



Congresso
Novas Fronteiras em Cardiologia
11 a 13 de Fevereiro, 2011
Hotel Vila Galois Evora

Avaliação da Função Sistólica e Diastólica- os melhores índices da eco

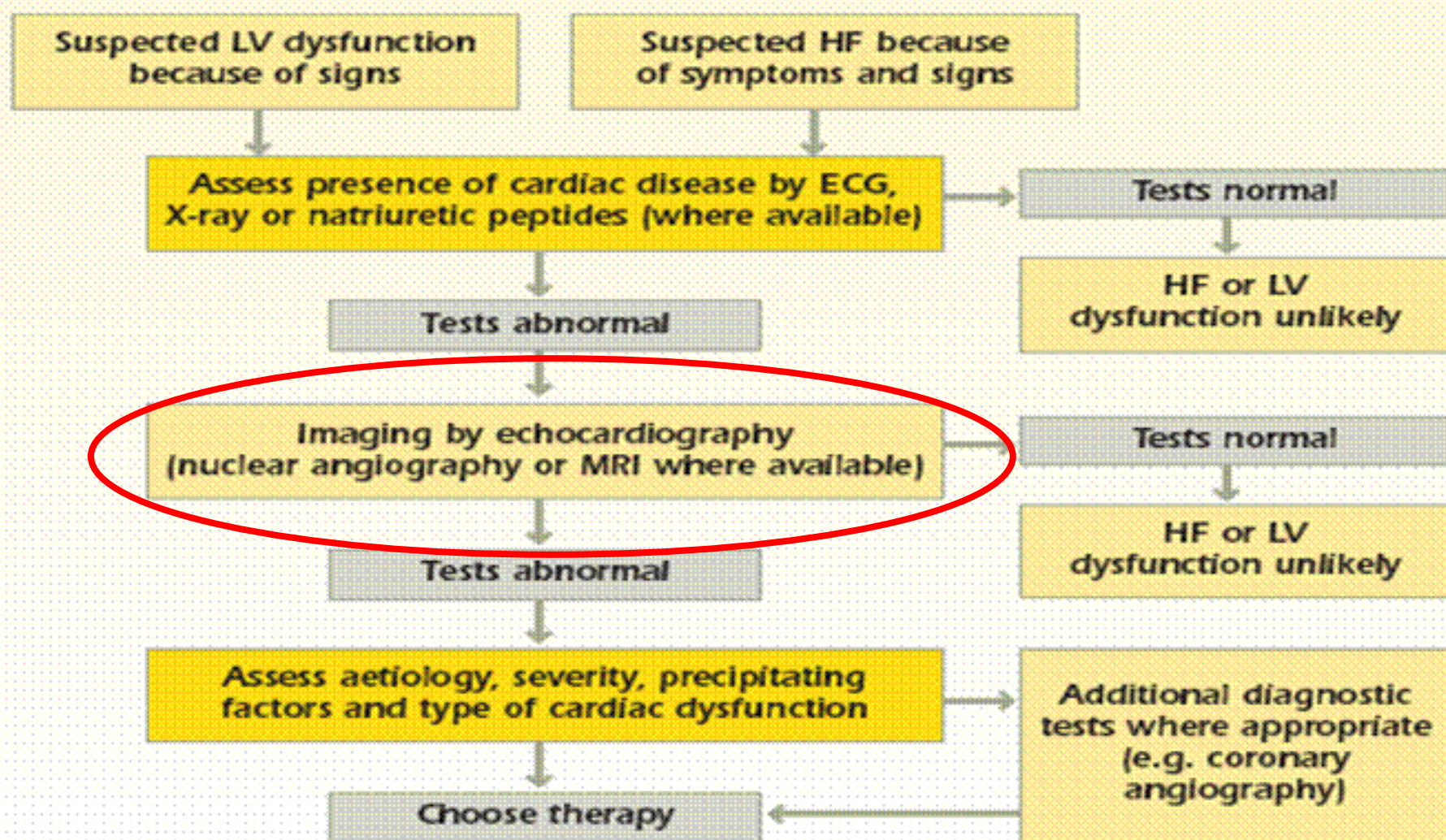
Fausto J Pinto



**Faculdade de Medicina
Universidade de Lisboa**

