Disclosure: Investigator in industry sponsored trials by Novartis
Update in the Management of Chronic Heart Failure

Family Medicine Grand Rounds
November 14, 2017

Arunima Misra, MD
Baylor College of Medicine
Harris Health System
OBJECTIVES

- Demographics
- Diagnosis
- Treatment
- Referrals
- Review
• HF prevalence has increased from 5.7 million (2009 to 2012) to 6.5 million (2011 to 2014) in Americans ≥20 years of age
• Five-year survival of HF diagnosis after an MI has also improved in 2001 to 2010 versus 1990 to 2000, from 54% to 61%
• Of incident hospitalized HF events, 53% had HF with reduced ejection fraction and 47% had preserved ejection fraction. Black males had the highest proportion of hospitalized HF with reduced ejection fraction (70%); white females had the highest proportion of hospitalized HF with preserved ejection fraction (59%)
• Projections show prevalence will increase by 46% from 2012 to 2030 resulting in more than 8 million people 18 years of age and older with HF
• YOU WILL BE SEEING THESE PATIENTS!
<table>
<thead>
<tr>
<th>ACCF/AHA Stages of HF (37)</th>
<th>NYHA Functional Classification (38)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A At high risk for HF but without structural heart disease or symptoms of HF</td>
<td>None</td>
</tr>
<tr>
<td>B Structural heart disease but without signs or symptoms of HF</td>
<td>I No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF.</td>
</tr>
<tr>
<td>C Structural heart disease with prior or current symptoms of HF</td>
<td>I No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF. II Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in symptoms of HF. III Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes symptoms of HF. IV Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest.</td>
</tr>
<tr>
<td>D Refractory HF requiring specialized interventions</td>
<td>IV Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest.</td>
</tr>
</tbody>
</table>

**HF Classification**
## Approach to the Classification of Heart Failure

<table>
<thead>
<tr>
<th>Stage</th>
<th>Patient Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>High risk for developing heart failure (HF)</td>
</tr>
<tr>
<td></td>
<td>• Hypertension</td>
</tr>
<tr>
<td></td>
<td>• CAD</td>
</tr>
<tr>
<td></td>
<td>• Diabetes mellitus</td>
</tr>
<tr>
<td></td>
<td>• Family history of cardiomyopathy</td>
</tr>
<tr>
<td>B</td>
<td>Asymptomatic HF</td>
</tr>
<tr>
<td></td>
<td>• Previous MI</td>
</tr>
<tr>
<td></td>
<td>• LV systolic dysfunction</td>
</tr>
<tr>
<td></td>
<td>• Asymptomatic valvular disease</td>
</tr>
<tr>
<td>C</td>
<td>Symptomatic HF</td>
</tr>
<tr>
<td></td>
<td>• Known structural heart disease</td>
</tr>
<tr>
<td></td>
<td>• Shortness of breath and fatigue</td>
</tr>
<tr>
<td></td>
<td>• Reduced exercise tolerance</td>
</tr>
<tr>
<td>D</td>
<td>Refractory end-stage HF</td>
</tr>
<tr>
<td></td>
<td>• Marked symptoms at rest despite maximal medical therapy (eg, those who are recurrently hospitalized or cannot be safely discharged from the hospital without specialized interventions)</td>
</tr>
</tbody>
</table>
### Why is Stage A Important

<table>
<thead>
<tr>
<th>Stage A</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hypertension and lipid disorders should be controlled in accordance with contemporary guidelines to lower the risk of HF</td>
</tr>
<tr>
<td>• Other conditions that may lead to or contribute to HF, such as obesity, diabetes mellitus, tobacco use, and known cardiotoxic agents, should be controlled or avoided.</td>
</tr>
</tbody>
</table>

### Target Treatment Earlier to Prevent HF
- Make patients aware of the importance of goals of therapy for HTN, DM
- Catch CAD earlier if pt has symptoms or has RF, treat RF such as HLD, HTN and DM more aggressively
- Screen for HF using BNP

