Heart Failure in the Older Adult

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Epidemiology of HF

- Affects 6.6 million adults in United States
- By 2030 projected to increase to 9.6 million
- Leading Medicare DRG in patients > 65 yo
- Cost: > $10 billion/yr
- Morbidity: 30-40% of patients with HF hospitalized/yr
- Mortality: 50% at 5 years
- The only cardiac disease with increasing incidence and prevalence
- Third leading cause of hospitalizations

Heart Disease and Stroke Statistics Update Circulation 2012
Prevalence of Heart Failure by Age and Sex

Heart Disease and Stroke Statistics Update Circulation 2012

Population-Attributable Risks for Development of HF

Population-attributable risk defined as:

\[
\text{Population-attributable risk} = \frac{100 \times \text{prevalence} \times (\text{hazard ratio} - 1)}{\text{prevalence} \times (\text{hazard ratio} - 1) + 1}
\]


Association Between Hypertension and Heart Failure

Treatment of HTN in patients 80+

64% reduction in the rate of heart failure (CI, 42 to 78; P<0.001)
Beckett et al NEJM 2008

Who are Older Patients with Heart Failure?

Baseline Characteristics of 2,540,838 Medicare Beneficiaries Hospitalized for Heart Failure, 2001-2005

- Mean age of hospitalized patients: 80 years
- Nearly 60% women
- High number of comorbid conditions
- 2/3 of the patients had chronic atherosclerosis
- 30% renal failure
- 67% HTN
- 42% COPD
- 42% diabetes mellitus
- ≈ 55% heart arrhythmia
- 14% dementia


Risk Factors for Admission in Older Adults and Newly Diagnosed HF: Cardiovascular Health Study

Chaudhry et al. JACC 2013
Primary Cause of Hospitalization according to Year and Sex

Dunlay et al. JACC 2009

Table 2: Primary Cause of Noncardiac Hospitalization based on ICD-9 Codes

Dunlay et al. JACC 2009

Geriatric Syndromes
Consecutive Patients Over 12 Months

Sanchez et al. Heart 2011
Table 3: Differences in hospital and 12-month outcomes between patients with and without major geriatric syndromes

<table>
<thead>
<tr>
<th></th>
<th>With major geriatric syndromes n=127</th>
<th>Without major geriatric syndromes n=84</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of stay (days, mean ± SD)</td>
<td>7.4 ± 4.9</td>
<td>6.3 ± 4.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Hospital mortality (n %)</td>
<td>5 (3.8 %)</td>
<td>2 (2.4 %)</td>
<td>0.7</td>
</tr>
<tr>
<td>Functional decline (n %)</td>
<td>45 (35.7 %)</td>
<td>7 (8.8 %)</td>
<td>0.002</td>
</tr>
<tr>
<td>12-month outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death, n (%)</td>
<td>35 (27.9 %)</td>
<td>12 (14.6 %)</td>
<td>0.00</td>
</tr>
<tr>
<td>Rehospitalization, n (%)</td>
<td>44 (34.6 %)</td>
<td>24 (28.8 %)</td>
<td>0.03</td>
</tr>
<tr>
<td>Functional decline, n (%)</td>
<td>59 (47.5 %)</td>
<td>24 (28.8 %)</td>
<td>0.007</td>
</tr>
<tr>
<td>Need for social help, n (%)</td>
<td>41 (31.3 %)</td>
<td>15 (18.3 %)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

*Functional follow-up, n=142 (87.7 % of survivors).

Sanchez et al. Heart 2011

Ventricular Remodeling

- **Stage A**
  - Hypertensive or diabetic heart disease
  - Stages B, C, D
  - Normal cavity size, concentric LVH
  - Diastolic dysfunction
  - Enlarged left atrium

- **Stage B, C, D**
  - Dilated cardiomyopathy
  - Stages B, C, D
  - LV dilation, globular shape
  - Systolic LV dysfunction
  - Mitral regurgitation

Survival Curves According to Geriatric Syndromes

Sanchez et al. Heart 2011
Survival for Elderly Patients with HF
(from Cardiovascular Health Study)


