

# Risk Factors and Diagnosis of Heart Failure



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# Overview

- Why do we care about CHF: Incidence and Prevalence
- Who is at risk for CHF: Risk Factors
- Mechanism of CHF: Pathophysiology
- Heart Failure Classification: Stages of Heart Failure
- Who has CHF: Making the Diagnosis

# Why Care About Heart Failure?

- Approximately 5 million patients in the US have heart failure
- >550,000 patients are newly diagnosed with heart failure each year
- “Heart failure” is the most common Medicare discharge diagnosis
- More Medicare dollars are spent on the diagnosis and treatment of Heart Failure than for any other diagnosis.

I'M FROM THE  
GOVERNMENT,  
I'M HERE  
TO HELP



# Who is at Risk for Heart Failure?

- Age
- Coronary Artery Disease/Peripheral Arterial Disease
- Hypertension
- Familial
- Diabetes
- Dyslipidemia
- Valvular Heart Disease



# Risk Factors

- Arrhythmia (tachycardia-induced)
- Obesity



# Risk Factors

- Endocrine abnormalities
  - Thyroid
  - Pheochromocytoma
- Anemia
- Peripartum
- Cardiotoxic (mediastinal irradiation, certain chemotherapeutic agents)

# Risk Factors

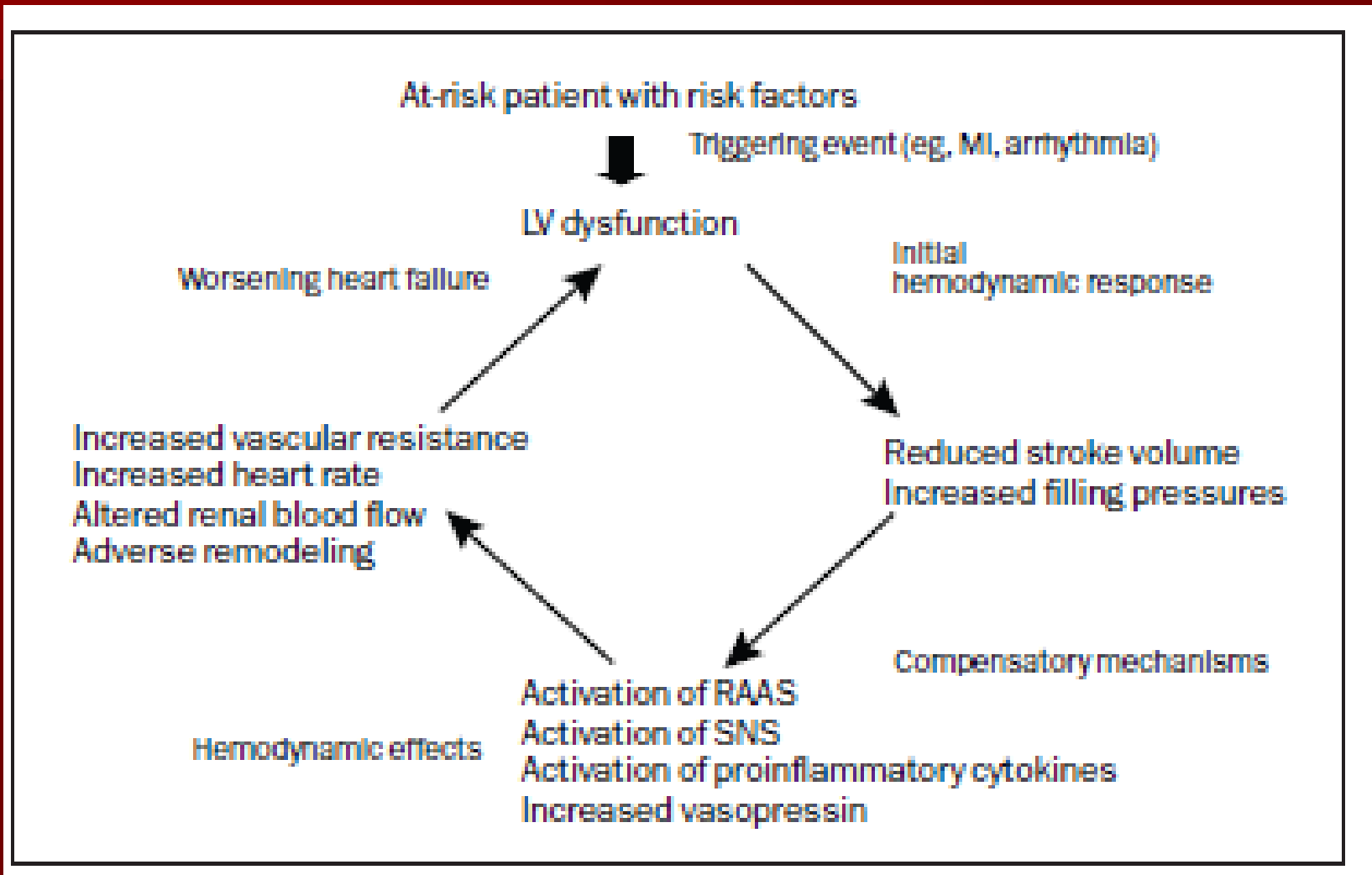
- Lifestyle issues (etoh, tobacco, illicit, nutritional, infectious—HIV/Chagas)



