MEDICAL CENTER ALKMAAR

# HARTFALEN ANNO 2010

## diagnostiek en pathofysiologie

Jan Hein Cornel
Medisch Centrum Alkmaar

http://www.nvvc.nl/richtlijnen/bestaande-richtlijnen#Hoofdgroep2

# Acute Dyspnoe

- Exacerbatie COPD
- Hartfalen
- Boezemfibrilleren met snelle ventrikelrespons
- Acuut coronair syndroom

MEDICAL CENTER ALKMAAR

# Definitie hartfalen

Hartfalen is een complex van klachten en verschijnselen tgv een tekort schietende pompfunctie.

Gouden standaard in de diagnostiek ontbreekt.

MEDICAL CENTER ALKMAAR

# Definitie hartfalen

Symptomen (dyspnoe/vermoeidheid)

Verschijnselen (CVD/3e toon/lever)

Objectief bewijs (echocardiogram)

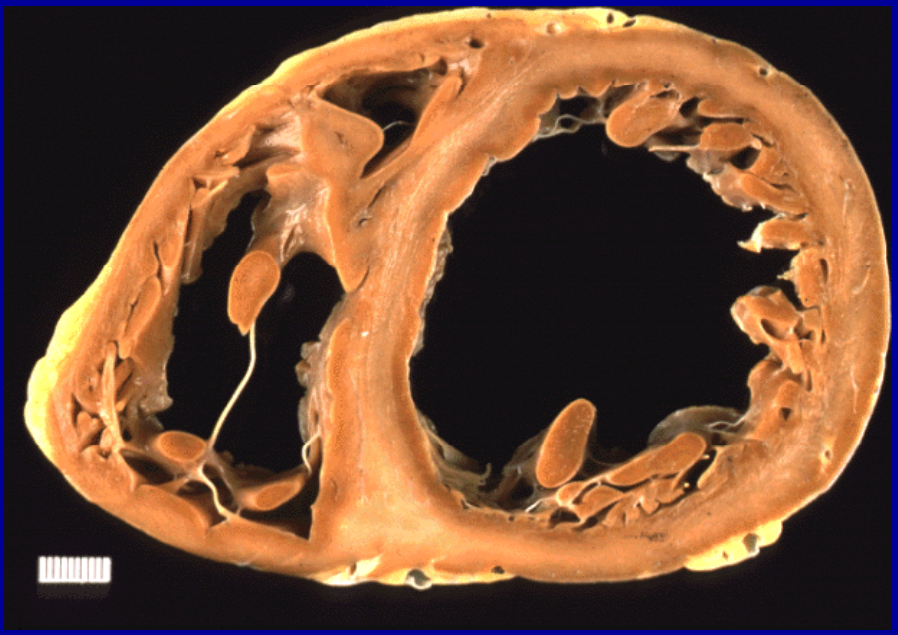
Asymptomatische LV disfunctie is geen hartfalen

# Indeling

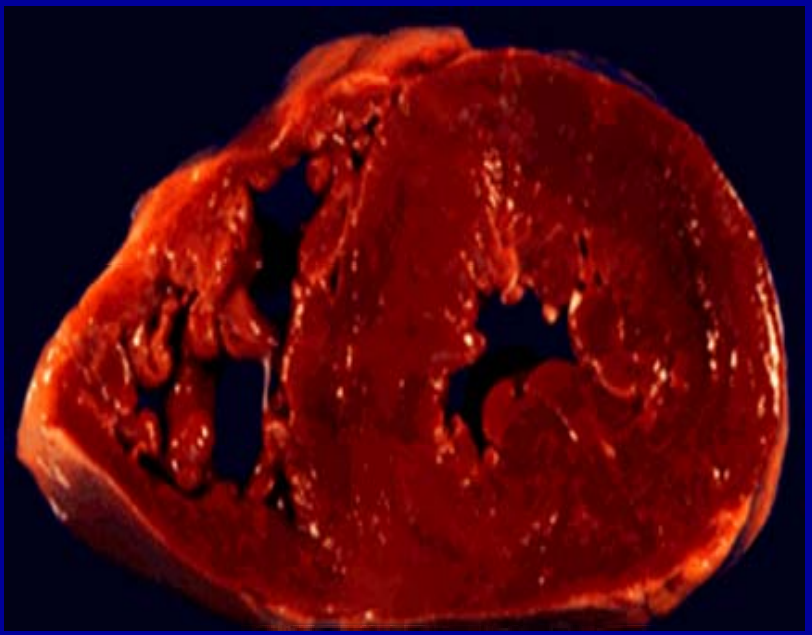
- *Nieuw* ontstaan HF
- *Tijdelijk* HF
- *Chronisch* HF

- acuut vs chronisch
- systolisch vs diastolisch

Systolisch



Diastolisch



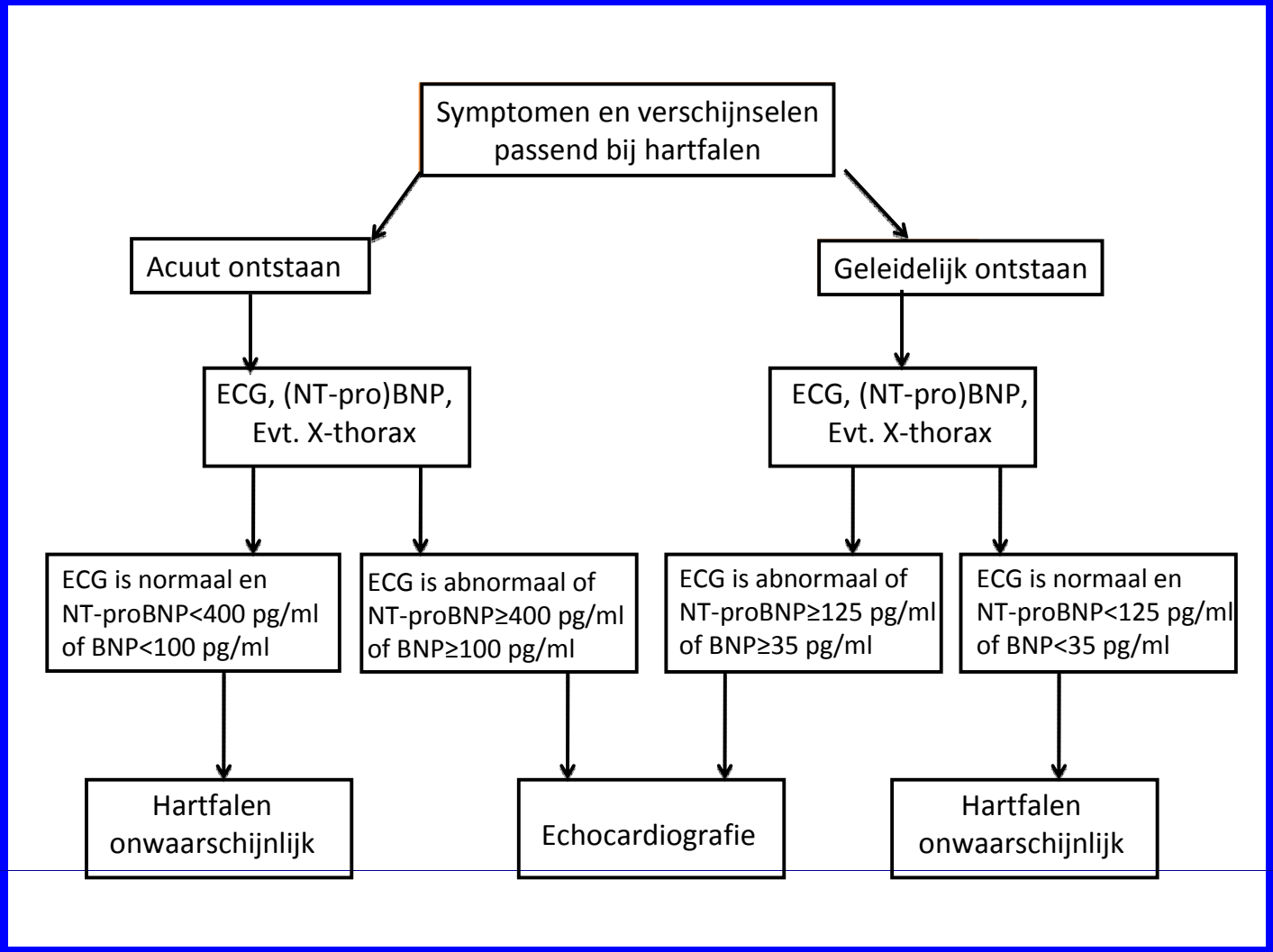
# Klinische karakteristieken van patiënten

| Kenmerken | Systolisch HF | Diastolisch HF |
|---|---|---|
| • Leeftijd | < 65 jaar | > 75 jaar |
| • % Vrouwen | 35 | 65 |
| • % Hypertensie | 62 | 85 |
| • % CHD | 86 | 45 |
| • Validiteit | ↓ | ↓ |
| • Syst RR | ↓ of normaal | ↑ |
| • BNP | ↑↑ | ↑ |
| • Morbiditeit | ↑↑ | ↑↑ |
| • Mortaliteit | ↑↑ | ↑ |