### Provide or Reinforce Lifestyle Interventions: Diet, Exercise, Weight Loss, and Smoking Cessation!!
Hypertension

- Nearly one fourth of the adult population of the U.S. has hypertension and (BP) lowering in patients with hypertension produces robust reductions in cardiovascular risk.
- The <140/90 mm Hg BP target is reasonable in patients with hypertension and CAD. A lower target BP of <130/80 mm Hg may be appropriate in some individuals with CAD or those with previous myocardial infarction (MI), stroke, or transient ischemic attack, or CAD risk equivalents (carotid artery disease, peripheral arterial disease, or abdominal aortic aneurysm). New goal in new guidelines.
- A BP goal of <150/90 mm Hg is recommended in those who are >80 years of age. Target of <140/90 mm Hg for the 65- to 79-year age group.
- Decreases in diastolic BP <60 mm Hg should be made with caution in any patient with diabetes mellitus or who is >60 years of age.
What treatment to use

- Beta-blockade in those patients with angina, prior MI, or heart failure with reduced ejection fraction.
- Angiotensin-converting enzyme inhibitor or angiotensin-receptor blocker if there is prior MI, left ventricular systolic dysfunction, diabetes mellitus, or chronic kidney disease.
- Thiazide or thiazide-like diuretic may be also added.
- Drugs to avoid in patients with hypertension and HF with reduced ejection fraction: non-dihydropyridine calcium channel blockers (such as verapamil or diltiazem), clonidine, and hydralazine without a nitrate.
- Avoid hypotension.
• Diet modification
• HgbA1C <7%
• Avoid hypoglycemia
• Contraindicated meds in HF: only if concomitant significant renal failure, then avoid metformin, sulfonylureas and -floxins
• Empagliflozin shows improved cardiovascular and total mortality, and decreased hospitalization for heart failure in high risk patients

Goals for DM Treatment to Prevent CV Disease

### Treatment of Stage B

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>In patients with a history of MI and reduced EF, ACE inhibitors or ARBs should be used to prevent HF</td>
<td>I</td>
</tr>
<tr>
<td>In patients with MI and reduced EF, evidence-based beta blockers should be used to prevent HF</td>
<td>I</td>
</tr>
<tr>
<td>In patients with MI, statins should be used to prevent HF</td>
<td>I</td>
</tr>
<tr>
<td>Blood pressure should be controlled to prevent symptomatic HF</td>
<td>I</td>
</tr>
<tr>
<td>ACE inhibitors should be used in all patients with a reduced EF to prevent HF</td>
<td>I</td>
</tr>
<tr>
<td>Beta blockers should be used in all patients with a reduced EF to prevent HF</td>
<td>I</td>
</tr>
<tr>
<td>An ICD is reasonable in patients with asymptomatic ischemic cardiomyopathy who are at least 40 d post-MI, have an LVEF ≤30%, and on GDMT</td>
<td>IIa</td>
</tr>
<tr>
<td>Nondihydropyridine calcium channel blockers may be harmful in patients with low LVEF</td>
<td>III: Harm</td>
</tr>
</tbody>
</table>
Patients with suspected, acute, or new-onset HF should undergo a chest x-ray

A 2-dimensional echocardiogram with Doppler should be performed for initial evaluation of HF

Repeat measurement of EF is useful in patients with HF who have had a significant change in clinical status or received treatment that might affect cardiac function or for consideration of device therapy

Noninvasive imaging to detect myocardial ischemia and viability is reasonable in HF and CAD

Viability assessment is reasonable before revascularization in HF patients with CAD

