Management of End-Stage Heart Failure in the Frail Elderly Patient

Katherine Abraham, MSN, RN, NP-C

Objectives

- Describe the signs and symptoms of an exacerbation of heart failure in the frail elderly.
- Discuss the key points of accepted clinical practice guidelines in the medical management of end-stage congestive heart failure.

Role of NP

- Uniquely qualified to see patient holistically via multiple perspectives
  - Clinician
  - Educator
  - Collaborator
HF definition
- Structural or functional heart defect that impairs the ability of the heart to pump effectively
- Heart is unable to meet the body’s metabolic demands due to decreased tissue and organ perfusion and increased volume

Prevalence of HF
- Over 4.8 million Americans have HF
- 10 in 10,000 over 65
- Incidence – approximately 550,000 new cases per year
- Heart Failure is on the rise –
  - 5 million symptomatic patients (2005)
  - 10 million estimated symptomatic patients 2037
- Most common reason for hospitalization in the elderly

Heart Failure and Frailty
- Clinical Syndrome
  - Decreased function
  - Slow walking speed
  - Decrease strength
  - Exhaustion
  - Unintentional Weight loss
- CHF associated with a seven fold increase in frailty

Heart Failure and Frailty

- Frailty associated with
  - Decreased myocardial function
  - Reduced global LV systolic function
  - Increased LV mass
- Presence of frailty leads to increased mortality


Systolic vs. Diastolic dysfunction

- Diastolic dysfunction is the inability of the heart to properly relax during diastole leading to increased pressure and decreased stroke volume
- Systolic dysfunction is the inability of the left ventricle to properly contract leading to decreased ejection volume
- The two can be present concurrently

NYHA Functional Class vs. ACC/AHA Heart failure Stage

<table>
<thead>
<tr>
<th>NYHA Functional Class</th>
<th>ACC/AHA Heart Failure Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Asymptomatic</td>
<td>A – at risk but without structural heart disease or s/s of heart failure</td>
</tr>
<tr>
<td>II Symptomatic with Moderate Exertion</td>
<td>B – structural heart disease without s/s of heart failure</td>
</tr>
<tr>
<td>III Symptomatic with Minimal Exertion</td>
<td>C – structural heart disease with prior or current s/s of heart failure</td>
</tr>
<tr>
<td>IV Symptomatic at Rest</td>
<td>D – refractory heart failure requiring specialized interventions</td>
</tr>
</tbody>
</table>
### Associated Symptoms

<table>
<thead>
<tr>
<th>Typical Symptoms</th>
<th>Dyspnea, Edema, Poor exercise tolerance, PND, Orthopnea, Weight Gain, Fatigue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atypical Symptoms</td>
<td>Confusion, Irritability, Anorexia, Abdominal Discomfort</td>
</tr>
<tr>
<td>Decrease in Exertional Symptoms</td>
<td>Elderly less active due to comorbid conditions, i.e. OA, poor vision</td>
</tr>
<tr>
<td>Minimize Symptoms</td>
<td>“I am just getting older”</td>
</tr>
</tbody>
</table>

### Physical Exam Findings

- JVD
- Rales
- S3 gallop
- Tachycardia
- Edema – extremities, abdomen, etc
- Displaced apical impulse
- Weight gain

### Diagnostics

- 2D Echo – may need serial studies
- TEE
- EKG
- Stress Testing
- Cardiac Cath – including right heart
- CXR – not always beneficial
Labs

- BNP – check for a baseline – some patients may have high levels when asymptomatic
  - Not always accurate in our population
  - Controversial
- BMP routinely, when titrating meds and during exacerbations
  - Renal function
  - Electrolytes

BNP vs. NT-proBNP

- Lab availability may vary
- NT-proBNP considered more sensitive
- Cannot compare one level to the other
- Lab normal limits range variable

Exercise

- If patient is able to walk or participate in activities encourage it
- Helps to prevent deconditioning
- Patient should do as much as he or she can tolerate
Treatment

- Exercise
- Diet
- Medication regimen
- Prevention of Exacerbations
- Avoidance of hospitalization

Diet

- 2gm Na diet
- Fluid restriction
- Weight loss

ACE - I

- Goal is to decrease afterload providing greater cardiac output and less workload on the heart
- Monitor renal function
- Monitor Potassium
- Most common side effect is cough
B-Blockers

- Decrease myocardial workload
- Protect against dysrhythmias
- Monitor HR, HB
- Can be used carefully with lung disease
- Can be used with diabetics
- *Choose a proven drug – i.e. Carvedilol, Bisoprolol or sustained release Metoprolol

*2009 Focused Update Incorporated Into the ACCF/AHA 2005 Guidelines for the Diagnosis and Management of Heart Failure in Adults