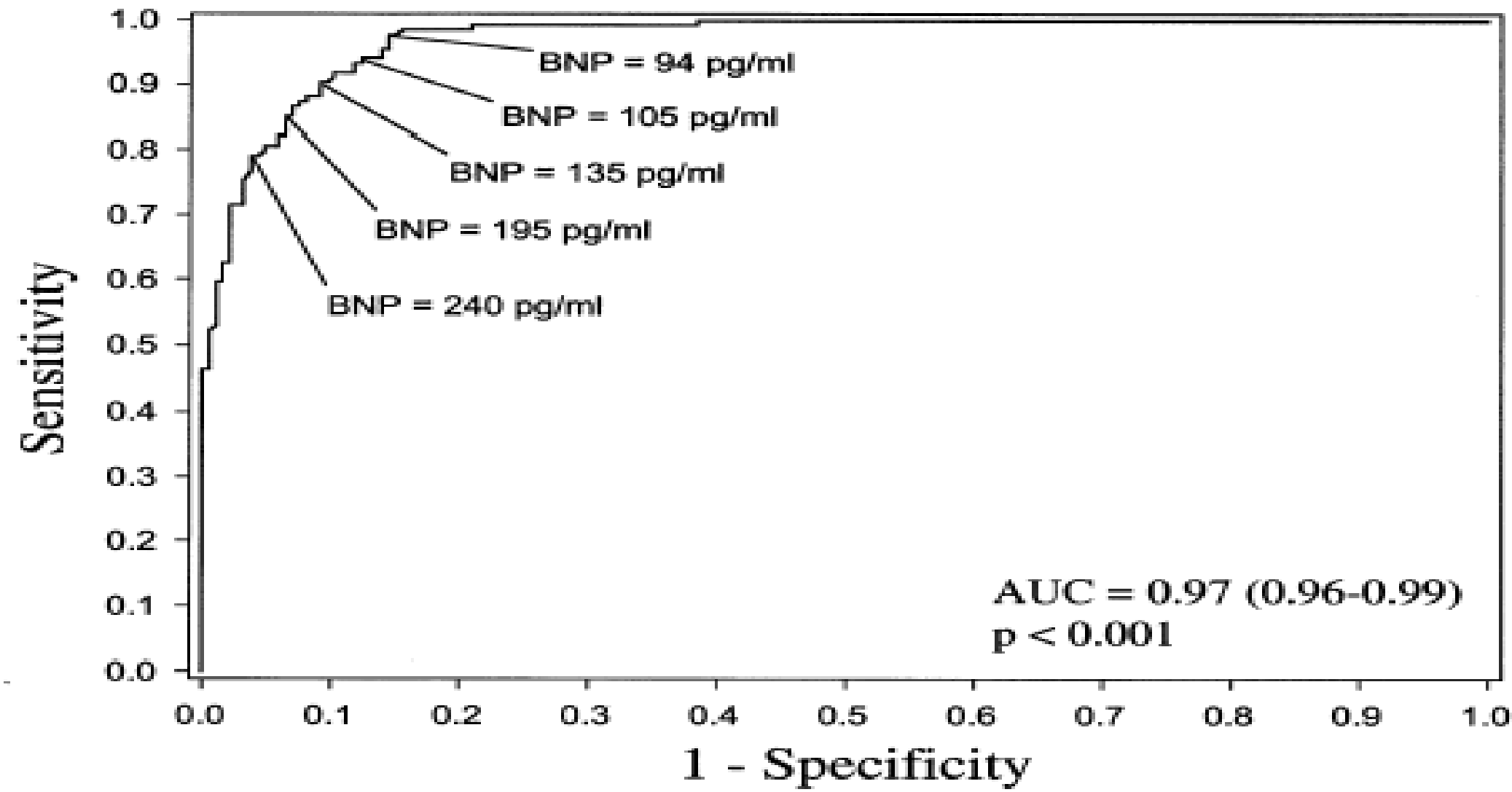
# Pijlers klinische diagnostiek

- Voorgeschiedenis, anamnese, lichamelijk onderzoek
- ECG
- (X thorax)
- objectieve aanwijzingen voor LV dysfunktie (BNP, echocardiogram)

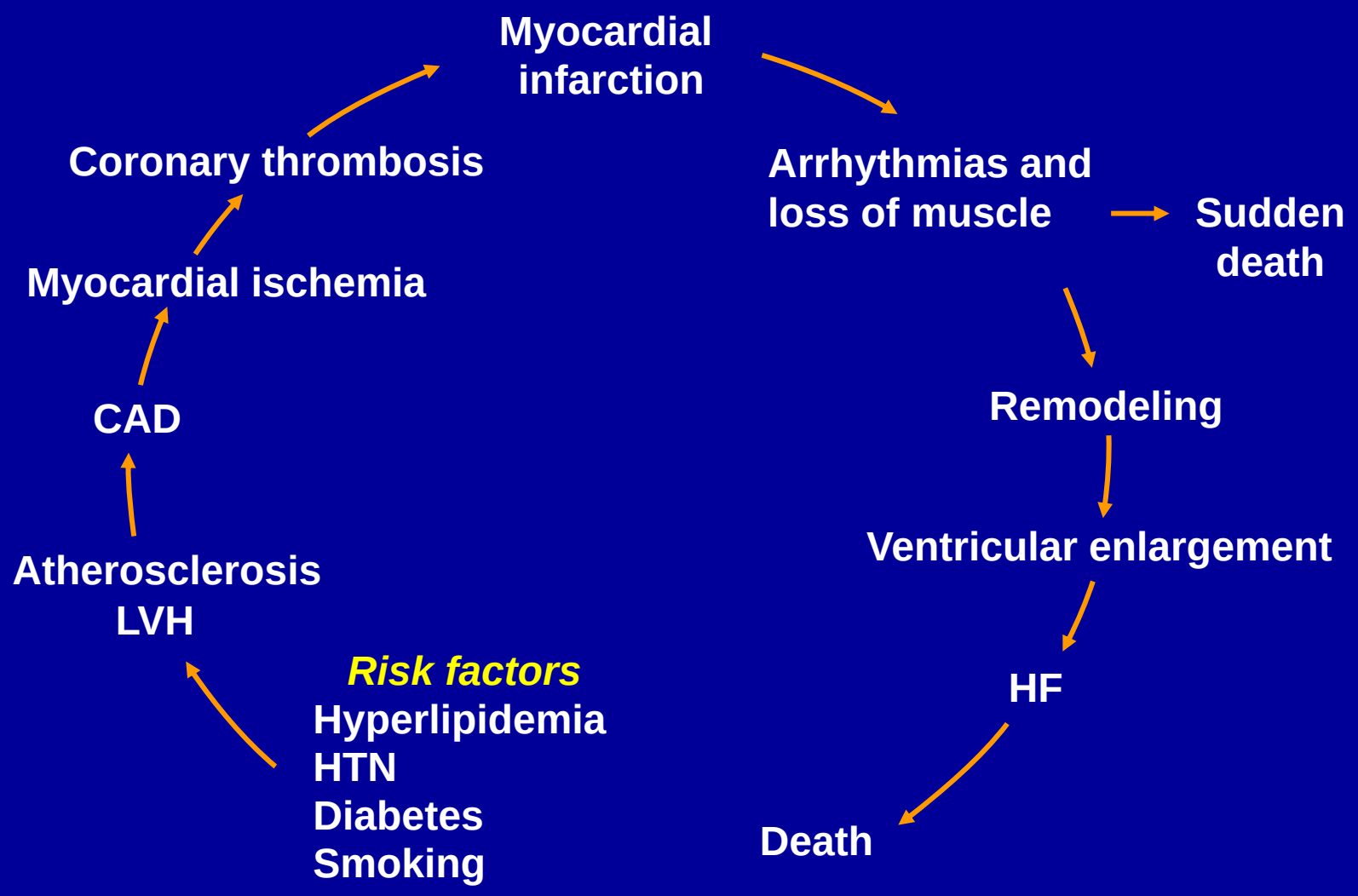
# Algoritme diagnostiek



# ROC-curve


BNP = 94 pg/ml
BNP = 105 pg/ml
BNP = 135 pg/ml
BNP = 195 pg/ml
BNP = 240 pg/ml
AUC = 0.97 (0.96-0.99)
p < 0.001
Sensitivity
1 - Specificity
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

