Key Terminology Updates

- **GDEM:** guideline-directed evaluation and management refers to care defined primarily by ACC/AHA Class I recommendations. Used in place of the previous term, guideline-directed medical therapy1,2
- **HF:** preferred over congestive HF, because patients may present without signs or symptoms of fluid overload2
- **CHF:** Chronic Heart Failure
- **HFrEF:** LVEF ≤40%. Also referred to as systolic HF3
- **HF with preserved ejection fraction (HFrEF):** LVEF ≥50%. Also referred to as diastolic HF3
- **HF with midrange ejection fraction (HFmrEF):** LVEF between 40% and 50%

Timeline of Key HF Clinical Trials

- **1986**
  - V-HeFT I
- **1987**
  - CONSENSUS
- **1991**
  - US Carvedilol HF Study
- **1992**
  - SOLVD Prevention
- **1996**
  - CIBIS-II
- **1997**
  - RALES
- **1999**
  - DIG
- **2001**
  - Val-HeFT
- **2003**
  - COPERNICUS
- **2007**
  - CORONA
- **2010**
  - SHIFT
- **2015**
  - COSMIC-HF
- **2017**
  - EMPHASIS-HF
- **2019**
  - BEAUTIFUL

Therapeutic Class

- **β-blockers**
- **ACEI/ARB**
- **Aldosterone blockers**
- **Hydralazine/nitrate**
- **β-blockers**
- **Other**

2014

- **Neprilysin inhibitor + ARB**
- **CHARM-Alternative**
- **CHARM-Added**
- **SOLVD treatment**

**V-HeFT II**

- **2014**
  - PARADIGM-HF

ACC, American College of Cardiology; ACEI, angiotensin-converting enzyme inhibitor; AHA, American Heart Association; ARB, angiotensin II receptor blocker; HFSA, Heart Failure Society of America.

Basis for inclusion in 2016 ACC/AHA/HFSA Guidelines Update
From here.... To where??

- PRE 1986
  - Rest...don't move
  - Nurses didn't need stethoscopes
  - Doctor was King
  - Very few medications
  - Minimal technology, computers new...but not in healthcare

- The New Millennium
  - Exercise is key to health
  - Doctors don't need stethoscopes
  - Team approach to care
  - Three new drugs in past 2 years
  - Technology, Technology, Technology.....

Where are we going??

- Heart failure has become a specialty within the specialty of Cardiology
- New Treatment Guidelines (newly updated!!!)
- New technology (Cardiomems, Life Vest)
- New Imaging Options (Cardiac MRI)
- New Drugs....

What is Heart Failure??

- What do you think of when I say "Heart Failure"?
  - Old People
  - Edema
  - Death
  - Fluid in the Lungs
Heart failure occurs when the heart muscle is weakened and cannot pump enough blood to meet the body's needs for blood and oxygen.

According to the American Heart Association...

ACC/AHA Definitions
Heart Failure with Reduced or Preserved Ejection Fraction

<table>
<thead>
<tr>
<th>Type of Heart Failure</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Failure with Reduced Ejection Fraction (HFrEF)</td>
<td>≤40</td>
<td>Also referred to as systolic HF. Randomized clinical trials have mainly enrolled patients with HFrEF, and it is only in these patients that efficacious therapies have been demonstrated to date.</td>
</tr>
<tr>
<td>Heart Failure with Preserved Ejection Fraction (HFpEF)</td>
<td>≥50</td>
<td>Also referred to as diastolic HF. Several different criteria have been used to define HFpEF. The diagnosis of HFpEF is challenging because it largely covers other potential noncardiac causes of symptoms suggestive of HF. To date, efficacious therapies have not been identified.</td>
</tr>
<tr>
<td>HFpEF, Borderline (41-49)</td>
<td></td>
<td>These patients fall into a borderline intermediate group. Their characteristics, treatment patterns, and outcomes appear similar to those of patients with HFpEF.</td>
</tr>
<tr>
<td>HFpEF, Improved (&gt;40)</td>
<td></td>
<td>It has been recognized that a subset of patients with HFpEF previously had HFrEF. These patients with improvement in recovery or EF may be biologically different from those with persistently preserved or reduced EF. Further research is needed to better characterize these patients.</td>
</tr>
</tbody>
</table>


Systolic vs Diastolic Heart Failure

- **Systolic Heart Failure**: Less blood pumped out of ventricles; weakened heart muscle can't squeeze as well.
- **Diastolic Heart Failure**: Less blood fills the ventricles; still heart muscle can't relax normally.
**Patterns of Ventricular Remodelling**

- **HFrEF**
  - Increased systolic pressure
  - Increased systolic wall stress
  - Parallel addition of new myofibrils
  - Wall thickening
  - Concentric hypertrophy
  - Pressure overload
  - Volume overload

- **HFpEF**
  - Increased diastolic pressure
  - Increased systolic wall stress
  - Series addition of new sarcomeres
  - Chamber enlargement
  - Eccentric hypertrophy
  - Pressure overload
  - Volume overload

**Heart Failure with Reduced or Preserved Ejection Fraction**

- **HFrEF (Systolic)**
- **HFpEF (Diastolic)**

**What Medications SHOULD I see for my heart failure patient?**

- Beta Blockers
- ACE/ARB/ARNI
- Aldosterone antagonist
- Diuretics
Beta Blockers

- Carvedilol (Coreg)
- Bisoprolol (Zebeta)
- Metoprolol Succinate (Toprol XL)

What do they do?
- Slows down the heart rate
- Lowers blood pressure
- It can even improve pump function!
- BUT..... They can also cause fatigue!

