Care of Patients with Advanced Cardiac Disease

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Objectives
• Review expanding options for medical management of advanced heart failure
• Discuss challenges in prognostication and integration of palliative care
• Identify strategies for supportive and palliative interventions throughout the course of heart failure treatment

Consider this patient...
• 65 year old man with type 2 diabetes mellitus, moderate-severe aortic stenosis, coronary artery disease with prior CABG 1998 and ischemic cardiomyopathy (EF 30%).
• Recurrent hospital admissions for heart failure decompensation (4 in past 2 months) despite maximal medical therapy with intensive home and transtelephonic nursing support.
• Readmitted to hospital for 5th time after 3 defibrillator shocks for ventricular tachycardia and recurrent decompensated heart failure
• What are the options for treatment?
Heart Failure (HF): Scope of the Epidemic

- US prevalence*: 5.8 million
- US annual incidence: 670,000
- Annual mortality: 282,754
  - 5-10% depending on severity
- Cost: $39.2 billion
  - 53% of cost due to hospitalization

1991 2001 2037
3.5 4.5 10.0

“At least I don’t have cancer...”

Trends in median survival after first HF admission, by gender
Scotland (1988-2003), n=776,555

Heart Failure is a Mortal Disease:
More malignant than most cancers
Physician Engagement with End of Life Care

Advanced Directive Documentation:
N=24,291 pts admitted over 5 yrs

Predictors:
- Age
- Female
- Caucasian
- Higher income
- Increased clinical risk score
- Palliative care or HF physician
- In-hospital death or hospice

Butler et al. JACC HF 2015;3:112-21

14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%

Palliative Care is Underutilized

- Patients dying from HF are far less likely to be referred to hospice than cancer patients


Only 8% of patients who died within 6 months of discharge referred to hospice

Challenge #1

Therapeutic Options for Heart Failure are Expanding
Staging Heart Failure

<table>
<thead>
<tr>
<th>Stage</th>
<th>Patient Description</th>
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<tbody>
<tr>
<td>A</td>
<td>High risk for developing heart failure (HF)</td>
</tr>
<tr>
<td>B</td>
<td>Asymptomatic HF</td>
</tr>
<tr>
<td>C</td>
<td>Symptomatic HF</td>
</tr>
<tr>
<td>D</td>
<td>Refractory end-stage HF</td>
</tr>
</tbody>
</table>

- Marked symptoms at rest despite maximal medical therapy (eg, those who are recurrently hospitalized or cannot be safely discharged from the hospital without specialized interventions)
- Known structural heart disease
- Shortness of breath and fatigue
- Reduced exercise tolerance
- Marked symptoms at rest despite maximal medical therapy (eg, those who are recurrently hospitalized or cannot be safely discharged from the hospital without specialized interventions)

Stages of HF and treatment options for systolic heart failure

- Medical Approaches
  - Hemodynamic Optimization
  - Inotropic Support
- Surgical Approaches
  - Revascularization, mitral valve repair
  - TAVR
  - Transplantation
  - Mechanical Circulatory Support (VAD)
- Regenerative Approaches?
  - Cell-based Therapy
  - Gene Therapy
- Palliation/Symptom Management

Expanding Options for 'End-Stage' Heart Failure

- Medical Approaches
  - Hemodynamic Optimization
  - Inotropic Support
- Surgical Approaches
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The Transplant Dilemma

Waiting Times Getting Longer

A ‘Bridge’ to Transplantation
Implantable Continuous Flow VAD

Heartmate III

Potential for Home Discharge and Good Quality of Life

Evolving VAD technology

HeartMate VXE Pulsatile Pump
HeartMate II Axial Flow Pump
HeartWare HVAD Centrifugal Rotary Pump
**Mechanical Support Strategies**

**Bridge to Transplant**
- Allow survival until donor heart available
- Improve quality of life, end-organ function

**Destination Therapy**
- Permanent mechanical support
- For those ineligible for transplant

**REMATCH**
**Randomized Evaluation of Mechanical Assistance for the Treatment of Congestive Heart Failure**
- Randomized clinical trial
  - Optimal medical therapy vs. pulsatile flow LVAD
- Non-transplant candidates (n=129)
  - EF ≤ 25%
  - peak VO2 < 12 ml/kg/min,
  - or continuous infusion inotropes
- FDA approval for XVE as destination therapy

