Systolic vs. Diastolic Heart Failure, is there a difference?

Kismet Rasmusson, DNP, FNP-BC, FAHA
Objectives

1. The learner will be able to describe how to differentiate types of heart failure

2. Learner will be able to describe treatments of heart failure with reduced vs. preserved ejection fraction

3. Learners will understand appropriate measures to reduce readmissions
Outline: Key Concepts in HF

Recognize types of HF

Improve understanding of “diastolic” HF

Follow guidelines to treat types of HF

Recognize decompensation

Assess risk factors for readmissions- use team approach
Challenges in HF Care

Why this is important...

Different classifications of HF have specific treatments

know the EF (Ejection Fraction)- echocardiogram

Lack of understanding about “diastolic” heart failure

Focus on systolic HF in CMS/Joint Commission Core measures

Readmissions are common & an area of national focus

- 22% of patients discharged with HF are readmitted within 30 days

- > 50% of patients discharged with HF are readmitted within 90 days

Most readmissions are thought to be preventable!
What is Heart Failure?

Definition

- HF is a clinical syndrome in which the heart is unable to pump sufficient blood to meet the metabolic demands of the body
- It can result from any structural or functional cardiac disorder that impairs the ability of the ventricle to fill with or eject blood
- Signs and symptoms of congestion and/or low output:
- Hallmark symptom is activity intolerance

Yancy et al. 2013 ACCF/AHA Heart Failure Guidelines. Circ, June 2013
## Stages of Heart Failure

<table>
<thead>
<tr>
<th>Stage</th>
<th>Patient Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: High risk for developing HF</td>
<td>HTN, FH of CM, CAD, Obesity, DM, Dyslipidemia</td>
</tr>
<tr>
<td>B: Asymptomatic HF</td>
<td>Previous MI, LVH, LVSD, Asymptomatic valvular disease</td>
</tr>
<tr>
<td>C: Symptomatic HF</td>
<td>Known structural Ht disease, SOB &amp; Fatigue, Reduced exercise tolerance</td>
</tr>
<tr>
<td>D: Refractory end-stage HF</td>
<td>Marked symptoms at rest, Maximal medical therapy</td>
</tr>
</tbody>
</table>
Types of Heart failure

<table>
<thead>
<tr>
<th>Classification</th>
<th>Ejection Fraction (EF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure with reduced ejection fraction (HFrEF)</td>
<td>&lt; 40%</td>
</tr>
<tr>
<td>• Formerly referred to as systolic heart failure</td>
<td></td>
</tr>
<tr>
<td>Heart failure with preserved ejection fraction (HFpEF)</td>
<td>&gt; 50%</td>
</tr>
<tr>
<td>• Formerly referred to as diastolic heart failure</td>
<td></td>
</tr>
<tr>
<td>HFpEF borderline</td>
<td>41-49%</td>
</tr>
<tr>
<td>HFpEF improved (patients with a history of HFrEF)</td>
<td>&gt; 40%</td>
</tr>
</tbody>
</table>

Classifications of HF

“systolic” vs. “diastolic”

Heart Failure with **Reduced** Ejection Fraction (HFrEF)
- Systolic HF ≤40%

Borderline Ejection Fraction
- 41-49%

Heart Failure with **Preserved** Ejection Fraction (HFpEF)
- Diastolic HF ≥50%
Clinical presentation

<table>
<thead>
<tr>
<th>Sign/Symptom</th>
<th>HFpEF (Diastolic HF)</th>
<th>HFrEF (Systolic HF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyspnea on exertion</td>
<td>60%</td>
<td>73%</td>
</tr>
<tr>
<td>Nocturnal dyspnea</td>
<td>55%</td>
<td>50%</td>
</tr>
<tr>
<td>Lower extremity edema</td>
<td>35%</td>
<td>46%</td>
</tr>
<tr>
<td>Rales</td>
<td>72%</td>
<td>70%</td>
</tr>
</tbody>
</table>

No difference in symptoms for HF with reduced vs. preserved EF; Symptoms from elevated left sided filling, pulmonary pressures & reduced stroke volume