Radionuclide ventriculography or MRI can be useful to assess LVEF and volume

MRI is reasonable when assessing myocardial infiltration or scar

Routine repeat measurement of LV function assessment should not be performed
<table>
<thead>
<tr>
<th>Classification</th>
<th>EF (%)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Heart failure with reduced ejection fraction (HFrEF)</td>
<td>≤40</td>
<td>Also referred to as systolic HF. Randomized controlled trials have mainly enrolled patients with HFrEF, and it is only in these patients that efficacious therapies have been demonstrated to date.</td>
</tr>
<tr>
<td>II. Heart failure with preserved ejection fraction (HFrEF)</td>
<td>≥50</td>
<td>Also referred to as diastolic HF. Several different criteria have been used to further define HFrEF. The diagnosis of HFrEF is challenging because it is largely one of excluding other potential noncardiac causes of symptoms suggestive of HF. To date, efficacious therapies have not been identified.</td>
</tr>
<tr>
<td>a. HFrEF, borderline</td>
<td>41 to 49</td>
<td>These patients fall into a borderline or intermediate group. Their characteristics, treatment patterns, and outcomes appear similar to those of patients with HFrEF.</td>
</tr>
<tr>
<td>b. HFrEF, improved</td>
<td>&gt;40</td>
<td>It has been recognized that a subset of patients with HFrEF previously had HFrEF. These patients with improvement or recovery in EF may be clinically distinct from those with persistently preserved or reduced EF. Further research is needed to better characterize these patients.</td>
</tr>
</tbody>
</table>

EF indicates ejection fraction; HF, heart failure; HFrEF, heart failure with preserved ejection fraction; and HFrEF, heart failure with reduced ejection fraction.
Suspected Heart Failure because of SYMPTOMS and/or SIGNS

Assess presence of CARDIAC DISEASE by ECG, CXR and BNP
And
VENTRICULAR FUNCTION Imaging by ECHO Doppler (preferred), Nuclear angiography or MRI if available

Tests abnormal

Heart Failure: (Reduced or Preserved)
Identify etiology, evaluate severity, choose therapy

ESC HF guidelines 2001, modified from AHA
• Identify heart disease and RF for cardiac disease
• Assess functional capacity (NYHA Class, 6 min walk, or other)
• Assess volume status: (edema, rales, JVP, hepatomegaly, body weight)
• Lab assessment: routine: electrolytes, renal function, BNP, repeat ECHO, RX only if significant changes in functional status
• Assess prognosis

Initial and Ongoing Diagnosis
Case 1

• 71 yo man with obesity, HTN, DM, paroxysmal afib, HIV presents with DOE. He denies CP, orthopnea, PND. Has some edema. No SOB at rest; only when he goes up stairs or lifts something heavy.
Physical Exam

- **Vitals**: HR 85 BP 119/75 mm Hg
- **Cardiovascular**: Irregular rhythm. S1 and S2, no S3 or S4. No murmur noted
- **Respiratory**: CTAB.
- **GI**: Soft, nontender, nondistended, bowel sounds present
- **Extremities**: +1-2 pitting edema BLE left more than right
- Sodium 142
- Potassium 4.0
- Chloride 102
- CO2 30.5
- Urea Nitrogen 24 (H)
- Creatinine 1.43 (H)
- Glucose 156 (H)
- Hgb A1c 6.7 (H)
- TSH 2.02
- BNP 327 (H)
ECG
EC HO
HFpEF

- Not well studied
- Prevalence and morbidity and mortality similar to HFrEF
- Therapies for HFrEF may prevent further decline in EF or clinical status
- No positive RCT to support use of any pharmacotherapy (neg trials including nitrates, phosphodiesterase inhibitors, spironolactone)
- Management includes control of comorbid conditions such as hypertension, CAD, DM, CKD, etc.
• Evaluate for CAD and treat
• If atrial fibrillation, control rhythm or rate
• Use of BB or ACEI/ARB is reasonable for BP control

In select patients with HFpEF (with EF ≥45%, elevated BNP levels or HF admission within 1 year, GFR>30 mL/min, creat <2.5 mg/dL, K <5.0 mEq/L), aldosterone receptor antagonists might be considered to decrease hospitalizations.