# Cardiovascular Continuum 1988




Dzau and Braunwald. Am Heart J 1991;121:1244

MEDICAL CENTER ALKMAAR

# Potentieel reversibel hartfalen

- ischemische cardiomyopathie
- hypertensie
- kleplijden (primair)
- schildklierlijden
- tachyaritmie
- alcohol
- myocarditis
- peripartum
- pheochromocytoom/hypoparathyreoidie
- anemie
- stress cardiomyopathie

MEDICAL CENTER ALKMAAR

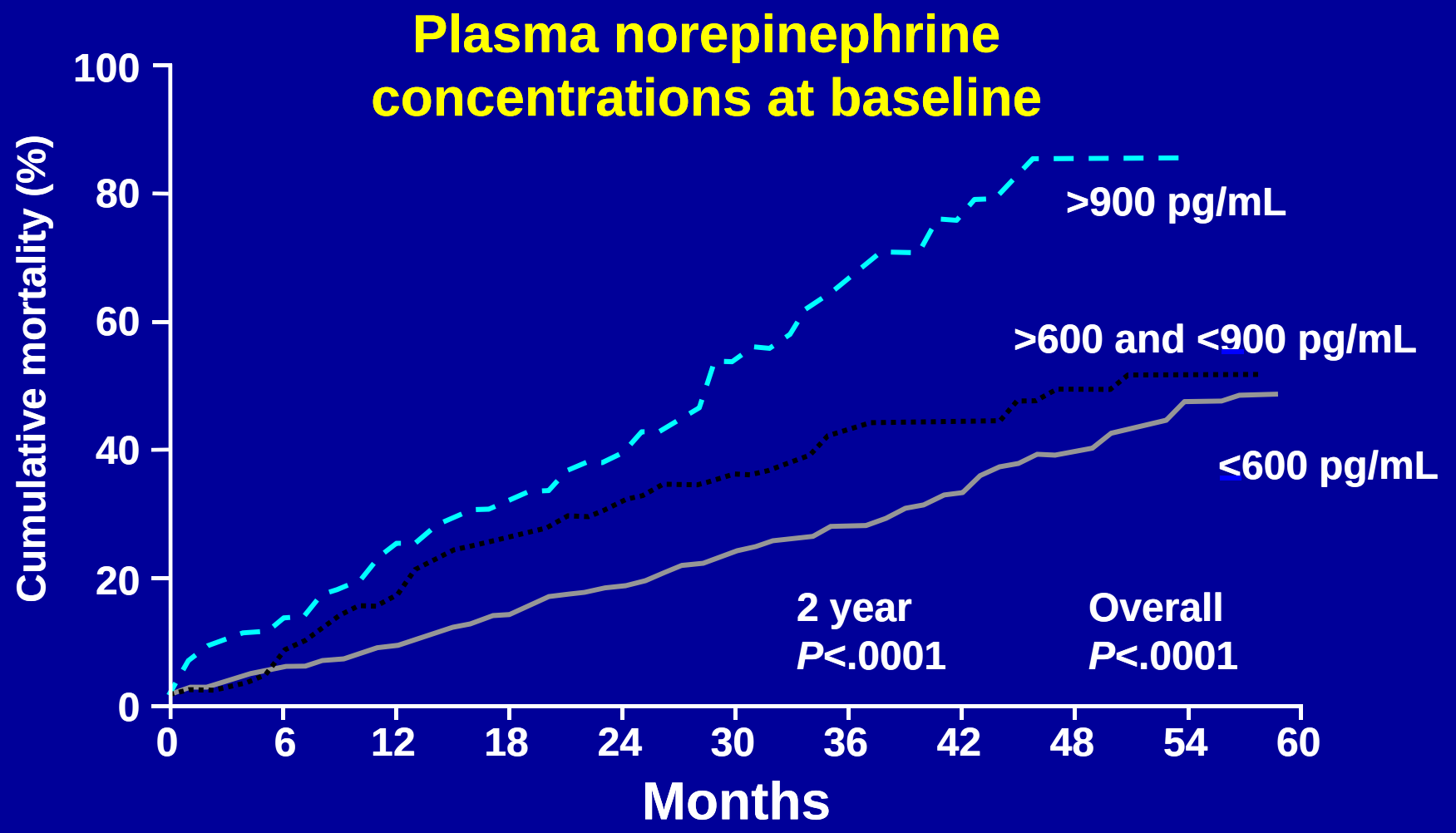
# Patholysiologie hartfalen

Overspannen circulatie

Neurohumorale model

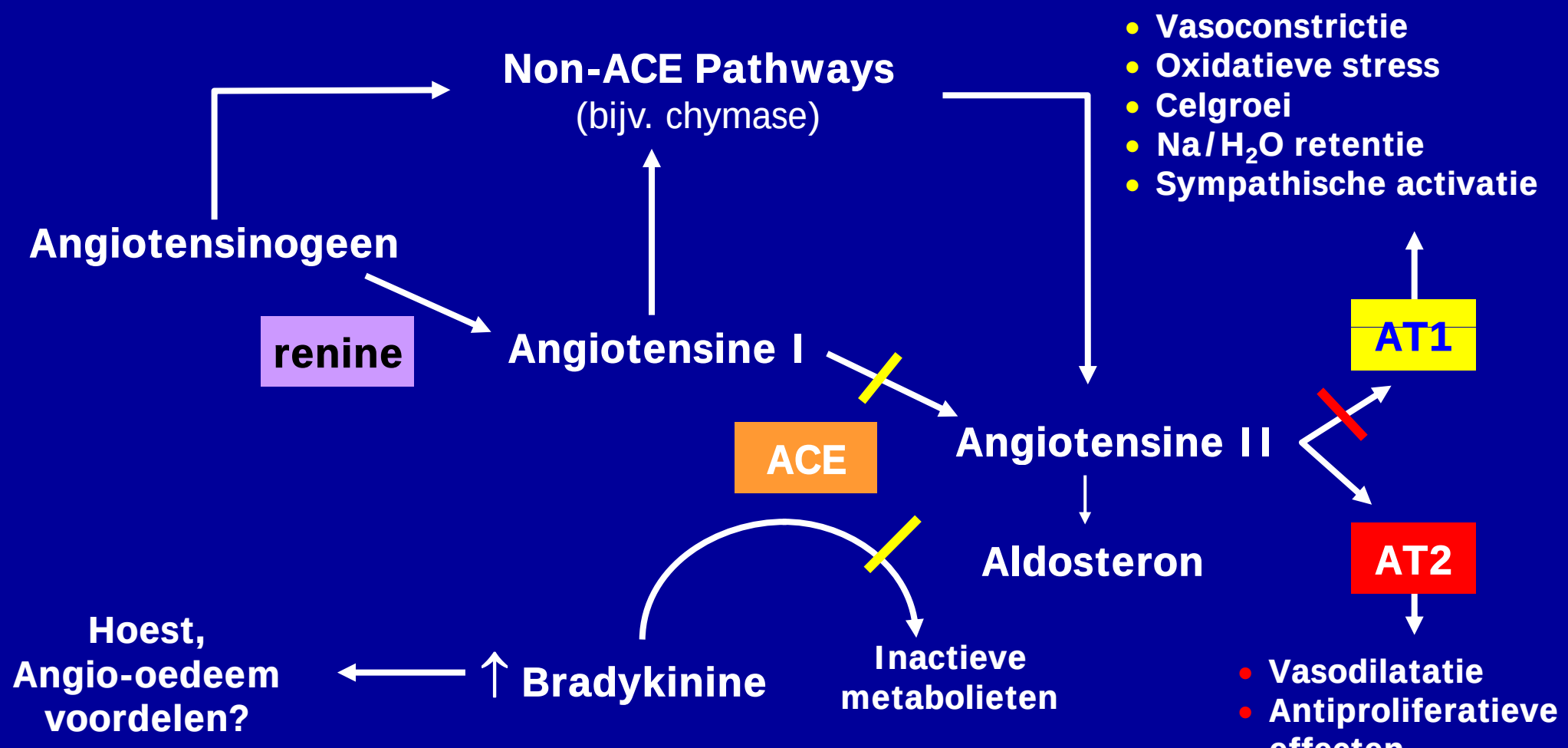
Oa activatie RAAS/NP systeem

# Imbalance of Mediators in Patients With Congestive Heart Failure: V-HeFT II



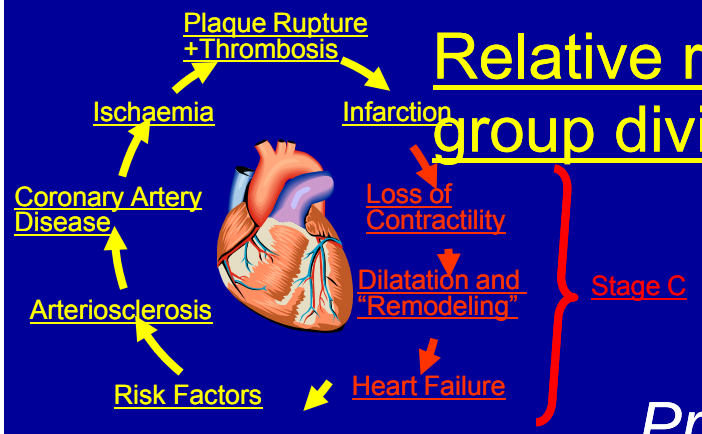

V-HeFT, Vasodilator - Heart Failure Trial
Adapted from Francis et al. Circulation 1993;87(suppl VI) VI-40