Treatment

<table>
<thead>
<tr>
<th>Drug</th>
<th>Starting Dose</th>
<th>Maintenance Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angiotensin converting enzyme inhibitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Captopril</td>
<td>6.25 mg three x daily</td>
<td>25-50 mg three x daily</td>
</tr>
<tr>
<td>Enalapril</td>
<td>2.5 mg once daily</td>
<td>10 mg twice daily</td>
</tr>
<tr>
<td>Lisinopril</td>
<td>2 mg once daily</td>
<td>4 mg once daily</td>
</tr>
<tr>
<td>Ramipril</td>
<td>1-2.5 mg once daily</td>
<td>2-5 mg twice daily</td>
</tr>
<tr>
<td>Trandolapril</td>
<td>1 mg once daily</td>
<td>4 mg once daily</td>
</tr>
<tr>
<td>β-Blockers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bisoprolol</td>
<td>1.25 mg once daily</td>
<td>10 mg once daily</td>
</tr>
<tr>
<td>Carvedilol</td>
<td>1.25 mg twice daily</td>
<td>25 mg twice daily</td>
</tr>
<tr>
<td>Metoprolol tartrate</td>
<td>5 mg three times daily</td>
<td>50 mg three times daily</td>
</tr>
<tr>
<td>Metoprolol succinate CR</td>
<td>12.5-25 mg once daily</td>
<td>200 mg once daily</td>
</tr>
</tbody>
</table>

ACE –I vs. ARB

- Always use ACE-I first
- Use ARB in ACE-I intolerant patient
- ARB shown to reduce hospitalizations
- May add ARB to conventional therapy in persistently symptomatic patients.

*2009 Focused Update Incorporated Into the ACCF/AHA 2005 Guidelines for the Diagnosis and Management of Heart Failure in Adults
Calcium Channel Blockers

Not indicated in patients with current or prior symptoms of HF and reduced LVEF

*2009 Focused Update Incorporated Into the ACCF/AHA 2005 Guidelines for the Diagnosis and Management of Heart Failure in Adults

Inotropes - Digoxin

- Digoxin previously used in most HF patients
- Narrow therapeutic window – level can be as low as 0.5 – 1.0 to receive benefit
- Digoxin does not appear to decrease mortality
- Gender differences – may increase mortality in women
- Can be added to standard HF regimen in patients with refractory symptoms to reduce hospitalizations

Inotropes - Digoxin

- Most benefit in symptomatic patients with poor EF and enlarged heart (Stage C &D)
- *No established usefulness in patients with normal EF
- Monitor HR and HB
- Monitor Levels
- Monitor for toxicity s/s – nausea/vomiting/anorexia, visual changes, halos, severe bradycardia, headache

*2009 Focused Update Incorporated Into the ACCF/AHA 2005 Guidelines for the Diagnosis and Management of Heart Failure in Adults
Aldosterone Antagonists

- RALES (Spironolactone)
- EPHESUS (Eplerenone)
  - Approved for improved survival of CHF patients post acute-MI
- Contraindicated in patients with serum Potassium > 5.0 mEq/L
- Use extreme caution with Creatinine > 2.5mg/dL in men or 2.0 mg/dL in women

*2009 Focused Update Incorporated Into the ACCF/AHA 2005 Guidelines for the Diagnosis and Management of Heart Failure in Adults

Diuretics

- Needed to restore and maintain volume status
- Goal of diuresis is symptom management
- Reaching dry weight is goal
- Use when evidence of fluid retention present

Adams KF, Linderfeld J, et.al. HFSA 2006 Comprehensive HF Guidelines, J Card Fail 2006;12

Diuretics

- Loop diuretics are preferred over thiazides
  - May require multiple adjustments
  - IV or IM use for exacerbations
  - Diuretic refractoriness: associated with worsened disease state and effect of diuretic on kidney
- Aldactone – RALES trial showed benefit – must monitor potassium closely
Hydralazine

- Arterial vasodilator
- Used alone or in combination with other meds – often Nitrates
- V-Heft trial showed benefit over placebo
- Bidil – combination of Isosorbide Dinitrate and Hydralazine (A-Heft trial)
- Avoid in patients with Lupus
- Wide dosing range – start low
- Use in combination with Nitrate in ACE-I and ARB intolerant patients
- BB in combination with Nitrate aids in decreased compensatory tachycardia

Medication Progression

Prevention of Exacerbations

- Proper Medication Regimen and Adherence
- Proper Diet
- Exercise
- Daily Weights – report gain of 2-4lbs in 1-3 days or 5lbs in 1 week
- Anxiety Management
- Patient Education!!
**Coumadin**

- Can be used in presence of dilated LV for thrombus prevention
- Usually EF of 20% or less
- Studies are conflicting
- Weigh risk vs. benefit of anticoagulation
- Most often used if thrombus visualized or stasis is noted in LV

**ICD Therapy**

- MADIT II and SCD-HeFT trials showed benefit for ICD therapy
- Patients with severe LV dysfunction - EF less than 35%
- Weigh Risk vs. Benefit

**Biventricular Pacing**

- Conduction delays such as IVCD or BBB lead to loss of synchronization of ventricular contractility
- May be combined with ICD
- Can provide dramatic symptomatic improvement in some patients
- Must consider if patient is appropriate candidate in our population
- Patient with SSS and CHF should get BiV
Treatment of Exacerbations

- Discuss with patient any recent changes
  - Meds – OTC, i.e. NSAID use, Antacids
  - Herbal remedies
  - Meds – adjustments to regimen by other providers
- Dietary changes – recent splurges
- ETOH intake
- Illicit drug use