Ericeira, 12 Fevereiro 2011

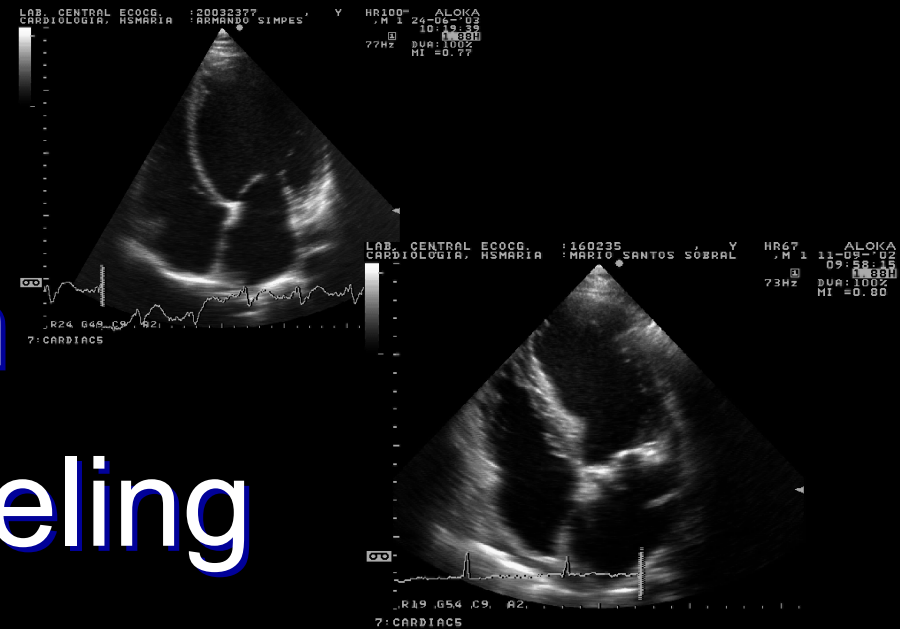
Algorithm for Diagnosis of Chronic HF or LV Dysfunction





Echo and Systolic Function

- Global Function
- Regional Function
- Ventricular remodeling
- Contractile reserve / ischemia / viability
- Valve function (MR important)