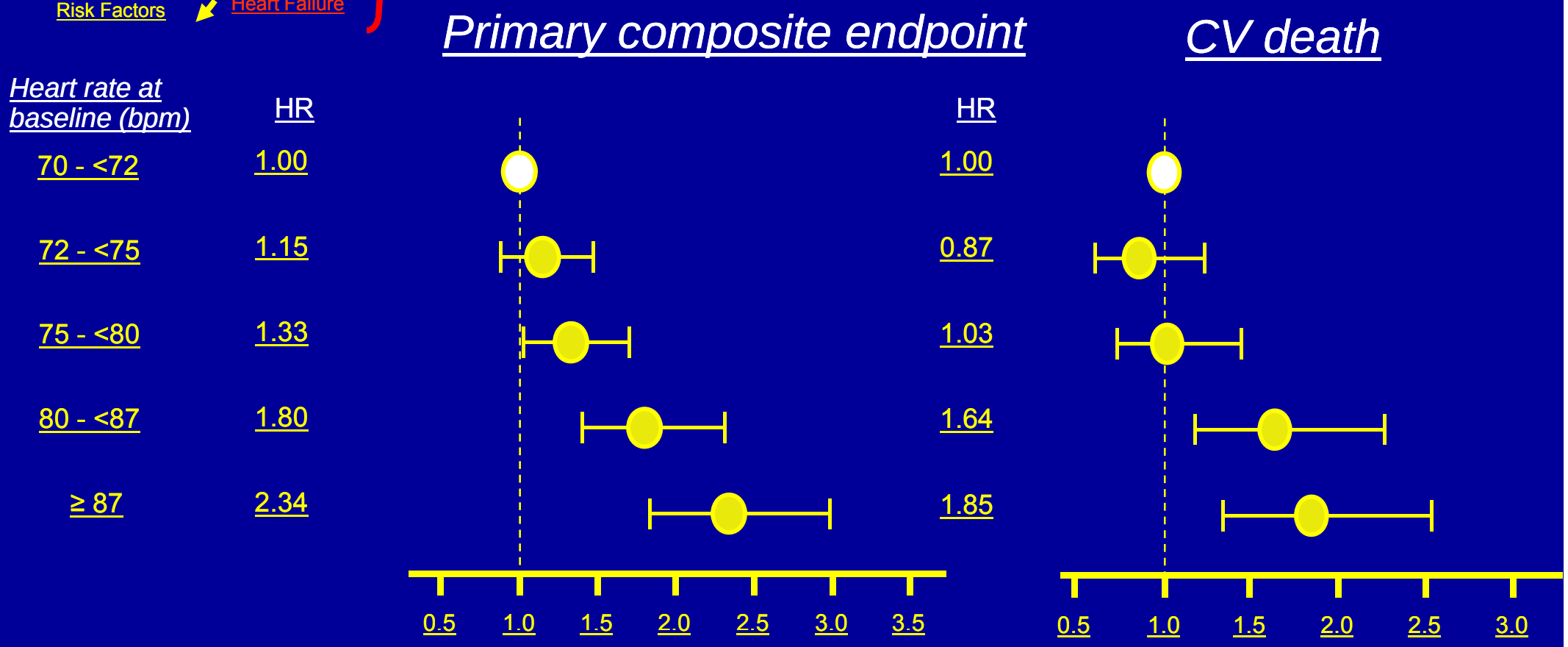
# Renine Angiotensine Aldosteron Systeem




Siragy, Am J Cardiol 1999:84;3S-8S; Fogari, Blood Pressure, 2001:10;6-15
Pfeffer, data gepresenteerd tijdens Scientific Sessions AHA, Orlando 2003
Fogari, Blood Pressure, 2001:10;6-15

# Relative risk of primary composite endpoint in the placebo group divided by quintiles of HR



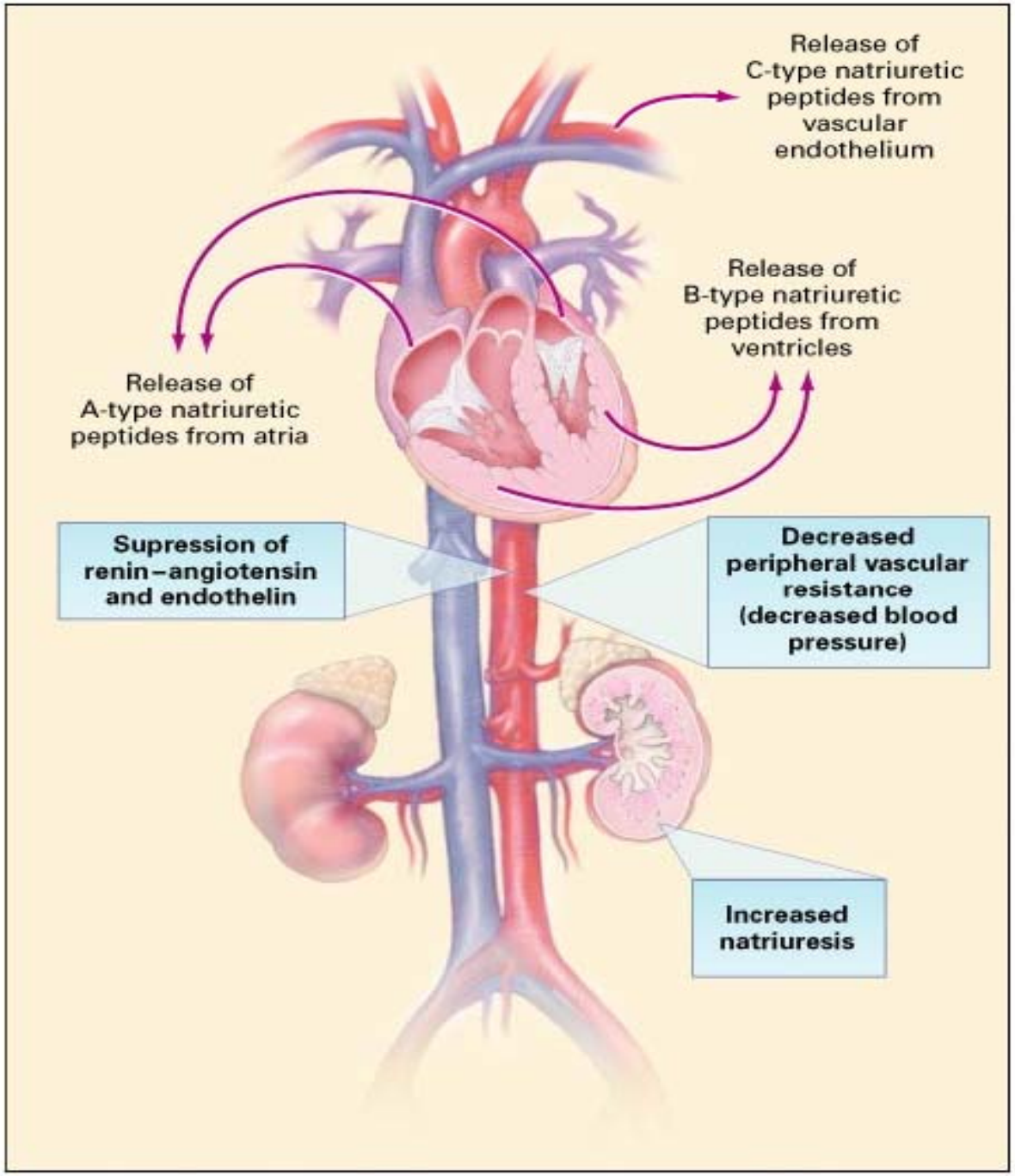




Primary composite endpoint: risk increases by 3% per 1-bpm increase, and by 16% per 5-bpm increase