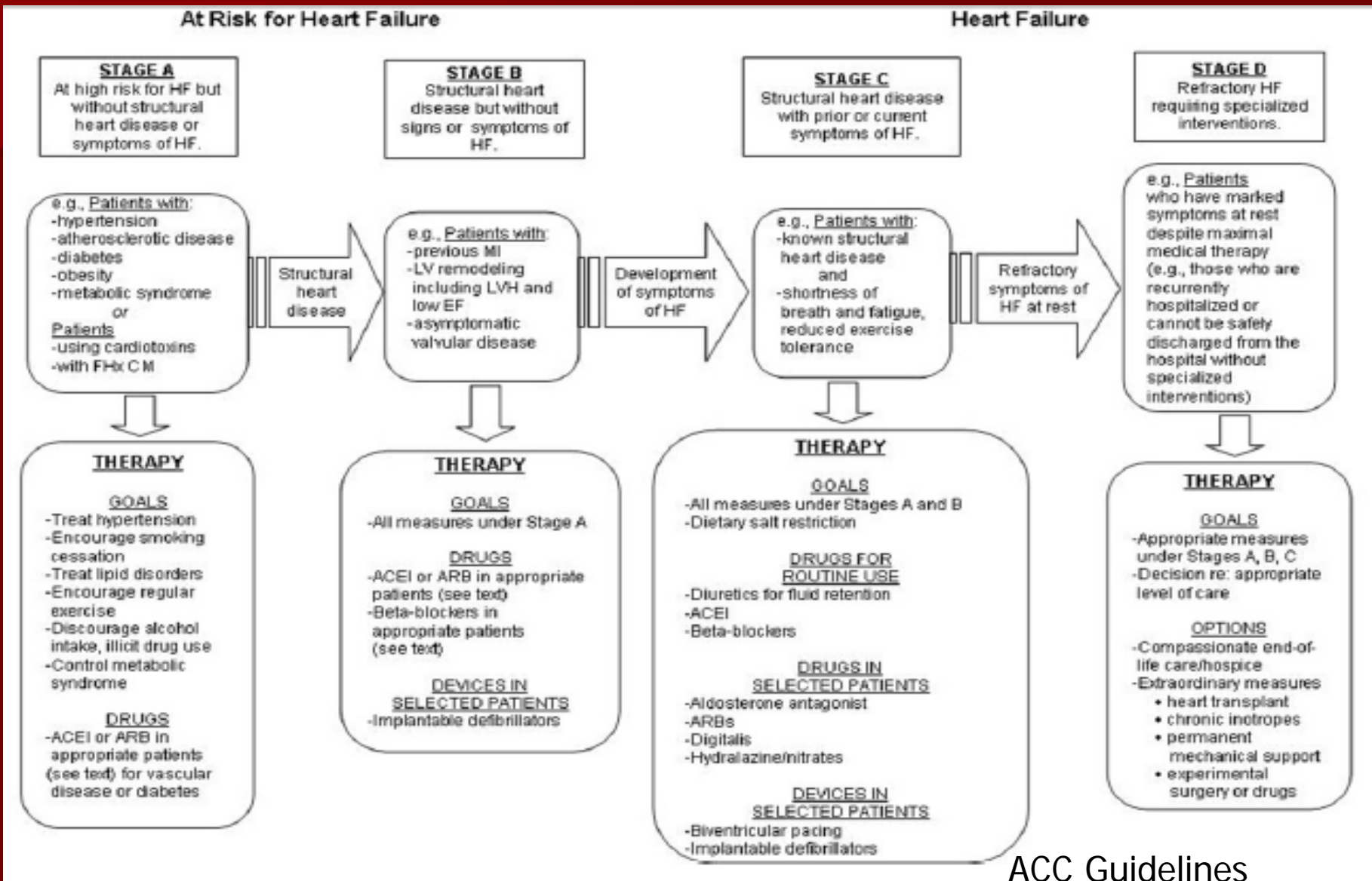
# Risk Factors

- Infiltrative (amyloid, hemochromatosis, sarcoid)
- Congenital Heart Disease
- Stress-induced/Tako-tsubo  
Cardiomyopathy

# Pathophysiology



# Heart Failure Classification



# Heart Failure Classification

## At Risk for Heart Failure

## Heart Failure

### STAGE A

At high risk for HF but without structural heart disease or symptoms of HF.

### STAGE B

Structural heart disease but without signs or symptoms of HF.

### STAGE C

Structural heart disease with prior or current symptoms of HF.

### STAGE D

Refractory HF requiring specialized interventions.

e.g. Patients with:  
-hypertension  
-atherosclerotic disease  
-diabetes  
-obesity  
-metabolic syndrome  
or  
Patients  
-using cardiotoxins  
-with FHx CM

Structural heart disease

e.g. Patients with:  
-previous MI  
-LV remodeling including LVH and low EF  
-asymptomatic valvular disease

Development of symptoms of HF

e.g. Patients with:  
-known structural heart disease and  
-shortness of breath and fatigue, reduced exercise tolerance

Refractory symptoms of HF at rest

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)

# Making the Diagnosis



“Off hand, I'd say you're suffering from an arrow through your head, but just to play it safe, I'm ordering a bunch of tests.”

