Advanced Heart Failure 
Palliative Considerations
Objectives

- Recognize functional limitations associated with the stages of heart failure
- Describe common pharmacological and device therapies used in the symptom management of advanced heart failure
- Identify consideration in goals of care discussions specific to heart failure patients
Heart Failure

- Chronic, progressive cardiac condition
- (At least) 20% of hospital admissions patients 65+

- In US, HF care estimated cost $25-40 billion
  - $8-15 billion is hospital costs
  - The costs of HF hospitalizations is DOUBLE that for all forms of cancer
Primary PCI for STEMI in Nonagenarians

This study reports that primary PCI can be safely and successfully performed in nonagenarians (>90 years old) presenting with STEMI through a trans-radial approach. Similar to younger patients, this invasive strategy is associated with a high rate of achieved reperfusion of the infarct-related artery and low incidence of procedure-related complications in this specific population.

While these results suggest that primary PCI may be offered to selected nonagenarians with acute MI, it should be noted that there was no comparison group, such as nonagenarians with STEMI who were not managed with primary PCI, so outcomes cannot be directly compared with optimal medical therapy.
Types of Heart Failure
Systolic-Diastolic HF

- Systolic
  - Reduced ability for the ventricles to eject blood

- Diastolic
  - Reduced ability for the ventricles to fill with blood

Either way, the heart is unable to pump blood adequately to meet the body’s metabolic needs.
Systolic Heart Failure

- Failed Pump-Decreased Squeeze

- Decreased Ejection Fraction (EF)
  - [Normal > 60%]
  - [Mild 45-60%]
  - Moderate 25-45%
  - Severe 20% or less

- Result - Symptoms of Left and Right sided HF
Diastolic Heart Failure

- Failed Muscle Relaxation/Decreased Filling

- Normal or Increased Ejection Fraction (EF)
  - Normal-60-70%
  - Hyperdynamic >70%

- Result - Symptoms of Left and Right sided HF
Left Sided Heart Failure

LUNG
Dyspnea
Orthopnea
Paroxysmal nocturnal dyspnea (PND)
Cough
Hypoxia/Low O2 sat
Rales/Crackles
Pulmonary edema
Right Sided Heart Failure

PERIPHERY
- Weight gain
- Edema
- Jugular Venous Distention (JVD)
- Liver engorgement
- Ascites
- Nausea/Vomiting
- Anorexia
- Constipation
- Diminished breath sounds
### Stage-Function Table

<table>
<thead>
<tr>
<th>ACC/AHA stage</th>
<th>NYHA functional classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>A At high risk for heart failure but without</td>
<td>None</td>
</tr>
<tr>
<td>structural heart disease or symptoms of heart</td>
<td></td>
</tr>
<tr>
<td>failure</td>
<td></td>
</tr>
<tr>
<td>B Structural heart disease but without symptoms of</td>
<td>I  Asymptomatic during ordinary physical activity</td>
</tr>
<tr>
<td>heart failure</td>
<td>II Slight limitation of ordinary physical activity</td>
</tr>
<tr>
<td>C Structural heart disease with prior or current</td>
<td>III Marked limitation of ordinary physical activity</td>
</tr>
<tr>
<td>symptoms of heart failure</td>
<td></td>
</tr>
<tr>
<td>D Refractory heart failure requiring specialised</td>
<td>IV Symptoms present at rest</td>
</tr>
<tr>
<td>interventions</td>
<td></td>
</tr>
</tbody>
</table>

**Key:** ACC = American College of Cardiology; AHA = American Heart Association; NYHA = New York Heart Association

Source: Br J Cardiol © 2004 Sherbourne Gibbs, Ltd.
Heart Failure Therapies
Goals of Therapy

- **Reduce or Control Risk Factors for Worsening HF**
  - **Stage A**
    - Manage underlying disease (HTN, diabetes, obesity)
    - ACE inhibitors or Angiotensin II receptor blockers
  - **Stage B**
    - Beta blockers
    - Implantable defibrillator