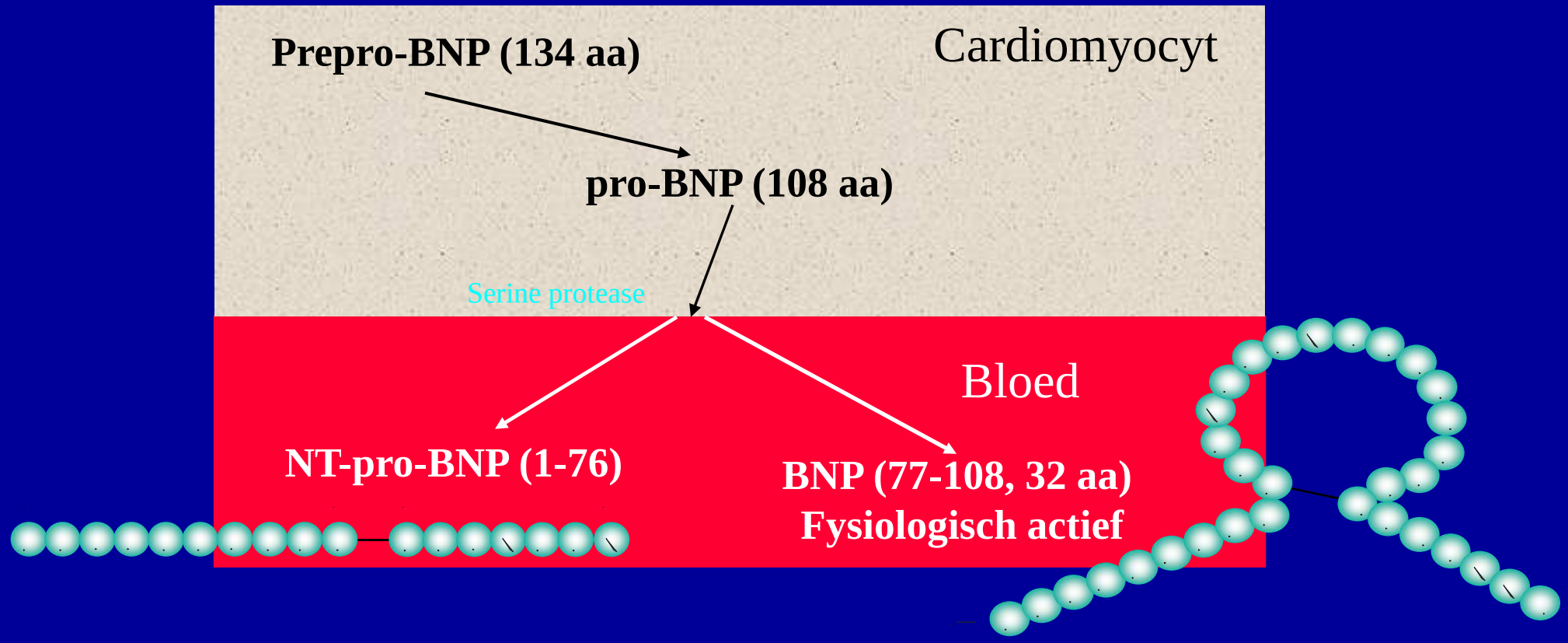
Böhm et al, *Lancet*, 2010. Online August 29.

# Functie

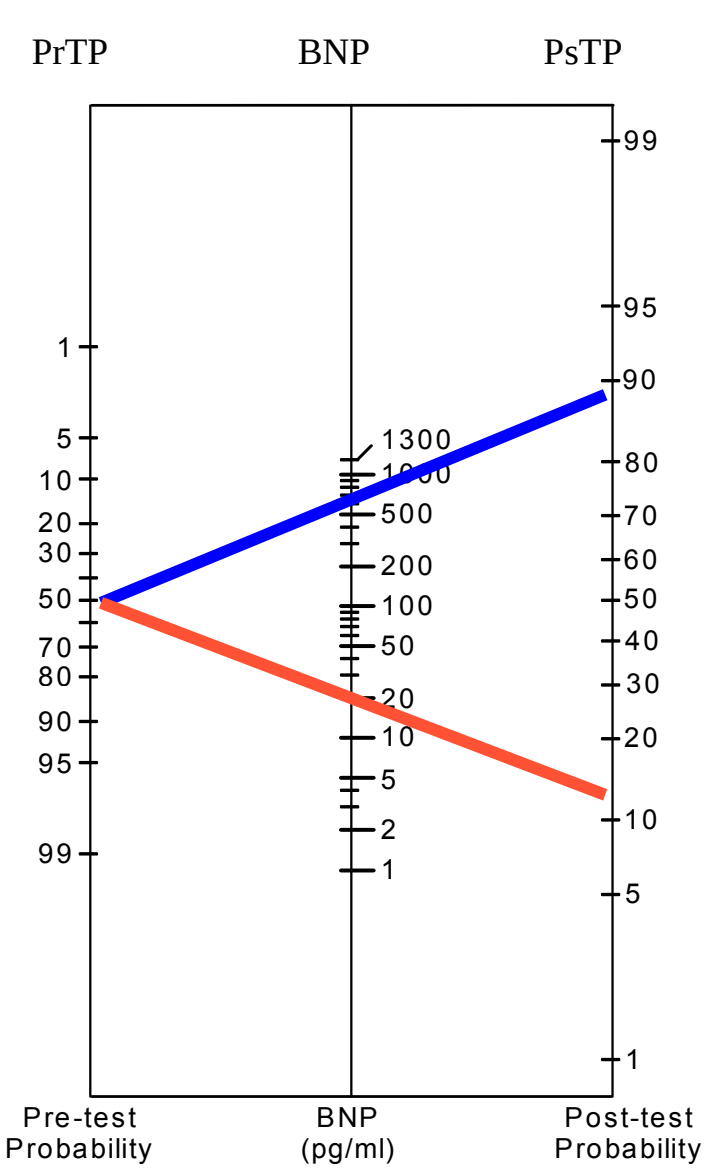
- BNP (ventrikels)
  - -Ventriculaire rek / toename wandspanning
    - ↑ Natriurese
    - ↑ Diurese, ↓BP
    - ↓ Renine
- ANP (atria)
  - -Toename wandspanning atrium
    - ↑ Natriurese
    - ↑ Diurese, ↓ BP
    - ↓ Renine
- CNP (vaatendotheel)
  - -Vaatverwijding



# BNP synthese en secretie



# Congestive Heart Failure Diagnosis Nomogram




***In Patients With 50% Probability***
***- BNP Value of 1000 pg/mL***
***- BNP Value of 20 pg/mL***

McCullough P, et al. *Circulation*. 2002;106.

# Echocardiografie

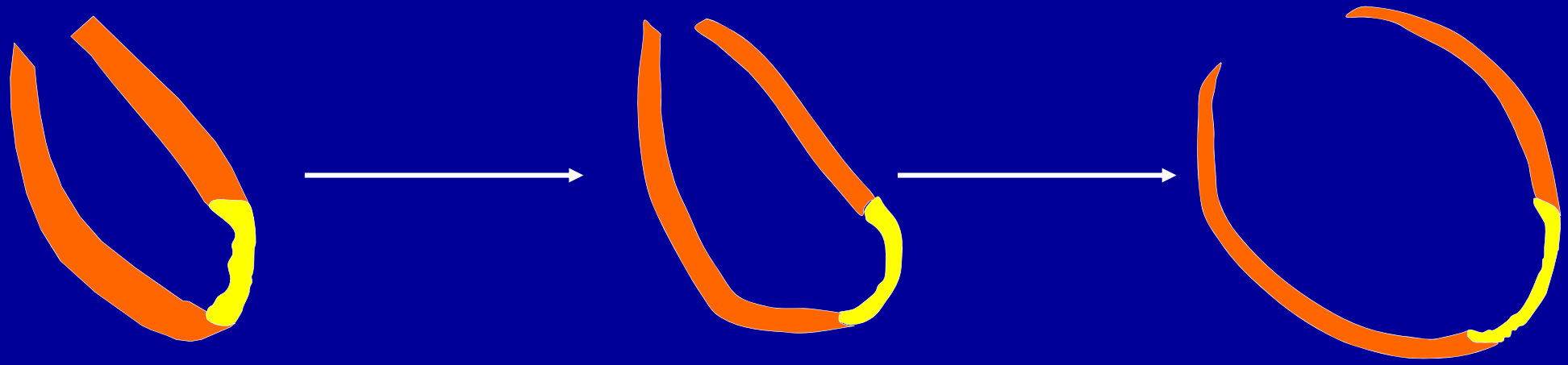
- Bepalen van dimensies, hypertrofie en coordinatie
- Behulpzaam bij ontdekken van reparabele oorzaken van hartfalen (kleplijden, coronairlijden)
- Geeft diagnostische informatie
- Geeft prognostische informatie
- Simpel, non-invasief and niet duur

