When to Consider Advanced HF Rx

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5 treatments options for stage D HF

OPTIONS:
1. Heart transplant
2. Ventricular assist device
3. Chronic home inotrope
4. Palliative care
5. Investigational surgery or medications

DEPEND ON:
1. Patient goal of living
2. Transplant candidacy
3. How much time left?

Complimenting rather than in isolation

5% of HF population are stage D HF

"Refractory symptoms of HF, despite GDM"
- Dyspnea at rest or minimal activities
- Frequent/prolong hospitalization
- Cardiac cachexia, CKD, PH, cirrhosis
- High mortality and morbidity
- 20-50% survival at 1 year
- Can be either inpatient or outpatient
- Some are “inotrope dependent”

You know when you see it

First, you have to do EVERYTHING that you can but non of them seem to work
NYHA III-IV
6WMT < 350
persistent of congestion
Recurrent HF hosp.
Recurrent VT, ICD shock
Not a CRT candidate
Cannot tolerate BB/ACEI/MRA
Less responsive to diuretics

Signs that death is near → referral center

Age, BMI, HR, SBP
EF, Cr, Na, Alb, Hb
QRS width, LV size
BNP, troponin
peak VO2

Risk model
SHFM: Circ 2006;113(11):1424.

ESC 2012 HF guideline. Eur J 2012;33:1787-847

Intolerance of ACEI

Unresponsive to diuretics

PRAISE 1 NEJM 1996

Repeat hospitalizations predict mortality in the community population with heart failure

- 14,374 pts from admin registry of British Columbia
- Median survival after the HF hospitalization
  - 1st = 2.4 yr
  - 2nd = 1.4 yr
  - 3rd = 1.0 yr
  - 4th = 0.6 yr

JACC 2003;41:2029-35

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HF-ACTION JACC 2016

Heart transplant is the best option for survival and QoL

- Durable
- Biventricular support
- Biocompatible

Tracy Ellerbroek kisses her two-and-a-half-month-old son Jayden, whispering to him, "Mom's here. I am not going anywhere." Tracy missed seeing him when she was in the hospital.

The Oregonian
September 04, 2010
**Heart Failure Clin 2015;11:563-572.**

**Thailand: 20/yr**

Very selected patient will benefit from HTx

<table>
<thead>
<tr>
<th>Indications for MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge to transplant (BTT)</td>
</tr>
<tr>
<td>Destination therapy (DT)</td>
</tr>
<tr>
<td>Bridge to ...</td>
</tr>
<tr>
<td>- To recovery:</td>
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<tr>
<td>- Shock, post cardiac surgery, post MI, myocarditis</td>
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<tr>
<td>- To decision:</td>
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<tr>
<td>- Evaluation for OHT candidacy status</td>
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<tr>
<td>- Periprocedure:</td>
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<tr>
<td>- High risk PCI, percutaneous valve, ablation.</td>
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</table>
**REMATCH study**

- HF stage D and not a transplant candidates
- 129 pts
- Pulsatile flow LVAD vs. OMM
- LVAD resulted in a survival benefit

**Ongoing technology**

**LVAD Technology Evolves**

A Fully Magnetically Levitated Circulatory Pump for Advanced Heart Failure

- NEJM 2001; 345:1435-43

**Too soon or too late**

The figure illustrates seven INTERMACS levels of clinical severity of end-stage heart failure with the corresponding survival. The time frame for consideration of mechanical circulatory support and evidence from clinical trials of 1-year survival benefit with LVAD implantation is shown in the table.

