Improving Transition of Care in Congestive Heart Failure

Mark J. Gloth, DO, MBA.
Vice President, Chief Medical Officer
HCR ManorCare
Heart Failure

• Fastest growing clinical cardiac disease in the United States.
• Approximately 670,000 new cases of heart failure are diagnosed each year
• About 277,000 deaths are attributed to heart failure each year
• The most frequent cause of hospitalization in patients over 65 years
Studies of CHF Rehospitalizations

- Within 30 days of hospitalization 27% of all CHF Medicare beneficiaries are rehospitalized.
- 58% of patients with CHF return to the hospital within 6-12 months of discharge.
- Less than half of the CHF patients rehospitalized within 30 days had a physician visit before readmission.
- 90% of CHF rehospitalizations within 30 days appear to be unplanned, the result of preventable clinical deterioration.
- Medication missteps 19% of Medicare discharges are followed by a “preventable” adverse event within 30 days—2/3 are medication related.
- MedPAC estimates that up to 76 percent of CHF re-hospitalizations may be preventable.
Time Segment Thresholds

**Time from Admission to Discharge**

- <= 48 Hours: 12.6%
- 3 to 7 Days: 24.1%
- 8 to 30 Days: 63.3%

Legend:
- Nursing Home Operations
- Selection
Re-hospitalization Prevention Opportunities

• At 24-48 Hours
  – Transition of Care

• At Day 3-7
  – Initial Assessment

• At Day 8-30
  – Communication
Definition:
A pathophysiologic state in which the heart fails to pump blood at a rate commensurate with the requirements of the metabolizing tissue or a state in which it is only able to do so with elevated diastolic filling pressure.
Pathology of Ventricular Failure

• **Systolic failure**: causes ventricle not to empty properly (most common cause of CHF)
  – Heart muscle has decreased ability to contract
  – Also caused by increased afterload (hypertension), or mechanical abnormalities (like valvular heart disease)
  – Characterized by low forward blood flow
Pathology of Ventricular Failure

• **Diastolic failure**: causes ventricle not to fill properly
  – Disorder of heart relaxation and ventricular filling
  – Usually the result of ventricular hypertrophy
  – Caused by chronic hypertension, aortic stenosis, or cardiomyopathy
  – Commonly seen in older adults
Types of CHF

• Left sided failure
  – Back up of blood into the lungs
  – Common causes are: CAD, HTN, cardiomyopathy and rheumatic heart disease
  – Other causes can be: MI damage, ischemia, scar tissue (reducing contractility),
Types of CHF

• Right sided failure
  – Backup of blood into the venous system and right side of the heart
  – Primary cause is left sided failure
  – Also caused by Cor pulmonale (caused by COPD, and pulmonary emboli)
  – Also caused by MI damage, ischemia and scarring
Pathophysiology of HF

- Myocardial Injury and Cell Death
- Diminished Contractility
- Release of ET-1, and Vasopressin
- Release of Norepinephrine
- Activation of RAAS, SNS
- Vasoconstriction
# Neurohormonal Effects in HF

<table>
<thead>
<tr>
<th>Response</th>
<th>Short-Term Effects*</th>
<th>Long Term Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt and water retention</td>
<td>Augments preload to increase cardiac output</td>
<td>Pulmonary congestion and peripheral edema</td>
</tr>
<tr>
<td>Vasoconstriction</td>
<td>Maintains blood pressure for perfusion of vital organs</td>
<td>Exacerbates pump dysfunction (increased cardiac afterload and energy expenditure)</td>
</tr>
<tr>
<td>Sympathetic stimulation</td>
<td>Increases heart rate and ejection (increased output)</td>
<td>Increases energy expenditure and causes arrhythmias</td>
</tr>
<tr>
<td>Cardiac hypertrophy</td>
<td>Adaptive: increased sarcomere number with increased cardiac output</td>
<td>Maladaptive: accelerated cell death, arrhythmias</td>
</tr>
</tbody>
</table>

