Objectives

- Identify the similarities and differences between CHF associated with left ventricular systolic dysfunction (HFrEF) and CHF associated with preserved left ventricular dysfunction (HFpEF)
- Identify causes of CHF
- Become familiar with management strategies for CHF
- Become familiar with strategies to reduce hospital readmissions due to CHF both globally and locally
I have no disclosures
Heart failure is a clinical condition in which the heart is unable to adequately circulate the blood to the body's tissues.

- Diastolic heart failure
- Systolic heart failure
NYHA Classes

- **I**
  - Cardiac disease, but no symptoms and no limitation in ordinary physical activity, e.g. no shortness of breath when walking, climbing stairs etc.

- **II**
  - Mild symptoms (mild shortness of breath and/or angina) and slight limitation during ordinary activity.

- **III**
  - Marked limitation in activity due to symptoms, even during less-than-ordinary activity, e.g. walking short distances (20–100 m). Comfortable only at rest.

- **IV**
  - Severe limitations. Experiences symptoms even while at rest. Mostly bedbound patients.
Stages of CHF

**At Risk for Heart Failure**

**Stage A**
- At high risk for HF, but without structural heart disease or symptoms of HF
  - e.g.: Patients with:
    - hypertension
    - atherosclerotic disease
    - diabetes
    - obesity
    - metabolic syndrome
    - Patients:
      - using cardiotoxins
      - with FHx CM

**THERAPY GOALS**
- Treat hypertension
- Encourage smoking cessation
- Treat lipid disorders
- Encourage regular exercise
- Disourage alcohol intake, illicit drug use
- Control metabolic syndrome

**DRUGS**
- ACEI or ARB in appropriate patients for vascular disease or diabetes

**Stage B**
- Structural heart disease, but without signs or symptoms of HF
  - e.g.: Patients with:
    - previous MI
    - LV remodeling including LVH and low EF
    - asymptomatic valvular disease

**THERAPY GOALS**
- All measures under Stage A
- ACEI or ARB in appropriate patients
- Beta-blockers in appropriate patients

**Stage C**
- Structural heart disease with prior or current symptoms of HF
  - e.g.: Patients with:
    - known structural heart disease and
    - shortness of breath and fatigue, reduced exercise tolerance

**THERAPY GOALS**
- All measures under Stages A and B
- Dietary salt restriction
- Diuretics for fluid retention
- ACEI
- Beta-blockers

**DRUGS FOR ROUTINE USE**
- Aldosterone antagonists
- ARBs
- Digitalis
- Hydralazine/nitrates

**DEVICES IN SELECTED PATIENTS**
- Biventricular pacing
- Implantable defibrillators

**Stage D**
- Refractory HF requiring specialized interventions
  - e.g.: Patients who have marked symptoms at rest despite maximal medical therapy (e.g., those who are recurrently hospitalized or cannot be safely discharged from the hospital without specialized interventions)

**THERAPY GOALS**
- Appropriate measures under Stages A, B, C
- Decision re: appropriate level of care

**OPTIONS**
- Compassionate end-of-life care/hospice
- Extraordinary measures - heart transplant
- - chronic inotropes
- - permanent mechanical support
- - experimental surgery or drugs
**Symptoms**

- **DIASTOLIC**
  - Shortness of breath, tachypnea
  - Frequent coughing, PND, and orthopnea
  - Leg, ankle, feet swelling

- **SYSTOLIC**
  - Shortness of breath
  - Frequent coughing, PND, and orthopnea
  - Swollen feet, ankles, and legs
  - Abdominal swelling
  - Fatigue
  - Dizziness, syncope
  - Sudden cardiac death
COMMON CAUSES

- Coronary artery disease and heart attack
- Cardiomyopathy
- High blood pressure (hypertension)
- Valvular heart disease
- Arrhythmias
- Congenital heart disease
- Alcohol, drug use
Treatment – Lifestyle changes

- Monitored modified exercise program
- Dietary sodium monitoring and restriction
- Fluid intake monitoring
- Weight monitoring
- Daily symptoms assessment
CLINICAL ASSESSMENT - REASONS TO CALL

- Weight gain 2 pounds in one day or 5 pounds in one week
- Progressive swelling in legs/feet/abdomen.
- Shortness of breath / exertional dyspnea
- Pulse and/or blood pressure abnormalities
- Difficulty lying flat / sleeping in chair
- Increased fatigue / tiredness
- Progressive cough, especially with pink, frothy or bloody sputum
- New or sudden chest pain / discomfort
Treatment - Pharmacologic