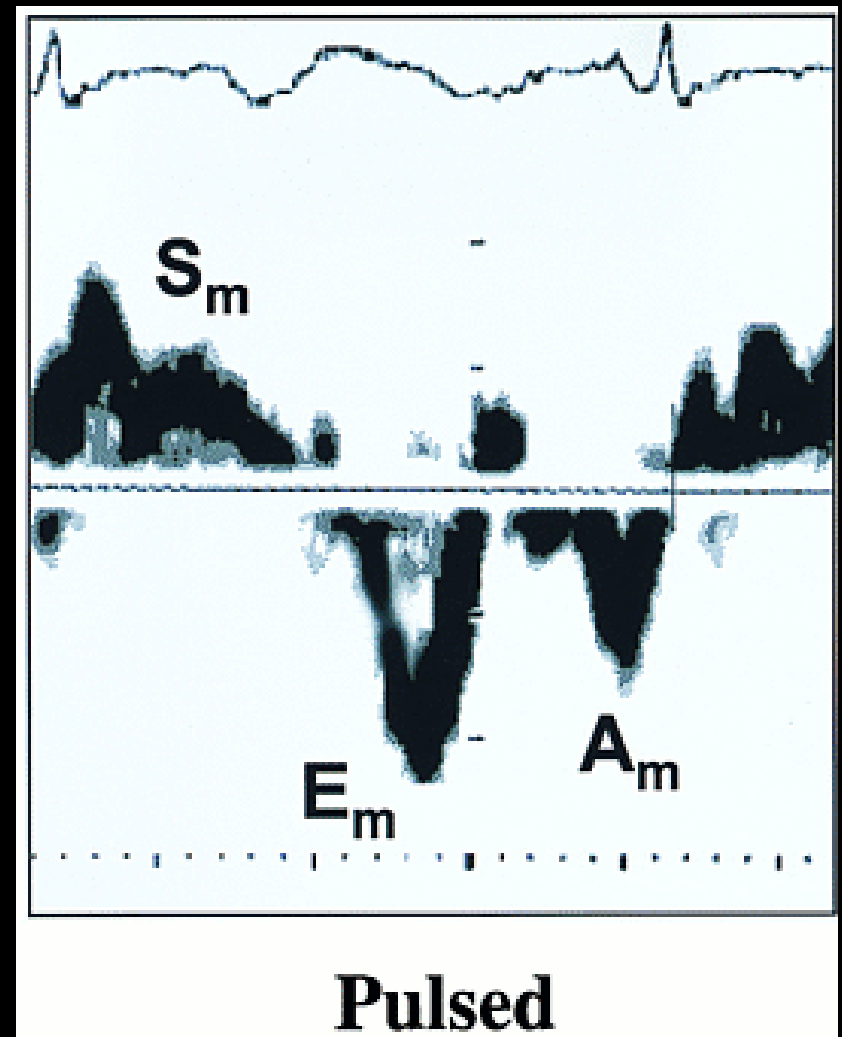
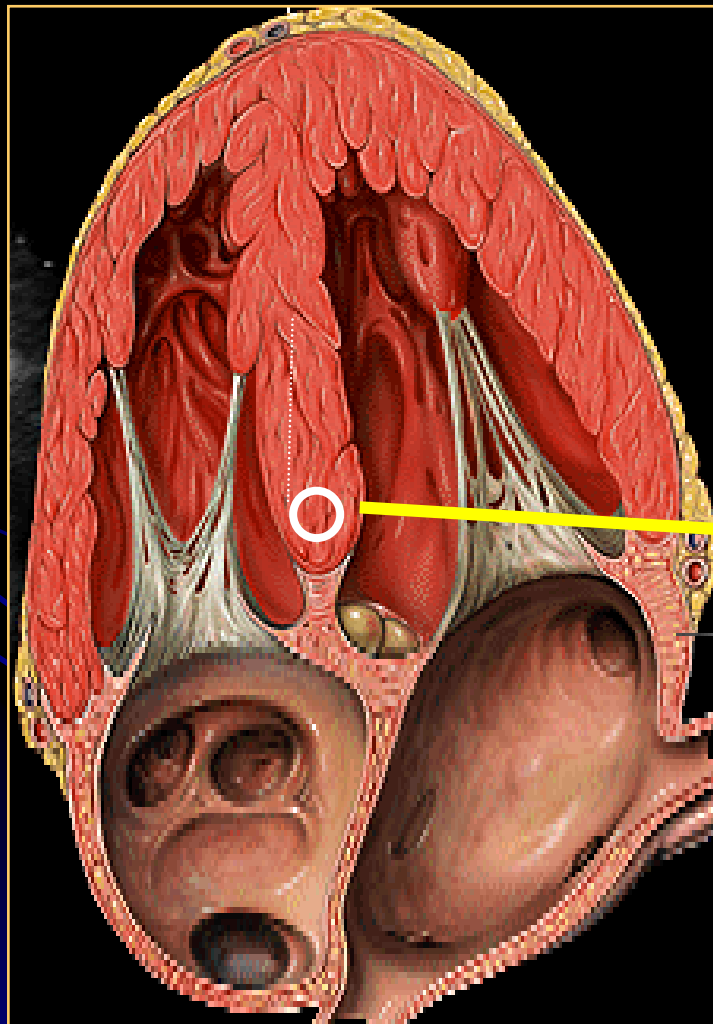


What Can be measured by Echo?