## HF Symptom Classification

### NYHA Functional Classification

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>No limitation of physical activity. Ordinary physical activity does not cause HF symptoms</td>
</tr>
<tr>
<td>II</td>
<td>Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in symptoms of HF</td>
</tr>
<tr>
<td>III</td>
<td>Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes symptoms of HF</td>
</tr>
<tr>
<td>IV</td>
<td>Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest</td>
</tr>
</tbody>
</table>

*Circulation 2013;128:e240-327.*
## Risk factors for HF

<table>
<thead>
<tr>
<th>HFpEF</th>
<th>HFrEF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Coronary artery disease</td>
</tr>
<tr>
<td>Gender (females)</td>
<td>Family history of heart disease</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Hypertension</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Diabetes</td>
</tr>
<tr>
<td>Obesity</td>
<td>Obesity</td>
</tr>
</tbody>
</table>

Why is Knowing the HF Classification Important?

Because treatments differ!

HFrEF (EF < 40%) should receive Guideline Directed Medical Therapy (GDMT)

- ACEi or ARB
- Beta- blocker
- Aldosterone receptor antagonist
- Persistent EF ≤ 35%: cardiac devices
- Persistent EF < 25%: advanced HF therapies
  - Heart transplant, LVAD
Outline: Key Concepts in HF

Recognize types of HF

Improve understanding of “diastolic” HF

Follow guidelines to treat types of HF

Recognize decompensation

Assess risk factors for readmissions- use team approach
Definitions

**Diastolic Dysfunction (DD):**
A functional abnormality of diastolic relaxation, filling, or distensibility of the left ventricle (LV), regardless of whether the LVEF is normal or abnormal and whether the patient is symptomatic or not.

**Heart Failure with Preserved Ejection Fraction (HFpEF):**
A clinical syndrome characterized by symptoms and signs of HF, a preserved LVEF ≥ 50%, no significant valvular abnormalities, and abnormal diastolic function.
Controversies with HFpEF

1) What is the role of cardiovascular dysfunction in producing HFpEF?

2) Does HFpEF represent true HF or just a collection of comorbidities?

3) Are HFpEF and HFrEF two separate syndromes or merely the extremes of a single continuum.
Challenges in HFpEF Care

Consensus-based diagnostic criteria result in a heterogeneous population that has proven challenging for clinical care.

Multiple mechanisms have been proposed but many remain hypothetical.

Good experimental models do not really exist, and do not reflect its integrative complexity.

HFpEF patients are afflicted with multiple common comorbidities that have a major impact on the syndrome and mortality.
ADHERE Database

- >100,000 hospitalizations ADHF across the US
- 50% of patients had normal EF (ie, HF-PEF)
- Patients with HFpEF had following clinical characteristics compared to those with systolic dysfunction:
  - More likely to be older, female, and hypertensive
  - Less likely to have had a prior myocardial infarction
  - Lower in-hospital mortality (3 versus 4 percent) but similar ICU and hospital length of stay
HFpEF is not “benign”

As compared to HFrEF

Similar functional decline

Similar hospital readmission rates

Similar economic costs
What Type of HF Does Your Patient Have?

**Signs/Symptoms**

**Signs - found on assessment**

- Rales and/or wheezing
- S3 Gallop
- Laterally displaced or prominent apical impulse (due to cardiac enlargement)
- Murmurs (due to dysfunction)
- Reduced cardiac output may be manifested by:
  - Cool extremities
  - Tachycardia
  - Poor mentation
  - Reduced urine output
- Ascites
- Distended or tight abdomen
- Pitting Edema

**Symptoms - reported by history**

- Paroxysmal nocturnal dyspnea (PND)
- Orthopnea (due to pulmonary edema and/or pleural effusions)
- Palpitations
- Chest pain or pressure
- Dyspnea
- Cough
- Wheezing
- Bloating
- Nausea
- Decreased appetite
- Peripheral edema
Diagnosing HFpEF
Echo Enables Identifying Causes of HFpEF

- LVH
- Regional wall motion abnormalities due to ischemic heart disease
- Amyloidosis
- Other cardiomyopathies such as hemochromatosis and sarcoidosis
- In addition, other causes of HF-PEF can be identified including:
  - Constrictive pericarditis
  - Severe mitral regurgitation
  - Severe aortic regurgitation
Etiology of HFpEF

