Tackling Heart Failure

Heart Failure Program at Piedmont Athens Regional
Presenting Team and Disclosures

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*Dr. Jones, Melinda Jenkins, and Kate Connell have no relevant financial relationships to disclose.*
Management of Heart Failure: Where are we now?

Catherine Marti, MD MSc
Heart Failure: Definition

- Heart failure is a *clinical syndrome* caused by various cardiac pathologies.
- It is characterized by specific symptoms of impaired cardiac output, venous congestion, and fluid retention.
- It results from any structural or functional disorder that impairs the ability of the ventricle to *fill with* or *eject blood*.
- *Can be due to* HFrEF, HFpEF, infiltrative cardiomyopathy or other cardiac conditions.
Stages of Heart Failure

A
- No structural heart disease
- At risk population - HTN, DM, Anthracycline

B
- Minimal structural heart disease
- No symptoms or signs of HF

C
- Moderately severe structural heart disease
- Previous or current symptoms

D
- Severe structural heart disease
- Refractory symptoms requiring special RX
Hospital Discharges for Heart Failure

Number of discharges

Year


700,000 800,000 900,000 1,000,000 1,100,000 1,200,000

Projected US Heart Failure Prevalence and Direct Cost

Projected US Prevalence of Heart Failure (%)

- 25% in 2010
- Projected increase to 3.5% in 2020
- Further increase to 4% in 2030

Projected US Direct Costs for Heart Failure (billions 2008$)

- 215% increase from 2010 to 2030

Adapted from Heidenreich PA et al. Circulation. 2011;123:933-944
AHA Statement: Forecasting the future of CV disease in US
Heart Failure Death Rates, 2011-2013
Adults, Ages 35+, by County

Rates are spatially smoothed to enhance the stability of rates in counties with small populations.

Data Source:
National Vital Statistics System
National Center for Health Statistics
Guideline-Directed Medical Therapy
Drugs for Long-term Therapy for Heart Failure with Reduced LVEF

Clinical Trial Benefit

✓ ACE inhibitors or
  Angiotensin receptor blockers
✓ Beta-blockers
✓ Aldosterone blockers
✓ Nitrate/Hydralazine
✓ Digoxin*
Life Saving Therapy

Drugs that inhibit the renin-angiotensin system have modest effects on survival.

Based on results of SOLVD-Treatment, CHARM-Alternative, COPERNICUS, MERIT-HF, CIBIS II, RALES and EMPHASIS-HF
Improvement of Systolic Function is Related to Beta Blocker Dose

Heart Failure Cocktail: Effect of Adding Therapies

![Graph showing the effect of adding therapies on heart failure progression over years. The graph illustrates the percentage of patients remaining free from heart failure events. The x-axis represents years (0 to 5), and the y-axis represents the percentage (0% to 100%). The lines represent different therapies and combinations: + ICD, + Aldo Blocker, + β Blocker, + ACEI, and Baseline. The graph shows a decreasing trend, indicating improved outcomes with each added therapy.]
Drugs for Long-term Therapy for Heart Failure with Reduced LVEF

Clinical Trial Benefit

✓ ACE inhibitors or Angiotensin receptor blockers
✓ Beta-blockers
✓ Aldosterone blockers
✓ Nitrate/Hydralazine
✓ Digoxin*

Sacubitril/Valsartan (ENTRESTO)
Heart Failure Hospitalization is Ominous

Setoguchi. Am Heart J. 2007
Heart Failure Hospitalization Starts Weeks Before Admission!

Time Course of Decompensation

- Hemodynamically Stable
- Presymptomatic Congestion
- Decompensation

Advanced Heart Failure Therapies
Wireless Pulmonary Hemodynamic Monitoring
Patient Management Database

Trend Data
- Easy-to-read
- Physician alerts
- Home transmission
- Secure, encrypted web-based access

Discrete Data

<table>
<thead>
<tr>
<th>Reading</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic:</td>
<td>24</td>
</tr>
<tr>
<td>Mean:</td>
<td>19</td>
</tr>
<tr>
<td>Diastolic:</td>
<td>16</td>
</tr>
<tr>
<td>Heart Rate:</td>
<td>81</td>
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</tbody>
</table>
Wireless pulmonary artery haemodynamic monitoring in chronic heart failure: a randomised controlled trial

Study Duration
37% RRR
p < 0.0001

<table>
<thead>
<tr>
<th>Study Duration</th>
<th>6 Months</th>
<th>28% RRR</th>
<th>p &lt; 0.0002</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 6 Months</td>
<td>45% RRR</td>
<td>p &lt; 0.0001</td>
<td></td>
</tr>
</tbody>
</table>

Cumulative Number of HF Hospitalizations

- Control: 254 HF Hospitalizations
- Treatment: 158 HF Hospitalizations

Hazard ratio 0.63
(95% CI 0.52–0.77)
p < 0.0001

<table>
<thead>
<tr>
<th>HF for HF Hsp at 6 Mo</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFrEF</td>
<td>0.76</td>
</tr>
<tr>
<td>HFpEF</td>
<td>0.48</td>
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</table>
High Risk Patients for Readmission

- "Initial discharge"
- "Transition Phase"
- "Plateau Phase"
- "Palliation and Priorities"
- "death"

Median Time from hospital discharge vs. Readmission Rate
Improved Outcomes in Stage D with Advanced Therapies for Heart Failure
Transplant is Not a Viable Option for Many Patients

NOTE: This figure includes only the heart transplants that are reported to the ISHLT Transplant Registry. As such, the presented data may not mirror the changes in the number of heart transplants performed worldwide.
Home Inotropic Therapy
Left Ventricular Assist Device (LVAD)
Improving Outcomes with LVAD

[Graph showing survival rates for different LVAD models over time.