- LVIDd, LVIDs, fractioned shortening
- LVEDV, LVESV, EF (which method?)
- LV mass (method?)
- Cardiac output (LVOT Doppler)
- LV dP/dt (MR jet)

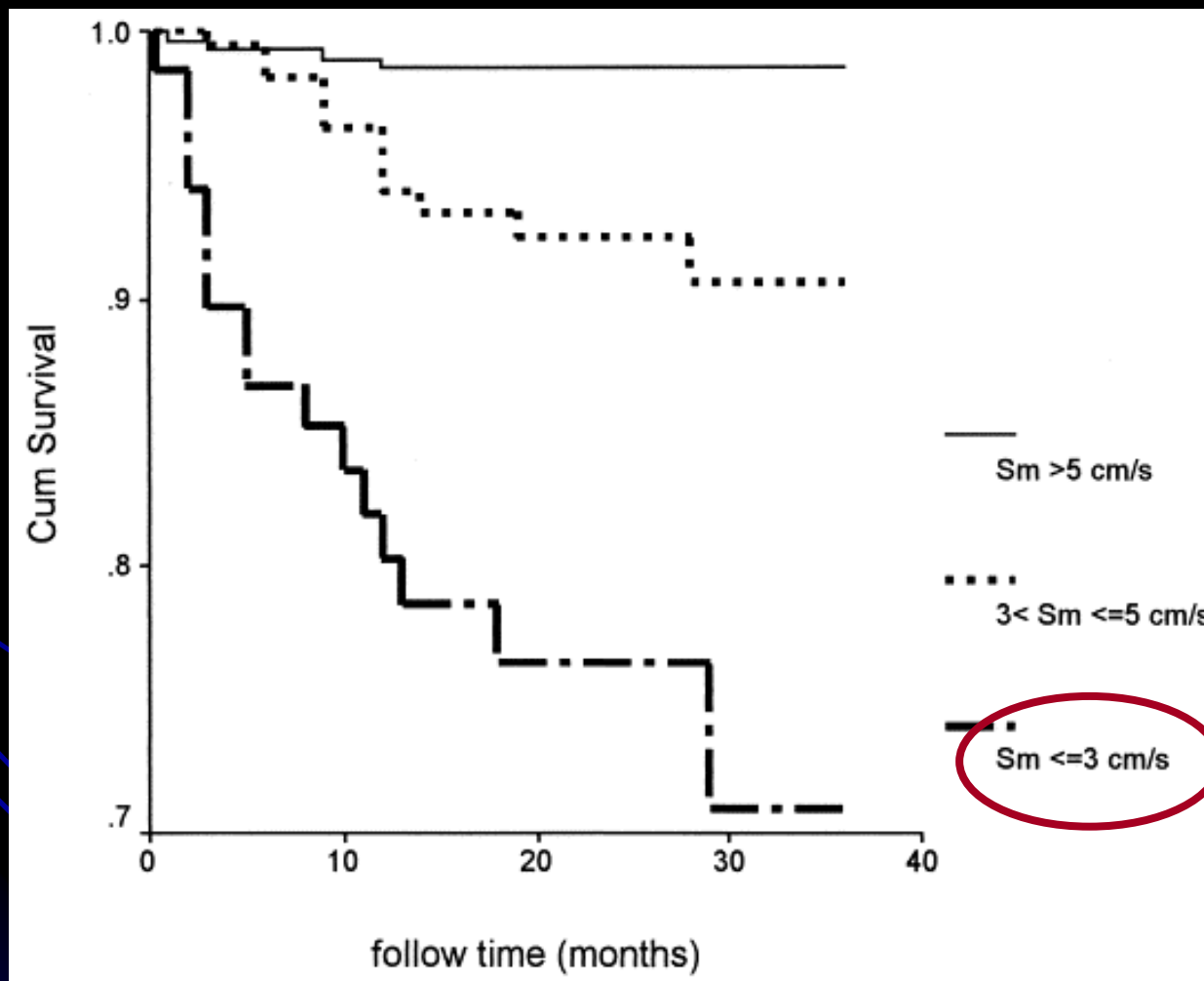