• Use of ARBs might be considered to decrease hospitalizations for patients with HFpEF.
• Did nuclear stress test that showed scar in RCA territory: he did not want cath (unclear if SOB is angina since improved with nitrates)

• Meds:
  • Metoprolol succinate 25 mg daily
  • Furosemide 80 mg daily
  • Not on ACEI/ARB or spironolactone
  • Isosorbide mononitrate 30 mg daily
  • On Doxazosin (for BPH and not willing to change)
  • DM meds
  • HLD meds
  • Potassium
  • HIV meds
Case 2
58yo male w/ HTN now presents with 1 week history of worsening SOB and cough productive of clear and blood-tinged sputum associated with BLE edema.

- PMH: HTN
- FH: not reported
• **BP 186/128 | Pulse 104 | Temp(Src) 98.4 °F (36.9 °C) | Resp 30 | SpO2 97%**

• Cardiovascular: Regular rhythm, normal heart sounds and intact distal pulses. **Tachycardia** present. Exam reveals no gallop and no friction rub. No murmur heard.

• Pulmonary/Chest: **Tachypnea** noted. He is in **respiratory distress**. He has no wheezes. He has **rales** in the right lower field and the left lower field. He exhibits no tenderness.

• Abdominal: Soft. Bowel sounds are normal. He exhibits no distension. There is no tenderness. There is no rebound and no guarding.

Musculoskeletal: Normal range of motion. He exhibits edema (**1+ BLE**). He exhibits no tenderness.

**Physical**
<table>
<thead>
<tr>
<th>Rate</th>
<th>105</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR</td>
<td>184</td>
</tr>
<tr>
<td>QRS</td>
<td>150</td>
</tr>
<tr>
<td>QT</td>
<td>393</td>
</tr>
<tr>
<td>QTc</td>
<td>454</td>
</tr>
</tbody>
</table>

Possible left atrial enlargement

Electronically signed on 03-05-14 20:25:28 CST by Nasser Lakkis, M.D.

Abnormal ECG

Confirmed by: Nasser Lakkis, M.D. 03/06/2014 20:26:28

ECG
LABS

- BNP: 930
- HgbA1C: 6.1%
- Cholesterol: 179
- Triglyceride: 117
- HDL: 43
- LDL: 113
- TSH: 2.02
- Sodium: 145
- Potassium: 3.9
- Chloride: 106
- CO2: 31
- Urea Nitrogen: 24 (H)
- Creatinine: 1.9 (H)
- Glucose: 84
• 32-amino acid protein that is secreted by the ventricles in response to ↑ wall stress
• Levels >100 pg/mL are considered abnormal; usually >>150 in heart failure
• Systolic HF >>>>> Diastolic HF
• ↑ in women compared to men
• May be ↓ in obesity
• Initially used in ER setting to improve identification of HF as cause of SOB (Breathing Not Properly study)
How to Use BNP
Echo
• Etiology is important: either need nuclear stress test, dobutamine stress echo or cardiac catheterization especially in patients who have risk factors for CAD

• Etiologies that are reversible include valvular disease, thyroid disease, some infiltrative diseases

• REFER to cardiologist sooner than later
• IMPRESSIONS
  No evidence of ischemia or infarction. Reduced left ventricular function with ejection fraction of 44%. Dilated LV.
Eligible for revascularization are HF patients presenting with:
- angina or significant ischemia (Class I)
- Chest pain (Class IIa)
- Known or suspected CAD (Class IIa)
What Stage of HF is our patient

A • At high risk for heart failure, but no structural heart disease

B • Evidence of structural heart disease, but asymptomatic

C • Structural heart disease with prior or current heart failure symptoms

D • Refractory heart failure requiring specialized interventions

What Stage of HF is our patient
“I get SOB walking from the elevator to the clinic”

- I: Experience symptoms at levels of exertion that would limit normal individuals
- II: Symptoms with ordinary exertion
- III: Symptoms with less than ordinary exertion
- IV: Symptoms at rest