• Chronic hypertension and other causes of LV hypertrophy (LVH)
• Hypertrophic cardiomyopathy (HCM)
• Coronary heart disease
• Diabetic heart disease
• Restrictive cardiomyopathy, which can be idiopathic or caused by infiltrative diseases (cardiac sarcoidosis, amyloid)
Mechanism of disease

Diastolic dysfunction

- Impaired (slow) relaxation
- Increased stiffness

Neurohormonal activation

Diastolic function is determined by two factors:

- Myocardial relaxation
- Compliance or distensibility of the left ventricle

Abnormal diastolic relaxation & distensibility

- Impairs LV filling and causes an increased LV diastolic, left atrial, and pulmonary venous pressure
HFpEF pathophysiology

Ventricular hypertrophy

Inflammation

Impaired cardiac relaxation

Neurohormones
HF pathophysiology

**Normal**
- Right atrium
- Diastole (filling)
- Right ventricle
- The ventricles fill normally with blood

**HFrEF**
- Left atrium
- Left ventricle
- The enlarged ventricles fill with blood

**HFpEF**
- The stiff ventricles fill with less blood than normal
LV dilation, globular shape

**Systolic** LV dysfunction
Mitral regurgitation

Normal cavity size, concentric LVH

**Diastolic** dysfunction
Enlarged left atrium
Features of Diastolic HF

Poor toleration of certain kinds of hemodynamic stress, each of which results in increased LV diastolic pressure:

**Atrial Fib**: loss of atrial contraction can dramatically reduce LV filling and limit the stroke volume

**Tachycardia**: increase in heart rate shortens the duration of diastole which can limit LV filling

**Hypertension**: especially the abrupt and severe elevations often seen with renovascular hypertension, increase left ventricular wall stress, which can impair or delay myocardial relaxation

**CAD**: worsening of diastolic dysfunction by ischemia raises left atrial and pulmonary venous pressure (anginal equivalent or cardiac asthma)
Outline: Key Concepts in HF

- Recognize types of HF
- Improve understanding of “diastolic” HF
- Follow guidelines to treat types of HF
- Recognize decompensation
- Assess risk factors for readmissions- use team approach
# AHA/ACC 2013 HF Guidelines: HFpEF

## Table 16. Recommendations for Treatment of HFpEF

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic and diastolic blood pressure should be controlled according to published clinical practice guidelines</td>
<td>I</td>
<td>B (28.247)</td>
</tr>
<tr>
<td>Diuretics should be used for relief of symptoms due to volume overload</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Coronary revascularization for patients with CAD in whom angina or demonstrable myocardial ischemia is present despite GDMT</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>Management of AF according to published clinical practice guidelines for HFpEF to improve symptomatic HF</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>Use of beta-blocking agents, ACE inhibitors, and ARBs for hypertension in HFpEF</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>ARBs might be considered to decrease hospitalizations in HFpEF</td>
<td>IIb</td>
<td>B (248)</td>
</tr>
<tr>
<td>Nutritional supplementation is not recommended in HFpEF</td>
<td>III: No Benefit</td>
<td>C</td>
</tr>
</tbody>
</table>

ACE indicates angiotensin-converting enzyme; AF, atrial fibrillation; ARB, angiotensin-receptor blockers; CAD, coronary artery disease; COR, Class of Recommendation; GDMT, guideline-directed medical therapy; HF, heart failure; HFpEF, heart failure with preserved ejection fraction; and LOE, Level of Evidence.
## Treatment of HFpEF

<table>
<thead>
<tr>
<th>HFpEF Characteristic</th>
<th>Treatment Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume overload symptoms</td>
<td>Diuretic</td>
</tr>
<tr>
<td>Hypertension</td>
<td>ACE inhibitor, ARB, β-blocker</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>β-blocker, non-DHP CCB, digoxin, amiodarone</td>
</tr>
<tr>
<td>Diabetes/CKD</td>
<td>ACE inhibitor, ARB</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>ACE inhibitor or ARB + β-blocker, statin, aspirin</td>
</tr>
<tr>
<td></td>
<td>Aldosterone receptor antagonist (post MI)</td>
</tr>
</tbody>
</table>

AHA/ACC 2013 HF Guidelines: HFrEF

Yancy, CW et al.
2013 ACCF/AHA Heart Failure Guideline: Executive Summary

HFrEF Stage C
NYHA Class I – IV
Treatment:

• GDMT:
  – ACEi/ARB
  – BB
  – Aldosterone Receptor Antagonist

ACEI indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin-receptor blocker; HFrEF, heart failure with reduced ejection fraction; Hydral-Nitrates, hydralazine and isosorbide dinitrate; LOE, Level of Evidence; and NYHA, New York Heart Association.
HF Treatment Summary by Classification

HF-preserved-EF

1. Control volume overload
2. Teach MAWDS-HF
3. Control comorbidities
4. Know EF

If hx of HFrEF & “recovered”, continue GDMT

HF-reduced-EF

1. Control volume overload
2. Teach MAWDS-HF
3. Control comorbidities
4. Know EF

EF < 40%: Use GDMT

EF < 35%: Consider Device

EF < 25% Consider Advanced HF therapies
HF Patient Education

- MAWDS-HF
  - Medications
  - Activity
  - Weight
  - Diet
  - Symptoms
HF Patient Education Materials

• Self-care diary
• Fact sheets
  • What is HF
  • Fluid tracker
  • Low sodium diet
• Patient education manual
• Video
• Classes (at IMC)
• Website
Heart Failure

What is it?
Heart failure is a condition in which your heart can't pump enough blood to meet your body's needs. Usually this is because your heart muscle is too weak to "squeeze" out enough blood with each beat. But heart failure can also happen when your heart becomes too stiff and can't fill up with enough blood between each beat.

Heart failure is a serious condition—and it's also quite common. Right now in the United States, more than 5 million people are living with heart failure. This handout explains the basics of this condition, including how to manage symptoms.

What are the symptoms?
Common symptoms of heart failure include:
- Shortness of breath
- Cough
- Feeling very tired and weak
- Weight gain (from fluid buildup)
- Swollen ankles, feet, belly, lower back, and fingers
- Trouble concentrating or remembering

The underlying condition of heart failure (heart muscle damage and weakness) cannot be cured, but symptoms can be managed. Good treatment and self-care can slow the progression of these symptoms.

What causes it?
Heart failure occurs most often in older people—but it can happen to anyone, at any age. Heart failure can be caused by anything that damages and weakens the heart muscle, but up to 40% of all cases of heart muscle damage have no known cause. The most common known causes of heart muscle damage listed at right.

- Atherosclerosis (coronary artery disease). If the arteries that supply your heart with blood become narrowed by fatty plaque buildup, you have atherosclerosis. Atherosclerosis limits the amount of oxygen your heart receives and weakens the muscle. It can also cause a heart attack, which can further damage your heart.
- High blood pressure (hypertension). Poorly controlled blood pressure makes your heart work harder to pump blood throughout your body. Over time, this extra work can wear out your heart and lead to heart failure.
- Heart valve problems. Heart valves control the one-way flow of blood through your heart. If valves are damaged or abnormal, you can have back-flow or limited forward flow. Both make your heart work harder and can lead to heart failure.
- Alcohol abuse. Long-term alcohol abuse can severely weaken your heart muscle.

Heart Failure Fluid Tracker

If you have heart failure, one key to managing it is restricting sodium (salt) and limiting fluids, as part of a heart failure diet. Limiting fluids can ease edema (swelling) and lighten the workload on your heart. Generally, limit your fluid intake to 2 liters (2,000 mL) per day. (Check with your healthcare provider to be sure.)

Use the tracker on the other side of this handout to monitor how much fluid you drink. Also, use these tips for limiting your fluids:
- Sip a small bottle of water throughout the day (record it in the table as part of a snack).

<table>
<thead>
<tr>
<th>Fluids</th>
<th>Ounces</th>
<th>mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast: 1 cup of milk with cereal</td>
<td>8 oz.</td>
<td>240 mL</td>
</tr>
<tr>
<td>Snack: 2 cups of watermelon (ice cream, sherbet, and soup count as fluid, as well as fruits and vegetables with a lot of water, such as watermelon.)</td>
<td>16 oz.</td>
<td>480 mL</td>
</tr>
</tbody>
</table>

Fluid tracker

Use the tables below to track your daily fluids. Each table covers a week, and the entire page lets you track your fluids for 3 weeks. You may want to make a photocopy of the blank sheet before you get started, so you can make more copies as you need them.