# Heart Failure Diagnosis

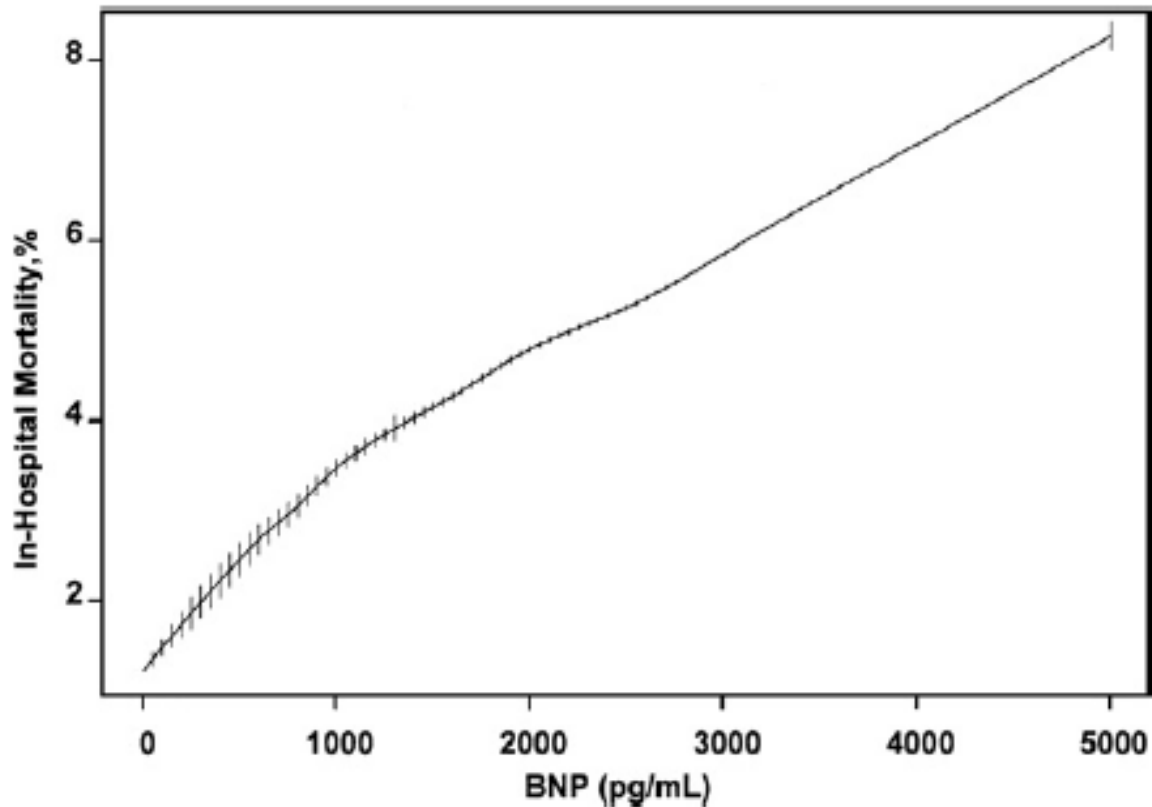
- Clinical Diagnosis: History and Physical
  - History: screen for symptoms (decreased exercise tolerance, dypnea, fatigue, pnd, orthopnea, edema) as well as risk factors for heart failure
  - Physical exam: Elevated JVD, S3, rales, hepatojugular reflex, edema



