Advances in Heart Failure

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Ernest Gallo Distinguished Professor of Medicine
University of California, San Francisco
Advances in heart failure

- Systolic and Diastolic HF
- Definitions
- Epidemiology
- Prognosis
- Diagnosis
- Treatment strategies
Chronic heart failure

• Definition:
• Chronic heart failure is a syndrome with following features:
  • Symptoms of heart failure at rest or during exercise
  • Clinical signs of heart failure
  • Objective evidence of structural or functional abnormality of the heart
Heart Failure : Epidemiology

- Estimated 550,000 new cases occur / yr
- Estimated to rise to 772,000 /year by yr 2040
- More than 5 million Americans have HF
- Estimated to increase to 10 million by yr 2040
- Among Medicare beneficiaries, HF is the leading cause of hospitalization
- Cost of HF treatment - > 35 billion $ in 2007

(Heart Disease and stroke statistics :
- 2007 update : a report from the American Heart Association Statistics committee and Stroke Statistics Subcommittee
- Circulation ; 2007; 115 : e69-e171)
Heart Failure: Epidemiology

- Heart failure is the 3rd most prevalent CVD
- Prevalence and age:
  - 20-39 – less than 1%
  - 80 or older – about 20%
- Life time risk of developing heart failure:
  - 20% for both women and men
- Life time risk of developing heart failure without CAD:
  - Age 40 - men -11.4%, women -15.4% 

Heart Failure: Epidemiology

- Mortality: nearly 50,000 annually
- Morbidity:
  - 6.5 million days of hospital stay/yr
  - 12-15 million office visits/yr

Heart Failure : Epidemiology

Increasing rate of hospitalizations:
  1979—1,274,000
  2004---3,860,000
More than 80 % were among patients 65 yrs or older.

Heart Failure: Epidemiology

Racial differences in the incidence of CHF

Overall incidence / 1000 person –years

- African American: 4.6
- Hispanic: 3.5
- White: 2.4
- Chinese AM: 1.0

Heart Failure: Epidemiology

- Is there gender and race differences?
- Age–adjusted incidence rate /1000 person-years:
  - Caucasian men: 6.0
  - African–American men: 9.1
  - Caucasian women: 3.4
  - African women: 8.1

(Loehr LR, et al: Heart failure Incidence and Survival (from the Atherosclerosis Risk in Communication Study))

AM H J Cardiol, 2008, 101, 1016
Advances in heart failure

Most common clinical subsets of chronic heart failure:

Systolic heart failure (SHF) also termed Heart failure with reduced ejection fraction (HFREF)

Diastolic heart failure (DHF) also termed Heart failure with preserved ejection fraction (HFPEF)
Systolic Heart Failure
Clinical Definition

• A clinical syndrome of heart failure
• resulting from reduced left ventricular ejection fraction

• “Heart failure with reduced ejection fraction “
Diastolic Heart Failure

- Diastolic Heart Failure - contemporary clinical definitions:
  - “A clinical syndrome characterized by the symptoms and signs of heart failure, a preserved ejection fraction, and abnormal diastolic function.”

- Other clinical definitions:
  - “Heart failure with preserved ejection fraction.”
Heart Failure : Epidemiology

- Risk factors
  - increasing age
  - hypertension
  - CAD
  - diabetes
  - obesity
  - insulin resistance
  - genetic factors
  - use of cardiotoxins
Heart Failure: Epidemiology

- Insulin resistance cardiomyopathy (ICRM)
- Heart failure in absence of frank diabetes
- Insulin resistance is a risk factor for both systolic and diastolic heart failure
### Systolic Vs Diastolic Heart Failure

- ADHERE – All enrolled discharges

<table>
<thead>
<tr>
<th>Profile</th>
<th>SHF</th>
<th>DHF</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF</td>
<td>&lt;40%</td>
<td>&gt;40%</td>
</tr>
<tr>
<td>Age</td>
<td>69.9</td>
<td>74.2*</td>
</tr>
<tr>
<td>Female</td>
<td>39%</td>
<td>62.2 %*</td>
</tr>
<tr>
<td>CAD</td>
<td>63 %</td>
<td>54%*</td>
</tr>
<tr>
<td>Diabetes</td>
<td>42 %</td>
<td>46 %*</td>
</tr>
<tr>
<td>AF</td>
<td>29%</td>
<td>33 %*</td>
</tr>
</tbody>
</table>