Table 1. Homeostatic Responses to Impaired Cardiac Performance (Due in part to activation of the renin-angiotensin-aldosterone system (RAAS) and of the sympathetic nervous system).
Signs and Symptoms

- Angina
- Tachycardia
  - Palpitations
- Venous Congestion
  - Edema, Orthopnea
- Low Cardiac Output
  - Dyspnea
  - Fatigue
  - Decreased Appetite
  - Nocturia or Oliguria
  - Cerebral Symptoms
Complications of Congestive Heart Failure

• Pleural effusion
  – Increased pressure in pleural capillaries
  – Leakage of fluid from capillaries into pleural space.
• Arrhythmias
• Left ventricular thrombus
• Hepatomegaly
  – Liver becomes congested with venous blood
  – Leads to impaired liver function
Classifications – NYHA/ACA

- Class I/Stage A – No limitation of physical activity
- Class II/Stage B – Slight limitation of physical activity
- Class III/Stage C – Marked limitation of physical activity
- Class IV/Stage D – Symptomatic at rest and unable to participate in physical activity without discomfort
Rehospitalization Prevention Opportunities and Transition of Care Initiatives

- **At 24-48 Hours**
  - Transition of Care
- **At Day 3-7**
  - Initial Assessment
- **At Day 8-30**
  - Communication
Transition of Care Initiatives
24-48 Hours - Transition

- Clinical Skills Inventory
- Transfer Checklist
- Transition of Care Nurse to Nurse Report
- Diagnosis Specific Checklist
Transitions of Care

TOOLBOX

- Acute Myocardial Infarction
- Heart Failure
- Pneumonia
Transitions of Care Initiatives
Heart Failure

24-48 Hours Checklist

☐ Low Salt Diet
☐ Daily Weights
☐ Baseline Vital Signs
  ☐ Orthostatic Blood Pressure and Heart Rate
  ☐ Oxygen Saturation
☐ Baseline Cardiac Labs
  ☐ BNP
  ☐ Glucose
  ☐ K, BUN, CRT
☐ Cardiac Medication Review
  ☐ Loop Diuretics
  ☐ Digoxin
  ☐ ACE-I
  ☐ B-blocker
  ☐ Spirinolactone
  ☐ Alternate Cardiac Medications
Orthostatic Hypotension (OH) is defined as a decrease of 20 mmHg (or more) in systolic pressure or a decrease of 10 mmHg (or more) in diastolic pressure. The measurement of Heart Rate (HR) along with blood pressure can aid in differential diagnosis. For example, a postural drop in blood pressure accompanied by an increase in HR by 15 bpm or more may indicate a nonneurogenic cause (eg, medication), while no increase in HR may indicate neurogenic etiology (eg, primary or secondary autonomic system failure).

Step 1: Have the patient lie supine for 10 minutes and obtain blood pressure and HR.

Step 2: Take blood pressure and HR immediately after the patient arises and ask about dizziness.

Note: Orthostatic stability usually takes place in less than 1 minute. It is important to note any immediate fall in blood pressure and increase in HR because, even though the time interval to recovery is very small, an opportunity for mishap (eg, a fall) does exist. The presence of symptoms, such as dizziness, might be more clinically important than a change in pressure reading. Further, among elderly patients, the baroreceptor response time may be blunted. Thus, although these patients may not be experiencing true OH, they may have a short period of dizziness and imbalance.

Step 3: After the patient maintains an upright posture for 3 minutes, obtain blood pressure and HR again.