- **Stabilize and Compensate for the Failing Heart**
  - **Stage C**
    - Salt restriction
Goals of Therapy

- **Stabilize and Compensate for the Failing Heart**
  - **Stage C (continued)**
    - Diuretics, aldosterone antagonists, digoxin, hydralazine, nitrates
    - Biventricular pacing
  - **Stage D**
    - Chronic inotropes
    - Transplant
    - Permanent mechanical support
• Indication: Fluid retention

• In Stage C & D - use in combination with ACE-I
# Diuretics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Class</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furosemide (Lasix)</td>
<td>Loop</td>
<td>PO: 20 up to 400 mg; IV load/infusion</td>
</tr>
<tr>
<td>Bumetanide (Bumex)</td>
<td>Loop</td>
<td>PO: 0.5 up to 5 mg; IV load/infusion</td>
</tr>
<tr>
<td>Torsemide (Demadex)</td>
<td>Loop</td>
<td>PO: 10 up to 200 mg; IV load/infusion</td>
</tr>
<tr>
<td>Metolazone (Zaroxolyn)</td>
<td>Thiazidelike</td>
<td>PO: 2.5 up to 20 mg</td>
</tr>
<tr>
<td>Hydrochlorothiazide(HCTZ)</td>
<td>Thiazide</td>
<td>PO: 12.5 up to 100 mg</td>
</tr>
<tr>
<td>Spironolactone (Aldactone)</td>
<td>Aldosterone Antagonist</td>
<td>PO: 12.5 up to 50 mg</td>
</tr>
</tbody>
</table>
- Reduces risk of worsening HF and improves survival

- Indication: All stable patients with current or prior symptoms of HF and reduced LVEF, unless contraindicated

- Caution (*not absolute contraindication*) reactive airway disease and asymptomatic bradycardia

- May need to be decreased temporarily in acute exacerbation
## Beta Blockers

<table>
<thead>
<tr>
<th>Drug</th>
<th>Starting Dose</th>
<th>Target Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metoprolol CR/XL (Toprol)</td>
<td>12.5-25 mg daily</td>
<td>200 mg daily</td>
</tr>
<tr>
<td><em>Metoprolol tartrate (Lopressor)</em></td>
<td>12.5 -25 mg <em>bid</em></td>
<td></td>
</tr>
<tr>
<td>Bisoprolol (Zebeta, Ziac)</td>
<td>1.25 mg daily</td>
<td>10 mg daily</td>
</tr>
<tr>
<td>Carvedilol (Coreg)</td>
<td>3.125 mg <em>bid</em></td>
<td>25-50 mg <em>bid</em></td>
</tr>
</tbody>
</table>
• Indication: All stable patients with current or prior symptoms of HF and reduced LVEF, unless contraindicated

• Vasodilation, improvement in LVEF, and survival benefit

ACE-I & ARBs
Key Points
## Ace Inhibitors (ACEI)

<table>
<thead>
<tr>
<th>Drug</th>
<th># Doses/d</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benazepril (Lotensin)</td>
<td>1-2</td>
<td>20-40 mg</td>
</tr>
<tr>
<td>Captopril (Capoten)</td>
<td>2-3</td>
<td>25-150 mg</td>
</tr>
<tr>
<td>Enalapril (Vasotec)</td>
<td>1-2</td>
<td>10-40 mg</td>
</tr>
<tr>
<td>Fosinopril (Monopril)</td>
<td>1-2</td>
<td>20-40 mg</td>
</tr>
<tr>
<td>Lisinopril (Prinivil, Zestril)</td>
<td>1-2</td>
<td>20-40 mg</td>
</tr>
<tr>
<td>Quinapril (Accupril)</td>
<td>1-2</td>
<td>20-80 mg</td>
</tr>
<tr>
<td>Ramipril (Altace)</td>
<td>1-2</td>
<td>2.5-20 mg</td>
</tr>
</tbody>
</table>
# Angiotensin Receptor Blockers (ARBs)

