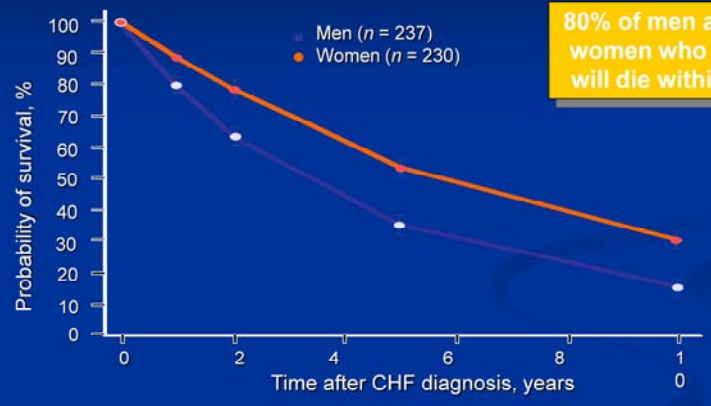
HEART FAILURE AND ARRHYTHMIAS

Prof.Dr.A.Oto,MD,FACC,FESC,FHRS
Dr.A.Ateş,MD
Department of Cardiology
Hacettepe University Faculty of Medicine

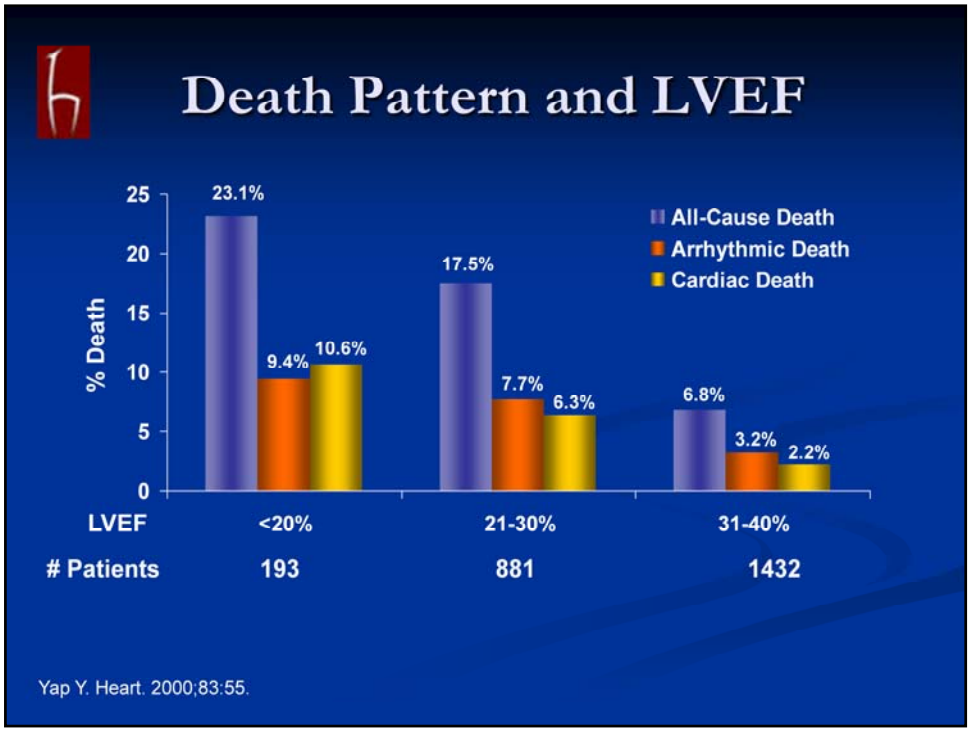
- Heart failure has been 'the new epidemic of cardıovasculer disease' for the 21.st century.
- Nearly 5 million CHF patients (prevalence) in the USA.
- 0.75-1 million 'new' CHF cases a year.
- 50% of these patients die suddenly.
- 25% probability of dying over 2.5 years

CHF Patients Survival Results



80% of men and 70% of women who have CHF will die within 8 years.