MEDICAL CENTER ALKMAAR

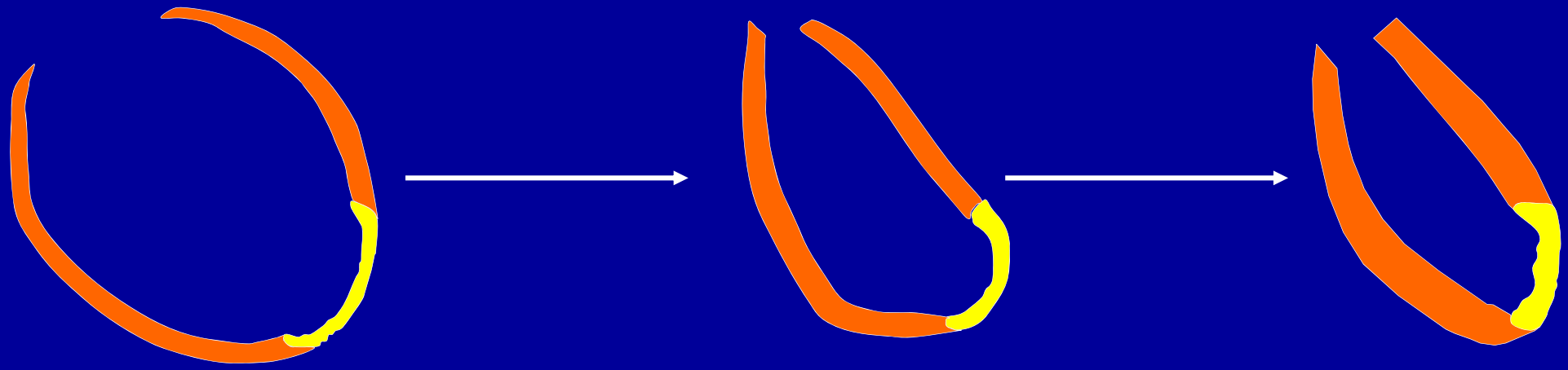
# Waarde echo/doppler bij FU

- dimensies, vorm, LVEF
- inschatten vullingsdrukken (TI, VCI, TDI)
- synchrone contractie?