<table>
<thead>
<tr>
<th>Week:</th>
<th>Sun</th>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
<th>Sat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>oz.</td>
<td>mL</td>
<td>oz.</td>
<td>mL</td>
<td>oz.</td>
<td>mL</td>
<td>oz.</td>
</tr>
<tr>
<td>Breakfast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dinner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAILY TOTAL</td>
<td>2,000 mL or less</td>
<td>2,000 mL or less</td>
<td>2,000 mL or less</td>
<td>2,000 mL or less</td>
<td>2,000 mL or less</td>
<td>2,000 mL or less</td>
<td>2,000 mL or less</td>
</tr>
</tbody>
</table>
## Heart Failure Self-Care Diary

### Instructions:

1. At the beginning of a new month, write in your target weight and the month at the top of the page.

2. Write in the day of the month in the square in each box.

3. Put a check in the zone you are in for the day.

4. Each day record your weight.

5. Record your heart rate.

6. Record your blood pressure.

### Monthly Tracking Table:

<table>
<thead>
<tr>
<th>Mon</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
</tr>
</thead>
<tbody>
<tr>
<td>weight:</td>
<td>weight:</td>
<td>weight:</td>
<td>weight:</td>
<td>weight:</td>
</tr>
<tr>
<td>HR:</td>
<td>HR:</td>
<td>HR:</td>
<td>HR:</td>
<td>HR:</td>
</tr>
<tr>
<td>BP:</td>
<td>BP:</td>
<td>BP:</td>
<td>BP:</td>
<td>BP:</td>
</tr>
</tbody>
</table>

### Heart Failure Action Plan

**Keep up the good work!**
- Follow MAWDS every day!

**Make sure you:**
- Not feeling well
- Weight is up 2 or more pounds in one day or up 5 pounds over your target weight
- Noticeable swelling or bloating
- Some difficulty breathing with activity and at night
- Symptoms are worsening

**Call your healthcare provider to find out how to prevent symptoms from becoming severe.**

**Provider’s instructions:**

- [ ]
- [ ]
- [ ]
- [ ]
- [ ]

**Call your healthcare provider or go directly to the emergency room.**
- DO NOT try to treat this yourself.

**Provider’s number:**

- 

**Emergency number:** **911**
**About Heart Failure**

With heart failure, initial damage weakens the heart muscle.

To compensate, hormone pathways are activated, causing your heart to beat faster and to enlarge (stretch or thicken).

Symptoms can result from poor forward flow (fatigue, trouble concentrating) or fluid backing up (swelling, shortness of breath).

**Medications** do a number of things:
- Block hormone pathways
- Lower the workload of the heart
- Strengthen the pumping action of the heart
- Decrease your chance for hospitalization
- Improve survival

**Symptom management** includes medications to control excess fluid (diuretics, digoxin) and practicing MAWDS self management every day.