American Heart Association. *Heart Disease and Stroke Statistics—2003 Update.*



A marked depression of LVEF is the most powerful predictor of SCA. A LVEF < 0.30 is the most significant risk factor for SCA. This risk factor, however, has low specificity, since studies have shown more than 50% of SCA victims have a LVEF > 0.30.

A large registry study (n = 9,258) documented the rate of SCA among patients with varying degrees of left ventricular dysfunction.16 A strong relationship was found between LVEF and SCA, as shown above.

(Source: Vreede-Swagemakers JJ. *J Am Coll Cardiol*. 1997;30:1500-1505)

- Every survivor of acute myocardial infarction is a potential congestive heart failure patient ,who will need CHF and sudden cardiac death risk reduction.

ARRHYTHMIAS AND HEART FAILURE

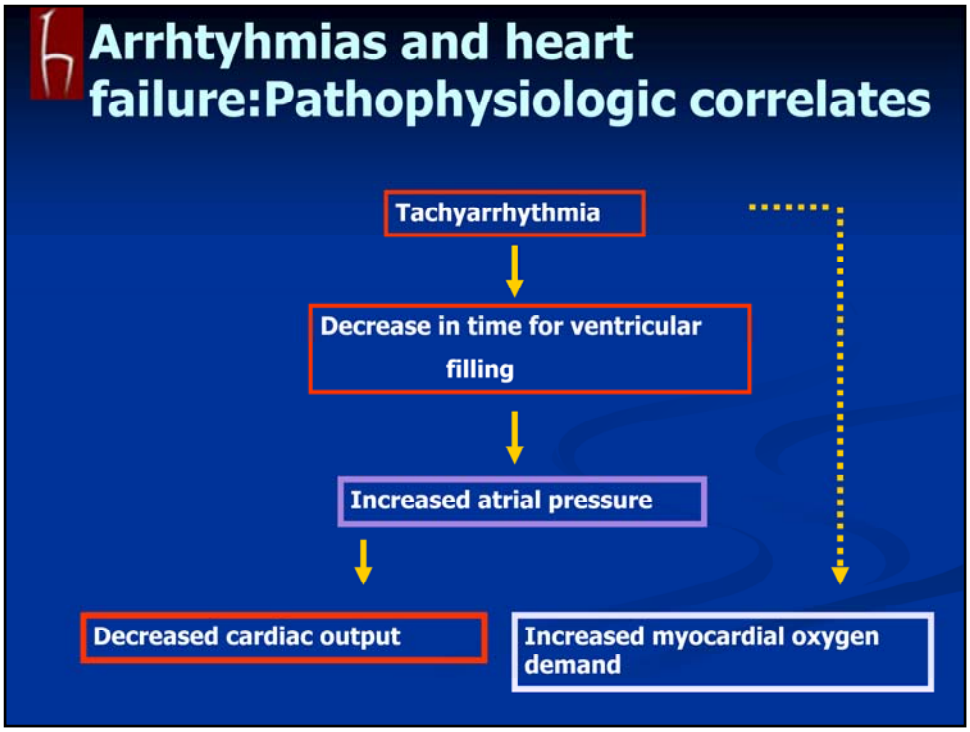
- Cardiac arrhytmias are common in patients with heart failure.
- The development of arrhythmias may precipitate heart failure