NYHA Functional Class
Survival
Morbidity
Exercise capacity
Quality of life
Neurohormonal changes
Progression of CHF
Symptoms

**Treatment Objectives**
### Treatment

#### For All HF Patients
- Control of risk factors
- Lifestyle modification
- Treat etiologic cause / comorbid conditions
- Drug therapy
- Personal care
- Team work

#### For Select Patients
- Revascularization for obstructive CAD
- ICD (Implantable Cardiac Defibrillator)
- Cardiac resynchronization
- Ventricular assist devices
- Heart transplant
- Artificial heart
- Neoangiogenesis, Gene therapy (experimental)
Pharmacologic Therapy

- ACE inhibitors
- ARBs
- Beta blockers
- Diuretics
- Spironolactone
- Hydralazine/Nitrates
- Neprolysin/ARB (ARNIs)
- Ivabradine
- Digoxin?
Neurohormonal Activation

Renin → Angiotensinogen → Angiotensin I → Angiotensin II → Aldosterone → ACE enzyme

ACE INHIBITORS
- ARB
- SPIRONO

β-BLOCKERS

Vasoconstriction ↑ Catecholamines
Sodium retention Cardiac fibrosis

BETA-BLOCKERS
How neprilysin or sacubitril works along with valsartan

June 2016 Br J Cardiol 2016;23(suppl 1):S1–
How Ivabradine works

Blocks the If current and lowers heart rate at the SA node level
<table>
<thead>
<tr>
<th>Medication</th>
<th>Initial Dose</th>
<th>Goal Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enalapril</td>
<td>2.5 mg daily</td>
<td>10 – 20 mg bid</td>
</tr>
<tr>
<td>Lisinopril</td>
<td>2.5 – 5 mg daily</td>
<td>20-40 mg daily</td>
</tr>
<tr>
<td>Captopril</td>
<td>6.25 mg tid</td>
<td>Up to 50 mg tid</td>
</tr>
</tbody>
</table>

Main side effects: cough, hyperkalemia and serious angioedema; not to use in pregnancy

ACE Inhibitors
<table>
<thead>
<tr>
<th>Medication</th>
<th>Properties</th>
<th>Initial Dose</th>
<th>Goal Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carvedilol</td>
<td>β₁β₂ Vasodilatory Antioxidant</td>
<td>3.125 mg bid</td>
<td>25 mg bid if &gt;85 kg</td>
</tr>
<tr>
<td>Metoprolol XL®</td>
<td>β₁</td>
<td>12.5 mg daily</td>
<td>200 mg daily</td>
</tr>
<tr>
<td>Bisoprolol</td>
<td></td>
<td>1.25 mg daily</td>
<td>10 mg daily</td>
</tr>
</tbody>
</table>

Main side effects: fatigue, bradycardia, sexual dysfunction

**Beta-Blockers**
Angiotensin Receptor Blockers (ARBs)

- Indicated in patients who are intolerant of ACE inhibitors due to cough (or angioedema).
- Valsartan and Candesartan have been most studied in HF.
- Patients who develop angioedema with ACE inhibitors may have a similar response to ARBs although uncommon.

<table>
<thead>
<tr>
<th></th>
<th>Losartan</th>
<th>12.5 - 25 mg</th>
<th>150 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valsartan</td>
<td>40 mg BID</td>
<td>160 mg BID</td>
<td></td>
</tr>
<tr>
<td>Candesartan</td>
<td>4-8 mg</td>
<td>32 mg</td>
<td></td>
</tr>
</tbody>
</table>
• **Sprinolactone:**
  - Side Effects: Hyperkalemia, Gynecomastia, Impotence, Oligomenorhea (due to androgen / progesterone receptor binding)