Treatment of Exacerbations

- Medication Management
  - Ensure patient is on proper regimen
  - Uptitrate ACE-I to highest effective dose
    - Use care if ARF is present
  - Uptitrate or add B-Blocker after exacerbation stabilized
  - Can ↓ B-Blocker if needed during exacerbation
  - Afterload reduction
  - Add or increase diuretics – remember diuretic resistance

Treatment of Exacerbations

- Monitoring
  - BNP, BMP – K+, BUN, Cr
- Hospitalization – when outpatient management unsuccessful
Treatment of Exacerbations

- Outpatient
  - Ensure compliance
  - Close follow up
  - Daily weights
  - Have patient call or email progress
  - Enlist family/caregiver involvement

- Long Term Care
  - Educate staff (RN, LPN, CNA) on plan of care
  - Give parameters for when to call NP
  - Educate on symptomatic hypotension
  - Frequent labs
  - Daily weights if patient can tolerate

- Hospital Discharge
  - Post CHF exacerbation instructions should be clear
    - Activity level
    - Diet
    - Medications
    - Follow-up appointment
    - Weight monitoring
    - What to do if symptoms worsen

Bonow, JACC 2005;46;1144
Associated Conditions

- Afib
  - Convert rhythm
  - Rate control
- CAD
  - Manage ischemia
  - Revascularization if indicated

Associated Conditions

- COPD
  - Treatments can complicate each other
  - Avoid oral steroids when possible
  - Avoid meds with tachycardia SE
  - Lower pulmonary pressures help COPD and CHF
- Anemia
  - Erythropoietin therapy if indicated
  - Iron replacement – IV or po
  - May include associated renal failure
  - Rarely is ACE-I induced

Associated Conditions

- Renal Failure
  - Difficult balance with diuretics and renal function
  - Use lowest effective dose of diuretics for as long as possible
  - Can induce ARF
  - Monitor labs closely
  - Discuss possibility of dialysis with patient and family early
Associated Conditions

- DM
  - Tight glycemic control may not decrease mortality
  - Studies indicate little benefit for a Hgb A1C less than 7.1%
  - More data needed
  - Consider life expectancy

J Am Coll Cardiol 2009 July 28;54(5):429-31

Associated Conditions

- Obstructive Sleep Apnea (OSA)
  - Ask the right questions
    - GASP questionnaire
  - Sleep study if indicated
  - CPAP
  - Controlled OSA can alleviate some HF symptoms

Associated Conditions

- Valvular Heart Disease
  - Can be cause of symptoms
  - Surgery if indicated
  - Discuss with patient and family in accordance with Advanced Directives
Associated Conditions

- Psychological Distress
  - Don’t forget to assess for this
  - Family/Social/Financial Distress
  - Loss of Function/Mobility/Independence
  - May need anti-depressant
    - Use care with SSRIs – monitor sodium levels
  - Consider psych consult if indicated

HF Palliative Care

- When is the end?
- Optimize comfort
  - May need increase in diuretics
  - Nebulized medications including Atrovent, Morphine
  - IV inotropes
  - Opioids
  - Continue HF med regimen if possible
  - O2
  - Turn off ICD if indicated
- Continue dietary sodium and fluid restrictions
- Always respect and revisit Advanced Directives

Hospice

- Only 4% of patients dying of CHF get palliative care vs. 40% of cancer patients (Gibbs, 2002)
- Discuss this early in treatment as an option when end stage arrives
- Revisit discussion as needed
Summary

- Optimize HF regimen to prevent exacerbations
- Consider what meds you might be missing or which may not be maximized in a patient with refractory symptoms
- Treat exacerbations quickly and aggressively to avoid hospitalization
- Educate patients and family on disease trajectory

Case Study

- 90yo female with known CHF c/o increasing SOB at rest. No longer able to self-propel WC due to DOE.
- PMH: HTN, CAD s/p CABG 2003, COPD-O2 dependent, HF – EF 20%
- SH: residing in LTC facility x6 months s/p hospitalization for HF exacerbation; negative ETOH; positive h/o smoking 2 pack per day x20 years, quit 10 years ago

Case Study

- Physical Exam
  - VS: T98.8 P122 R24 BP 102/56
  - General: awake, alert, states “I just can’t catch my breath very well”
  - HEENT: +JVD 10cm, no carotid bruits
  - CV: S1S2 RRR, +S3, II/VI SEM at LSB
  - Abd: soft, mild distention, +BS x4, no hepatosplenomegaly
  - Extremities: 3+ bilateral, pitting LE edema, 2+ DP and PT pulses bilaterally; capillary refill <3 seconds
Case Study

Current Medications
- Lisinopril 40mg po daily
- Carvedilol 3.125mg po BID
- Furosemide 40mg po BID
- KCl 40meq po daily
- Advair 50/500 mcg po BID
- Hydralazine 50mg po TID
- ASA 81mg po daily

Case Study

Labs
- Sodium 135 meq/L
- Potassium 4.3 meq/L
- BUN 21 mg/dL
- Cr 1.0 mg/dL
- BNP 3,216 ng/L