ARRHYTHMIAS AND HEART FAILURE

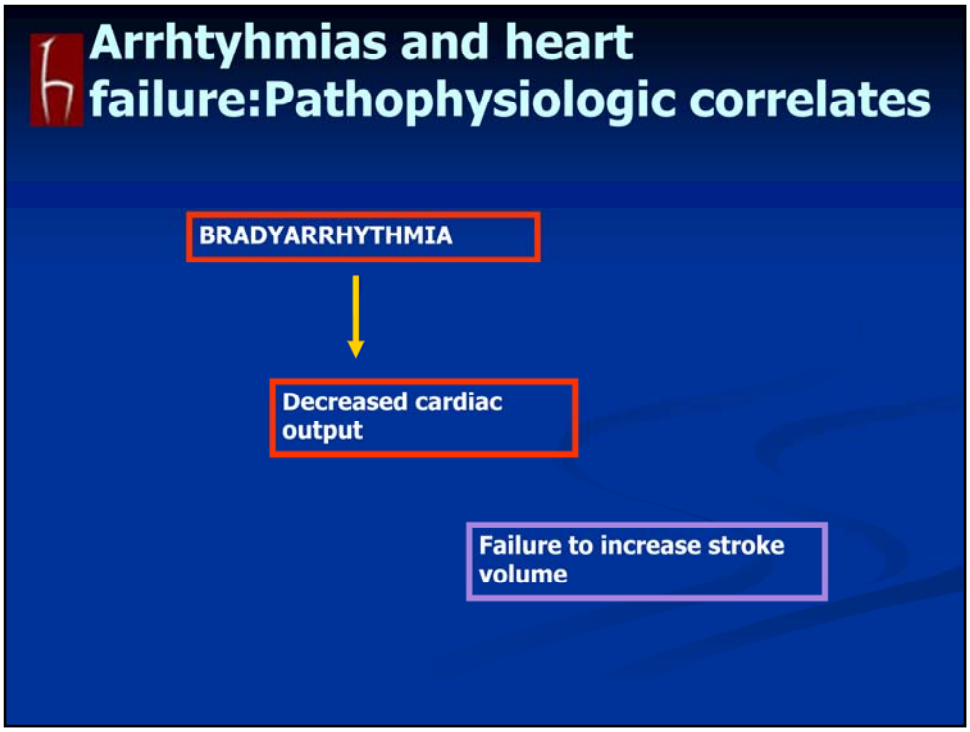
- The development of arrhythmias may precipitate heart failure through several mechanisms:

1. Tachyarrhythmias(most commonly atrial fibrilation)
2. Marked bradicardia
3. Atrioventricular dissociation
4. Abnormal intraventricular conduction

Arrhtyhmias and heart failure:Pathophysiologic correlates



Arrhtyhmias and heart failure:Pathophysiologic correlates



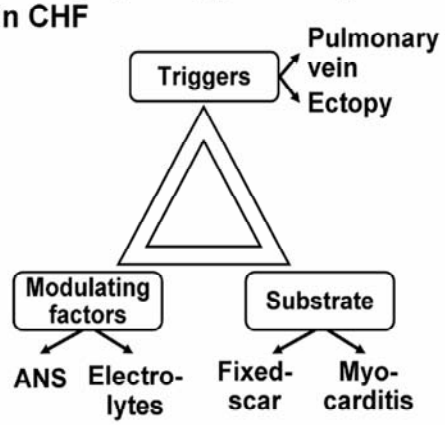
Arrhtyhmias and heart failure:Pathophysiologic correlates

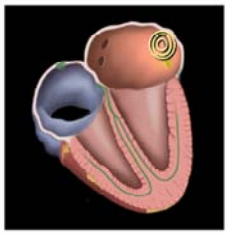
- Atrioventricular dissociation results in decreased ventricular filling , increasd atrial pressure, decreased cardiac output
- Abnormal intraventricular conduction impairs ventricular synchrony and decreasess myocardial performance

HEART FAILURE AND ATRIAL FIBRILLATION

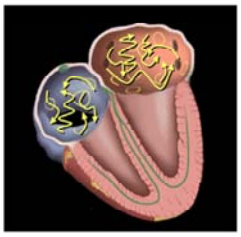
- Atrial fibrillation is a frequent arrhythmia in heart failure.
- Prevalence of atrial fibrillation increases with worsening ventricular dysfunction
- **AF may aggravate heart failure and increases the risk of stroke and mortality**
- Some structurel changes like fibrosis may contribute to AF in HF.
- AF reduces the functional capacity of the HF patient.