Functional Status Post Hospitalization HF-PEF vs HF-Systolic

Smith JACC 2003

Heart Failure – Middle Age vs Older Adults

<table>
<thead>
<tr>
<th></th>
<th>Middle Age</th>
<th>Elderly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence</td>
<td>&lt;1%</td>
<td>&gt;10%</td>
</tr>
<tr>
<td>Gender</td>
<td>Men &gt; Women</td>
<td>Women &gt; Men</td>
</tr>
<tr>
<td>Etiology</td>
<td>CAD</td>
<td>Hypertension</td>
</tr>
<tr>
<td>Clinical Features</td>
<td>Typical</td>
<td>Atypical</td>
</tr>
<tr>
<td>LVEF</td>
<td>Reduced</td>
<td>Normal</td>
</tr>
<tr>
<td>Comorbidities</td>
<td>Few</td>
<td>Multiple</td>
</tr>
<tr>
<td>RCTs</td>
<td>Many</td>
<td>Few</td>
</tr>
<tr>
<td>Therapy</td>
<td>Evidence-based</td>
<td>Empiric</td>
</tr>
<tr>
<td>Physician</td>
<td>Cardiologist</td>
<td>Primary Care Physician</td>
</tr>
</tbody>
</table>

Discharge Status from the National Hospital Discharge Survey 1980-2004

- Communication and Coordination Failures
- HF knowledge management skills highly variable

*LTC includes NH and SNF
Clinical Outcomes in HF Patients Discharged to Home vs. SNF

![Graph](Image 1)

Clinical Outcomes in HF Patients Discharged to Home vs. SNF

![Graph](Image 2)

Skilled Nursing Facilities

- Assuring a seamless transition from inpatient to ambulatory care
- "Rehabilitation time" for educating patient and family
- Assuring patient and caregiver understanding of discharge instructions
- AND identifying psycho/social challenges, engaging a caregiver
- Appropriate case management to assure resources necessary for self-care
Why Skilled Nursing Facilities?

Skilled Nursing Facilities are central to the care transition. The most vulnerable adults with heart failure often go home after a skilled nursing stay:
- Older age
- Functional Decline
- Co-morbidities
- Cognitive Impairment/Dementia

The Bridge Program for Skilled Nursing Facilities

- Project Goal: To Bridge the Gap in HF Management in Skilled Nursing Facilities
  - Assessment
  - Targeted Education
  - Enhancement of Existing HF Management
- Plan to tailor the program to specific gaps in care at each SNF

SNF Multidisciplinary Assessment
(4 Facilities Cleveland, Ohio)

Administration, Nursing, Physical Therapy, Dietary, Social Work

- No HF programs, no HF specific standing orders
- No HF specific information required from acute care
- No required documentation of LV function
- No standardized review of medications (ACE, BB)
- No protocol for identifying or tracking
- No protocol for recognition of signs and symptoms
- No Physical therapy protocols
- No HF specific discharge instructions
- No HF specific patient education available
- Only diet available in 3 facilities is NAS
% of Patients with Rehospitalization

Comorbidity by # of ICD-9 Codes

Boxer et. al, JAMDA 2011

Unforeseen SNF Challenges

- Location of skilled patient (SNF unit vs LTC)
- Staffing (nurse:patient) 1:8 to 1:25
- Reporting requirements- only four post-acute care measures: vaccinations delirium, moderate to severe pain, and pressure ulcers
- SNF hierarchical culture (STNAs as caregivers and caregiver mentor)
- Patient Education in Self Management
- Discharge Planning

Hospital Discharge Plan Must Lead the SNF through the Rehabilitation Period

- Change in the type of patient that a SNF is caring for i.e. chronic complicated medical illness
- Rapid change in HF management which for older adults still relies on the “art of medicine”
- Anticipate adverse events and formulate an adverse event prevention plan at discharge
Tools are Critical for SNF

- “Aid” to practitioners to apply “best care”
- Making tools attractive by not “adding more work”
- Non threatening
- Easily integrated into the current practice
- Need to understand better the barriers that exist to implement quality measures
- Promoted by “champions”

Clinical Assessment
Recognizing the Geriatric Patient with HF

- Does the patient have a history of HF OR HF symptoms?
- Does the patient have predisposing diagnoses for HF?
- Are there physical exam signs of HF?

