT	IIa	C
Management of AF according to published clinical practice guidelines for HFpEF to improve symptomatic HF	IIa	C
Use of beta-blocking agents, ACE inhibitors, and ARBs for hypertension in HFpEF	IIa	C
ARBs might be considered to decrease hospitalizations in HFpEF	IIb	B
Nutritional supplementation is not recommended in HFpEF	III: No Benefit	C

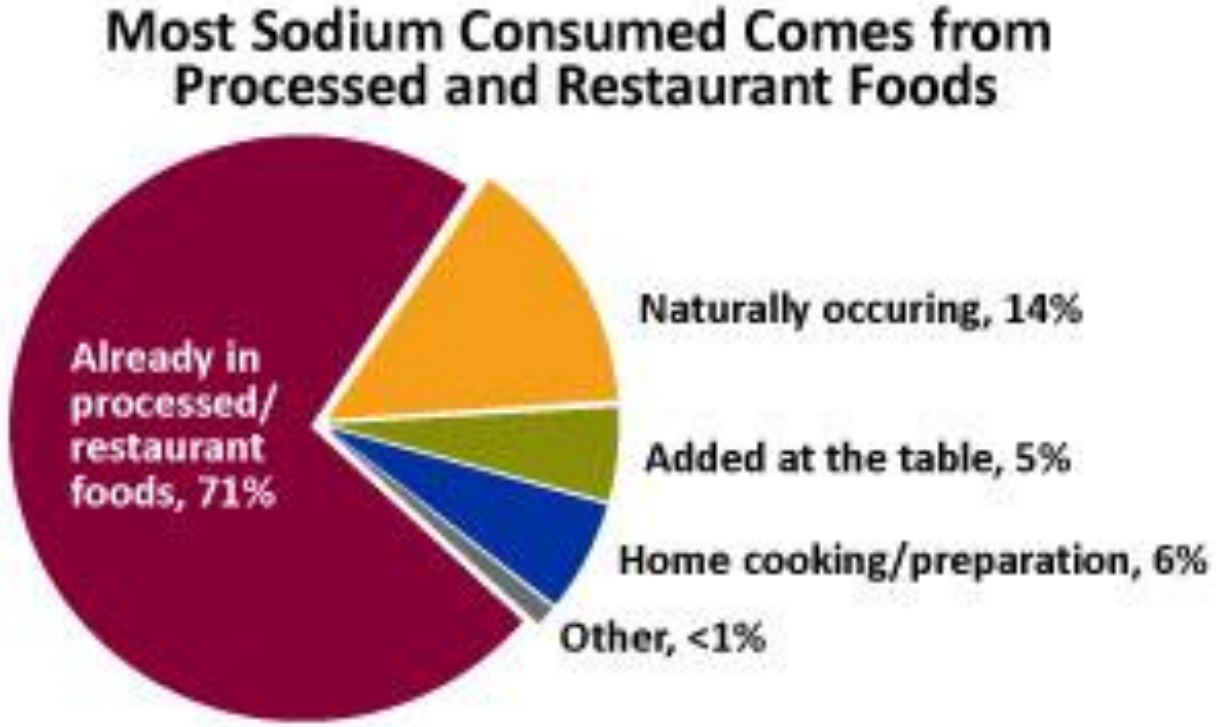
HFpEF and Spironolactone 2017 Targeted Update

IIb	**B-R**	In appropriately selected patients with HF*p*EF (with EF ≥45%, elevated BNP levels or HF admission within 1 year, estimated glomerular filtration rate >30 mL/min, creatinine <2.5 mg/dL, potassium <5.0 mEq/L), aldosterone receptor antagonists might be considered to decrease hospitalizations.	NEW: Current recommendation reflects new RCT data.

CAVEAT: SUBGROUP ANALYSIS SUGGGEST BENEFIT MAY ONLY BENEFIT WOMEN

Non-Pharmacologic Management

The "No Added Salt" Cop-Out



Harnack LI, Cogswell ME, Shikany JM, et al. Sources of Sodium in US Adults from 3 Geographic Regions. Circulation. 2017;135:1775-1783.