**Actuarial Survival**
**HeartMate II Destination Therapy Trial**
- As-treated analysis
  - Log-rank Test p=0.008
Actuarial Survival vs REMATCH* HeartMate II Destination Therapy Trial

- Months 0 6 12 18 24
- Percent Survival 0 10 20 30 40 50 60 70 80 90 100
- CF LVAD 68%
- LVAD REMATCH: 23%
- PF LVAD 24%
- OMM REMATCH: 8%

* N Engl J Med 2001; 345:1435-43

LVAD: Adverse Events

- Bleeding 10-30%
- RV failure 5-20%
- Infection 10-30%
- Embolism 2-5%
- Device failure 2-6%

Acute/subacute

Chronic

LVAD: Adverse Events

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- RV failure 5-20%
- Infection 10-30%
- Embolism 2-5%
- Device failure 2-6%

Acute/subacute

Chronic
Our Patient

- Ultimately taken to LVAD as ‘bridge to transplantation’
- Initially did well, discharged successfully home on post-op day #30
- 3 months later returned with acute onset of dense R hemiparesis and expressive aphasia consistent with L MCA stroke despite INR 2.0

Challenge #2

Estimating Prognosis in Heart Failure is Challenging – When to Integrate Palliative Care?

Heart Failure is not exactly like Cancer

The Progression of Heart Failure

Goodlin SJ. JACC 2009; 54: 386

Modelling the ‘Ideal’


Median Time from hospital discharge

Three-Phase Terrain of Lifetime Readmission Risk
After HF hospitalization

Desai AS, Stevenson LW. Circ Heart Fail 2012; 397-99
Chun S, et al. Circ Heart Fail 2012; xx-xx
**Mortality after HF Hospitalization**

![Graph showing cumulative mortality over time for different hospital admissions.](image)

Signs that the end is near...

- Rising Creatinine / Progressive Renal Dysfunction
- > 5% non-fluid related weight loss (cachexia)
- Escalating diuretic dose requirements
- Intolerance of standard medical therapy
- Increasing frequency of HF hospitalization
- Increasing burden of ventricular arrhythmias
- Refractory HF symptoms
- Need for inotropic support

When ought we begin to integrate palliative care?

- “Surprise” Question
- Patient Request
- Uncertainty Regarding Prognosis
- Care Management Transitions (VAD/ICD)
- Recurrent Hospital Admissions

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AHA: Suggested Triggers for Formal Discussion of Prognosis/Goals of Care

- Routine
  - “Annual Heart Failure Review” with a scheduled clinic visit
- Event-driven “milestones” that should prompt reassessment
  - Increased symptom burden and/or decreased function/quality of life
  - Falls
  - Worsening heart failure prompting hospitalization, particularly if recurrent
  - Serial increases of maintenance diuretic dose
  - Symptomatic hypotension, azotemia, or refractory fluid retention necessitating neurohormonal medication underdosing or withdrawal
  - First or recurrent ICD shock for VT/VF
  - Initiation of intravenous inotropic support
  - Consideration of renal replacement therapy
  - Other important comorbidities: new cancer, etc
  - Major “life events”: death of a spouse


Challenge #3

Poor Alignment Between Patient and Physician Expectations of Prognosis

Discrepant perceptions of Prognosis

Ambardekar, et al. JACC:HF 2017
Prognostic Expectations: Patient vs. Physician

<table>
<thead>
<tr>
<th>Patient Expectations of Prognosis</th>
<th>Physician Would you be surprised if this patient died within the next year?</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 years</td>
<td>Would be surprised: 18% Would not be surprised: 54%</td>
</tr>
<tr>
<td>&gt; 5 years</td>
<td>Would be surprised: 28% Would not be surprised: 10%</td>
</tr>
<tr>
<td>&gt; 10 years</td>
<td>Would be surprised: 0% Would not be surprised: 10%</td>
</tr>
</tbody>
</table>

60% of patients indicated they would like to be informed if physician anticipated life expectancy < 1 year.

Balancing Quantity and Quality of Life

- As the end nears, many patients with heart failure are willing to trade quantity for quality of life.
- In general, the willingness to trade time for quality correlates with the severity of symptoms and functional limitation.
- However, there is substantial inter-individual variation in the intensity of this preference.

Lewis E. J Heart Lung Transplant 2001; 20:1016

What Do Patients with Serious Illness Want?