Management of Heart Failure
Recommended Therapy by ACC/AHA Stage

Stage A
- Development of structural heart disease
- Therapy
  - Treat hypertension
  - Quit smoking
  - Treat lipids
  - Exercise
  - Discourage alcohol intake and illicit drug use
  - ACE inhibitors

Stage B
- Development of heart failure symptoms
- Therapy
  - Stage A therapy
  - ACE inhibitors
  - Beta-blockers
  - Diuretics

Stage C
- Refractory symptoms at rest
- Therapy
  - Stage A therapy
  - Diuretics
  - ACE inhibitors
  - Beta-blockers
  - Digoxin
  - Salt restriction

Stage D
- Therapy
  - Stage C therapy
  - Mechanical assist devices
  - Heart transplantation
  - Continuous inotropic infusions
  - Hospital care

The Clinical Exam and the Missed Diagnosis of Heart Failure

- Failure to establish volume status
- Misinterpreted physical exam findings
- Dismissing the “gut” instinct about a patient’s condition
- Failure to seek confirmatory testing

Clinical History

<table>
<thead>
<tr>
<th>Category</th>
<th>Symptoms/Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardiac</strong></td>
<td>Chest pain/pressure</td>
</tr>
<tr>
<td><strong>Generalized</strong></td>
<td>Fatigue, weakness, edema, weight loss/gain</td>
</tr>
<tr>
<td><strong>Respiratory</strong></td>
<td>SOB, DOE, orthopnea, PND, cough, hemoptysis, wheezing, bronchitis/pneumonia</td>
</tr>
<tr>
<td><strong>Renal</strong></td>
<td>Nocturia, oliguria, anuric</td>
</tr>
<tr>
<td><strong>GI</strong></td>
<td>Abdominal pain/bloating, constipation, anorexia, nausea/vomiting, diarrhea</td>
</tr>
<tr>
<td><strong>Neuro/psych</strong></td>
<td>Anxiety/panic attacks, depression, presyncope, confusion, decreased mentation, irritability</td>
</tr>
<tr>
<td><strong>Change in Activities</strong></td>
<td>Curbing activities with or without complaints</td>
</tr>
<tr>
<td></td>
<td>The last time the patient felt “normal”</td>
</tr>
<tr>
<td></td>
<td>Length of time required to perform ADL’s</td>
</tr>
<tr>
<td></td>
<td>Insomnia, daytime fatigue</td>
</tr>
<tr>
<td></td>
<td>Loss of appetite</td>
</tr>
<tr>
<td></td>
<td>Difficulty concentrating, reading, calculating</td>
</tr>
</tbody>
</table>

Clinical History

- **Neuro/psych** Anxiety/panic attacks, depression, presyncope, confusion, decreased mentation, irritability
- **FALLS**

- **Change in Activities**
  - Curbing activities with or without complaints
  - The last time the patient felt "normal"
  - Length of time required to perform ADL’s
  - Insomnia, daytime fatigue
  - Loss of appetite
  - Difficulty concentrating, reading, calculating
Risk Factors for Heart Failure

- CAD/MI
- HTN
- Valvular Disease
- Substance Abuse
- Chemotherapy
- Radiation Therapy
- Sleep Apnea
- Family History

Physical Exam

- **Cardiac Output**
  - Blood pressure/pulse
  - Extremities
  - Decreased pulse pressure
  - Mental acuity
  - Fatigue
  - Low urine output

- **Volume**
  - Changes in weight
  - JVP; HJR
  - Chest- rales, wheeze
  - Cardiac-gallops, murmurs
  - Hepatomegaly; ascites
  - Edema

New York Heart Association (NYHA) Functional Classification

CLASS I: No limitations.
No symptoms with ordinary activity.

CLASS II: Slight limitations.
Symptoms with ordinary activity.

CLASS III: Marked limitations.
Symptoms with less than ordinary activity.

CLASS IV: Symptoms of cardiac insufficiency at rest.
The Jugular Venous Pressure (the best measure of volume status)

Pulmonary Exam
- Clear lungs DO NOT rule out heart failure
  - Adaptation of the pulmonary vasculature through long-standing elevated filling pressures

Cardiac Exam
- Chest Palpation
  - RV lift
  - Lateral diffuse point of maximal impulse (PMI)
- Auscultation
  - Extra heart sound - S3
  - 2 extra heart sounds - summation gallop
  - Presence of a murmur (tricuspid or mitral regurgitation)
Abdominal Exam

- Liver span
- Tenderness
- Ascites
- Distention
- Diminished bowel sounds

Pulses and the Periphery

- Narrow pulse pressure
- Pulses alternans
- Extremities
  - Temperature
  - Cyanosis
  - Edema
  - Chronic venous stasis changes