<table>
<thead>
<tr>
<th>Drug</th>
<th># Doses/d</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candesartan (Atacand)</td>
<td>1</td>
<td>16-32 mg</td>
</tr>
<tr>
<td>Irbesartan (Avapro)</td>
<td>1</td>
<td>150-300 mg</td>
</tr>
<tr>
<td>Losartan (Cozaar)</td>
<td>1-2</td>
<td>50-100 mg</td>
</tr>
<tr>
<td>Olmesartan (Benicar)</td>
<td>1</td>
<td>20-40 mg</td>
</tr>
<tr>
<td>Telmisartan (Micardis)</td>
<td>1</td>
<td>40-80 mg</td>
</tr>
<tr>
<td>Valsartan (Diovan)</td>
<td>1</td>
<td>80-320 mg</td>
</tr>
</tbody>
</table>
Adjunct Management

- **Aldosterone Antagonists**
  - Spironolactone (Aldactone) 12.5 to 25 mg daily
  - Eplerenone (Inspra) 25 to 50 mg daily

- **Digoxin**

- **Hydralazine and Nitrates**
Inotrope Infusions

- **Milrinone (Primacor)**
  - **Symptomatic relief** in *end-stage heart failure* unresponsive to other HF therapies
  - Most common dosing 0.375-0.75 mcg/kg/minute
  - Sometimes lower initial dose 0.1 mcg and a maintenance of 0.2-0.3 mcg/kg/min
  - Caution with renal impairment- reduce dose
  - Watch for ventricular arrhythmias and hypotension

- **Dobutamine**
Implanted device that monitors cardiac arrhythmias and delivers electrical therapy to interrupt the arrhythmia.

Can also be a pacemaker that regulates the heart rate, replacing the heart’s electrical conduction system.

**Implantable Cardioverter/Cardiac Defibrillator (ICD)**
Biventricular Device
Resynchronization Therapy

Adds a left ventricular lead

Can be a pacemaker or defibrillator
Mechanical Circulatory Assist Devices

- Bridge to transplant (BTT)
- Bridge to recovery
- Bridge to "decision making"
- Destination therapy (DT) for remainder of patient's life.
Mechanical artificial heart implanted in the chest and connected to an electrical source.

LVAD, RVAD, BiVAD, TAH

Only for patients with advanced HF

Burdens of Therapy
Minimally invasive procedure (aortic valve stenosis).

Usually reserved for those who can't undergo open-heart surgery or for people for whom surgery presents too many risks.

Can relieve the signs and symptoms of aortic valve stenosis and may improve survival.
Goals of Care
Too Few Patients With End Stage Heart Disease Receive Palliative Care Discussion

Disease Trajectory

![Diagram showing the trajectory of a disease over time, with stages labeled 1 to 5, indicating transitions from excellent health to death, with markers for heart failure, supportive care, sudden death event, and transplant or ventricular assist device.](source: www.medscape.com)
Palliative → Hospice Care

- **Early**
  - Initiation of Advance Care Planning
  - Promote Quality of Life/Functional Status

- **Disease Progression**
  - Incorporate Symptom Management
  - Discussions about
    - Disease progression
    - Potential life-limiting aspects of HF
    - Impact on function
    - Benefits & burdens of therapies
Palliative → Hospice Care

- End Stage
  - Aggressive Symptom Management
  - Discuss Stopping Treatments that are No Longer Effective
  - Hospice
Advance Care Planning

- Definition of Quality of Life
- Healthcare Surrogate/Advance Directive
- Treatment Preferences
  - HF exacerbations
  - Sudden catastrophic events (cardiac arrest, stroke)
  - Worsening of coexisting noncardiac illness
Advance Care Planning

- Resuscitation Status
  - CPR
  - Defibrillation (both external and ICD)
  - Intubation/Mechanical Ventilation
  - Non-invasive ventilation (BiPAP)
Specific Care Discussions