- Medications
  - ACE inhibitor or ARB
  - Beta blocker
  - Diuretics
  - Aldosterone inhibitor
  - Nitrates
  - *Ivabradine (Corlanor)
  - *Sacubitril/Valsartan (Entresto) – combination ARNI/ARB
Ivabradine (Corlanor) IIa, B-R

- Sinoatrial node modulator used to decrease heart rate in patients on target therapy with beta blockers, intolerant to beta blockers.
- In addition to optimal medical therapy
- Increased risk of development of atrial fibrillation
- Can be beneficial to reduce HF hospitalization for patients with symptomatic NYHA Class II-III stable chronic HF rEF (LVEF ≤ 35%) who are in Sinus Rhythm with a HR > 70.
- Contraindicated in patients with ADHF, BP < 90/50, sick sinus syndrome, AV block, resting sinus bradycardia, severe hepatic impairment, concomitant strong cytochrome P450 3A4 inhibitors
### Dose Adjustments of Ivabradine Based on Resting Heart Rate

<table>
<thead>
<tr>
<th>Heart Rate</th>
<th>Dose Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 60 bpm</td>
<td>Increase dosage by 2.5 mg twice daily up to a maximum dosage of 7.5 mg twice daily.</td>
</tr>
<tr>
<td>50 to 60 bpm</td>
<td>Maintain dosage.</td>
</tr>
<tr>
<td>Less than 50 bpm or signs and symptoms of bradycardia</td>
<td>Decrease dosage by 2.5 mg twice daily; if current dosage is 2.5 mg twice daily, discontinue therapy.</td>
</tr>
</tbody>
</table>
Systolic Heart failure treatment with the I_f inhibitor ivabradine Trial (SHIFT): a randomised placebo-controlled study

:Objective

SHIFT tested the effect of heart rate reduction with Corlanor® in patients with chronic HF.¹

:Study design

SHIFT was an international, multicenter, randomized, double-blind, placebo-controlled outcomes study with a median duration of 22.9 months (N = 6,505)¹

Inclusion criteria included stable chronic systolic HF for ≥ 4 weeks, in sinus rhythm, NYHA class II to IV, with a reduced LVEF (≤ 35%), a resting heart rate ≥ 70 bpm, and hospitalization for worsening HF within 12 months¹
Primary endpoint  SHIFT TRIAL

For patients with stable, symptomatic chronic HF with LVEF ≤ 35% and in sinus rhythm with resting heart rate ≥ 70 bpm:

Corlanor® significantly reduced the relative risk of hospitalization for worsening HF or CV death$^{1,2}$

• Composite endpoint result reflected only a reduction in the risk of hospitalization for worsening HF with no favorable effect on CV death

TIME TO FIRST EVENT OF PRIMARY COMPOSITE ENDPOINT (RANDOMIZED SET)

Secondary endpoint

Corlanor® reduced the relative risk of hospitalization for worsening HF by 26% (4.7% ARR)$^{1,2}$
2016 Update to AHA/ACC 2013 Guidelines for the Management of CHF

Sacubitiril/valsartan (Entresto) I, B-R

- ARNI – angiotensin receptor blocker plus neprilysin inhibitor
  Inhibition of neprilysin increases levels of natriuretic peptides, bradykinin, and adrenomedullin, thus resulting in natriuresis and vasodilatation.

- Indicated for patients with chronic symptomatic HFrEF NYHA Class II or III who tolerate an ACE or ARB, replacement with an ARNI is recommended to further reduce mortality and morbidity.

- In addition or optimal medical therapy, cannot be used simultaneously with solo ACE or ARB (36 hour wash out) or aliskiren (Tekturna)

- Adverse effects include hypotension, impaired renal function/progressive azotemia, angioedema, hyperkalemia, cough, dizziness

- Dose adjustment for severe renal impairment eGFR <30, and moderate hepatic impairment
### Dosing

Choose initial dose of ENTRESTO™ based on current treatment and titrate to the target dose.

Dosing in clinical trials was based on the total amount of both components of ENTRESTO (sacubitril/valsartan); 24/26 mg, 49/51 mg, and 97/103 mg were referred to as 50 mg, 100 mg, and 200 mg, respectively.