Assessment of Hemodynamic Status

<table>
<thead>
<tr>
<th>Low Perfusion at Rest</th>
<th>Warm &amp; Dry</th>
<th>Warm &amp; Wet</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>yes</td>
<td>Cold &amp; Dry</td>
<td>Cold &amp; Wet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Congestion at Rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
</tr>
<tr>
<td>yes</td>
</tr>
</tbody>
</table>
Testing

- Labs
  - Electrolytes with renal panel
    - Sodium/potassium/magnesium
  - CBC
    - Anemia
  - Brain Naturetic Peptide (BNP)
- ECG
- ECHO

BNP

- Physiologic Role
  - Volume homeostasis
  - Regulation of blood pressure
  - Arterial and venous dilation
  - Natriuresis
  - Suppression of RAAS
  - Suppression of sympathetic nervous system
- Useful to establish cause of undifferentiated symptoms
- Flash pulmonary edema – may not have elevated BNP
- A lab test is not a diagnosis!!

The Echocardiogram: How Can it Help You?

- Tool to further understand pathophysiology of a patient’s heart failure.
- Is Left systolic function depressed or preserved?
- Is the Left ventricle dilated/thickened?
- Are there wall motion abnormalities?
- Is Right systolic function depressed?
- Are the atria enlarged?
- Are the valves normal?
- Is the PAP high?
Frailty in patients with Heart Failure

- Frailty (a poor ability to cope with physiologic stress) is hallmarked by poor functional capacity.
- The CV Health Study found that 7% of a community sample of older adults was frail and those with heart failure have an increased likelihood of frailty (OR 7.5).

FRAILTY

The Muscle Hypothesis of Heart Failure

Effects of HF on the Older Adult Perpetuating the Cycle of Frailty

- Body Composition
  - Muscle: loss of strength
  - Bone: loss of minerals, decreased exercise tolerance
  - Cachexia: weight loss
- Nutrition: loss of appetite and nutrient absorption
  - Salt and Water
  - Vitamins and Minerals
  - Protein
- Functional Status
  - Strength
  - Balance
  - Fatigue
  - Falls
Many Reasons Older HF Patients may become Frail and Decline in Function:

- Frequent hospital admissions
- Decreased exercise tolerance leading to sarcopenia
- Changes in muscle metabolism, structure, and perfusion.
- Inflammation
- Elevated RAAS, sympathetic stimulation
- Catabolism

How to Measure Frailty

- Frailty Phenotype
- Composite score
  - Handgrip strength
  - 8 foot walk time (modification)
  - 2 depression questions
  - Physical activity scale of the elderly (PACE)
  - Weight loss**
- Six Minute Walk Distance


Problems of Cognition

- Delirium
  - Acute and Fluctuating
  - Inattention
  - Often related to medical illness
  - Can develop in >50% of hospitalized older adults
  - Reversible
- Cognitive Impairment/Dementia
Some Risk Factors for Delirium

- Advanced Age
- Dementia
- Fluid shifts
- Low perfusion states
- Electrolyte abnormalities (sodium)
- Severe Illness
- Immobility
- Fever/infection
- Depression

Delirium – Confusion Assessment Method CAM

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acute change in mental status, AND</td>
<td>Observation by a family member, caregiver, or primary care physician</td>
</tr>
<tr>
<td>2. Symptoms that fluctuate over minutes or hours, AND</td>
<td>Observation by nursing staff or other caregiver</td>
</tr>
<tr>
<td>3. Inattention</td>
<td>Patient history: Poor digit recall, inability to recite months of year backwards</td>
</tr>
<tr>
<td>PLUS</td>
<td></td>
</tr>
<tr>
<td>4. Altered level of consciousness, OR</td>
<td>Hyperalertness, drowsiness, stupor, or coma</td>
</tr>
<tr>
<td>5. Disorganized thinking</td>
<td>Rambling or incoherent speech</td>
</tr>
</tbody>
</table>

Dementia

- Difficulties
  - Learning new information
  - Handling complex tasks
  - Reasoning ability
  - Spatial ability and orientation
  - Language
  - Behavior

Inoyue et al. AIM
Is there Cognitive Impairment or Dementia

Hints there may be a problem with cognition
- Failure of self-care – Repeat hospitalizations
- Word finding difficulty
- Word substitution
- Repetition
- Patient may or may not know there is a problem

