Heart failure and Hypertension

Kirsten Bibbins-Domingo, PhD, MD, MAS
Lee Goldman, MD Endowed Chair in Medicine
Professor of Medicine and of Epidemiology and Biostatistics
University of California, San Francisco

Objectives
• To understand the features of heart failure and hypertension that are specific to poor and minority populations.
• To develop approaches to diagnosis and management of heart failure and hypertension in these vulnerable populations.
• To review recommendations for pharmacotherapy for heart failure and hypertension in African American patients.

Definition & epidemiology of heart failure
• Complex clinical syndrome
  – Structural or functional impairment that impairs the ventricle’s ability to fill or eject blood effectively
  – Clinical manifestations of dyspnea, fatigue, and fluid retention
• Lifetime risk in adults of 20%
• Increasing in prevalence
• Most common reason for hospitalization among Medicare recipients
First acute decompensated heart failure annual event rates per 1000 from Atherosclerosis Risk in Communities community surveillance (2005–2012)

New Cases of Heart Failure in the Black and White Young Adults

In CARDIA, >5000 young adults in their 20’s and 30’s followed for 20 years:
- 1 in 100 black men and women develop heart failure before age 50.
- Blood pressure elevation in 20’s was strongest predictor, as well as development of diabetes over 20 years.

Diagnosis of heart failure in primary care

- Most common presentation is fatigue

- Risk factors for heart failure
  - Hypertension (most common modifiable risk factor)
  - Diabetes/Metabolic syndrome/Obesity
  - Atherosclerotic disease

Additional etiologies to consider

- Toxins
  - Alcohol - heavy consumption >10 years, men
  - Cocaine

- Infectious
  - HIV – 8% dilated cardiomyopathy in long term f/u
  - Chagas disease – central/south America, 10-30% of those infected, conduction abnormalities

- Inflammatory
  - Sarcoidosis – more common in African Americans

- Idiopathic cardiomyopathy – more common in African Americans
Stages of heart failure

**Stage A**
At risk for HF but no structural heart disease or signs or symptoms

**Stage B**
Structural heart disease but no signs or symptoms of HF

**Stage C**
Structural heart disease with prior or current symptoms

**Stage D**
Structural heart disease with symptoms of HF refractory to treatment

---

Treatment of heart failure

**Goals**
- Improve symptoms
- Improve health-related quality of life
- Increase patient education
- Prevent hospitalizations
- Prevent mortality

**Additional considerations**
- Limited literacy
- Financial barriers
- Other competing demands

---

Treatment of heart failure

**Treatment strategies in HF with preserved EF**
- Diuretics for congestion
- Management of associated factors
  - Hypertension
  - Atrial fibrillation
  - Diabetes
  - Atherosclerotic disease
Treatment of heart failure

- Treatment strategies in HF with depressed EF
  - Diuretics for congestion (most require chronic use)
  - ACE inhibitors or ARBs
  - Beta Blockers (carvedilol, metoprolol XL, bisoprolol)
  - Spironolactone (if still symptomatic)

- Consider in the appropriate patient
  - Revascularization
  - Resynchronization therapy (CRT)
  - ICDs

Treatment of heart failure with refractory symptoms (Stage D)

- Goals
  - Improve symptoms
  - Improve health-related quality of life
  - Reduce readmissions
  - Establish end of life goals

- Treatments
  - Transplant
  - Hospice

- Additional considerations
  - Access to care
  - Financial
  - Limited literacy
  - Advocacy in navigating health system

Pharmacotherapy in African Americans

- Hydralazine – isosorbide dinitrate
  - Originally studied in V-Heft and considered an alternative to ACE inhibitors
  - Re-analysis - largest effect in African Americans
  - Studied again in A-Heft
    - RCT of African Americans with depressed EF
    - Mortality benefit when added to standard therapy
  - First drug approved for a specific race/ethnic group

Pharmacotherapy in African Americans

Considerations for use of hydralazine-isosorbide dinitrate

1. Should be added to standard therapy (ACE/ARB, beta blocker, diuretic), and not replace standard therapy.

2. Hypotension and headache are important side-effects that limit use. Limit use to those with hypertension.

3. Significant pill burden. In fixed dose combination of BIDIL, dosed three times daily - more if dosed individually.
Conclusions – Heart Failure

• Heart failure is a common cardiovascular disease, with high morbidity and mortality, that is increasing in prevalence.

• African Americans are disproportionately affected by heart failure, particularly at younger ages.