• **Eplerenone:**
  - EF <40%, CHF AFTER MI
  - Side effects: Hyperkalemia

<table>
<thead>
<tr>
<th>Spironolactone</th>
<th>GFR &gt; 50</th>
<th>12.5-25 mg</th>
<th>25 mg (50 mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GFR 31-49</td>
<td>12.5 mg QD OR QOD</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eplerenone</th>
<th>GFR &gt; 50</th>
<th>25 mg</th>
<th>50 mg (100 mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GFR 31-49</td>
<td>25 mg QOD</td>
<td></td>
</tr>
</tbody>
</table>
- May be used in patient who cannot take an ACE inhibitor or ARB such as hyperkalemia (Class IIb)

- A-Heft Trial:
  - African-Americans with HF were randomized to conventional therapy +/ - this combination (Class IIa)

<table>
<thead>
<tr>
<th>Isosorbide dinitrate plus hydralazine</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Without ACE-I/ARB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isosorbide dinitrate</td>
<td>10-20 mg QID</td>
<td>40 mg QID</td>
</tr>
<tr>
<td>Hydralazine</td>
<td>10-25 mg QID</td>
<td>75 mg QID</td>
</tr>
<tr>
<td>With ACE-I/ARB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isosorbide dinitrate</td>
<td>10-20 mg 3 TID</td>
<td>40 mg TID</td>
</tr>
<tr>
<td>Hydralazine</td>
<td>10-25 mg 3 TID</td>
<td>75 mg TID</td>
</tr>
</tbody>
</table>

**Nitrates / Hydralazine**

A-Heft: NEJM 351:2049-57, 2004
• Can use in patients who remain symptomatic on standard therapy of BB, ACEI/ARB and aldosterone antagonist
• Must use **INSTEAD** of ACEI or ARB **not** in addition to
• Contraindication in patients with **angioedema**
• Must wait 36hrs for ACEI to washout to avoid risk of angioedema

| ARNI     | 24mg/ 26mg bid | 97mg/ 103mg bid |

Sacubitril/ Valsartan
- HF readmissions occur more commonly in patients with HR >70
- Can use this SA nodal blocking agent in the setting of HR that is high even after tolerated BB dose has been optimized
- Has prospective data compared to digoxin with retrospective data

<table>
<thead>
<tr>
<th>Ivabradine</th>
<th>2.5 mg bid</th>
<th>7.5 mg bid</th>
</tr>
</thead>
</table>

Ivabradine
<table>
<thead>
<tr>
<th>Evidence-Based Therapy</th>
<th>Relative Risk Reduction in All-Cause Mortality in Pivotal Randomized Clinical Trial(s), %</th>
<th>NNT to Prevent All-Cause Mortality Over Time</th>
<th>NNT for All-Cause Mortality&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACEI/ARB</td>
<td>17</td>
<td>22 over 42 mo</td>
<td>77</td>
</tr>
<tr>
<td>ARNI&lt;sup&gt;b&lt;/sup&gt;</td>
<td>16</td>
<td>36 over 27 mo</td>
<td>80</td>
</tr>
<tr>
<td>β-Blocker</td>
<td>34</td>
<td>28 over 12 mo</td>
<td>28</td>
</tr>
<tr>
<td>Aldosterone antagonist</td>
<td>30</td>
<td>9 over 24 mo</td>
<td>18</td>
</tr>
<tr>
<td>Hydralazine/nitrate</td>
<td>43</td>
<td>25 over 10 mo</td>
<td>21</td>
</tr>
<tr>
<td>CRT</td>
<td>36</td>
<td>12 over 24 mo</td>
<td>24</td>
</tr>
<tr>
<td>ICD</td>
<td>23</td>
<td>14 over 60 mo</td>
<td>70</td>
</tr>
</tbody>
</table>

<sup>a</sup> Standardized to 12 months.