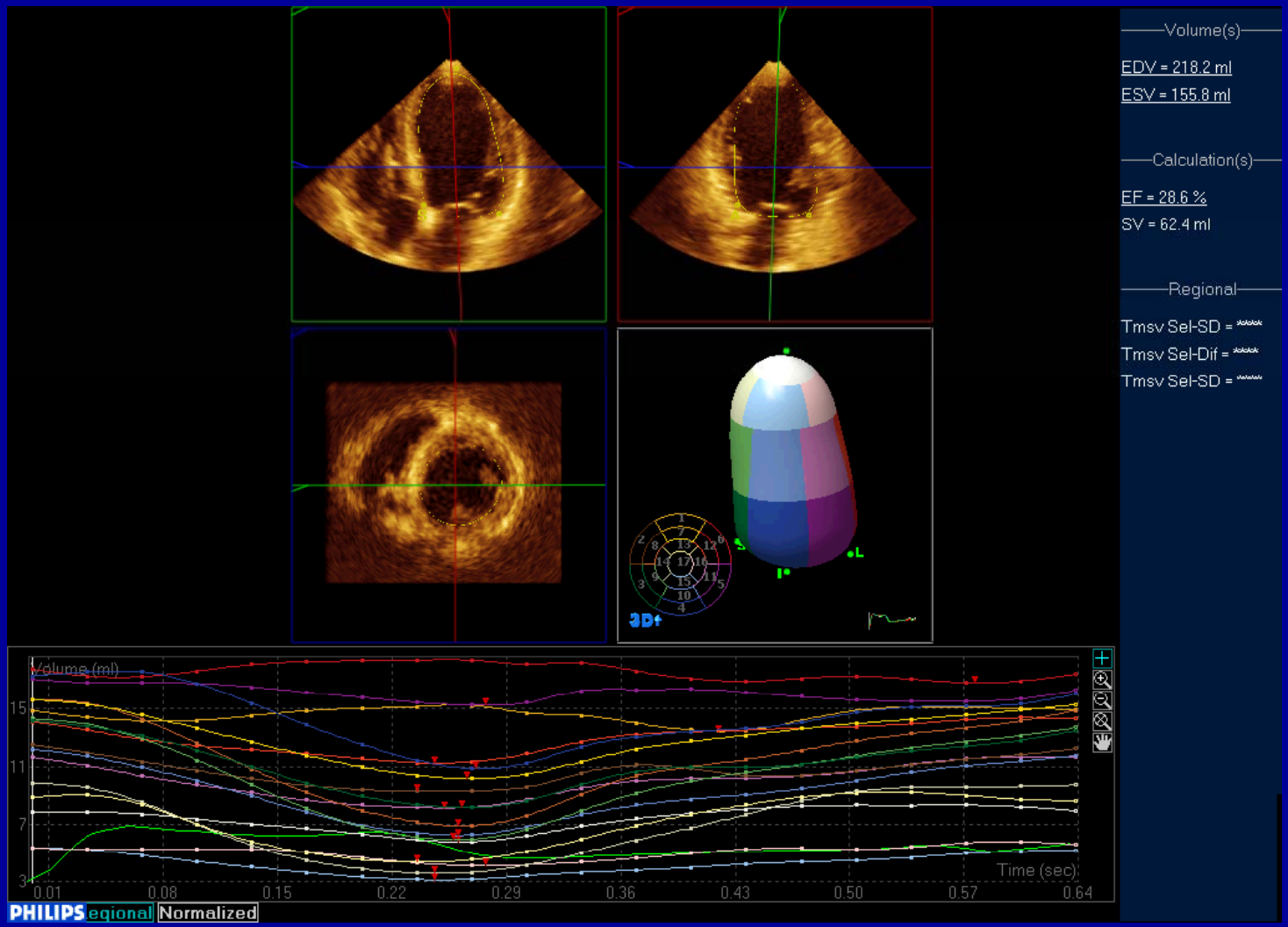
# Progression of remodelling



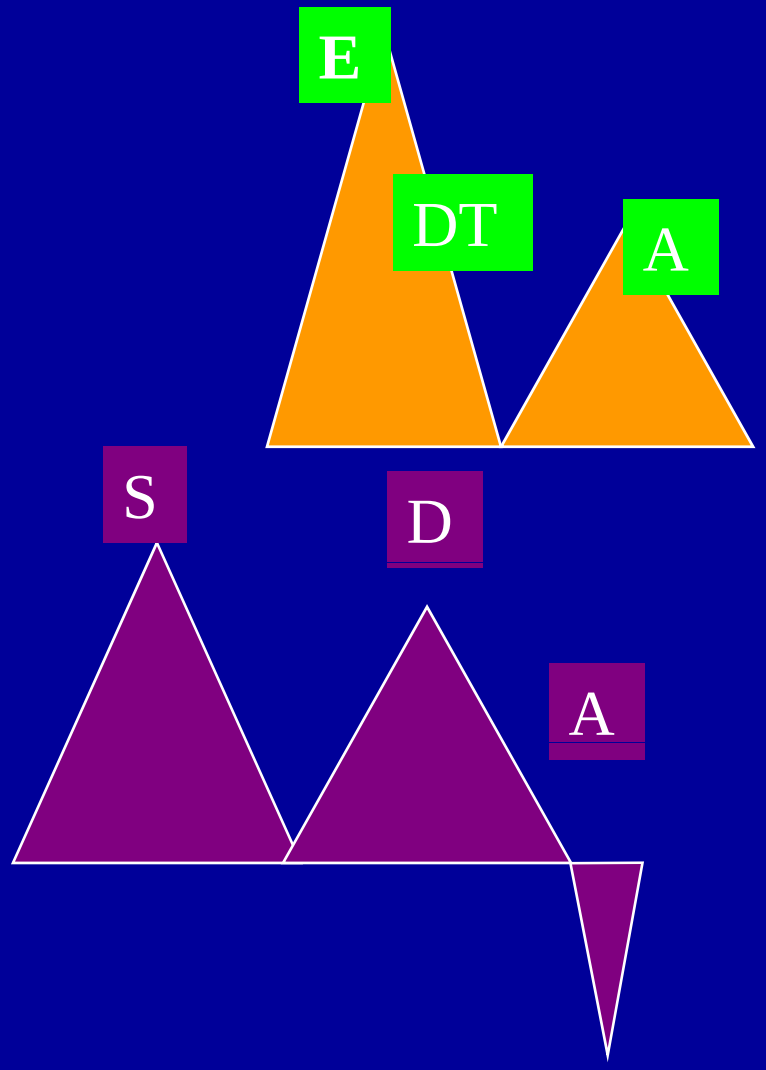
# Regression of remodelling: possible



# 3DE


Volume(s)
EDV = 218.2 ml
ESV = 155.8 ml
Calculation(s)
EF = 28.6 %
SV = 62.4 ml
Regional
Tmsv Sel-SD =
Tmsv Sel-Dif =
Tmsv Sel-SD =
Volume (ml)
15
11
7
3
0.01
0.08
0.15
0.22
0.29
0.36
0.43
0.50
0.57
0.64
Time (sec)
PHILIPS
Normalized