Pathophysiology of Arrhythmia in CHF



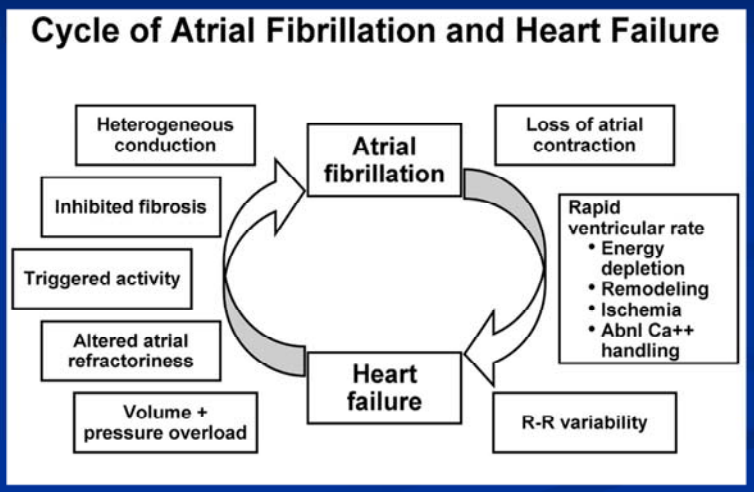


Focal trigger

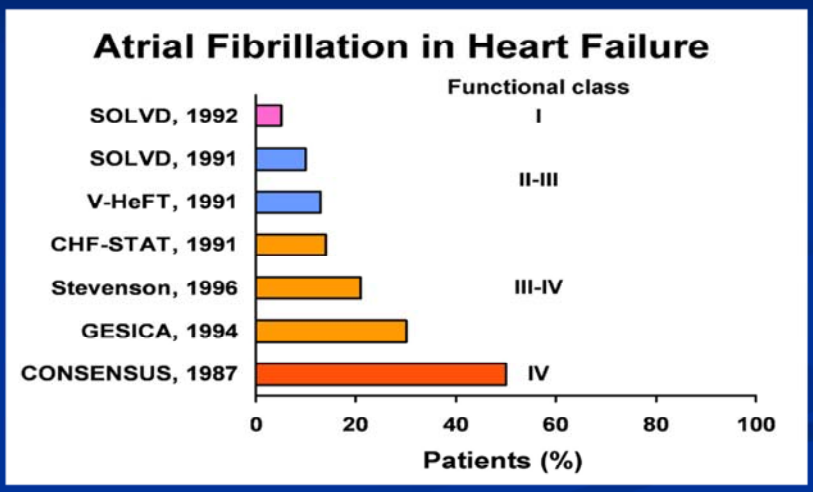


Multiple wavelets

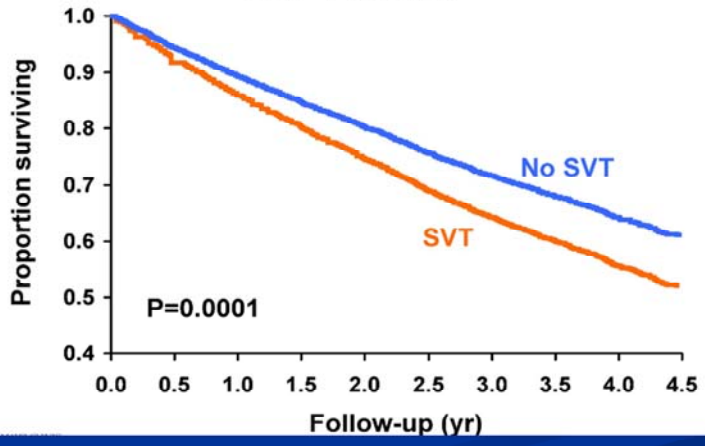
PATHOPHYSIOLOGY OF AF IN HEART FAILURE



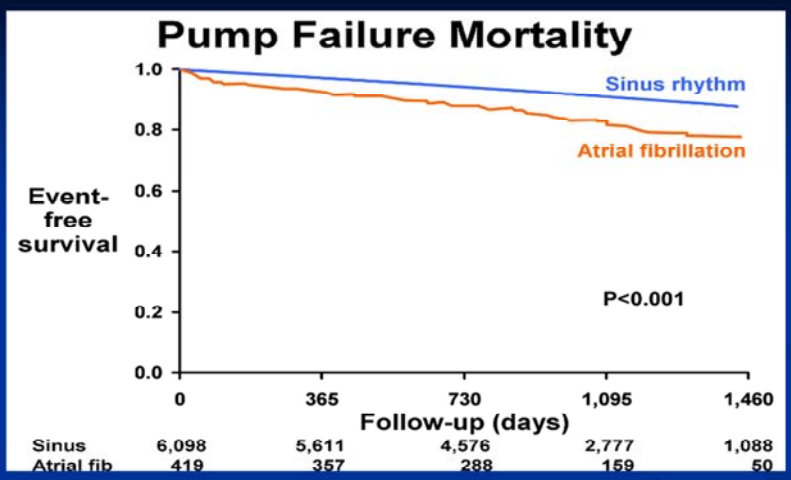
AF AND SEVERITY OF HEART FAILURE



Effect of SVT on All-Cause Mortality in CHF Patients



The DIG Investigators. *Chest.* 2000;118:914-922.
From: Shivkumar, Weiss, Fonarow, and Narula; eds. *Braunwald's Atlas of EP in HF.*



SOLVD Investigators: *J Am Coll Cardiol.* 1998;32:695-703.
From: Shivkumar, Weiss, Fonarow, and Narula; eds. *Braunwald's Atlas of EP in HF.*

TREATMENT OF AF IN HEART FAILURE

- **Pharmacological**
