Treatment Strategies for End Stage Heart Failure: Medications, Heart Transplantation and Pumps

Cesar Guerrero-Miranda M.D.
Transplant Cardiology, Heart Failure and Mechanical Circulatory Support
Baylor University Medical Center
April 29th, 2017

Disclosures: No industry relationship.

Objectives

- How to define end stage heart failure.
- Review treatment options and strategies.
- Review indications and contraindications for heart transplantation and mechanical circulatory support.

Clinical Course of Heart Failure

- Transition to End Stage Heart Failure:
  - NYHA Class IV HF
  - Marked HF symptoms even at rest
  - High risk of death

HF Stage D

- Terminology:
  - Advanced HF
  - Refractory HF
  - End-stage HF

- Patients with marked HF symptoms even at rest:
  - NYHA Class IV HF
  - Recurrent hospitalizations despite GDMT

Clinical Course & Events: Useful for Identifying Patients with Advanced HF

- Repeated (≥2) hospitalizations or ED visits for HF in the past year.
- Progressive deterioration in renal function (e.g., rise in BUN and creatinine).
- Weight loss without other cause (e.g., cardiac cachexia).
- Intolerance to ACE inhibitors due to hypotension and/or worsening renal function.
- Intolerance to beta-blockers due to worsening HF or hypotension.
- Inability to walk 1 block on the level ground due to dyspnea or fatigue.
- Recent need to escalate diuretics to maintain volume status.
- Progressive decline in serum sodium, usually to <133 mEq/L.
- Frequent ICD shocks.
Treatment Options in Advanced HF

- Inotropes
- Transplantation
- LVADs
- Palliative care

Inotropic Harm

- Long-term use of either continuous or intermittent, intravenous parenteral positive inotropic agents, in the absence of specific indications or for reasons other than palliative care, is potentially harmful in the patient with HF.

- Use of parenteral inotropic agents in hospitalized patients without documented severe systolic dysfunction, low blood pressure, or impaired perfusion, and evidence of significantly depressed cardiac output, with or without congestion, is potentially harmful.

Inotropic Therapy: Historical Data

Continuous Outpatient Support with Inotropes

Source: ACC.17 Presentations

Cardiac Transplantation

- Evaluation for cardiac transplantation is indicated for carefully selected patients with stage D HF despite GDMT, device, and surgical management.

- Cardiac transplantation considered gold standard for treatment of refractory end-stage HF

Inotropic Therapy: New data

More Recent Data on Chronic Inotrope Patients

Source: ACC.17 Presentations

1st Human Heart Transplant - 1967

- In December 3, 1967 Christiaan Barnard performed the first human-to-human heart transplant at the Groote Schuur Hospital in Cape Town, South Africa.

Indications for Heart Transplant

1. Cardiogenic shock with reversible organ dysfunction.
2. Low cardiac output state or refractory HF requiring inotropes.
3. Class III-IV HF with poor exercise tolerance:
   - RHC: PSAP < 50 mmHg AND TPG < 15 OR PVR < 3 WU AND SBP > 85 mmHg
4. Refractory ventricular arrhythmia.
5. Refractory angina.

Special Considerations

- Congenital heart disease with or without associated ventricular dysfunction
- Restrictive cardiomyopathies:
  - Infiltrative (sarcoid, amyloid, Fabry's, hemochromatosis, endomyocardial fibrosis).
  - Idiopathic (must rule out constriction).
  - Hypertrophic, non obstructive cardiomyopathy.
- Arrhythmogenic Right Ventricular Cardiomyopathy

Contraindications for Cardiac Transplant

- Severe systemic disease with poor survival.
- Severe peripheral vascular disease.
- Irreversible pulmonary hypertension (PVR > 3)
- Severe COPD, emphysema or pulmonary dz.
- CVA with severe cognitive impairment.
- Uncontrolled diabetes with proteinuria, renal disease, vasculopathy, neuropathy.
- Active infection, malignancy or bleeding.
- Ongoing substance abuse, smoking or other psychosocial serious problems.
- Lack of family support or adequate financial resources.
- Severe obesity (BMI > 35, IBW > 140%).
Types of Durable LVAD

- Mechanical Circulatory Support
  - HVAD
  - HMII

Destination LVAD Eligibility

- Broadly similar to transplant
  - Coexistent illness with limiting prognosis
  - Psychosocial instability, substance abuse, etc.
- Less inclusive (compared to Tx)
  - Severe Right heart failure
- More inclusive (compared to Tx)
  - Older patients (over 70 yrs old)
  - Obesity: BMI up to 40
  - Creatinine up to 2
  - Pulmonary hypertension with PVR >3
  - DM, PVD, some infections not as problematic.

Indications for LVAD Placement

- Bridge to Decision
- Bridge to Transplant
- Destination Therapy
- Bridge to Recovery

Survival Over Time Across Landmark HM Clinical Trials
Longterm Complications

- GI Bleeding
- Driveline Infections
- Device Thrombosis
- Hemolysis
- AI
- Stroke
- Late RV failure

Conclusions

- Landscape of advanced HF has changed due to emerging specialized therapies.
- Heart transplantation remains the most successful therapy for end stage cardiomyopathy, although severe donor shortage limits its beneficial only for a small fraction of these patients.
- LVAD utilization is gaining increased acceptance as device technology improves and transplantation rates remain flat.
- Efforts to improve DT LVAD outcomes, perhaps not transplantation, represents the greatest hope for addressing end stage heart failure.

Thank you
Cesar.guerreromiranda@BSWhealth.org