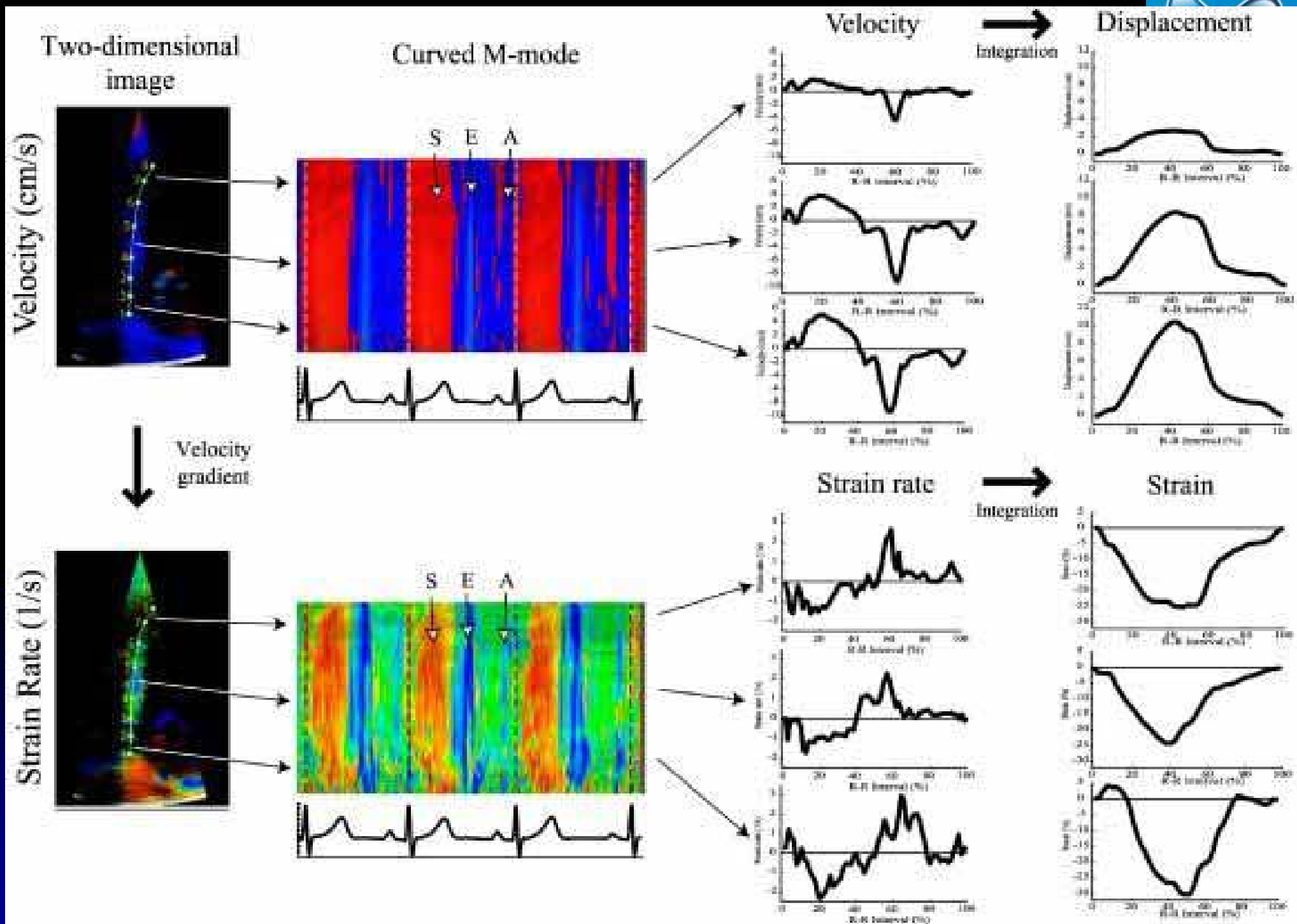
Longitudinal Function





Sm and cumulative cardiac death



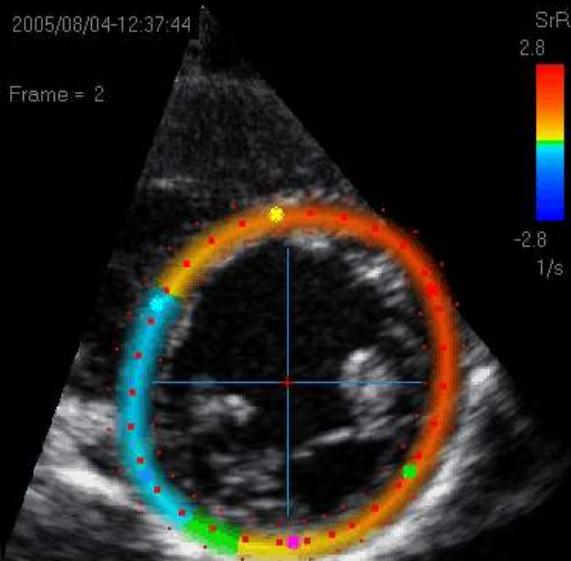


2D Strain/Speckle Tracking Imaging