Non-Medical Interventions

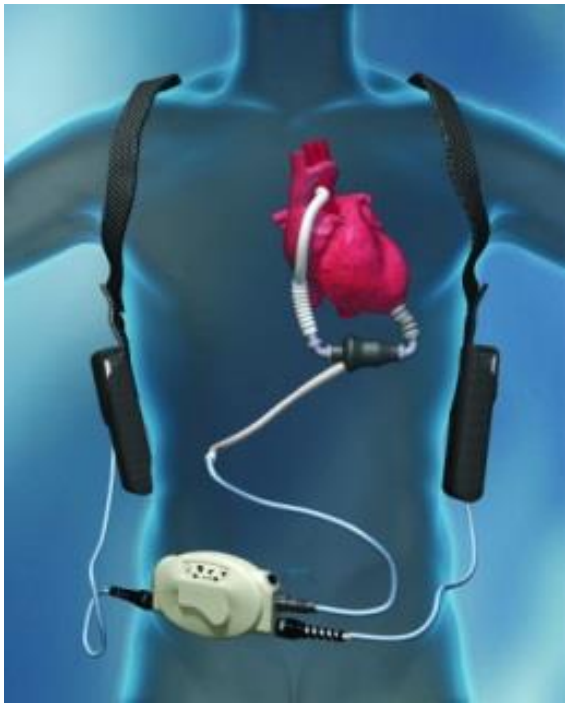
- Daily weights
  - Call for Δ 2lb/day or 5lb/week
  - ***CLOSE FOLLOW-UP***
- Sleep disorders
- Cardiac Rehab

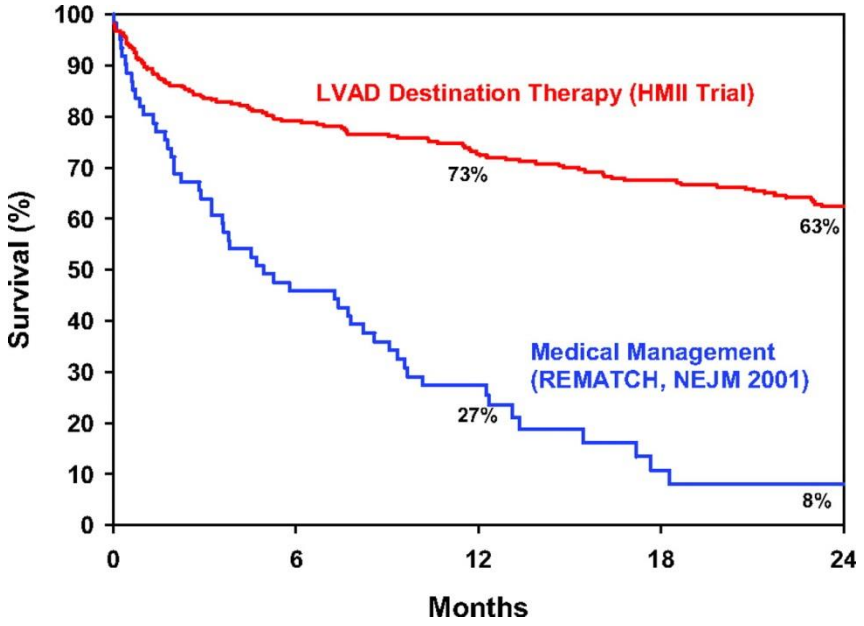
Advanced HF

- Device Therapy
  - ICD: LVEF < 35% on Med Rx +/- revascularization
  - Bi-V pacing: LVEF < 35%, NYHA II-IV, LBBB

- Stage D HF
  - Ventricular Assist Device
  - Cardiac Transplantation
  - Palliative Care
  - Hospice

LVAD





1 year survival for LVAD DT now ≈ 80-90%

Rose EA et al. N Engl J Med 2001; 345:1435-1443

Thank you.

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