*(< 0.0001)*
Heart Failure: Framingham Criteria for Diagnosis

- Major Criteria:
  - PND or Orthopnea
  - Neck vein distention
  - Rales
  - Cardiomegaly
  - Acute pulmonary edema
  - S3 gallop
  - Increased venous pressure > 6 Cm
  - Increased circulation time > 25 sec.
  - Hepatojugular reflux
Heart Failure: Framingham Criteria for Diagnosis

- Minor Criteria:
  - Ankle edema
  - Night Cough
  - Dyspnea on exertion
  - Pleural effusion
  - Decreased maximal vital capacity
  - Tachycardia (rate > 120 bpm)

- Major or minor criteria:
  - weight loss > 4.5 KG in five days in response to treatment
  - TWO MAJOR or ONE MAJOR and TWO MINOR
<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Diastolic HF (EF&gt;50%)</th>
<th>Systolic HF (EF&lt;50%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyspnea on exertion</td>
<td>85%</td>
<td>96%</td>
</tr>
<tr>
<td>Paroxysmal nocturnal dyspnea</td>
<td>55%</td>
<td>50%</td>
</tr>
<tr>
<td>Orthopnea</td>
<td>60%</td>
<td>73%</td>
</tr>
<tr>
<td><strong>Physical Examination</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jugular venous distension</td>
<td>35%</td>
<td>46%</td>
</tr>
<tr>
<td>Rales</td>
<td>72%</td>
<td>70%</td>
</tr>
<tr>
<td>Displaced Apical Impulse</td>
<td>50%</td>
<td>60%</td>
</tr>
<tr>
<td>S3</td>
<td>45%</td>
<td>65%</td>
</tr>
<tr>
<td>S4</td>
<td>45%</td>
<td>66%</td>
</tr>
<tr>
<td>Hepatomegaly</td>
<td>15%</td>
<td>16%</td>
</tr>
<tr>
<td>Edema</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Chest radiograph</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiomegaly</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>Pulmonary venous hypertension</td>
<td>75%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Heart Failure: Diagnosis

- Physical examination:
  - Signs of heart failure-diagnostic of cardiac cause
  - e.g., S3, elevated JVP, positive HJR,
  - Presence of cardiac pathology-very suggestive
    of cardiac cause
  - Chest X-ray: very helpful when findings of
    - pulmonary venous congestion or pulmonary
    hypertension are present
  - ECG: normal electrocardiogram – a negative
    predictive value over 90 %
  - BNP-elevated in heart failure
    - normal in patients with non cardiac dyspnea
### ACC/AHA and HFSA Guidelines on the Use of BNP Measurement in Patients with Heart Failure

<table>
<thead>
<tr>
<th>ACC/AHA 2005 Heart Failure Guideline Update</th>
<th>HFSA 2006 Practice Guideline: Acute HF Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement of B-type natriuretic peptide (BNP) can be useful in the evaluation of patients presenting in the urgent care setting in whom the clinical diagnosis of heart failure is uncertain (Level of evidence: A)</td>
<td>The diagnosis of decompensated heart failure should be based primarily on signs and symptoms. (Level of evidence: C)</td>
</tr>
<tr>
<td>The value of serial measurements of BNP to guide therapy for patients with heart failure is not well established. (Level of Evidence: C)</td>
<td>When the diagnosis is uncertain, determination of BNP or NT-proBNP concentration should be considered in patients being evaluated for dyspnea who have signs and symptoms compatible with heart failure. (Level of evidence: A)</td>
</tr>
</tbody>
</table>
# Systolic Vs Diastolic Heart Failure Neurohormonal dysfunction