<table>
<thead>
<tr>
<th>Heart Transplant</th>
<th>Mechanical Circulatory Support</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indication</strong></td>
<td>Gold standard</td>
</tr>
<tr>
<td></td>
<td>Improve survival + QoL</td>
</tr>
<tr>
<td><strong>1-yr survival</strong></td>
<td>85 - 90%</td>
</tr>
<tr>
<td><strong>Limitation</strong></td>
<td>Limited candidacy</td>
</tr>
<tr>
<td></td>
<td>Limited donors</td>
</tr>
<tr>
<td></td>
<td>Very selected patient</td>
</tr>
<tr>
<td><strong>Experiences</strong></td>
<td>Worldwide: 4000 / year</td>
</tr>
<tr>
<td></td>
<td>Thailand: 20 / year</td>
</tr>
<tr>
<td><strong>A Disease by itself</strong></td>
<td>Immunosuppressant</td>
</tr>
<tr>
<td></td>
<td>Endomyocardial biopsy</td>
</tr>
<tr>
<td></td>
<td>“New kind of patient”</td>
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<tr>
<td><strong>Complications</strong></td>
<td>Rejection</td>
</tr>
<tr>
<td></td>
<td>Infection</td>
</tr>
<tr>
<td></td>
<td>Malignance</td>
</tr>
<tr>
<td></td>
<td>RV failure</td>
</tr>
<tr>
<td></td>
<td>Bleed/ Clot</td>
</tr>
<tr>
<td></td>
<td>Infection</td>
</tr>
</tbody>
</table>
Recommendation for Advanced Rx

**Cardiac transplantation**
- Evaluation for cardiac transplantation is indicated for carefully selected patients with severe LV dysfunction whose M CS remains inadequate despite maximal medical therapy.

**Long term home inotrope**
- **Use of inotrope is controversial but common**
  - 75% in DMM arm of REMATCH
- **Chronic, ambulatory home inotropic infusion**
  - **↑ CO by ↑ contractility**
- **Agents**
  - Dopamine
  - Dobutamine
  - Milrinone
- **Recently available in Thailand**
- **Limited evidences**
  - Safe
  - Improve hemodynamics by RHC
  - Allow death at home
  - Decreased hospitalization
  - Effect on mortality
  - Cost saving
  - 2 groups of patients -
    1. “A bridge” - Awaiting HTx or MCS -
    2. Palliative care

**References**
- Circ Heart Fail. 2015;8:880-886.
107 patients on home inotrope
- 56 yo, EF 20% ischemic
- 86% survivors
- Mean LOS 3.1 ± 1.3 mo
- 36% death, 25% still on inotrope, 12% wean off inotrope, 12% MCS, 16% HTx
- 55/60 successfully bridge

Table 1: Initial Follow-up and Hospitalizations on Inotropes

<table>
<thead>
<tr>
<th>Inotrope</th>
<th>No. of Patients</th>
<th>Mean Hospitalizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dobutamine</td>
<td>50</td>
<td>2.8</td>
</tr>
<tr>
<td>Milrinone</td>
<td>57</td>
<td>3.2</td>
</tr>
</tbody>
</table>

No mortality differences between dobutamine and milrinone
- Retrospective
- 112 inotrope-dependent stage D HF not HTx candidates
- Mean dose:
  - Dobutamine (5.4 mcg/kg/min)
  - Milrinone (0.4 mcg/kg/min)

COSI Study
- 36 inotrope-dependent patients, not a HTx candidate
- 55.4 yo, EF 20%, LVEDD 70 mm
- ICD = 5
- Mostly dobutamine
- Median survival = 3.4 months
- 55% death at home

Milrinone
- Phosphodiesterase 3 inhibition
- Increased cyclic AMP
- Can be co-administered with BBs
- Effect
  - ↑ contractility, ↑CO, ↓PCWP
  - ↑ systemic vasodilation
  - ↑ pulmonary vasodilator, ↓PA
- Typical dose: 0.125 - 0.75 µg/kg/min
- Long duration
  - 11/2 = 2.5 hours
  - Excreted by renal,
- Side effect: Hypotension, AT, VT

How we do it

Patient selection
- LVSD = 40%, NYHA 3, 4
- Inotrope in CMR 4.3, C3 - 22 in PCWP - 29/ICD
- Inotropic improved (20%) and not on inotrope - selecting patients with intense whitewash

Procedure
- Bridge to HTx
- Final inotrope
- How to handle inotrope
- Patient and family
- Inotropic treatment and the rationale
- Treatment side effects
- Long term follow-up
- Monitoring and weaning issues
- Medications
- How to handle complications
- Plan for weaning