- Pain and symptom control
- Avoid inappropriate prolongation of the dying process
- Achieve a sense of control
- Relieve burdens on family
- Strengthen relationships with loved ones

Singer et al. JAMA 1999;281(2):163-168
Challenge #4
Role of Palliative Care Provider in Non-Oncology Settings

Burden of Symptoms

• Advanced HF patients have similar symptom burden as advanced cancer patients

• Relative to those with cancer, HF pts with worst health status (KCCQ 0-50) had greater physical symptoms (p=0.03), higher depression scores (p=0.001), and lower spiritual well-being (p<0.01).

  Bekelman et al. J Gen Int Med 2009; 24: 592

Managing Heart Failure Symptoms

• Heart Failure Specific Treatments
  – Optimization of Volume Status (Diuretics, sodium/fluid restriction)
  – Optimization of Cardiac Output (Neurohormonal antagonists, inotropic drugs, devices)

• Management of Comorbidities
  – Depression/Anxiety
  – Sleep Apnea
  – Anemia/Iron Deficiency

• Other Approaches
  – Exercise training
  – Mind-Body Interventions
  – Opiates
Supportive Care in Heart Failure: Opportunities

- Relieve Physical and Emotional Suffering
  - Omission of unhelpful therapies
  - Continuation and Reinforcement of symptom-directed therapies
- Improve Patient-Physician Communication and Decisionmaking
- Family/Caregiver Support
- Coordinate and Assure Continuity of Care Across Settings
- Reduce Readmissions?

Selecting Patients for High-Risk Cardiac Interventions: Role for Palliative Care Providers

- Facilitating Informed Consent
- Ensuring Adequate Communication between physicians and patients
- Establishment of Advanced Directives
- Family/Caregiver Education, Appointing a Decisionmaker
- Integration of symptom-focused strategies
- Development of an acceptable device withdrawal process

Checklist for pre-LVAD discussions

How do Heart Failure Patients Die?

- NYHA II: 64%
  - CHF: 24%
  - Other: 28%
  - Sudden Death: 36%

- NYHA III: 58%
  - CHF: 59%
  - Other: 28%
  - Sudden Death: 13%

- NYHA IV: 58%
  - CHF: 32%
  - Other: 25%
  - Sudden Death: 43%

Deaths = 103

Usual Terminal Rhythm in End-Stage Heart Failure

Discussion of ICD inactivation

- ICDs reduce arrhythmic death in HF patients
- The likelihood of painful ICD discharges (shocks) increases as heart failure progresses
- Some patients may prefer to inactivate their devices to prevent shocks and maximize comfort
- In one survey, only 27% of patients who died with ICDs in place had been offered ICD inactivation (most within a few days of the end)

Preferences Regarding ICD Inactivation

Challenge #5

How to integrate palliative care?
Study Design

- Prospective, randomized, pilot study in the Center for Advanced Heart Disease, Brigham and Women's Hospital
- 1:1 allocation to a structured, social worker-led palliative care intervention or usual care (n=50)

Inclusion Criteria

- Hospitalized for ADHF with at least one risk factor for poor prognosis:
  - Prior HF hospitalization within 1 year
  - Age > 80 yrs
  - eGFR < 45 mL/min/1.73 m²
  - SBP < 100 mm Hg
  - Serum sodium < 130 meq/L
  - Cardiac Index < 2.0 mL/min/m²
  - Serious noncardiovascular illness

Exclusion Criteria

- Enrolled in hospice or palliative care
- Anticipated major cardiac surgery, including Ventricular Assist Device (VAD) or transplant, within 3 months of enrollment
- Unable to provide written informed consent

Intervention

- Structured evaluation based on Serious Illness Conversation Guide conducted by a social worker experienced in palliative care and embedded within the care team
- Key components:
  - Evaluation of prognostic understanding, end-of-life preferences, symptom burden, and quality of life
  - Communication of this information to treating clinicians
  - Longitudinal follow up in the ambulatory setting
- Supervision by a palliative care physician who reviewed all cases and provided focused guidance when indicated.