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>SHF</th>
<th>DHF</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF</td>
<td>54%</td>
<td>31%</td>
<td>60%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>NE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pg/ml</td>
<td>169</td>
<td>287</td>
<td>306</td>
<td>P= .007</td>
</tr>
<tr>
<td>BNP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pg/ml</td>
<td>3</td>
<td>28</td>
<td>56</td>
<td>P= .02,.001</td>
</tr>
</tbody>
</table>

(Kitzman D.W et al JAMA, 2002)
Heart Failure

- Classification based on the severity of symptoms:
- NYHA class I: asymptomatic
- NYHA class II: symptoms during more than usual physical activity
- NYHA class III: symptoms during less than usual physical activity
- NYHA class IIIb: symptoms during minimal activity
- NYHA class IV: symptoms at rest
Heart Failure

New classification not based on the severity of symptoms:

• Stage A: At high risk for HF but without structural heart disease or symptoms of HF
• Stage B: Structural heart disease but without symptoms of HF
• Stage C: Structural heart disease with prior or current symptoms of HF
• Stage D: Refractory HF requiring specialized interventions
Systolic Heart Failure-Prognosis

- Improved with modern therapy:
- "The annualized mortality for heart failure has dropped from 18% to 20% to about 6% to 8% on average."

- Francis GS, Tang WHW: JACC, 2006, 7, 1385-86
Diastolic Heart Failure: Prognosis

- Moderately severe heart failure
- The Charm Preserved Trial
- Candesartan Placebo
  (n=1514) (1509)
  Cardiovascular Death
  11.2% 11.3%
  Annual Mortality Rate
  3.8% 3.8%
# Diastolic and Systolic Heart Failure: Prognosis

- **Mortality and Morbidity-advanced heart failure**

<table>
<thead>
<tr>
<th></th>
<th>DHF</th>
<th>SHF</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF %</td>
<td>60</td>
<td>25</td>
</tr>
<tr>
<td>Mort %</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>In-hosp</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>2-mo</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>6-mo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readmission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ Mortality %</td>
<td>53</td>
<td>56</td>
</tr>
</tbody>
</table>

(Adapted from: Danciu SC et al; AJC: 2006; 97, 256-259)
Systolic Heart Failure: Sudden Cardiac Death


<table>
<thead>
<tr>
<th>NYHA Stage</th>
<th>SCD</th>
<th>CHF</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYHA II</td>
<td>64 %</td>
<td>12 %</td>
</tr>
<tr>
<td>NYHA III</td>
<td>59 %</td>
<td>26 %</td>
</tr>
<tr>
<td>NYHA IV</td>
<td>33 %</td>
<td>56 %</td>
</tr>
</tbody>
</table>
Diastolic Heart Failure: Sudden Cardiac Death

- Sudden Cardiac Death
- Post-hoc analysis (Peace) trial
- No -8290, LVEF > 40 %
- SCD occurred in 1.5% of patients during a median follow-up of 4.8 years. (mean EF 58 %)
- The independent predictors of SCD –
  - Digitalis use – HR-2.58
  - Diuretic use – HR – 2.1
  - LVEF < 50 % - HR-2.08
  - Current angina-HR-1.51
Diuretics are needed to relieve congestive symptoms in both systolic and diastolic heart failure.

Digitalis may be effective in selected patients in both systolic and diastolic heart failure.

Reduction in heart rate is beneficial in both systolic and diastolic heart failure.
Diastolic and Systolic Heart Failure-Management Strategies

- **ACEIs / ARBs:**
  - Decrease mortality and morbidity
  - in systolic heart failure
  - Decrease morbidity not mortality in diastolic heart failure
  - (CHARM-PRESERVED, PEP-CHF)
  - I-PRESERVE-ARB in diastolic heart failure-no benefit

- **Beta-blocker therapy:**
  - Decrease mortality and morbidity
  - in systolic heart failure
  - Unproven benefit in diastolic heart failure

- **Hydralazine-nitrate**
  - Decrease mortality and morbidity
  - in systolic heart failure
  - Unproven benefit in diastolic heart failure
Diastolic and Systolic Heart Failure-Management Strategies