Dementia Assessment

Screening
- 5 minute recall
- Mini mental status exam (MMSE)
- Brief Interview for Mental Status (BIMS)
- Mini-Cog

Neuro-psychological testing
Caregiver/Family Interview

For Patients with Cognitive Difficulties

- Remove instigating factors
- Evaluate for underlying causes
- Arrange for appropriate level of support
- Define and advise for the roles in patients care
- Frequent follow-up
- Plan for caregiver support
Challenges of HF Care in Older Adults

- Demographics
- Physiology
  - Therapies
- Systems
  - Sites of care
  - Support for self-management

Standard of Care for HF

- Medications
- Low Sodium Diet
- Self Monitoring for signs and symptoms
- Self-identification of early decompensation with a prompt response in change of therapy
- Activity
- Prevention
- Education/teach back
- Follow-up/Medication reconciliation

Medication Management

**MEDICATIONS**

THINGS TO KNOW ABOUT TAKING MEDICATIONS
- Take medication exactly as directed.
- Don’t skip any medication on any day.
- Store the medicine, dose and reason for each pill.
- Have a pill box.
- Use an alarm to help you remember to take your medicine.

When to use:
- Keep a copy of your medication list near the phone and in your wallet or purse.
- Try to use the same pharmacy for all your prescriptions.
- Write down your prescription — they can help.
- Refill your prescription before you run out.
- Always keep your medicine bottles to your doctor visits.
- Keep a record of all pills and doses.
- When you get home check the medication bottles
  - Dose
  - Dosage
  - Teen/DyStat
  - Make sure they match your discharge list.
Low Sodium Diets

- Is a low sodium diet for everyone with HF?
- <2000 mg daily
- Reading labels
- **Access** to appropriate foods
- Unintended calorie restriction and weight loss
- Medication failures
Tracking Weight

- Encourage Activity

Symptoms

- Physical Activity

- Getting regular physical activity is essential

- Listen to your body.
- Be alert when you are tired.
- Beware when you are under stress.
- Let your healthcare team know when you are not feeling well.
Follow up

- 7 days post discharge
- Medication reconciliation
- Review of signs and symptoms
- Self-care management

MEDICATION RECONCILIATION PROCEDURE

Examine

Step 1 Compare patient's medication list from SNF D/C bottles with the medications (bottles, prescriptions, all topicals, eye drops, insulin, herbals, otc medications, inhalers) provided by the patient.

- 
- VISUALIZE actual pill containers and products if at all possible. If not possible—this should be documented—including reason. Don’t overlook non-oral agents.

- Compare supply of medications with most recent fill dates

- Ask how often the patient misses doses

- Consider a pill count of one or two meds if non-adherence is suspected or if this was initial reason for the consult

Step 2 Assess how the patient is taking each medication (including prescription, otc, herbals, supplements, topicals, eye drops, insulin, EXPIRED meds) by asking the following questions:

- Dose – How much of this medication do you take?
- Timing/dose: How often do you take this medication?
- What is this medication for? Or why do you use this?
- If variations from list are noted, please ask for any reason for this, e.g.:

  - Side effect or serious reaction (Adverse drug reaction)
  - Instruction of provider
  - Cost

Step 3 Document — Note on your copy of the medication list:

- For expired meds: is patient using this yes or no?
- List current dose:
  - Insulin
  - Warfarin
  - Loop diuretics (bumetanide, torsemide, furosemide)
- An indication for ALL prn’s if not listed in the current order
- Frequency of use of prn medications

Reconcile

Step 4 Document any variation between the way a patient reports taking the medication and the way the medication is ordered to be taken

- Include any reason given for above variations

Step 5 Plan with patient how patient is going to take meds with discrepancies until input can be obtained from pcp.

- Call the pharmacist or pcp/cardiologist if you judge that additional input is needed to make this decision.

Step 6 Update patient’s copy of the medication list with information gathered above, note medications to be clarified with primary care provider, and include your name and phone number.
Take Home Points

- HF is common in older adults, especially HF-PEF
- Hypertension is an important cause of HF in older adults
- Evidence to guide clinical practice is limited in the older adult
- Frailty and cognitive evaluation should be included in the HF clinical assessment
- Treatment requires a multidisciplinary approach and care planning
- Patients with HF in SNF may be the most vulnerable of HF patients
- Transitions of care are a perilous time and careful planning can avoid adverse outcomes.