# Diagnosis

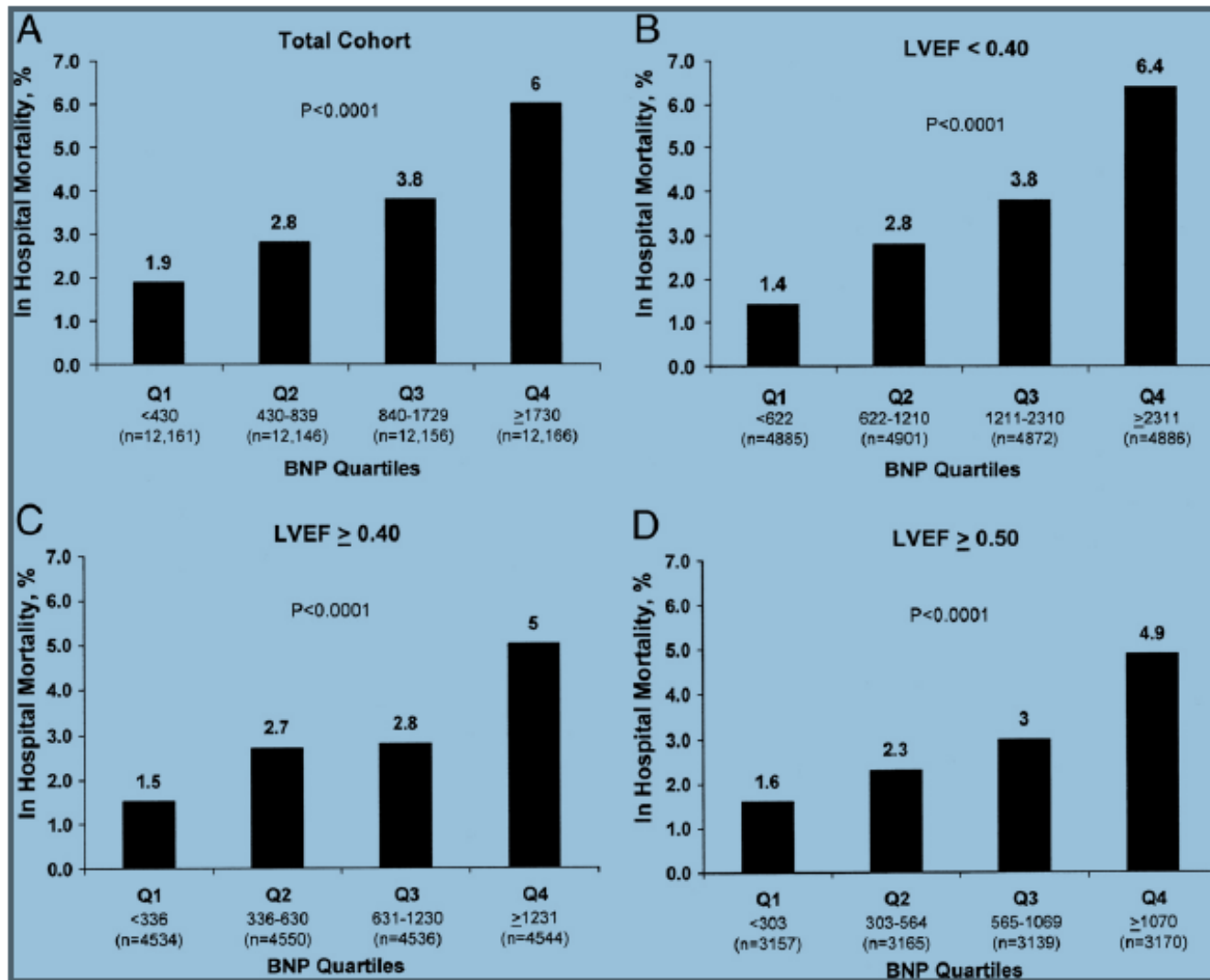
- Laboratory evaluation:
  - Routine baseline: CBC, CMP, TSH
  - Patient-specific
  - BNP—associated with reduced LV function, elevated filling pressures
    - Can be elevated in CHF, MI, PE, renal failure, and COPD
    - Obesity lowers BNP levels