Outpatient
- Discharge
- Follow up: 1 week
- Follow up: 1 month
- Follow up: 3 months
- Discontinue protocol

How we do it
Ambulatory infusion pump

- Battery > 24 hours
- Small, light weight, lock screen

Inotrope Summary

- Home inotropes are safe
  - for both bridge to HTx, MCS or destination Rx
- Recently data suggests improved 1 year mortality
  - Reduce Hospitalizations
  - Improved QoL
- Need extensive patient education and discussion

Recommendation for Advanced Rx

<table>
<thead>
<tr>
<th>Situation</th>
<th>LEC</th>
<th>LSE</th>
<th>Reference</th>
</tr>
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<tbody>
<tr>
<td>Inotropic support</td>
<td></td>
<td></td>
<td>[1]</td>
</tr>
<tr>
<td>Short-term support for transient end-organ dysfunction in hospital patients with stage II-III heart failure</td>
<td>B</td>
<td>B</td>
<td>[382, 401, 530]</td>
</tr>
<tr>
<td>Long-term support with continuous inotropic perfusion in Stage D-HF</td>
<td>B</td>
<td>B</td>
<td>[531-532]</td>
</tr>
<tr>
<td>Routine intravenous use, either continuous or intermittent, is potentially harmful in stage D-HF</td>
<td>C</td>
<td>C</td>
<td>[476, 664-665]</td>
</tr>
<tr>
<td>Short-term intravenous use in hospitalized patients without evidence of shock or treatment end-organ performance is potentially harmful</td>
<td>B</td>
<td>B</td>
<td>[552, 648, 558]</td>
</tr>
</tbody>
</table>

ACC 2013

ACC/AHA HF guideline 2013

**Palliative care**

- "patient and family-centered care that optimizes QOL by anticipating, preventing, and treating suffering"
  
  Clinical Practice Guidelines for Quality Palliative Care, 2013

- Appropriate at any age and at any stage in a serious illness
  - Palliative care ≠ end of life care

**Colon Cancer stage III**

- Surgery
- Chemo after chemo Rx
- Pain, poor appetite
- Infection
- Hospitalization
- ICU

When will you let patient know about:
- Prognosis?
- Goal of care?
- Goal of living?

Death (sooner or later)

**Stage D HF (20% mortality at 1 year)**

- ICD/CRT
- Hosp. after hosp.
- dyspnea, pain, depression
- renal failure, infection
- ICD shock
- CCU

When will you let patient know about:
- Prognosis?
- Goal of care?
- Goal of living?

Death (sooner or later)

**Heart Failure Disease Progression**

**RCT, n= 151**

- Metastatic non-small-cell lung cancer
- Palliative care on top standard care

Result:
- Despite less aggressive care
- Better QoL, depression
- 2.7 month survival benefits

Limited evidence in HF patients

- RCT, 232 patients AHF (usual vs. usual + PC)
- Equal survival, 30-day re-hosp.
- Improve QOL, symptoms (dyspnea, pain, tiredness, depression, anxiety), advance care plan

ACC/AHA 2013

- Class I, LoE B
Palliative and supportive care is effective for patients with symptomatic advanced HF to improve quality of life. (Level of Evidence: B)

My idea
- VAD/HTx discussion
- All stage D
- ICD implant/ upgrade
- Why not everyone

Challenge

- “Stigma of death, hopelessness, dependency, comfort care”
- “Palliative care = the person’s on death row”
- “Take you off medication and just comfort care”

- Provider discomfort (11%)
- Perception of patient/family unreadiness (21 + 12%)
- Fear of destroying hope (9%)
- Lack of time (8%)
- Lack of confidence (>30%)

My thoughts
- Variable prognosis
- Episodic improvement in symptoms
- The easiest option is not making any decision

Hospice care – End of life care

- When curative treatments are no longer beneficial
- When the burdens of treatments exceed the benefits
- When patients are entering the last weeks of life
- ≠ euthanasia or physician assist suicide

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Thank you

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