Note: This will help to define the degree of hypotension and allow you to take into consideration individual variances (eg, age related) in physiological response times.
ACE-I in CHF

• Mainstay of CHF Therapy
  – Improves Survivability
  – Decreases Disease Progression
  – Decreases CHF Readmissions

• Weekly Titration to Maximize Benefit
  – ‘Start low and go slow’
  – Titrate Ace-I, wean diuretic

• Monitor Labs and Side Effects
<table>
<thead>
<tr>
<th>Drug</th>
<th>Initial dosage (mg)</th>
<th>Targeted dosage</th>
<th>Maximal dosage</th>
<th>Peak BP effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captopril (Capoten)</td>
<td>6.25 to 12.5</td>
<td>50 mg three times daily</td>
<td>100 mg three times daily</td>
<td>1 to 2 hours</td>
</tr>
<tr>
<td>Enalapril (Vasotec)</td>
<td>2.5 to 5</td>
<td>10 mg twice daily</td>
<td>20 mg twice daily</td>
<td>4 to 6 hours</td>
</tr>
<tr>
<td>Fosinopril sodium (Monopril)</td>
<td>5 to 10</td>
<td>20 mg daily</td>
<td>40 mg daily</td>
<td>2 to 6 hours</td>
</tr>
<tr>
<td>Lisinopril (Zestril)</td>
<td>2.5 to 5</td>
<td>20 mg twice daily</td>
<td>40 mg twice daily</td>
<td>2 to 6 hours</td>
</tr>
<tr>
<td>Quinapril (Accupril)</td>
<td>5 to 10</td>
<td>20 mg twice daily</td>
<td>40 mg twice daily</td>
<td>2 to 4 hours</td>
</tr>
<tr>
<td>Ramipril (Altace)</td>
<td>1.25 to 2.5</td>
<td>5 mg twice daily</td>
<td>10 mg twice daily</td>
<td>4 to 6 hours</td>
</tr>
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CHF – Cardiac Medication Review
Evidence Based Approach

- Loop Diuretics (NYHA II, III, IV)
- Digoxin (Variable evidence)
  - Ace-I (Strong evidence)
  - ARBs (Limited evidence)
  - B-Blockers (NYHA II, III)
  - Spirinolactone (RALES)
- NSAIDS (negative effect)
- Calcium Channel Blockers (PRASES)
Transition of Care Initiatives
3-7 Days - Medical Practice

- Initial Visit Window
- Frequency of Visits
- Center Based Nurse Practitioner
- Diagnosis Specific Pathways
3-7 Day Rehospitalization Rates
Center-Based NP Facilities vs. Control Facilities

Percent of 30 Day Rehospitalization Total

Pre-NP

10 Months Rolling
- Center-Based NP
- Control
- Threshold
- Linear (Center-Based NP)
3-7 Day Assessment

- History
  - NYHA Functional Classification
  - Angina
  - Cough
- Physical Examination
  - Low SBP
  - Edema
- Database
  - Anemia
  - CRT
  - Echocardiogram
New York Heart Association (NYHA) Classification of Heart Failure

<table>
<thead>
<tr>
<th>Class</th>
<th>Patient Symptoms</th>
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<tbody>
<tr>
<td>Class I (Mild)</td>
<td>No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, rapid/irregular heartbeat (palpitation) or shortness of breath (dyspnea).</td>
</tr>
<tr>
<td>Class II (Mild)</td>
<td>Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, rapid/irregular heartbeat (palpitation) or shortness of breath (dyspnea).</td>
</tr>
<tr>
<td>Class III (Moderate)</td>
<td>Marked limitation of physical activity. Comfortable at rest, but less than ordinary physical activity results in fatigue, rapid/irregular heartbeat (palpitation) or shortness of breath (dyspnea).</td>
</tr>
<tr>
<td>Class IV (Severe)</td>
<td>Unable to carry on physical activity without discomfort. Symptoms of fatigue, rapid/irregular heartbeat (palpitation) or shortness of breath (dyspnea) are present at rest. If any physical activity is undertaken, discomfort increases.</td>
</tr>
</tbody>
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Transition of Care Initiatives
8-30 Days - Communication

- Clinical Core Programs
- New Alert
- SBAR/Interact III