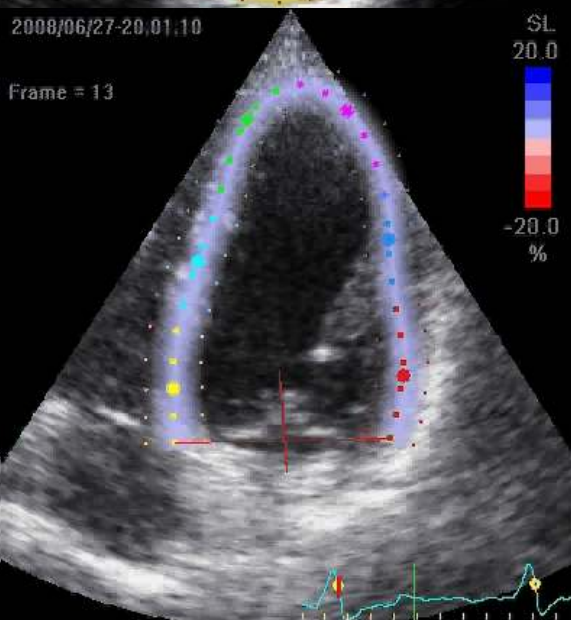
2005/08/04-12:37:44

Frame = 2



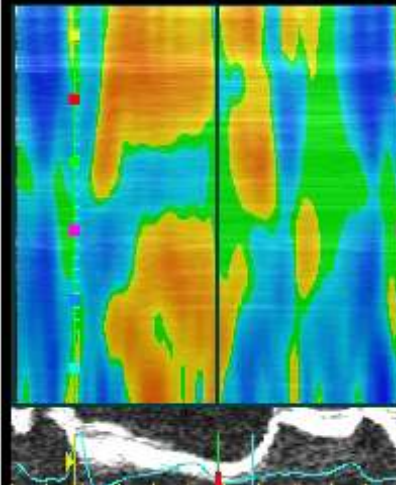
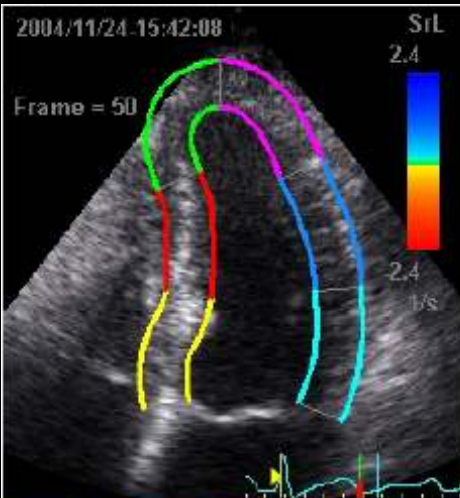
2008/06/27-20:01:10