• High degree of complexity in the diagnosis and medical management of heart failure may pose particular challenges for vulnerable populations.
Summary of epidemiology

- Although BP control has improved, prevalence of hypertension is increasing.
- Highest prevalence in African Americans, lowest control in Latinos
- Lowest rates of awareness, treatment, and control in young adults.
- Within each race/ethnic group, men at risk for poor control.

Diagnosis

- Recent guidelines, trials have raised question about the appropriate thresholds for hypertension
  - Association of BP and CVD risk is linear across a wide range, down to SBP of 110.
  - 140/90 mmHg is target in most people
  - In elderly risk of lowering BP must be balanced against benefit of BP lowering.
- Diagnosis requires BP measured correctly in clinic and should ideally be confirmed with out of office BP.

**Lifestyle approaches to BP control**

### Additional considerations

- **Calcium channel blockers** - highly effective BP control agents with minimal side-effects. Consider for patients when follow-up is uncertain
- **ACE/ARB** - important in multiple conditions (diabetes, albuminuria, CHF, CHD)
  - Requires follow-up lytes
  - Better BP control when administered with diuretic
- **Diuretic**
  - Chlorthalidone - longer acting, greater BP control, but also side effects, most evidence
  - HCTZ - most widely used, often in fixed combo
  - Loop diuretics - if CKD
- **Beta blockers**
  - Not great BP control agents and side-effects for patients
  - Reserve for post-MI and CHF

### General principles of pharmacotherapy

- Calcium channel blockers, diuretics, ACE/ARBs all can be considered first line therapies and effective in combination.
- Goal is regimen that maximizes adherence with additional consideration of therapeutic benefit for other conditions.
- Two agents achieve greater BP control than max dose of a single agent
- Fixed dose combination medications have been shown to improve adherence and BP control
- Stage 2 hypertension (>160/100) requires two agents (at least)

### Pharmacotherapy in African Americans

- Most African Americans achieve BP lowering with ACE inhibition, but mean BP reduction is less in African Americans than Whites.
  - African Americans are also more likely to develop angioedema
  - Many recommend starting with diuretics or Ca channel blockers.
- ACE inhibitors less effective in high sodium states
  - Work better with lower sodium intake
  - Work better when combined with diuretics
- African Americans may have other indications for ACE inhibition
  - Diabetes, albuminuria, heart failure
  - Use with diuretic
Resistant hypertension

- Definition: BP elevated despite 3 agents, or controlled on 4

Work-up
1. Rule-out “pseudo-resistance” - assess adherence, other contributors to BP elevation
2. Consider work-up of secondary causes as indicated by other patient factors
3. Add spironolactone to regimen that includes Ca channel blocker, ACE/ARB, diuretic

Health system approaches to BP control
Kaiser Permanente: 43% → 84%

Kaiser Northern California HTN Program

- Comprehensive HTN registry
  - Central HTN management team
  - Dissemination of successful practices

- Performance metrics

- Evidence-based treatment algorithm

- Medical assistant visits for BP measurements

- Single-pill combination drugs

- How can these approaches be translated to other healthcare systems that are more resource constrained?

- Safety net settings

- Rural settings
Conclusions - Hypertension

- Hypertension is the most common modifiable risk factor for CVD and increasing in prevalence.

- Despite improvements in control of blood pressure, many at-risk populations continue to have high rates of uncontrolled BP and suffer consequences of hypertension-related CVD.

- Complex medical management of this asymptomatic condition may pose particular challenges for vulnerable groups.

MOC question

Mr. G is a 55 year old African American man with hypertension and diabetes. He has a remote history of drug and alcohol use, but denies use over the past 20 years. He was recently evicted and now sleeps on the couch in his brother’s apartment. His blood pressure has been difficult to control, and several changes have been made to his medication regimen recently.

His medications include:
- Hydrochlorothiazide 25 mg daily
- Benazepril 40 mg daily
- Amlodipine 10 mg daily
- Metformin 1000 twice daily
- Atorvastatin 80 mg daily
- Aspirin 81 mg daily

Today’s vital signs: Temp 37, BP 165/90, pulse 70.

What’s the best next step?

a) Assume medication non-adherence, and remind Mr. G during today’s visit that he needs to take all medications as directed.

b) Assume Mr. G is lying about his drug use, and send a urine toxicology screen on this visit.

c) Send urine metanephrins to rule out pheochromocytoma immediately.

d) Review and reconcile Mr. G’s medications, paying particular attention to comprehension, errors that may have resulted from multiple recent changes, and potential financial barriers to chronic medication regimen.