**Summary of Your Heart Condition**

- [ ] Heart failure
  - [ ] Weak muscle EF _____
  - [ ] Stiff muscle EF _____
- [ ] Coronary artery disease
- [ ] Rhythm abnormality
  - [ ] Atrial
  - [ ] Ventricular
- [ ] Other
  - [ ]
<table>
<thead>
<tr>
<th><strong>M</strong></th>
<th><strong>A</strong></th>
<th><strong>W</strong></th>
<th><strong>D</strong></th>
<th><strong>S</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Please Do</strong></td>
<td><strong>Please Do</strong></td>
<td><strong>Please Do</strong></td>
<td><strong>Please Do</strong></td>
<td><strong>Please Do Not Remove From Patient Room</strong></td>
</tr>
<tr>
<td>“Your medical team will help you improve your health.”</td>
<td>“You can also improve your health.”</td>
<td>“We recommend that you increase your daily weight, and keep an eye on your weight.”</td>
<td>“The three key factors in diet are:”</td>
<td>“It is important to be aware of your individual symptoms and know when to take action.”</td>
</tr>
<tr>
<td>“It is important to monitor your medication and adjust your doses.”</td>
<td>“Activity helps increase your energy levels.”</td>
<td>“We recommend that you work up to 30 minutes of exercise daily.”</td>
<td>“The three key factors in diet are:”</td>
<td>“Some of the most common symptoms are:”</td>
</tr>
<tr>
<td>“Never stop taking your medication because you start feeling better.”</td>
<td>“Never stop taking your medication because you start feeling better.”</td>
<td>“You should also monitor your weight during exercise.”</td>
<td>“The three key factors in diet are:”</td>
<td>“Shortness of breath, weight gain, swelling, bloating, cough, increased fatigue, chest pressure, or an overall feeling of not doing well.”</td>
</tr>
<tr>
<td>“These medications may cause:FATIGUE and HEART FAILURE”</td>
<td>“These medications may cause:FATIGUE and HEART FAILURE”</td>
<td>“Always stay hydrated and rest when feeling fatigued.”</td>
<td>“The three key factors in diet are:”</td>
<td>“When you notice these symptoms, it is very important to take action and call your provider right away. Do not wait.”</td>
</tr>
<tr>
<td>“Some medications may cause: Hypertension, Systolic Hypertension, ARB / BB / CAD”</td>
<td>“Some medications may cause: Hypertension, Systolic Hypertension, ARB / BB / CAD”</td>
<td>“Find some ways to manage your stress or involve yourself in activities that you enjoy.”</td>
<td>“The three key factors in diet are:”</td>
<td>“This will help in the management of your care before your symptoms become too severe and to help avoid hospitalizations.”</td>
</tr>
<tr>
<td>“HF with New Onset Symptoms”</td>
<td>“HF with New Onset Symptoms”</td>
<td>“Back off of your diuretic and help your provider.”</td>
<td>“The three key factors in diet are:”</td>
<td>“It is also important to recognize symptoms of low blood pressure and/or dehydration: quick weight loss, significant fatigue, weakness, light-headedness.”</td>
</tr>
</tbody>
</table>

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**Intermountain Heart Institute**

Intermountain Medical Center
**Heart Failure**

**Action Plan**

**GO**
- Feeling well
- Breathing is easy
- Weight is stable
- Symptoms are stable

**MEDICATION**
- If you’re at home...
- Keep up the good work!
- Follow M&GDS every day!

**CAUTION**
- Not feeling well
- Weight is up 2 or more pounds in one day or up 5 pounds over your target weight
- Noticeable swelling or bloating
- Some difficulty breathing with activity and at night
- Symptoms are worsening

**AWD**
- Not feeling well
- Weight is up 2 or more pounds in one day or up 5 pounds over your target weight
- Noticeable swelling or bloating
- Some difficulty breathing with activity and at night
- Symptoms are worsening

**DIET**
- Go maintain therapy
- Not feeling well
- Weight is up 2 or more pounds in one day or up 5 pounds over your target weight
- Noticeable swelling or bloating
- Some difficulty breathing with activity and at night
- Symptoms are worsening

**TODAY’S GOALS**
- GO: maintain therapy
- MEDICATION: If you’re at home...
- CAUTION: Not feeling well
- AWD: not feeling well
- DIET: go maintain therapy

**Scripting**

- “Your **HEART FAILURE** action plan helps you to know when you should contact a provider.”

- “The **green zone** is where you are feeling well, breathing is easy, and your weight is stable.”

- “The **yellow zone** is where you are not feeling quite as well and you may be showing symptoms such as swelling, weight gain, or difficulty breathing. This zone is where we want you to call your doctor to prevent symptoms from becoming worse.”

- “The **red zone** is where you are breathless, weight is up more than 5 lbs., and symptoms are severe. This is when we want you to go to the ER or call 911.”

- “Use your **HEART FAILURE** diary to indicate your zone and know when you should call your health care provider.”
Heart Failure Tool Kit
2014 Heart Failure Classes

FREE CLASSES

TIME: 10 a.m. - 12 noon

LOCATION:
Intermountain Medical Center
5121 S. Cottonwood Street, Murray
Doty Education Center (Building 6)
Classroom 1

RSVP: HF RN:
801-507-4376

DATES:
January 8        July 16
February 19      August 13
March 12         September 17
April 16         October 15
May 14           November 12
June 18          No class in Dec.

Are You or Someone You Know Affected by Heart Failure?