- Aldosterone antagonists:
  - Decrease mortality and morbidity in symptomatic patients with systolic heart failure
  - Unproven benefit in diastolic heart failure
  - TOP-CAT trial is ongoing
- Exogenous BNP:
  - Decrease morbidity in decompensated systolic heart failure
  - Unproven benefit in diastolic heart failure
- Exercise training:
  - Improves exercise tolerance, improves quality of life
  - and probably decrease mortality in SHF,
  - has not been investigated in DHF
Diastolic and Systolic Heart Failure-Management Strategies

- Cardiac Resynchronization and /or ICD:
  - Decrease mortality and morbidity in
  - refractory systolic heart failure
  - Not indicated in diastolic heart failure
- Implantable LVAD:
  - May improve short term survival in
  - selected refractory systolic heart failure
  - patients
  - Unproven benefit in diastolic heart failure
- Cardiac Transplantation
  - May be of benefit in both systolic and diastolic heart
  - failure
•

• Thank You
Diastolic heart failure

- Heart rate limiting calcium channel blockers - Verapamil
- Beta –blockers (propranolol, carvedilol)
- ACEIs –(PEF-CHF)
- ARBs- (Candesertan- Charm preserved, Irbeasrtan –I Preserved)
- Aldosterone antagonist-(TOPCAT)
- Digitalis in atrial fibrillation
- AV-nodal ablation and pacemaker
- Diuretics to relieve congestive symptoms
- Rarely ultrafiltration
- Rarely cardiac transplantation
Systolic heart failure

- Potential new therapies:
  - Calcium sensitizing agents
  - Myosin activators
  - Vasopressin antagonists
  - Immuno-modulators
  - Istaroxime-inotropic and lusotropic agent
  - Modulation of MMP/TIMP
  - Modulation of TGF-beta
  - Modulation of TITINS
  - Mitogen-activated protein kinase (MAPK) inhibitors
  - D-ribose
  - Pentoxyphyllin
  - Thalidomide
  - Stem cell and gene therapy
  - Cardiac contraction modulation (CCM)
Systolic Heart Failure

• Potential new anti remodeling therapies :
  • Renin inhibition
  • Aldosterone inhibition
  • Brain-targeted aldosterone synthesis inhibition
  • Enhancement of eNOS synthesis
  • Modulation of B-adrenergic signaling
  • Erythropoetin
  • Anti apoptotic factors
Diastolic heart failure

- New potential therapies:
  - Modulation of collagen cross-links
  - Modulation of Titin isoforms
  - Modulation of MMP/TIMP
  - Reduction of matrix fibrosis:
    - aldosterone antagonists
    - chymase antagonists
    - TGF-beta
  - Improved relaxation:
    - phospholamban inhibition
    - D-ribose
    - Levosimendan (calcium sensitizer)
Heart Failure Risk In Patients With Diabetes, Hypertension Or Myocardial Infarction.

- Over 10 years, heart failure develops in
  - 10% of men
  - 18% of women with diabetes

- 12% of men
- 8% of women with hypertension

- 30% of men
- 30% of women with myocardial infarction

Etiology Of systolic Heart Failure (Solved Registry)

- Ischemic heart disease: 68.5%
- Idiopathic cardiomyopathy: 12.9%
- Hypertension: 7.2%
- Other: 11.3%
- n = 6,063

Borrassa et. al JACC, 1993 22,14 A-19 A
Diastolic Heart Failure

Prevalence – Echocardiographic cross-sectional population studies

- Male: 2.7-6.6 %
- Female: 1.7-9.5 %
- All: 2.2-8.8 %

Adapted from Hogg.K et al JACC, 2004, 43, 317
The Charm-Preserved Trial

- Candesartan  Placebo
  - (n=1514)  (1509)
  
Cardiovascular Death
  - 11.2%  11.3%

Annual Mortality Rate
  - 3.8%  3.8%
Prognostic Factors In Heart Failure

• Progressive Ventricular Remodeling
• Declining Ejection Fraction
• Right Ventricular Failure
Prognostic Factors In Heart Failure