# Admission BNP and Prognosis



**Figure 3**

Scatterplot Smoother of BNP Levels and In-Hospital Mortality



**Figure 2** Relationship Between BNP Quartiles and In-Hospital Mortality

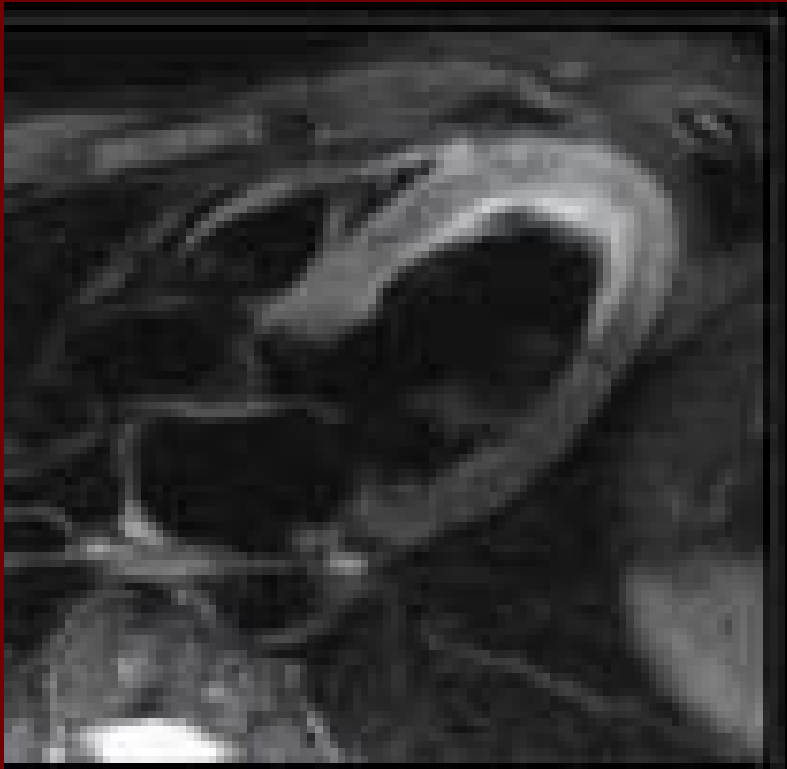
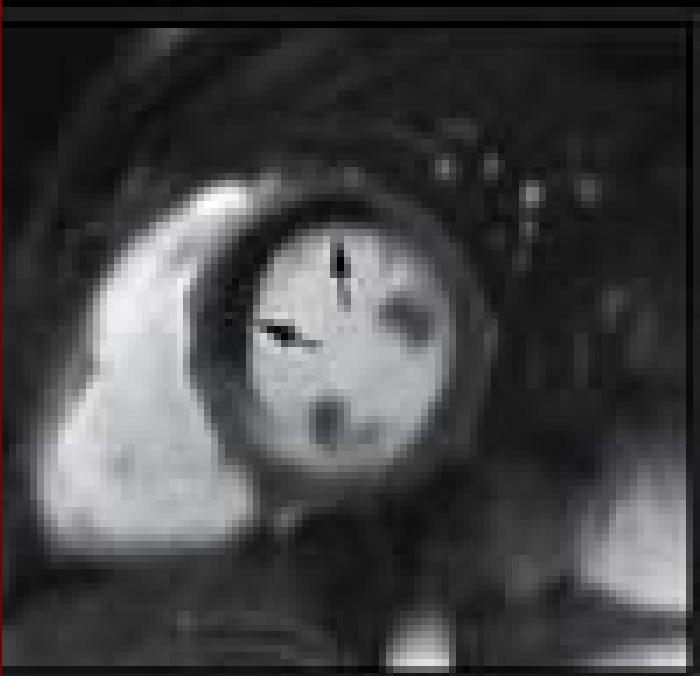
# Diagnosis