Frame = 13

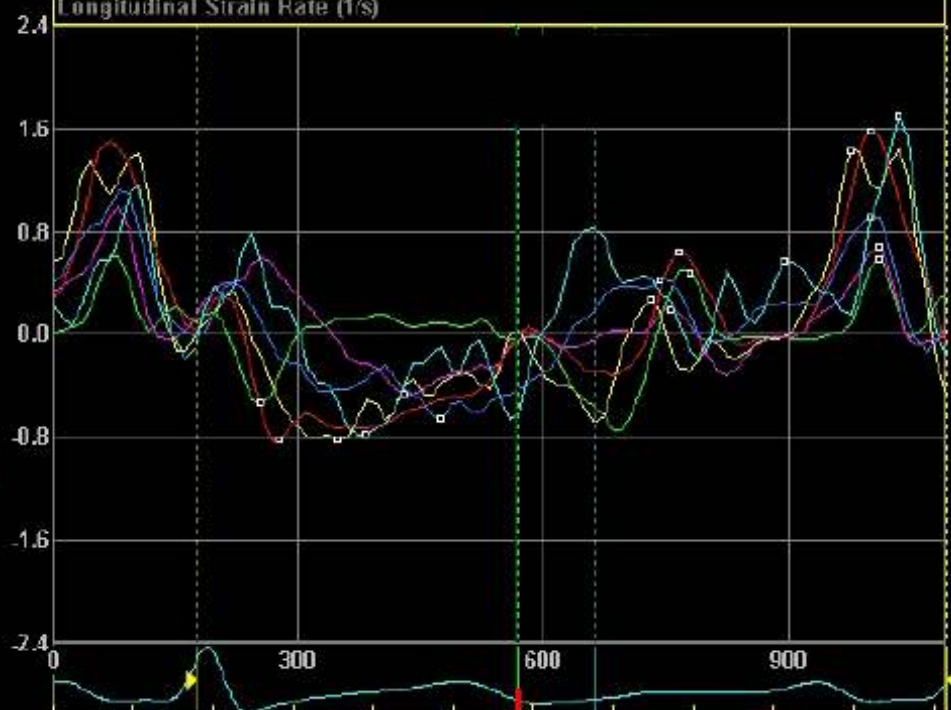


2004/11/24-15:42:08

Frame = 50



Longitudinal Strain Rate (1/s)