<table>
<thead>
<tr>
<th>Angiotensin-converting enzyme inhibitor (ACEi)</th>
<th>Stop ACEi 36 hours before starting ENTRESTO</th>
<th>Start ENTRESTO at the recommended dose of 49/51 mg twice daily</th>
</tr>
</thead>
</table>
| Patients receiving a total daily dose of >10 mg of enalapril or therapeutically equivalent doses of another ACEi, for example:  
  - Lisinopril >10 mg  
  - Ramipril >5 mg |                                               |                                                           |
|Patients receiving a total daily dose of ≤10 mg of enalapril or therapeutically equivalent doses of another ACEi, for example:  
  - Lisinopril ≤10 mg  
  - Ramipril ≤5 mg |                                               |                                                           |

<table>
<thead>
<tr>
<th>Angiotensin II receptor blocker (ARB)</th>
<th>Start ENTRESTO at the recommended dose of 49/51 mg twice daily</th>
</tr>
</thead>
</table>
| Patients receiving a total daily dose of >160 mg of valsartan or therapeutically equivalent doses of another ARB, for example:  
  - Losartan >50 mg  
  - Olmesartan >10 mg |                                                |
|Patients receiving a total daily dose of ≤160 mg of valsartan or therapeutically equivalent doses of another ARB, for example:  
  - Losartan ≤50 mg  
  - Olmesartan ≤10 mg |                                                |

| Not on ACEi or ARB | Start ENTRESTO at the recommended dose of 24/26 mg twice daily |
|-------------------|------------------------------------------------|---------------|
|                   |                                               |               |

Double the dose of ENTRESTO after 2 to 4 weeks, as tolerated by the patient, to reach the target maintenance dose of 97/103 mg twice daily.
The goal of the trial was to evaluate treatment with the combined angiotensin-receptor blocker (valsartan)/neprilysin inhibitor (sacubitril) LCZ696 compared with enalapril among participants with heart failure due to reduced ejection fraction (EF).

20% Reduced risk of CV death or HF Hospitalization as first event vs enalapril

4.7% Absolute risk reduction
Treatment - Mechanical

- Biventricular ICD
- Left Ventricular Assist Device
- Heart Transplantation
WHY IS THIS IMPORTANT?
1. Cost % 39 Billion/annually
2. 2nd most expensive chronic disease to Medicare

1. Center for Disease Control and Prevention, 2013
Background

- CHF incidence approximately 5.7 million in US
- CHF hospital admissions as primary diagnosis is approximately 1 million; as much as 3 million for primary or secondary admission diagnosis nationwide.
- Estimated 20-25% of Medicare beneficiaries discharged from a hospital are readmitted with 30 days.
- Medicare Payment Advisory Commission estimated annual cost of unplanned readmissions for CHF is $17.4 billion
- CMS guidelines has decreased or declined reimbursement or added penalties for patient readmitted within 30 days.
Preventing Heart Failure Readmissions: Is Your

Tackling Heart Failure Readmission

Preventing Heart Failure Readmission and Progression
What Does the Future Hold?

Moderator
Ileana L. Piña, MD, MPH
Professor of Medicine & Epidemiology and Population Health
Albert Einstein College of Medicine
Associate Chief for Academic Affairs
Montefiore Einstein Center
Bronx, New York

Effect of Nesiritide in Patients with Acute Decompensated Heart Failure
Top Five Reasons for HF Hospital Readmissions

- Patients may not fully understand what’s wrong with them
- Patient Non-adherence to medical regimen (diet, medications)
- Patients may be confused over which medications to take
- Patients do not have a primary medical provider
- Patients do not schedule a follow up appointment with their doctor
- Family members lack proper knowledge to provide adequate care
Strategies used to Reduce Readmission in Patients with CHF

- Access to care improvement
- Telephone intervention / Telemonitoring
- In-hospital identification / tracking with in-patient education efforts
- In-hospital multidisciplinary management
- Structured hospital-based CHF clinics
- Self-management education / strategies
- Disease Management programs
- Transitional care interventions
Ten Points to Remember

1. Transitions of care in HF refer to individual interventions and programs with multiple activities that are designed to improve shifts or transitions from one setting to the next, usually hospital to home.

2. After patient characteristics were controlled for in multivariate regression analysis, three hospital-based factors remained important predictors of 30-day hospital readmissions: evaluation of left ventricular function, smoking cessation, and HF admissions per year.