FREE HEART FAILURE EDUCATION:
The Heart Failure & Transplant program offers FREE classes to patients and their families in our community. If you or a family member have been affected by one of the following, you won’t want to miss this seminar:

- High Blood Pressure
- Heart Attack
- Coronary Artery Disease
- Damage to Heart Valves
- Diabetes
- Obesity
- Arrhythmias

WHAT IS HEART FAILURE?
Heart failure is a condition in which the heart muscle is either weak or stiff, and gradually loses its ability to pump enough blood to supply the body’s needs. Symptoms include shortness of breath, fatigue, activity intolerance, and fluid retention.

Heart failure affects nearly 6 million Americans and is the only major cardiovascular disease on the rise. While there is currently no known cure for heart failure, it can be well managed with appropriate lifestyle changes, medications, and implantable devices.
HF tools for providers

Ask about our HF clinical pearls
(email Kismet.Rasmusson@imail.org)

HF CME opportunities:
CV Update Conference (SLC)
October 2015
HF Update (St. George),
October 2015
Outline: Key Concepts in HF

- Recognize types of HF
- Improve understanding of “diastolic” HF
- Follow guidelines to treat types of HF
- Recognize decompensation
- Assess risk factors for readmissions - use team approach
The Course Of Heart Failure
Common reasons for HF exacerbations

- New/progressive coronary disease
- New arrhythmia (atrial or ventricular)
- Noncompliance
- Uncontrolled hypertension
- Infection:
  - Influenza
  - Pneumonia
  - Other
- Changes in renal function
Principles of Inpatient Management

Address precipitating causes of ADHF

Control volume overload with IV loop diuretics & correct hemodynamic abnormalities:
  - May consider continuous infusion and/or addition of a thiazide diuretic (metolazone)
  - May consider low dose dopamine to augment diuretics
  _Consider IV nitroprusside, nitroglycerine, or nesiritide in stable patients

Monitor BMP with changes in therapy

Continue GDMT when appropriate: initiate BB therapy after volume overload has been corrected

Provide thromboembolism prophylaxis

Treat comorbidities, assess for ischemia

Assess risk for readmissions, plan for transitions in care, use multidisciplinary team, plan close f/u

Assess for advanced HF

Consider palliative care in selected patients with significant symptoms

Teach patients in a meaningful manner with MAWDS-HF
Practical Approach to a Decompensated Patient

**Congestion at Rest?**

- **No**
  - **Warm and Dry**
    - PCW normal
    - CI normal (compensated)
  - **Cold and Dry**
    - PCW low/normal
    - CI decreased

- **Yes**
  - **Warm and Wet**
    - PCW elevated
    - CI normal
  - **Cold and Wet**
    - PCW elevated
    - CI decreased

**Low Perfusion at Rest?**

- **No**
  - **Diuretics**
    - Natriuretic Peptides
  - **Vasodilators**
    - Nitroprusside
    - Nitroglycerin

- **Yes**
  - **Inotropic Drugs**
    - Dobutamine
    - Milrinone

*Modified from Stevenson LW. Eur J Heart Failure 1999;1:251-257*
# IV Inotropes in HF

**Dopamine, Dobutamine, Milrinone**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Action</th>
<th>Dose (mcg/kg/min)</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dopamine</td>
<td>Adrenergic agonist</td>
<td>5-10</td>
<td>↑ CO, HR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-20</td>
<td>↑ CO, HR, SVR</td>
</tr>
<tr>
<td>Dobutamine</td>
<td>Adrenergic agonist</td>
<td>2.5-5</td>
<td>↑ CO, HR, ↓ SVR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-20</td>
<td>↑ CO, HR</td>
</tr>
<tr>
<td>Milrinone</td>
<td>PDE inhibitor</td>
<td>0.125-0.75</td>
<td>↑ CO, HR, ↓ SVR, PVR</td>
</tr>
</tbody>
</table>
## Recognizing Advanced HF

When to consider options

| Clinical Events: | Repeated (>2) Hospitalizations or ED visits in past yr  
|                 | Progressive deterioration in renal function  
|                 | Weight loss without other cause (cardiac cachexia)  
|                 | Intolerance to ACEi/ARB/BB  
|                 | Frequent SBP < 90  
|                 | Persistent dyspnea with usual activities  
|                 | Inability to walk 1 block  
|                 | Escalation of diuretics  
|                 | Progressive decline in serum sodium (< 133)  
|                 | Frequent ICD shocks |
Outline: Key Concepts in HF

