Advanced Heart Failure Treatment Options

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September 12, 2015
I have no financial relationships to disclose
Outline

- Heart failure perspective
- Recognizing Stage D heart failure
- Advanced therapies for heart failure
  - Cardiac transplant outcomes
  - LVAD outcomes
- Candidacy for advanced therapies
- Summary
Heart Failure in the U.S.

- 7 million Americans suffer with HF
- Nearly 700,000 new cases each year
- Incidence is approx. 10 per 1,000 pop in those older than 65
- 1.1 million hospitalizations annually
HF Medical Therapy Is Always First Choice

![Bar chart showing mortality reduction for different therapies.](chart.png)

# Stage D Heart Failure

<table>
<thead>
<tr>
<th>Stage A</th>
<th>Stage B</th>
<th>Stage C</th>
<th>Stage D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with risk factors for HF but without structural abnormalities of the heart</td>
<td>Patients with structural abnormalities of the heart who have never had HF symptoms</td>
<td>Patients with underlying heart disease with HF symptoms at present or in the past</td>
<td>Patients with refractory heart failure requiring special interventions</td>
</tr>
<tr>
<td>• HTN</td>
<td>• Previous MI</td>
<td>• Structural heart disease with fatigue and dyspnea</td>
<td>• Recurrent severe symptoms in spite of optimal therapy or those who cannot be safely discharged without special interventions</td>
</tr>
<tr>
<td>• Diabetes</td>
<td>• LVH</td>
<td>• Asymptomatic low EF</td>
<td>• Asymptomatic valvular disease</td>
</tr>
<tr>
<td>• Metabolic syndrome</td>
<td>• Asymptomatic valvular disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cardiotoxic drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Circulation 2005;112:e154-235*
Who May Have Stage D Heart Failure?

- Persistent shortness of breath or cough at night
- Fatigue or shortness of breath in the home
- Walks less than 1 block/climbs less than 1 flight of stairs
- Recurrent volume overload (edema, abdominal bloating, weight gain)
- 2 or more hospitalizations in 1 year
- Hypotension or renal failure interferes with therapy
- Any exposure to milrinone or dobutamine
**Baseline**

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Medications</th>
<th>Diuretics</th>
<th>IV</th>
<th>Lab Data</th>
<th>Devices</th>
<th>Other Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>60</td>
<td>80</td>
<td></td>
<td>Hgb</td>
<td>None</td>
<td>BiV Pacer</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>Beta-blocker</td>
<td></td>
<td>Lymphocyte%</td>
<td>BiV ICD</td>
<td>ICD</td>
</tr>
<tr>
<td>NYHA Class</td>
<td>4</td>
<td>Bumetanide 0</td>
<td></td>
<td>Uric Acid 8.5</td>
<td>IABP/Vent/UF</td>
<td>BiV ICD</td>
</tr>
<tr>
<td>Weight</td>
<td>90</td>
<td>Torsemide 0</td>
<td></td>
<td>Total Chol 145</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EF</td>
<td>20</td>
<td>Metolazone 0</td>
<td></td>
<td>Sodium 132</td>
<td></td>
<td>Pressors/Inotropes</td>
</tr>
<tr>
<td>Syst BP</td>
<td>90</td>
<td>HCTZ 0</td>
<td></td>
<td>HbB</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>90</td>
<td>Chorothiazide 0</td>
<td></td>
<td>QRS ≥150 msec</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Ischemic: [✓]
≥15% 1-Year Mortality Warrants Evaluation for Advanced Heart Failure Therapies
Probability of 1-Year Survival

- NYHA Class IV: 60%
- Inotrope-dependent: 25%

References:
- Circulation 1997;95:2660-2667
- J Heart Lung Transpl 2011;30:1071-1132
- Circulation 2012;125:191-3200
Advanced Therapies for Heart Failure

Heart Transplant

LVAD
Improved Survival with Cardiac Transplant

1-year survival ~ 88%

J Heart Lung Transplant 2013;32:951-964
What is an LVAD?

- Continuous flow device (NO PULSE)
- 3-10 L/min of flow
- Constant power source
- Silent operation
- Driveline exits the body
- Warfarin + ASA
- No swimming
1-Year Survival with LVAD

Survival at 1 year (%)

- 2001: 52%
- 2009: 68%
- 2011: 85%
- 2012: 86%
- 2013: 84%

References:
N Engl J Med 2001;345:1435-1443
Circulation 2012;125:3191-3200
J Heart Lung Transplant 2013;32:675-683
HF Symptoms Improve after LVAD

Percent of patients

Baseline 1 mo 3 mo 6 mo

LVAD Duration

NYHA II NYHA I

J Am Coll Cardiol 2010;55:1826-1834
Probability of 1-Year Survival

- NYHA Class IV: 60%
- Inotrope-dependent: 25%
PROS/CONS of Cardiac Transplant and LVADs

Cardiac Transplant

**PROS**
- Most durable treatment
- 50% of transplant recipients live more than 13 years
- Improved functional capacity and good quality of life
- Fully implantable, no need for power source

**CONS**
- Limited due donor shortage
- Requires immune suppression
- Need for frequent testing in first 5 years
- Higher risk of rejection and infection during first year
- Risk of transplant coronary disease and malignancy long-term

LVAD

**PROS**
- Unlimited supply
- 1-year survival closing in on transplant
- Most patients can live several years
- Improved quality of life and functional capacity
- Rapidly advancing technology with improving outcomes

**CONS**
- Less durable than transplant
- Requires warfarin and ASA
- Requires constant power source
- Limits contact with water
- Risk of infection, bleeding, thrombosis and device malfunction
Candidates for Heart Transplant

- Up to age 70
- No significant extra-cardiac disease
- No active cancer in last 5 years
- No alcohol, tobacco or drug use
- No evidence of untreated psychiatric illness
- Support persons to assist with care
- Ability to learn and strictly comply with instructions about treatment
- Adequate insurance to cover transplant surgery and care
Candidates for LVAD

- Up to age 70-75 and selected older patients
- No significant Mild-to-moderate extra-cardiac disease
- No active cancer in last 5 years *(selected cases)*
- No alcohol, *tobacco* or drug use
- No evidence of untreated psychiatric illness
- Support persons to assist with care
- Ability to learn and strictly comply with instructions about treatment
- Adequate insurance to cover LVAD surgery and care
Guideline-directed medical therapy for heart failure is the treatment of choice

Stage D heart failure patients have severe, refractory symptoms and may benefit from advanced therapies

Life expectancy and functional status improve significantly with LVADs and heart transplant

Refer potential candidates to a heart transplant/LVAD center for evaluation
A Much Better Life is Possible

A heart transplant recipient at the summit of Mount Kilimanjaro in 2001

An LVAD recipient getting back into fishing after completing cardiac rehab