- **Initiation or Cessation of Inotropic Infusions**
  - Site of care—many hospices can’t provide at home
  - Stopping—how to rapidly handle symptoms

- **Continuation or Cessation of Anticoagulants**
  - Stopping - risk of PE or stroke
  - Continuing – GI bleed, hemorrhagic stroke, bleeding (falls)

- **Fluid/Sodium Restriction**
Specific Care Discussions

- **Turning off Tachy Therapy on ICD**
  - In the dying phase, a patient may experience a shock if not disabled
  - Pacing remains on
  - Consult patient’s Cardiology office
  - Device Manufacturer Representative

- **Cardiorenal Syndrome Therapies**
  - Ultrafiltration
  - CRRT
  - Temporary Dialysis/Cessation of Dialysis
End Stage
Symptom Management
Cardinal Symptoms

- **Dyspnea** (at rest or minimal exertion)
- Profound Fatigue
- Cardiac Cachexia
- Repeat or Prolonged Hospitalizations
- Cardio-Renal Syndrome
PATIENTS/FAMILIES SHOULD BE REASSURED OF THE MEDICAL TEAM’S COMMITMENT TO TREAT THE SYMPTOMS AND TO FOCUS ON COMFORT EVEN IF MEDICAL THERAPIES ARE NO LONGER WORKING TO MODIFY THE COURSE OF THE ILLNESS
Dyspnea

- Pharmacological
  - Diuretics (unless refractory to them)
  - Morphine (or equianalgesic equivalent)
    - Short acting, prn
    - Starting dose: 1-4 mg IV; 5-10 mg po (tablet or liquid)
    - May be higher in opioid tolerant
    - May need continuous IV infusion
  - Short acting benzodiazepine (lorazepam/Ativan)
    - Anxiety associated with dyspnea
    - Scheduled or prn
  - Oxygen
    - If hypoxic, may be helpful
Dyspnea

- Nonpharmacological
  - Fan for air movement
  - Cool environment
  - Positioning
    - Head of bed elevated/hospital bed
    - Recliner
    - Arms supported

- Interventions
  - Thoracentesis (pleural effusions)
  - Paracentesis (ascites)
Profound Fatigue

**Pharmacological**
- Assess for Depression; treat if wanted or appropriate
- Stimulants may be appropriate
  - Modafanil (Provigil) has fewer cardiac side effects

**Energy Conservation**
- DME- 3 in 1 chair, wheelchair, overbed table, urinal
- Pace activities with rest. Affirm naps!
- Small, more frequent meals
- Consider PT/OT
Cardiac Cachexia

- **Education**
  - Anorexia is Common and Expected in Advanced HF
    - Physiologic burden of eating
    - Lack of appetite
    - Feeling of fullness
    - ? Constipation

- **Pharmacologic**
  - Trial of megesterol (Megace) – caution about increased risk of thromboembolic events
Hospitalizations

- Recommend Hospitalization for:
  - Severe decompensated HF (hypotension, worsening renal dysfunction, altered mentation)
  - Dyspnea at rest
  - Hemodynamically significant arrhythmia

- Consider Hospitalization for:
  - Refractory edema despite maximal oral diuretic
  - Major electrolyte abnormalities
  - Associated comorbid conditions (eg, pneumonia, pulmonary embolism, diabetic ketoacidosis, stroke/tia)
  - Repeat ICD firings
Hospice Eligibility Guidelines-HF

- Recurrent NYHA Class IV HF symptoms AND
- Optimal Treatment (or unable to tolerate)
  - (diuretics, ACEI, and vasodilators; \(b\)-blockers, aldactone, device tx)

Supporting documentation:
- \(EF \leq 20\%\) (not required)
- Treatment resistant arrhythmias (VT or SVT)
- Unexplained syncope
- Cardiac arrest
- Cardiogenic embolic stroke
- Concomitant HIV disease
QUESTIONS

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