Clinical Features

- Persistent Volume Overload
- Pulmonary Hypertension
- Recurrent Hospitalizations
Prognostic Factors In Heart Failure

Neuroendocrine Factors

- Increased Angiotensin II
- Increased Catecholamines
- Increased Cytokines
- Increased Natriuretic Peptides
- Nitric Oxide Abnormalities
- Increased Arginine Vasopressin
Prognostic Factors In Heart Failure

Other Risk Factors

• Anemia
• Cachexia
• Renal Failure
• Hyponatremia
Mortality in Hospitalized HF Patients

<table>
<thead>
<tr>
<th>Serum concentration</th>
<th>30-Day Mortality</th>
<th>1-Year Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin &lt;10.0 g/dL</td>
<td>1.73 (1.25-2.36) &lt;.001</td>
<td>2.07 (1.65-2.60) &lt;.001</td>
</tr>
<tr>
<td>Sodium &lt;136 mEq/L</td>
<td>1.69 (1.30-2.20) &lt;.001</td>
<td>1.61 (1.34-1.94) &lt;.001</td>
</tr>
<tr>
<td>Potassium &lt;3.5 mEq/L</td>
<td>0.66 (0.38-1.08) &lt;.12</td>
<td>0.68 (0.49-0.93) &lt;.02</td>
</tr>
<tr>
<td>Creatinine &gt;2 mg/dL (&gt;177 µmol/L)</td>
<td>2.47 (1.84-3.29) &lt;.001</td>
<td>2.90 (2.33-3.63) &lt;.001</td>
</tr>
<tr>
<td>Urea nitrogen, mg/dL (per 10-unit increase)</td>
<td>1.32 (1.26-1.39) &lt;.001</td>
<td>1.37 (1.30-1.44) &lt;.001</td>
</tr>
</tbody>
</table>

n=2624

Lee et al. JAMA. 2003;290:2581-2587.
**Prognostic Value of Neurohumoral Activation for All Patients: Multivariate COX Proportional Hazard Analysis**

<table>
<thead>
<tr>
<th>Neurohormone</th>
<th>P* Value</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renin</td>
<td>&gt;.006</td>
<td>1.6 (1.2-2.3)</td>
</tr>
<tr>
<td>Norepinephrine</td>
<td>.092†</td>
<td>1.3 (1.0-1.9)</td>
</tr>
<tr>
<td>ANP</td>
<td>.026</td>
<td>1.5 (1.1-2.1)</td>
</tr>
<tr>
<td>AVP</td>
<td>.003</td>
<td>1.6 (1.2-2.3)</td>
</tr>
<tr>
<td>Epinephrine</td>
<td>NS</td>
<td>1.2 (0.7-2.0)</td>
</tr>
<tr>
<td>Aldosterone</td>
<td>.014</td>
<td>1.5 (1.1-2.1)</td>
</tr>
<tr>
<td>Dopamine</td>
<td>NS</td>
<td>1.0 (0.7-1.45)</td>
</tr>
</tbody>
</table>

*P were calculated on the basis of COX proportional hazard analysis. †Denotes activation of neurohormone is borderline significant (.05<P<.1).

ANP=atrial natriuretic peptide; AVP=arginine vasopressin.
Rouleau et al. JACC. 1994;24:583-591.
Ph in chronic left heart failure

- Epidemiology:
  - Prevalence of left heart failure in the USA and in Europe 1-2%.
  - Prevalence of PH –
    - Estimated almost 2/3rd of patients evaluated for heart transplant
    - Possibly higher in advanced diastolic heart failure.
  - Precise incidence remains unknown
PH in chronic left heart failure

- Diagnostic criteria:
  - PCWP > 15 mm Hg
  - With LV systolic dysfunction
  - Passive
  - Reactive
    - reversible with NO, dobutamine,
    - Na nitroprusside, prostaglandin E1
  - Irreversible (fixed)
- With normal LV systolic function (spontaneous or after 500 ml fluid challenge)
  - PCWP > 15 mm Hg, PADP-PCWP > 10 mm Hg
  - PCWP > 15 mm Hg, PADP-PCWP < 10 mm HG
PH in chronic left heart failure

• The potential mechanisms:
• Loss of nitric oxide
• Endothelin-mediated vasoconstriction
• Growth factor–mediated proliferation
• PDGF, VEGF
Heart Failure in the United States of America: Prevalence and Etiology

- Is there any racial differences in acute decompensated heart failure (ADHF)?
- The ADHF National Registry database.

