Chronic Systolic Heart Failure Management

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Objective
Upon completion of this presentation the participant should be able to:
• Discuss the incidence and prevalence of heart failure
• Describe the pathophysiology in the development of dilated cardiomyopathy/heart failure
• Identify the ACC/AHA recommendations for neurohormonal blockade in patients with advanced heart failure
• Identify the indications for device therapy in the management of patients receiving optimal pharmacological therapy
• Describe the utilization of medical therapy in the treatment of acute/chronic heart failure
• Discuss the Nurses role in the education of patients with heart failure

Presenter Disclosure Information
Brenda S. Thompson MS, CNS, APRN, CCRN, FAHA

DISCLOSURE INFORMATION:
The following relationships exist related to this presentation:

• Honoraria from (in alphabetical order):
  • Medtronic USA, Inc.
  • Advisory Board for Medtronic USA, Inc.

• American Association of Heart Failure Nurses Annual Nominations Committee Member
Systolic vs. Diastolic Heart Failure

**Systolic dysfunction** - Complex clinical syndrome characterized by dyspnea and fatigue secondary to structural and functional changes in the heart that all occur in the setting of neurohormonal activation and cytokine release. Reduced LV ejection fraction of < 40%. LVEF = symptoms (NYHA)

**Diastolic dysfunction or Preserved Left Ventricular Function** - Abnormal LV relaxation, filling or diastolic stiffness; LVEF > 40%

Heart Failure: The Facts

- About 5.7 Million Americans are living with heart failure.
- About half of people who have heart failure die within 5 years of diagnosis. 1
- 75% of people with HF had preceding high blood pressure. Compared with people whose blood pressure is 140/90 mmHg, the risk of HF doubles among those whose blood pressure is 160/100 mmHg – 20 mmHg difference.
- Heart failure is the primary cause of more than 55,000 deaths each year. 1
- Heart failure was mentioned as a contributing cause in more than 280,000 deaths (1 in 9) in 2008. 1
- At age 40, your chance of developing HF over your lifetime is 1 in 5.
- The estimated direct and indirect cost of heart failure in the United States for 2009 is $37.2 billion.


The Economic Burden Is Huge: Estimated Direct and Indirect Costs of Heart Failure in US for 2009

- Hospitalization $20.1
- Home Healthcare $3.4
- Lost Productivity/Mortality* $3.5
- Total Cost $37.2 Billion

**HF patients comprise 14% of Medicare beneficiaries and utilize 43% of Medicare dollars.**

Medicare Data of 3 Million Hospitalizations for Heart Failure

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>Heart failure (n=1,330,157)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Day Readmission rate</td>
<td>24.8%</td>
</tr>
<tr>
<td>Readmissions for heart failure</td>
<td>35.2%</td>
</tr>
<tr>
<td>Median Time to 30-day readmission</td>
<td>12 days</td>
</tr>
<tr>
<td>Readmission in postdischarge days</td>
<td>61.0%</td>
</tr>
</tbody>
</table>

Among 18–64 year-old adults, the cost of hospitalization was higher when heart failure was the secondary diagnosis rather than the primary diagnosis ($25,325 versus $17,654).

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Worsening Heart Failure: The Major Reason for Heart Failure Hospitalizations

- Worsening chronic heart failure (75%)
- De novo heart failure (23%)
- Advanced/ end-stage heart failure (2%)

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Causes of Hospital Readmission for Congestive Heart Failure

- Diet Noncompliance 24%
- Rx Noncompliance 24%
- Inappropriate Rx 16%
- 19% Failure to Seek Care
- 17% Other

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Reference:

Fonarow GC. Rev Cardiovasc Med. 2003; 4 (Suppl. 7): 21
Cleland JG et al. Eur Heart J. 2003; 24: 442

More than 50% of Patients Have Little or no Weight Loss During Hospitalization

Clinical Status at Time of Discharge

- Enrolled Discharges in the Last 12 Months (April 2005 to March 2006)
- Patients Who Were Discharged Home (Including home w/additional and/or outpatient care)

Pathological Progression of CV Disease

ACC/AHA Heart Failure Guidelines

Based on the 2009 Focused Update Incorporated Into the ACCF/AHA 2005 guidelines for the Diagnosis and Management of Heart Failure in Adults:

A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With:
International Society for Heart and Lung Transplantation

Released March 27, 2009

ACC/AHA 2005 Guideline: Classification of HF

ACC/AHA HF Stage NYHA Class

A At high risk for HF but no structural heart disease or symptoms of HF I Asymptomatic

B Structural heart disease but no symptoms of HF

C Structural heart disease with prior or current HF symptoms II Symptoms: moderate exertion

III Symptoms: minimal exertion

D Refractory HF requiring specialized interventions IV Symptoms: at rest
New York Heart Association Functional Classification

Class I
No limitations of physical activity

Class II
Slight limitations of physical activity

Class III
Marked limitations of physical activity

Class IV
Inability to carry out physical activities without discomfort and/or symptoms at rest

Goals of Therapy

Goal
Improve pump performance
Reduce cardiac workload
Control salt and water retention
Increase oxygenation

Therapy
Medical Therapy
Medical Therapy
Diuretics
Oxygen therapy

Control salt and water retention
Diuretics
Low-sodium diet

Goals of Therapy

Therapy
Oxygen therapy
Rest

Control salt and water retention
Diuretics
Low-sodium diet

Applying Classification of Recommendations and Level of Evidence

Class I
Benefit >> Risk
Procedure/Treatment SHOULD be performed/administered

Class IIa
Benefit >> Risk
Additional studies with focused objectives needed
Procedure/Treatment IT IS REASONABLE to perform/administer

Class IIb
Benefit ≥ Risk
Additional studies with broad objectives needed; Additional registry data would be helpful
Procedure/Treatment MAY BE CONSIDERED

Class III
Risk ≥ Benefit
Procedure/Treatment should NOT be performed/administered SINCE IT IS NOT HELPFUL AND MAY BE HARMFUL

Level of Evidence:

Level A:
- Data derived from multiple randomized clinical trials or meta-analyses
- Multiple populations evaluated

Level B:
- Data derived from a single randomized trial or nonrandomized studies
- Limited populations evaluated

Level C:
- Only consensus of experts opinion, case studies, or standard of care
- Very limited populations evaluated
2005 ACC/AHA Guidelines:
Class 1 Indications

ACC / AHA Guidelines
- ADL's
- Volume status
- Symptoms
- Weight
- Blood Pressure

Hunt, SA ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult.

Is your patient sleeping sitting up?

Is your patient eating the proper diet?
Has your patient’s exercise tolerance changed?

Heart Failure Medications

- Diuretics
- Digoxin (Dig)
- Ace inhibitors (ACEI)
- Angiotension receptor blockers (ARBs)
- Beta blockers (β-blockers)
- Aldosterone antagonists
- Hydralazine/Nitrates

ACC/AHA Guidelines 2005: Optimal Pharmalogical Therapy

Applying Classification of Recommendations & Level of Evidence

<table>
<thead>
<tr>
<th>Class</th>
<th>Class II a</th>
<th>Class II b</th>
<th>Class III</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Digitalis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Diuretics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>ACE Inhibitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>ARB Recommendations*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>β-Blocker Recommendations*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Aldosterone Antagonist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Hydralazine-Nitrate combination*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* This indicates that additional details are available for certain classes
Identifying the High-Risk Patient for device therapy

- Form a checklist for all CHF patients each visit
- Any symptoms of HF
  - > 1 month from MI
  - > 3 months from PCI or CABG
  - > 3 months if non-ischemic
  - > 1 year life expectancy

Guidelines for Device Therapy

CRT and ICD Indications

**CRT**
- Class III or IV CHF despite optimal medical therapy
- LVEF < 35%
- QRS Duration >120ms
- With or without indication for ICD

**ICD**
- EF < 35%
- Class II – III
- Any symptoms of HF
  - > 1 month from MI
  - > 3 months from PCI or CABG
  - > 3 months if non-ischemic
  - > 1 year life expectancy
- Class I – LVEF <30%
Basic Education for All HF Patients

Nonpharmacologic strategies
- Dietary sodium restriction
- Daily weights
- Monitor and report changes in symptoms
- Lifestyle modifications
  - Smoking/Alcohol cessation
  - Physical activity