  - Drugs for heart failure(beta blockers,ACEI,diuretics,nitrates,digitalis…)
  - Drugs for arrhythmia(amiodarone…)
- **Non Pharmacological**
  - Catheter ablation (atria)
  - AV nodal ablation and CRT

TREATMENT OF AF IN HEART FAILURE

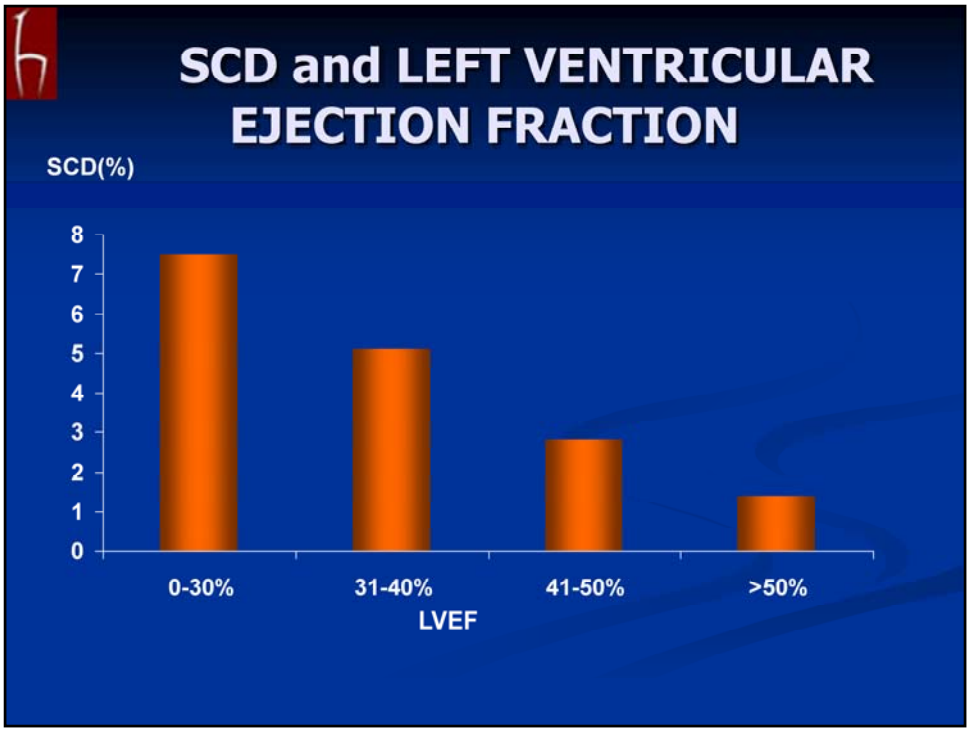
- For most patients an attempt to restore and maintain sinus rhythm is warrented.If sinus rhythm cannot be restored, good rate control remains an important therapeutic goal.
- The most important antiarrhythmic agent for maintenance of sinüs rhythm in heart failure patients is amiodarone.
- Other antiarrhythmic agents like propafenone and sotalol may exacerbate heart failure and increase mortality in patients with ischemic heart disease.