- Assessment of Left Ventricular Function:
  - Echocardiography
  - Radionuclide VentriculoGraphy (RVG) or Multiple Gated Acquisition scan (MUGA)
  - MRI-especially if infiltrative
  - CT

# Echocardiography

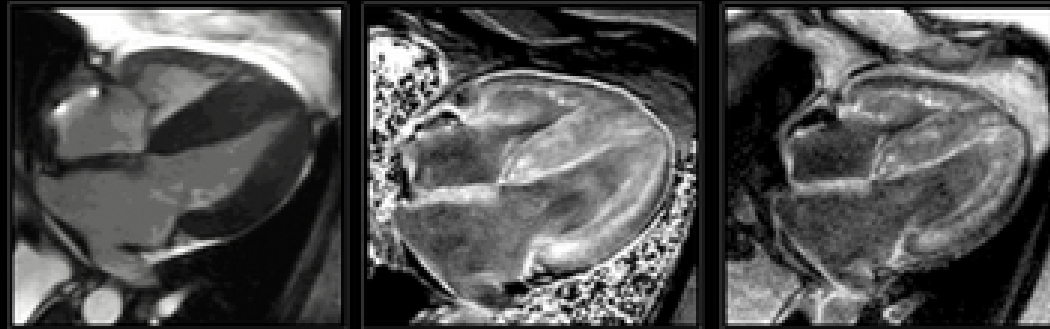
**RVG/MUGA**

# Cardiac MRI: Myocardial Infarction

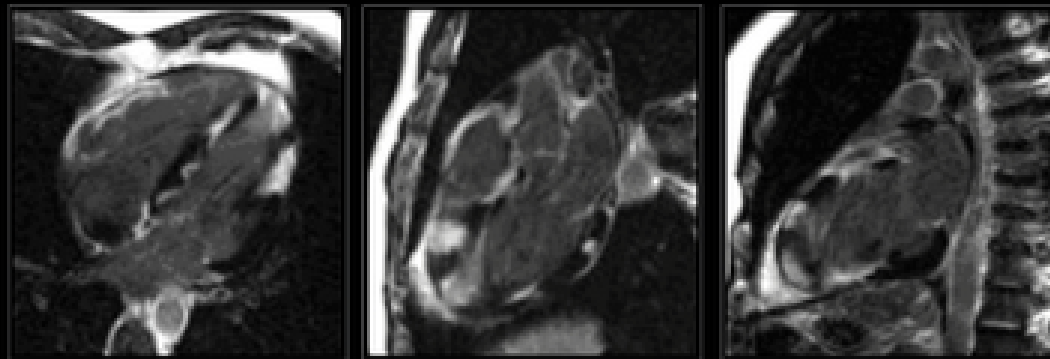


# Cardiac MRI: Infiltrative Disease

## Infiltrative Myocarditis: Amyloidosis



## Infiltrative Myocarditis: Sarcoidosis

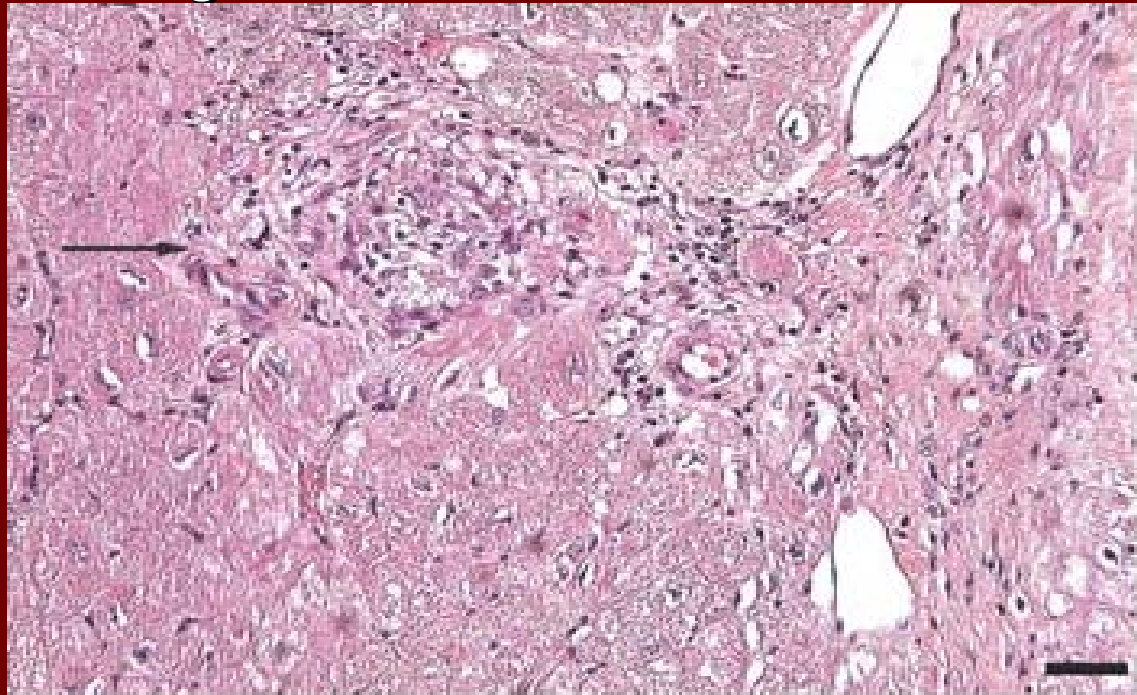


# Cardiac CT



# Diagnosis

- Endomyocardial biopsy – limited role and NOT indicated in routine evaluation of cardiomyopathy
- Consider only when it will significantly alter patient management



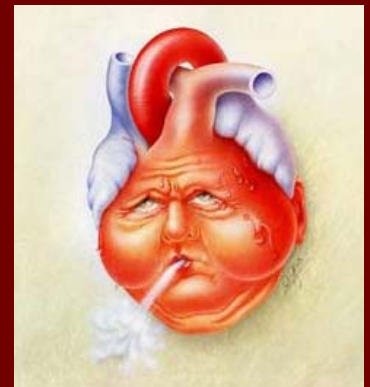
# Endomyocardial Biopsy

- Often shows nonspecific changes
- Sampling error



# Diagnosis

- Classify patients by NYHA class I-IV
  - Class I: no functional limitations
  - Class II: mild symptoms and minor limitation of ordinary activities
  - Class III: marked limitation of activities due to symptoms; comfortable at rest
  - Class IV: severely limited, symptoms even at rest



# Treatment...