PATIENT SYMPTOMS

F - Fatigue
A - Altered Activity
C - Congestion
E - Edema
S - Shortness of Breath

Dietary Sodium Intake

Problems with Excess Sodium Intake
- Increase in congestive symptoms
- Increase in episodes of exacerbation
- Increase in hospitalizations
- “Diuretic intolerance” and refractory heart failure
Restrict Dietary Sodium to 2000mg Daily*

Common Dietary Sodium Sources

- 1%—drinking water
- 11%—table/cooking salt
- 11%—naturally inherent in foods
- 77%—Processed foods

Sodium Restriction

- Not adding table salt does not constitute a low sodium diet
- Cook without salt
- Take the salt shaker off the table
- Wean, rather than abruptly discontinue usual diet
- Teach how to read a food label
- Reframe: alternatives, replacements, not deprivation
  - How to eat out: ask if food is cooked with salt
  - Menus
- Utilize dietitian whenever possible
- Some patients require fluid restriction as well

READING FOOD LABELS

Be sure to look at the “serving size”. This number tells you how much food you can eat.

This amount of sodium in a half-cup serving is 140 mg, or 13% of the recommended intake. The goal is 7% or less of the daily recommended intake.

Use a 1 to 1 ratio of calories to sodium. Ex: 90 calories no more than 90 mg of sodium per serving.
**Educating Patients About Fluid Intake**

- Advise patients to avoid excessive fluid intake
- Fluid restriction not advisable unless patients develop hyponatremia
- For those requiring fluid restriction
  - Keep pitcher filled with water in refrigerator
  - Drink water from pitcher or remove equivalent of other fluid consumed
- Advise patients to abstain from alcohol (direct cardiac toxin/suppressant)

Konstan M et al. AHCPR publication 94-0612.

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**Educating Patients About Daily Weights**

- The vascular bed can hold 10 pounds of fluid before it starts to seep out into the tissues
- 2 pounds = 1 quart of water extra in the circulation (use patient’s water pitcher as a visual aide)
- Use a calendar to record weights
- Report a 2-3 pound weight gain overnight or 5 pound gain in one week

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**Assessment of Fluid Volume Status**

- Teaching points for patients/families:
  - Ankle swelling (shoes too tight, socks make marks on leg)
  - Abdominal swelling (“bloated”, belt too tight)
  - Orthopnea
  - Paroxysmal nocturnal dyspnea
  - Weight gain
Finding the Teachable Moment

- The most important lesson: understanding how subtle signs and symptoms were clues of an impending exacerbation:
  - “My feet grew 2 sizes this week!”
  - “I had to cut a new notch in my belt”
  - “I slept in my recliner the week before I came to the hospital”
  - “I gained weight even though I wasn’t eating”
  - “I had trouble going up my stairs”

Benefits of Exercise in HF

- Increased Exercise Capacity
- Improved Muscle Metabolism
- Improved Autonomic Profile
- Improved Hemodynamics
- Improved Quality of Life

Exercise Recommendations

Start slow, increase slowly

- Avoid the extremes of intertemperate climates
  - mall walking
  - indoor treadmills or tracks
  - exercise cycle indoors

- May not initially tolerate exercise
  - may see increased symptoms (2-6 weeks)
  - increased blood volume
  - fatigue

- Don’t be discouraged by inevitable interruptions in activity/training schedule
Selecting Physical Activities

- **Recommended**
  - Walking
  - Mall walking
  - Stretching
  - Golf
  - Seated exercises
  - Bicycling
  - Swimming

- **Not recommended**
  - Heavy lifting
  - Pushing heavy objects
  - Strenuous yard work
  - Heavy housework
  - Climbing stairs
  - Sit-ups or push-ups
  - Exercising in extreme hot/cold weather conditions

Alcohol
Cardioprotective? Cardiotoxic?