Baseline Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Intervention (N=26)</th>
<th>Usual Care (N=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, yrs</td>
<td>74.7 ± 11.2</td>
<td>69.2 ± 10.2</td>
</tr>
<tr>
<td>Male (%)</td>
<td>14 (53.9)</td>
<td>15 (62.5)</td>
</tr>
<tr>
<td>White (%)</td>
<td>17 (65.4)</td>
<td>20 (83.3)</td>
</tr>
<tr>
<td>Ejection Fraction (%)</td>
<td>30 ± 14</td>
<td>36 ± 17</td>
</tr>
<tr>
<td>Prior HF Hospitalization (%)</td>
<td>36 (65.4)</td>
<td>36 (66.7)</td>
</tr>
<tr>
<td>ICU stay in last 12 mos (%)</td>
<td>22 (86)</td>
<td>21 (87)</td>
</tr>
<tr>
<td>eGFR (mL/min/1.73 m²)</td>
<td>35 ± 17</td>
<td>33 ± 14</td>
</tr>
<tr>
<td>Advanced Care Planning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Care Proxy (%)</td>
<td>23 (88)</td>
<td>18 (75)</td>
</tr>
<tr>
<td>MOLST (%)</td>
<td>1 (3.9)</td>
<td>1 (4.1)</td>
</tr>
<tr>
<td>Any care preferences documented (%)</td>
<td>4 (15.4)</td>
<td>4 (16.0)</td>
</tr>
</tbody>
</table>
6 Month Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Intervention</th>
<th>Control</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>39%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Any Documentation of Preferences</td>
<td>38%</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>MOLST/CC/Hospice</td>
<td>58%</td>
<td>20%</td>
<td></td>
</tr>
</tbody>
</table>

Improved Prognostic Alignment

Patients allocated to the social worker-led intervention were more likely to revise their baseline prognostic assessment in a direction consistent with the physician’s assessment.

Patient-Reported Outcomes

<table>
<thead>
<tr>
<th>Change from Baseline in Survivors at 6 months</th>
<th>Intervention</th>
<th>Control</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHQ-8 (depression)</td>
<td>-1.4 ± 3.8</td>
<td>-0.8 ± 4.3</td>
<td>0.52</td>
</tr>
<tr>
<td>GAD-7 (anxiety)</td>
<td>-3.0 ± 4.5</td>
<td>-2.6 ± 4.8</td>
<td>0.38</td>
</tr>
<tr>
<td>FACIT-Sp (spirituality)</td>
<td>+6.1 ± 20.3</td>
<td>+3.3 ± 21.2</td>
<td>0.59</td>
</tr>
<tr>
<td>KCCQ-12 (QOL)</td>
<td>+11.5 ± 20.6</td>
<td>+13.9 ± 27.6</td>
<td>0.95</td>
</tr>
</tbody>
</table>

* Between group difference in change from baseline.
Challenge #6

Managing specific HF therapies

What to do with Heart Failure Therapies when approaching end-of-life?

- Many heart failure medications are important to relieving symptoms and maintaining quality of life

- Therefore, most active cardiac meds should be continued even as palliative care needs are escalating
ACEI/ARB Therapy: When to Consider Decreasing?

When the patient might feel better without:
- Symptomatic hypotension
- Worsening renal function that inhibits maintenance of comfortable fluid status
- Worsening renal function with uremic symptoms (usually BUN > 100)
- (Spironolactone also can reduce BP and renal function)

Beta blocker therapy When to consider decreasing?

- When the patient might feel better without:
  - Symptomatic hypotension
  - Symptoms of refractory or recurrent fluid retention
  - Exertional dyspnea
  - Worsening renal function even after ACEI/ARB discontinued
- When fatigue, listlessness, or lack of interest dominate

CAUTION: BBl withdrawal may worsen symptom burden in patients with active arrhythmias or angina, which may cause symptoms

ACC/AHA Guidelines for End-Stage Heart Failure (Stage D)

- Options for end of life care should be discussed with the patient and family when severe symptoms persist despite application of all recommended therapies.
- Continuous IV infusion of a positive inotropic agent may be considered for palliation of symptoms in patients with refractory end-stage heart failure.
Management of Devices at End-of-Life

- Pacemakers are usually left ‘on’, since they deliver no painful therapies, and deactivation might accelerate death for those who depend on them.
- Biventricular Pacemakers (CRT) improve symptoms and are also left ‘on’ (can be decoupled from ICD).
- Defibrillator functions are contained within many types of heart failure devices, and can be deactivated without injuring patient or worsening symptoms (purely an ‘insurance policy’).

Thank You!

www.brighamandwomens.org/heart