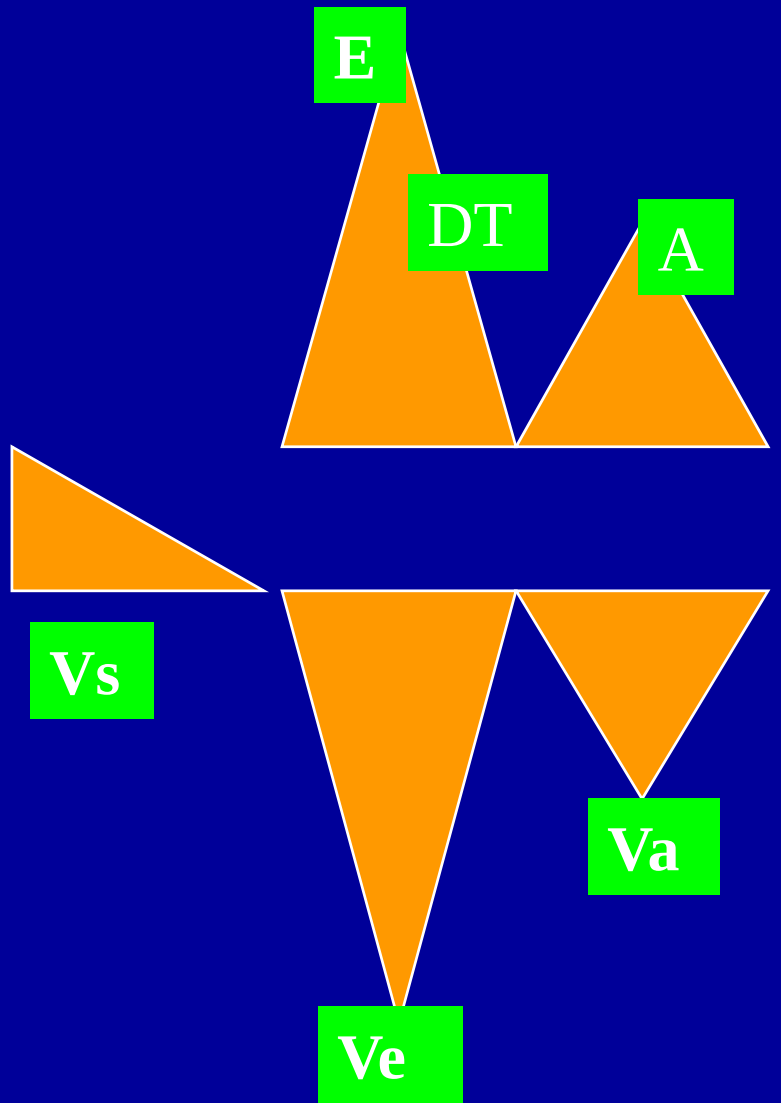
# Normal Relaxation




Mitral Valve Flow

Pulmonary Vein Flow

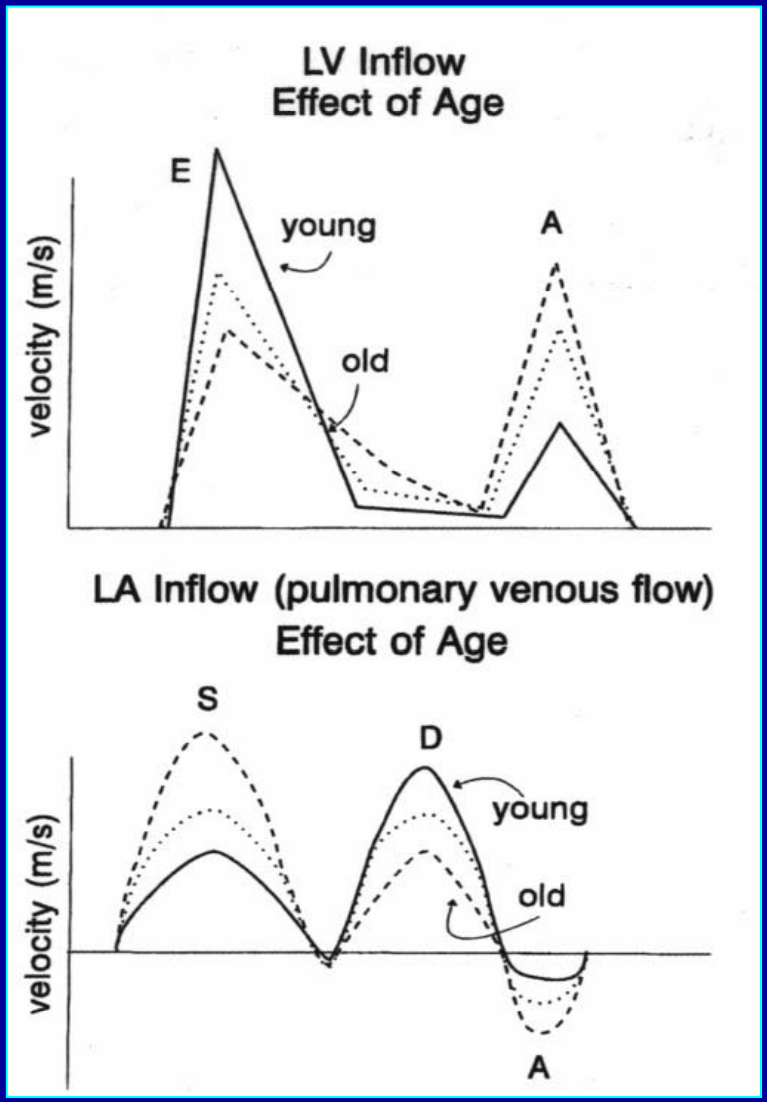
# Normal Relaxation

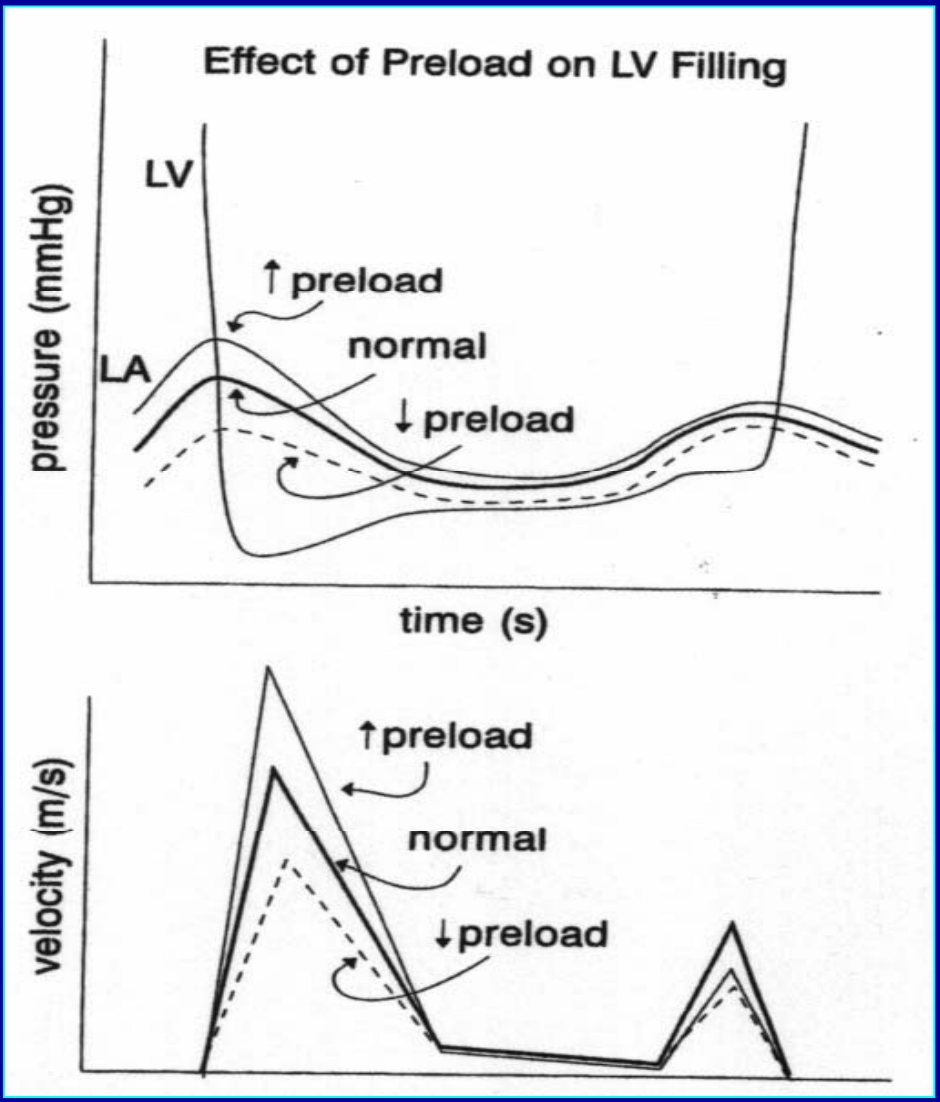



Mitral Valve Flow

Tissue Doppler Imaging

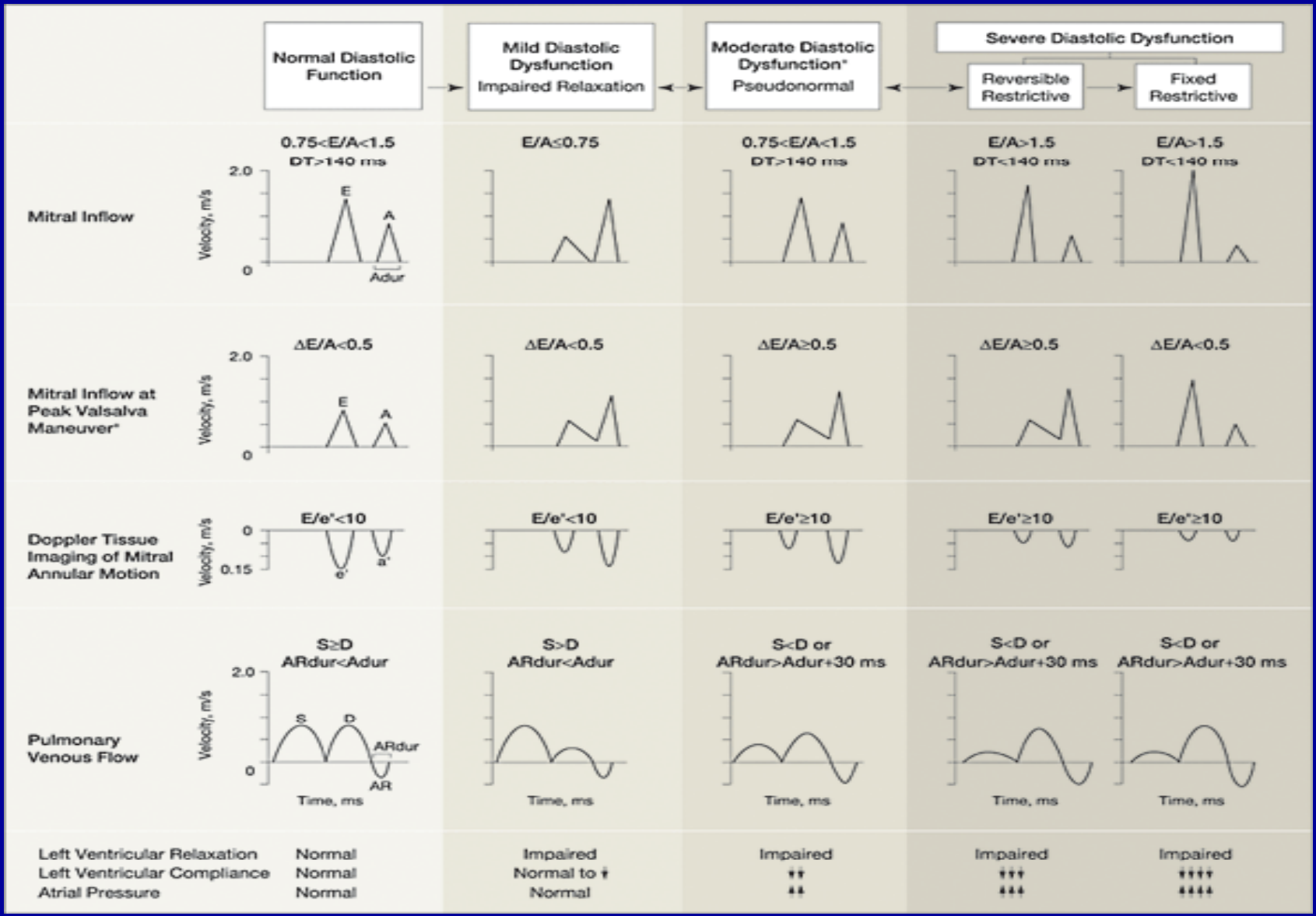
# LV filling patterns and pitfalls



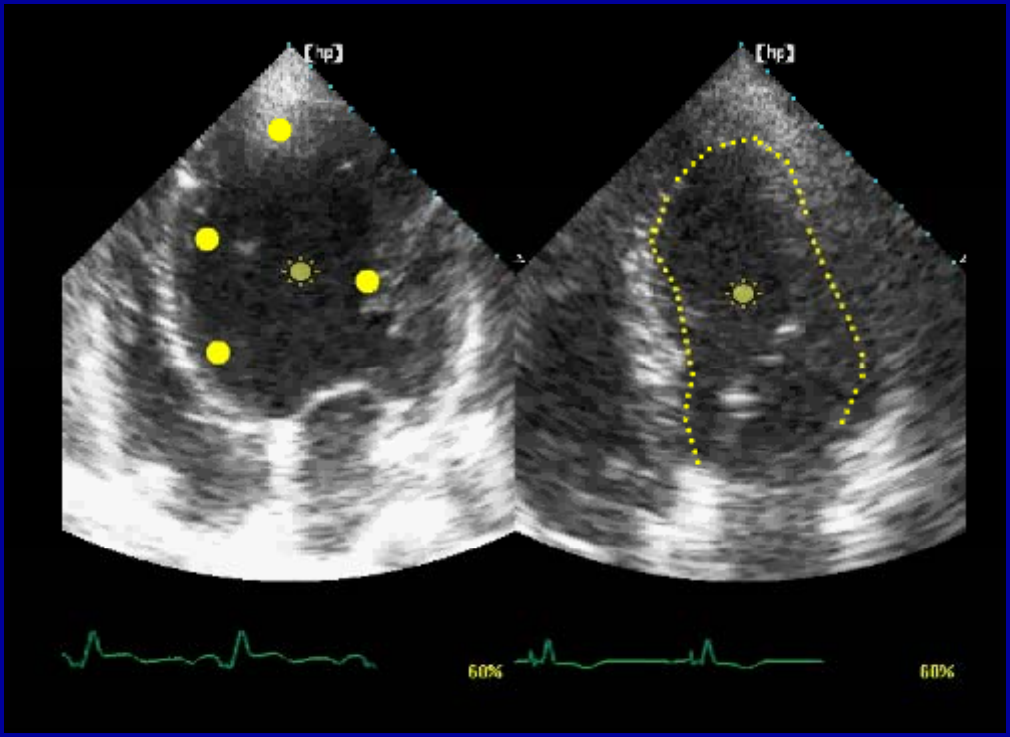

Otto, Textbook of Echocardiography, 1999

# Different patterns of diastolic dysfunction




redfield et al JAMA 2003

# VOOR/NA BIV PM



# HARTFALEN ANNO 2010

- Diagnostiek van hartfalen is complex en vereist zorgvuldigheid.
- Het onderkennen van behandelbare oorzaken is dankbaar.