- Alcohol is a myocardial depressant and toxin
- Alcoholic cardiomyopathy
  - abstinence = clinical improvement and decreased mortality
- Current recommendations limit alcohol to one standard drink/day if continue to drink

Smoking

- Cigarette smoking should be strongly discouraged in patients with heart failure.
- Adverse effects on coronary disease
- Adverse hemodynamic effects in patients with congestive heart failure:
  - Increase in heart rate and blood pressure
  - Mild increases in pulmonary artery pressure, ventricular filling pressures, and total systemic and pulmonary vascular resistance
  - Peripheral vasoconstriction contributes to mild reduction in stroke volume, increases oxygen demand and
  - Decreases myocardial oxygen supply due to reduced diastolic filling time (with faster heart rates) and increased carboxyhemoglobin concentrations
Medication Noncompliance or Mistakes Account for 24% of Readmission Rate

- Multidrugs/multinames: “You mean Warfarin and Coumadin are the same drug?”
  - Use both generic and brands whenever possible when teaching pts
- Discharge medication lists - make them as explicit as possible
- Check on patient’s system for taking medications
- Seven day/4 compartment per day pill boxes are helpful
- A home visit is VERY helpful
- No calcium blockers in systolic dysfunction (except felodipine, amlodipine)

SAMPLE MEDICATION CARD

<table>
<thead>
<tr>
<th>Medication</th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Dinner</th>
<th>Bedtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enalapril 5 mg</td>
<td>1 tablet twice a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lasix 40 mg</td>
<td></td>
<td>1 tablet</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>twice a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digoxin 0.125 mg</td>
<td></td>
<td>1 tablet at bedtime</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coreg 12.5 mg</td>
<td></td>
<td></td>
<td>2 tablets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>twice a day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aldactone 25 mg</td>
<td></td>
<td></td>
<td>1 tablet</td>
<td></td>
</tr>
<tr>
<td>KCL 10 meq</td>
<td></td>
<td></td>
<td></td>
<td>1 tablet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>daily</td>
</tr>
<tr>
<td>Protonix 40 mg</td>
<td></td>
<td></td>
<td></td>
<td>1 tablet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>daily</td>
</tr>
</tbody>
</table>

Website to search for medication pictures: http://search2.drugs.com/imprints.php

JCAHO: Quality-of-Care Indicators for HF

HF-1: Assessment of LV Function – ejection fraction was documented before arrival (in past) or during hospitalization
HF-2: Beta Blocker prescribed if LVEF less than 40% or moderately or severely depressed LVFS
HF-3: ACEI or ARB at Discharge in Appropriate Patients
HF-4: Discharge Instructions

1. Diet/fluid intake
2. Weight monitoring
3. Worsening symptoms
4. Physical Activity level
5. Smoking cessation
6. Follow-up appointment
7. Discharge medications
ADHERE: Variation in Discharge Instructions


Percentages of ADHERE Patients in Whom HF Quality of Care Indicators Addressed


Cumulative Impact of Heart Failure Therapies

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Relative-Risk</th>
<th>2 Year Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>- -</td>
<td>35%</td>
</tr>
<tr>
<td>ACE Inhibitor</td>
<td>↓ 23%</td>
<td>27%</td>
</tr>
<tr>
<td>Aldosterone Ant</td>
<td>↓ 30%</td>
<td>19%</td>
</tr>
<tr>
<td>Beta-Blocker</td>
<td>↓ 35%</td>
<td>12%</td>
</tr>
<tr>
<td>CRT +/- ICD</td>
<td>↓ 36%</td>
<td>8%</td>
</tr>
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</table>

Cumulative risk reduction if all four therapies are used: 77%
Absolute risk reduction: 27%, NNT = 4

Evidence-Based, Mechanism-Driven Treatment Across the Continuum of LVD and HF

Control Volume
- Diuretics
- ? Ultrafiltration
- ? Aquaretics

Reduce Morbidity/Mortality
- ACEI or ARB
- β-Blocker
- Aldosterone Antagonist (or ARB?)

C
- CRT ± an ICD*
- Hyd/ISDN*

Effective Disease Management
- HF clinics
- Patient education
- Monitoring devices

Treat Residual Symptoms
- Digoxin, Transplant, Palliative Care

Modify Risk Factors
- Prevent/control HTN
- Treat dyslipidemia

TEAMWORK
A Shared Purpose Combined with a Positive Mental Attitude Constitutes an Unstoppable Force

Questions?

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