<sup>b</sup> Benefit of ARNI therapy incremental to that achieved with ACEI therapy. For the other medications shown, the benefits are based on comparisons to placebo control.
Defibrillators or ICDs

- All ICDs have pacemaker capabilities
- Patients should carry device ID card and have device checked q 3 months
- Average device cost:
  - $17-20,000
• 3 lead devices:
  • RA
  • RV
  • LV via coronary sinus
• Indications (Class IIa):
  • NYHA III or IV
  • Receiving optimal medical Rx
  • Sinus rhythm
  • QRS >120 msec
  • Reasonable expectations to survive >1 year
• Carvedilol 25 mg bid
• Losartan 25 mg daily
• Furosemide 120 mg bid
• Spironolactone 25 mg daily
• +/- Metolazone as needed
• Amiodarone 200 mg daily for PAF
• Rivaroxaban

• Optimization complicated by continued sx of fatigue and dizziness and multiple HF admissions
• Vitals: BP 115/80, HR 100, Creat 1.9
• ECG with sinus tachy with LBBB
• TTE f/u LVEF <20%

What is the next step?

Patient’s Meds
To add Digoxin?

- Lack contemporary data
- However, in 2013 Guidelines, remains Class IIa indication
- In pts with high HR and on tolerated optimal dose of BB, in particular with afib, digoxin can be used (narrow window of therapy and do not use in pts with CKD)
- Amiodarone is more effective in afib HR control
Indications for Warfarin in HF

- Atrial fibrillation
- Previous thrombotic events
- Intraventricular thrombi

Indications for Aspirin in HF

- 2° Prevention of Atherothrombotic events
- Atrial fibrillation when warfarin or NOAC is contraindicated
• <2000 mg sodium / day
• Culprit foods:
  • Canned soup / vegetables
  • Bacon / ham
  • Pickles / BBQ sauces / Salad dressings
  • Fast food
  • Microwave meals / Spice packets in meal kits
  • Spaghetti Sauce
• CAUTION: Some salt substitutes contain potassium!

Low Salt Diet
• HF-ACTION
  • Multi-center, randomized trial of 3000 patients
  • Exercise regimen: 30 min 3x/week to 40 min 5x/week
  • No ∆ mortality or hospitalization
  • After adjusting for other differences, exercise was associated with a 11% ↓ in death or hospitalization.
  • Exercise appears safe

Exercise and HF

| Treatment of hypertension is recommended to prevent or delay the onset of HF and prolong life. |
| Treatment with statins is recommended in patients with or at high-risk of CAD whether or not they have LV systolic dysfunction, in order to prevent or delay the onset of HF and prolong life. |
| Counselling and treatment for smoking cessation and alcohol intake reduction is recommended for people who smoke or who consume excess alcohol in order to prevent or delay the onset of HF. |
| Treating other risk factors of HF (e.g. obesity, dysglycaemia) should be considered in order to prevent or delay the onset of HF. |
| Empagliflozin should be considered in patients with type 2 diabetes in order to prevent or delay the onset of HF and prolong life. |
| ACE-I is recommended in patients with asymptomatic LV systolic dysfunction and a history of myocardial infarction in order to prevent or delay the onset of HF and prolong life. |
| ACE-I is recommended in patients with asymptomatic LV systolic dysfunction without a history of myocardial infarction, in order to prevent or delay the onset of HF. |
| ACE-I should be considered in patients with stable CAD even if they do not have LV systolic dysfunction, in order to prevent or delay the onset of HF. |
| Beta-blocker is recommended in patients with asymptomatic LV systolic dysfunction and a history of myocardial infarction, in order to prevent or delay the onset of HF or prolong life. |
• Educate patient about ↓ salt diet and medication compliance
• Titrate ACE inhibitors and beta-blockers to target or maximally tolerated doses
• Remember to add aldosterone antagonist and/or hydralazine/nitrates to those who qualify
• Refer to cardiology those with continued symptoms for novel pharmacotherapy (not on formulary yet), frequent admissions, and for device assessment and potential further referral to advanced heart failure center

Take Home Points for Treating HF
Thank You!!