<table>
<thead>
<tr>
<th></th>
<th>African American</th>
<th>Whites</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of episodes</td>
<td>29,862</td>
<td>105,872</td>
</tr>
<tr>
<td>Age</td>
<td>63.5</td>
<td>72.5</td>
</tr>
<tr>
<td>LVEF</td>
<td>lower</td>
<td>----</td>
</tr>
<tr>
<td>HTN, diab, obesity</td>
<td>higher</td>
<td>-----</td>
</tr>
<tr>
<td>In-hosp mortality</td>
<td>2.1%</td>
<td>4.5%</td>
</tr>
</tbody>
</table>
Heart Failure in the United States of America: Prevalence and Etiology


<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>52</td>
<td>226</td>
</tr>
<tr>
<td>All cause mortality, HF rehospitalization</td>
<td>similar</td>
<td>similar</td>
</tr>
<tr>
<td>IDCMM</td>
<td>50 %</td>
<td>37 %</td>
</tr>
<tr>
<td>NIDCM</td>
<td>19 %</td>
<td>40 %</td>
</tr>
</tbody>
</table>
Diastolic Heart Failure

- Prognosis:
  - Asymptomatic diastolic dysfunction:
    - Natural history not adequately studied
  - Echocardiographic and Doppler studies
    - (Redfield et al, JAMA, 2003)
  - Risk of all cause mortality:
    - Mild dysfunction - 8.3 fold increase
    - Moderate to severe dysfunction – 10.2 fold increase
## Distolic and Systolic Heart Failure

<table>
<thead>
<tr>
<th></th>
<th>Mortality and Morbidity</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DHF</td>
<td>SHF</td>
<td></td>
</tr>
<tr>
<td>EF %</td>
<td>60</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Mort%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-hosp</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2-mo</td>
<td>6</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>6-mo</td>
<td>11</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Readmission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mortality%</td>
<td>53</td>
<td>56</td>
<td></td>
</tr>
</tbody>
</table>

(Adapted from: Danciu SC et al; AJC: 2006; 97, 256-259)
Systolic Heart Failure

- Risk factors
  - Hypertension
    - Coronary artery disease
    - Diabetes
    - Use of cardiotoxins
    - Family history of cardiomyopathy
Prognostic Factors In Heart Failure

- Age
- Race
- Diabetes
- Metabolic Syndrome
- Smoking
- Hypertension
Heart Failure in the United States of America

- Etiology of Diastolic Heart failure
  - Primary –hypertensive heart disease,
  - IHD, diabetes, ICRCM
- HCM
- Valvular HD,
- Pericardial disease
Heart Failure in the United States: Prevalence and etiology

• Is there any racial difference in survival with ICD therapy in systolic heart failure?

• In the SCD-Heft:
  • Mortality was equally reduced in both race groups:
  • hazard ratio
  • African Americans - 0.65
  • Whites - 0.73

Heart Failure in the United States of America: Prevalence and Etiology

- Gender differences in mortality in systolic heart failure:
- Prospective study: 158 patients, NYHA II-IV 60 yrs old or older; follow up-3.1 yrs
- Mortality:
  - Women - 24%
  - Men - 43%

Diastolic Heart failure

- Retrospective-Duke data base
- No. of patients - 1941
- EF % 50
- Years 1995-2004
- Mortality 548 patients (28%)
- SCD 40/548 (7.3%)
Criteria of Congestive Heart Failure
Framingham Study

Major criteria

- PND or Orthopnea
- Neck-vein distention
- Rales
- Cardiomegaly
- Acute pulmonary edema
- S3 gallop
- Increased venous pressure > 6 cm
- Circulation time > 25 sec.
- Hepatojugular reflux