HEART FAILURE AND SUDDEN DEATH

- Sudden death is common in heart failure and accounts for approximately one third of the deaths .
- SCD occurs 6-9 times higher than general population.
- Most common cause of SCD in these patients is ventricular tachyarrhythmia.

SCD AND HEART FAILURE

- Reduced left ventricular ejection fraction (LVEF) remains the single most important risk factor for overall mortality and SCD.
- Increased risk is measurable at ejection fractions above 30 percent, but an ejection fraction equal to or less than 30 percent is the single most powerful independent predictor for SCD.


SCD and LEFT VENTRICULAR EJECTION FRACTION
SCD(%)
8
7
6
5
4
3
2
1
0
0-30%
31-40%
41-50%
>50%
LVEF

VENTRICULAR ARRHYTHMIAS IN HF

- **Ventricular arrhythmias ranging from asymptomatic ventricular premature beats(VPBs) to ventricular fibrilation , are common in patients with heart failure.**

→ ***Malignant or potentially lethal arrhytmias***: Sustained VT or VF…

→ ***Nonsustained or hemodinamically tolerated arrhthmias***: NSVT,accelerated idioventricular rhthm(AIVR)…

VENTRICULAR PREMATURE BEATS IN HEART FAILURE

- VPBs occur in 70-95% of patients with heart failure.They may be frequent and complex.
- VPBs can cause symptoms,usually palpitation . Symptoms are generally mild and most patients require no specific therapy.Beta blockers can help control symtoms in some situations.
- Because of proarrhythmic risks other antiarrhythmic drugs are not in routine use. Amiadarone and dofetilide may be helpful.

NSVT IN HEART FAILRE

- NSVT may be observed in %50-80 of patients with heart failure or cardiomyopathy.
- NSVT has a predictive value for future malignant arrhythmias and mortality.
- As with VPBs, there is no need for pharmacologic supression of NSVT to reduce the risk of malignant arrhythmias or SCD.
- NSVT is often asymptomatic, but sometimes patients cmay have palpitations,presyncope or dyspnea.
- Beta blokers, amiadarone , dofetilide or catheter ablation are potential therapeutic options.

ACCELERATED IDIOVENTRICULAR RHTYHM (SLOW VT) IN HEART FAILURE

- Arises from below the atrioventricular node with a rate of 50-100/min.
- AIVR occurs in approximately %8 patients with heart failure. and in %50 patients during acute MI setting.
- Mostly transient and require no treatment.
- If AIVR is an escape ryhthm, pharmacologic treatment is contraindicated because of the risk of asystole.
- Patients with symptomatic AIVR due to sinus node dysfunction,may benefit from atrial pacing.

SUSTAINED VT OR VF IN HEART FAILURE

- SVT is unusual and occurs in <%5 patients with HF.
- Survivors of SCD due to unstable VT or VF , should be referred to an electrophysiologist for consideration of a defibrillator and antiarrhythmic therapy.

CONCLUSIONS

- A WIDE SPECTRUM OF ARRHYTHMIAS IS PART OF THE HEART FAILURE SYNDROME
- ATRIAL FIBRILLATION IS AN IMPORTANT CAUSE OF MORBIDITY AND MORTALITY IN HF
- ROLE OF ANTIARRHYTHMIC THERAPY IN HEART FAILURE IS LIMITED
- ICD AND CRT-ICD ARE REASONABLE OPTIONS TO PREVENT SUDDEN DEATH IN HF