- HM XVE
- HeartMate II
- HeartWare

Survival rates are shown in percentage (%), with years identified as 1997, 2005, and 2008.

Multicenter clinical evaluation of the HeartMate vented electric left ventricular assist system in patients awaiting heart transplantation. Frazier OH, Rose EA, Oz MC et al. J Thor Cardiovasc Surg 2001:122

# Adverse Events
## HeartMate II Destination Therapy Therapy Trial

<table>
<thead>
<tr>
<th>Event</th>
<th>CF LVAD (n=133) [211 pt-years]</th>
<th>PF LVAD (n=59) [41 pt-years]</th>
<th>Risk Ratio [95% Confidence Interval]</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Replacements</td>
<td>0.06</td>
<td>0.51</td>
<td></td>
<td>&lt;0.001</td>
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<tr>
<td>Stroke</td>
<td>0.13</td>
<td>0.22</td>
<td>[0.67, 2.28]</td>
<td>0.21</td>
</tr>
<tr>
<td>Ischemic Stroke</td>
<td>0.06</td>
<td>0.10</td>
<td>[0.45, 2.22]</td>
<td>0.38</td>
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<tr>
<td>Hemorrhagic Stroke</td>
<td>0.07</td>
<td>0.12</td>
<td>[0.28, 4.88]</td>
<td>0.33</td>
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<tr>
<td>Device-related infection</td>
<td>0.49</td>
<td>0.90</td>
<td>[1.25, 5.32]</td>
<td>0.01</td>
</tr>
<tr>
<td>Local non-device infection</td>
<td>0.39</td>
<td>1.33</td>
<td>[0.75, 2.40]</td>
<td>0.02</td>
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<tr>
<td>Sepsis</td>
<td>0.39</td>
<td>1.11</td>
<td>[0.27, 4.96]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Bleeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bleeding requiring PRBC</td>
<td>1.66</td>
<td>2.45</td>
<td>[1.01, 5.96]</td>
<td>0.06</td>
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<tr>
<td>Bleeding requiring surgery</td>
<td>0.29</td>
<td></td>
<td>[0.21, 4.11]</td>
<td>0.57</td>
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<tr>
<td>Other Neurological</td>
<td>0.17</td>
<td>0.29</td>
<td>[0.77, 5.52]</td>
<td>0.14</td>
</tr>
<tr>
<td>Right Heart Failure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended Inotropes</td>
<td>0.14</td>
<td>0.46</td>
<td>[0.41, 3.37]</td>
<td>&lt;0.001</td>
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<tr>
<td>RVAD</td>
<td>0.02</td>
<td>0.07</td>
<td>[0.27, 3.48]</td>
<td>0.12</td>
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<tr>
<td>Cardiac Arrhythmias</td>
<td>0.69</td>
<td>1.31</td>
<td>[1.01, 3.68]</td>
<td>0.006</td>
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<tr>
<td>Respiratory Failure</td>
<td>0.31</td>
<td>0.80</td>
<td>[0.39, 1.64]</td>
<td>&lt;0.001</td>
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<tr>
<td>Renal Failure</td>
<td>0.10</td>
<td>0.34</td>
<td>[0.27, 3.44]</td>
<td>&lt;0.001</td>
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<tr>
<td>Hepatic Dysfunction</td>
<td>0.01</td>
<td>0.00</td>
<td>[0.27, 3.44]</td>
<td></td>
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<tr>
<td>Device Thrombosis</td>
<td>0.01</td>
<td>0.01</td>
<td>[0.27, 3.44]</td>
<td></td>
</tr>
<tr>
<td>Re-hospitalizations</td>
<td>2.64</td>
<td>4.25</td>
<td>[1.16, 11.0]</td>
<td>0.02</td>
</tr>
</tbody>
</table>
Improved Quality of Life
Additional Resources

PAR Heart Failure Clinic
706-475-1700

www.hfsa.org/heart-failure-guidelines
www.hfsa.org/accahahfsa-guideline-management-heart-failure-update/
Complete Care: Heart Failure
Piedmont Athens Regional
Medically Integrated Practice Units (IPUs)
Traditional Functional Structure

- Supply-driven
- Organized around skills and facilities
- Services in silos
- Discordant care, miscommunication, errors and waste
Integrated Practice Unit Structure

- Demand-driven; organized around **medical conditions**
- **Full range** of medical expertise, skills, and facilities
- Care provided by a **team**
- **Dedicated** resources
- Results-driven
- Complete **cycle of care**
Heart Failure IPU

Redefining Health Care at Piedmont Athens Regional
Heart Failure IPU at PAR

• Dedicated multidisciplinary team:
  • Hospitalists
  • Heart Failure specialists (outpatient provider)
  • Nursing
  • Dietitian
  • Pharmacists
  • Social Worker
  • Heart Failure Navigator

• Responsible for the full cycle of care

• Patient education, engagement and follow-up
Heart Failure IPU at PAR

Consistent Workflow Processes

• Nursing pathways
• Education materials
• Inpatient consults
• Follow-up appointments
• Follow-up phone calls
Heart Failure IPU at PAR

Integrated Workflow Processes

• Staff training
• Improved communication
• Improved team approach, including patient and family
Initial Success!

- Recently ranked #1 in Heart Failure Treatment in Georgia, #7 in US
- Scores based on patient safety, inpatient quality, readmissions, mortality, and complications