3. There are eight common components to disease management programs after hospital discharge for HF: telephone follow-up, education, self-management, weight monitoring, sodium restriction or dietary advice, exercise recommendations, medication review, and social and psychological support.
AHA Statement on Transitions of Care in Heart Failure

4. Post-discharge care was separated into clinic care (physician office with nurses primarily managing HF medications), multidisciplinary care (multiple services by multiple care providers), and case management models (transition care programs aimed at early, intense post-discharge monitoring).

5. Compared with usual care, clinic care models failed to reduce rehospitalization and mortality, but case management improved late mortality (≥6 months after discharge). Case management and multidisciplinary care programs improved early (within 6 months) and later HF rehospitalization and all-cause rehospitalization.

6. The role of the person directing interventions most commonly was a nurse. Patient education involved teaching principles about HF such as diet, signs and symptoms of HF, self-care expectations, and medication counseling and education.
AHA Statement on Transitions of Care in Heart Failure

7. Most programs had a first telephone call follow-up post-discharge within 48 to 72 hours and most follow-up appointments were within 7-10 days post-discharge. In one report reviewed, 46% of patients had problems in understanding and complying with diet and self-care needs.

8. Efficient handoff communications to outpatient healthcare providers must be improved for more effective medication reconciliation and follow-up care.

9. Optimal transitions can decrease rates of rehospitalization, risk for adverse clinical events, and promote patient satisfaction.

10. HF programs should consider implementing principles of transition of care in high-risk patients with chronic HF.
UNIVERSITY OF MARYLAND AT UPPER CHESAPEAKE HEALTH

WHAT ARE WE DOING ABOUT THIS DILEMMA?
Comprehensive CARE Center: CHF Program

Role of the CHF Management Clinic

Started November 9, 2015

- To have a multi-disciplinary team manage CHF patients medical and social care for 30 days in the CARE Center
- Transition patients in 30 days back to their PCP’s and cardiologists in the community
- Prevent / Reduce 30 day re-admissions
- Decrease symptoms; Improve quality of life
- Decrease mortality
- Provide assistance with advanced directives / palliative care referral
Comprehensive CARE Center: CHF Program

- Centered around a chronic medical condition
- Operated by an integrated and multidisciplinary team
- Deliver care in line with evidence-based guidelines
- Educate patients and families about their condition / disease
- Map out processes for transitions of care
- Partner with resources in the community
- Define, measure and follow meaningful metrics
Comprehensive CARE Center: CHF Program

- In-Patient Transitional Nurse Navigators (TNN)
- ED Nurse Navigator
- Outpatient TNN

Contact the patient at the point of impact and transition the care to the outpatient setting utilizing collaboration and care coordination principles.

Modified LACE score (LOS, Acuity, Comorbidities, ER visits)
Comprehensive CARE Center: CHF Program

Team

- NP/MD – provides medical care, prescriptions, referrals, communicate with HH

- Nurse Care manager – disease, medication, and diet education; telephone contact, care coordination

- Social Worker – assess barriers to care, coordinate community resources (PCP, insurance, transportation, etc), counseling and depression screening

Work collaboratively with patient, families, and community resources to develop and implement a care plan.

The patient is included in the care plan development process to promote self-care strategies.
Comprehensive CARE Center: CHF Program

Consider Consultation For:

- Newly diagnosed Cardiomyopathy (CM) with EF ≤ 40%
- Known chronic CM with new cardiac issues such as Afib with RVR or ischemia
- Known CM with CHF exacerbation and high risk for 30 day re-admission
- Known CM but no recent cardiac evaluations (> one year)
- Known CM not responding to usual treatment
- CHF with preserved systolic function at high risk for 30 day re-admission
- 2nd CHF admission within 30 days
- Three or more admissions for CHF in six months
- Three or more chronic diagnoses that require management or education
- No PCP or Cardiologist (i.e. recent relocation)
- Would benefit from palliative care consultation, family meeting, care coordination from multiple disciplines
Conclusions

- HF is a prevalent condition with significant morbidity, mortality, and cost to the healthcare system.
- HF readmissions are common and frequency predicts survival.
- The majority of reasons for HF readmissions are related to non-compliance and therefore is modifiable.
- Most readmissions can be impacted by a multidisciplinary team approach.
- Disease management programs can reduce HF readmissions and should be utilized to target high-risk patient populations.
Questions?

THANK YOU!