Carvedilol>Bisoprolol>Metoprolol Succinate

Why one and not another??

- Studies show....
  - (i) in comparable high doses of carvedilol, metoprolol and bisoprolol, carvedilol was associated with significantly lower all-cause mortality risk; and
  - (ii) was also the only dose regimen to significantly lower all-cause hospitalization.

- Availability
- Cost
  - Carvedilol $4
  - Bisoprolol $10-20
  - Metoprolol Succinate $10-20

https://www.goodrx.com/

Other Beta Blockers

Nebivolol (Bystolic)
- Not studied in heart failure
- Decreases Blood pressure
- Decreases Heart Rate
- Beneficial in patients with Pulmonary Hypertension
**Blood Pressures:**
- Most effect from Carvedilol
- Least effect from Metoprolol Succinate

**Heart Rate:**
- Most effect from Metoprolol Succinate
- Least effect from Carvedilol

**Kidney Function:**
- Isn’t affected by Beta Blockers

**Other Side Effects:**
- Dizziness (usually resolves after 2-3 days)
- Increase in glucose levels
- High initial dose of beta blockers can be dangerous, start low

**Angiotensin Converting Enzyme (ACE) Inhibitors**
- Lisinopril (Prinivil)
- Enalapril (Vasotec)
- Captopril (Capoten)

**What do they do?**
- Lowest blood pressure
- Can help improve heart strength
- Protects the kidneys
- BUT…

**Blood Pressures:**
- Decrease in blood pressure (more at first)
- Takes about 2 weeks to get to steady state

**Kidney Function:**
- Can be a bump in creatinine when started
- Can effect potassium in patients (increase)

**Other Side Effects:**
- Dizziness (usually resolves after 2-3 days)
Angiotension Receptor Blocker (ARB)

- Valsartan (Diovan)
- Losartan (Cozaar)
- Irbisartan (Avapro)
- Olmesartan (Benicar)

What do they do for my patients?
- Lowers blood pressure
- Protects the kidneys
- Improves pump function
- Psst... and no cough!

Angiotensin Receptor Neprilysin Inhibitor (ARNI)

- There is only One:
  - Entresto
  - Combination of Sacubitril/Valsartan

- Used IN ADDITION to your current heart failure medications

- There are special instructions when Entresto is started

Effects of Sacubitril/valsartan in HFrEF
Effect on BNP and NT-proBNP

- BNPs, brain natriuretic peptides; NT-proBNP, N-terminal of the prohormone brain natriuretic peptide.
- Vasoactive peptides include the NPs (atrial NPs, BNPs, C-type NPs), adrenomedullin, and bradykinin.

Why Would I Use This Expensive Drug??

- Lowered blood pressure
- Decreased mortality
- Decreased hospital admissions
- Shown to improve symptoms of breathlessness
- Shown to improve ejection fraction

SPECIAL UPDATE....Entresto CANNOT be used in the following situations:

- In patients with hypersensitivity to any component
- In patients with a history of angioedema related to previous ACEi or ARB therapy
- With concurrent use of ACEi
- With concurrent use of aliskiren
- With concurrent use of aldosterone antagonists in patients with diabetes
Diuretics

- AKA: "The Water Pill"
  - Furosemide (Lasix)
  - How available it in the presence of fluid?
  - Torsemide (Demadex)
  - Half as much
  - Bumetanide (Bumex)
  - ??
  - Amiloride (Midamor)
  - Potassium sparing
  - Metolazone (The Power Pee Pill)
  - The Big Dog
  - Should rarely see this being used daily

Aldosterone Antagonist

Aldosterone antagonists are drugs that block harmful effects on the heart and blood vessels caused by the hormone aldosterone.

- Spironolactone (aldactone)
- Eplerenone (Inspra)

#1-LESS or NO Potassium Supplement
- Decreases Blood Pressure
- Works as a wimpy water pill

Corlanor® (ivabradine) Indication

Corlanor® is indicated to reduce the risk of hospitalization for worsening heart failure in patients who meet all of the following conditions:
- Stable, symptomatic chronic heart failure with left ventricular ejection fraction ≤ 35%
- In sinus rhythm with resting heart rate ≥ 70 bpm
- On maximally tolerated doses of beta-blockers or have a contraindication to beta-blocker use
Heart Failure Progression

- A progressive disease
- 50% of patients will die within the first 5 years of diagnosis
- Worsening symptoms
  - Fatigue
  - Shortness of Breath
  - Chest Pain
  - Confusion
  - Other organ failure
- Medications have to be titrated
- Medications have to be stopped

BRYAN HEART IMPROVEMENT PROGRAM (BHIP)

- Physician Director: John Steuter, MD
- Physician: Matt Baker, MD
- Nurse Practitioner: Colleen Carpenter, DNP, APRN
- Nurse Practitioner: Heather Mosley, MSN, APRN
RESOURCES

- https://www.uptodate.com/contents/search
- https://www.goodrx.com/