Recognize types of HF

Improve understanding of “diastolic” HF

Follow guidelines to treat types of HF

Recognize decompensation

Assess risk factors for readmissions- use team approach
Optimizing HF Care

CMS penalties for excessive readmissions exist

- Hospitals focus to reduce preventable readmissions
- Lack of timely f/u care is associated with readmissions

Optimal HF care

- identify risk for readmission and/or mortality
- use a multidisciplinary team to deliver specialized care
Intermountain’s Focus

HF Board Goals (2013-2015)

1. Accurate and timely identification of patients coded with a primary diagnosis of heart failure

2. Optimize the measurement and reporting systems for heart failure patients

3. Achieve the 2013 Value Based Purchasing and Core Measure heart failure goals

4. Transition Phase (Hospital to Home/SNF)
   
   Time of vulnerability

   Enhance hand-over communication of plan of care

   Continue usual HF management

   Maintain clinical stability
New Heart Failure Developments
High Risk HF Pathway

Know your patient’s risk for readmission and/or mortality

HIGH Risk?
Discuss in Care Coordination
Enhanced services:
Multidisciplinary team: pharmacists, HF RNs/Nursing, dietary, cardiac rehab, care management
f/u appointments and calls

Low-Med Risk?
Providers
Homecare

Usual care

Consider palliative care consult

Providers
Homecare

Computerized d/c orders
## Themes in HF Patient Perspective

Learning from Heart Failure Patients to Improve Patient Centered Care

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Focus Group (n=27)</th>
<th>Phone Interview Group (n=51)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D/C Instructions</strong></td>
<td>• Include caregivers</td>
<td>• RN to provided detailed instruction from Ed packet</td>
</tr>
<tr>
<td></td>
<td>• Start education earlier</td>
<td>• Watch DVD</td>
</tr>
<tr>
<td></td>
<td>• Personalize instruction</td>
<td>• Provide instruction/tips to manage congestion</td>
</tr>
<tr>
<td></td>
<td>• Create support group</td>
<td>• Allow time to practice tracking weights: prep for d/c</td>
</tr>
<tr>
<td></td>
<td>• Honestly discuss disease &amp; severity</td>
<td>• Time to recover from the “shock”, prior to education</td>
</tr>
<tr>
<td><strong>Dietary Recommendations</strong></td>
<td>• Provide simple/ detailed meal plans</td>
<td>• Enhance diet, meal planning and sodium restriction instructions</td>
</tr>
<tr>
<td></td>
<td>• Consider comorbid conditions to personalize meal planning</td>
<td></td>
</tr>
<tr>
<td><strong>Medication Management</strong></td>
<td>• Provide new med list</td>
<td>• Provide guidance on medications, costs, refills, potential interactions</td>
</tr>
<tr>
<td></td>
<td>• Provide pill box, mobile App</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Coordinate with pharmacy for partial refills</td>
<td></td>
</tr>
<tr>
<td><strong>Coordination of Care</strong></td>
<td>• Provide close f/u in month after d/c</td>
<td>• Enhance communication from hospital to PCP</td>
</tr>
<tr>
<td></td>
<td>• Personalize home care instructions</td>
<td>• Provide consistent communication: d/c &amp; diet plan</td>
</tr>
<tr>
<td></td>
<td>• Improve care coordination with PCP</td>
<td>• Suggest ways to manage stress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Suggest ways to be their own advocate, negotiate health care system</td>
</tr>
</tbody>
</table>
Intermountain’s Heart Failure Work
2015+

High Risk HF Pathway implementation across the system

HF messaging to patients

New RN module about HF, on My Learning

Enhanced Palliative Care Services

Shared Accountability HF pilot

• *Health Pathway creation for stages of HF (A-D, prevention to end stage disease) across all sites of care*
Summary

1. Recognizing HFrEF compared to HFpEF is important, as their treatments differ

2. HFpEF or “Diastolic HF” has been difficult to understand

3. Decompensations lead to hospitalizations; understand principles of management

4. Intermountain is doing a lot to improve HF care....utilize existing tools & stay tuned for future developments
Thank You!

Questions?