Heart Talk: Understanding the Science of Heart Failure

Module 1: Evidence-based Education for Health Care Professionals

Communities of Care
QUALIDIGM
Heart Failure is a HUGE Problem

<table>
<thead>
<tr>
<th>Prevalence</th>
<th>Incidence</th>
<th>Mortality</th>
<th>Hospital Discharges</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,300,000</td>
<td>660,000</td>
<td>284,965</td>
<td>1,084,000</td>
<td>$34.8 billion</td>
</tr>
</tbody>
</table>

Major Cause of Hospital Readmissions

- 1 in 5 Medicare patients are readmitted to the hospital within 30 days of discharge
- Heart failure is the most common reason for readmission
- Many of these readmissions may be preventable with:
  - Better understanding of disease by patients
  - Closer follow-up after discharge
What is Heart Failure?

- Impaired ability of the left ventricle to pump blood
- Classic symptoms:
  1. Shortness of breath
  2. Edema
  3. Fatigue
Heart Failure Classes
New York Heart Association

- Developed in 1963
  - NYHA I – Asymptomatic
  - NYHA II – HF symptoms with significant exertion
  - NYHA III – HF symptoms with minimal exertion
  - NYHA IV – Symptoms at rest
## Two Types of Heart Failure

<table>
<thead>
<tr>
<th>Systolic Heart Failure</th>
<th>Diastolic Heart Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart is weak</td>
<td>Heart is stiff</td>
</tr>
<tr>
<td>Ejection fraction is</td>
<td>Ejection fraction is</td>
</tr>
<tr>
<td>reduced</td>
<td>normal</td>
</tr>
<tr>
<td>(&lt;50%)</td>
<td>(55-65%)</td>
</tr>
</tbody>
</table>
Two Phases of Heart Failure

Phases

Acute Heart Failure

Chronic Heart Failure

Systolic Heart Failure

Diastolic Heart Failure
Heart Failure Therapy

**Acute**
- Therapy aimed at reducing fluid congestion on the lungs
  - Diuretics (e.g. Furosemide, Lasix)
  - Nitroglycerine
  - Ultrafiltration
  - Inotropes (e.g. Milrinone; Dobutamine)

**Chronic**
- Therapy aimed at maintaining fluid levels and lowering the risk of recurrent heart failure or death
  - Beta blockers
  - ACE-inhibitors
  - Aldosterone Antagonist (e.g. Spironolactone)
  - Diuretics (e.g. Furosemide, Lasix)
# Acute Heart Failure Therapy

In general, same therapies for both diastolic and systolic

<table>
<thead>
<tr>
<th>Systolic Heart Failure</th>
<th>Diastolic Heart Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Diuretics</td>
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</tr>
<tr>
<td>2. Nitroglycerine</td>
<td>2. Nitroglycerine</td>
</tr>
<tr>
<td>3. Ultrafiltration</td>
<td>3. Ultrafiltration</td>
</tr>
<tr>
<td>4. Inotropes</td>
<td>4. Inotropes</td>
</tr>
</tbody>
</table>
# Chronic Heart Failure Therapy

## Systolic Heart Failure
1. ACE Inhibitors or Angiotensin receptor blockers (ARBs)
2. Beta-blockers
3. Aldosterone antagonists
4. Implantable cardiac defibrillators (ICDs)
5. Others drugs and therapies

## Diastolic Heart Failure
1. Control fluid levels with oral diuretics
Medications

Chronic Systolic Heart Failure

- ACE inhibitors:
  - Captopril (Capoten)
  - Enalapril (Vasotec)
  - Lisinopril (Zestril, Prinivil)
  - Ramipril (Altace)
- Beta Blockers:
  - Carvedilol (Coreg)
  - Metoprolol (Toprol, Lopressor)
  - Hydralazine
- Angiotensin Receptor Blockers (ARBs):
  - Candesartan (Atacand)
  - Irbesartan (Avapro)
  - Valsartan (Diovan)
- Nitroglycerine
- Digoxin
- Spironolactone (Aldactone)
Beta Blocker Evidence

N = 3,991 patients
Class II-IV HF
Average EF=28%

MERIT-HF
Effect on All-Cause Mortality

Risk reduction = 34%
$p = 0.0062$

The MERIT-HF Study Group, 1999

Used with permission
ACE Inhibitor Evidence

All Cause Mortality

- Placebo
- Enalapril

16% Risk Reduction
$p = 0.0036$

Used with permission
ACE Inhibitor Evidence
Symptomatic HF Patients with EF < 35% NYHA Class II-III

# Hospitalizations Due to Heart Failure

- Placebo + Conv TX: 971
- Enalapril + Conv TX: 683

30% Reduction
p<0.001

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Medications

Chronic Diastolic Heart Failure

• Control fluid levels with diuretics
• Treat blood pressure
• Treat arrhythmias (i.e. atrial fibrillation)
Preventing Sudden Death

- General population
- Any previous coronary event
- Low ejection fraction
- Cardiac arrest VT/VF survivors

Incidence of Sudden Death
Other Treatment Options

Implantable Cardiac Defibrillators (ICDs)
Indications for ICDs
2009 AHA Guidelines

- Any EF < 35% with class II or class III symptoms
- On optimal medical therapy
- Reasonable expectation of survival with a good functional status for more than one year
Other Therapy Options

Systolic Heart Failure

- Bi-ventricular pacemakers
- Chronic IV therapy with inotropes
- Ventricular assist devices (VADs)
- Heart transplant
Summary

- Two types of heart failure: diastolic and systolic
- Two phases of heart failure: acute and chronic
- Patient self-management: Patients who understand their disease live longer and spend less time in the hospital
For information on the Heart Talk videos, please visit us on our website:
www.qualidigm.org
or email us at:
HeartTalk@qualidigm.org
Credits

The Hospital of Central Connecticut
• Shelley Dietz RN, MBA

Qualidigm
• Anne Elwell, RN, MPH
• Michelle Pandolfi, MSW, LNHA

University of Connecticut Heath Center
• Wendy Martinson RN, BSN
• Jason Ryan, MD, MPH
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