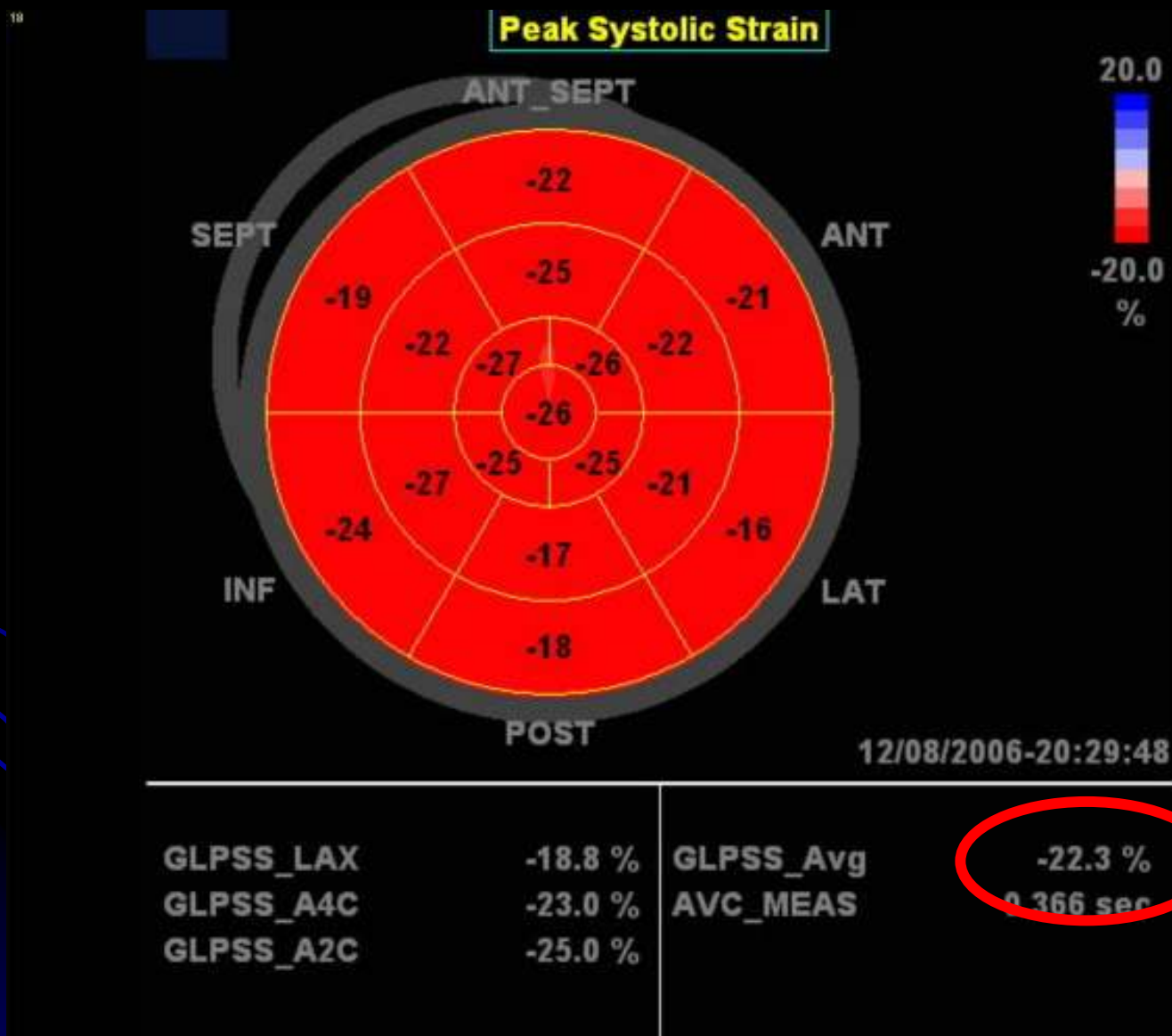
VL	Approve
SL	Approve
SrL	Approve
DL	Approve
DT	Approve

ATTENTION ! Values are averages over segments !

SrL	basSept	midSept	apSept	apLat	midLat	basLat
Peak S	-0.01	-0.02	-0.54	-0.47	-0.65	-0.79
Peak E	0.29	0.66	0.51	0.22	0.45	0.57
Peak A	1.45	1.60	0.60	0.70	0.93	1.71



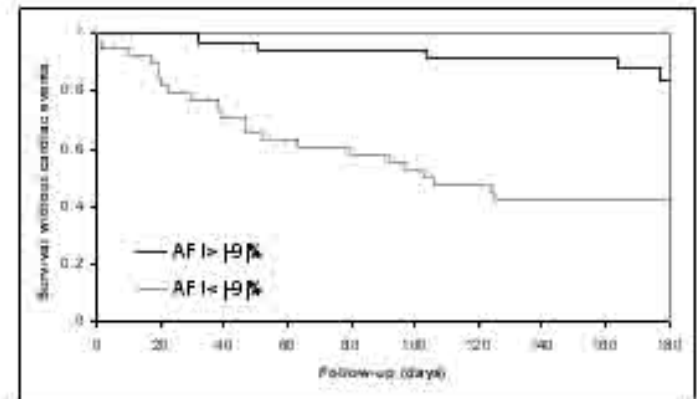
Normal AFI





Global longitudinal strain as a strong predictor of cardiac events in patients with depressed LV function: a multicenter study (n=144pts)

- GLS reproducibility was higher than LV EF (-8% vs -13%).
- ROC curve identified a value of GLS at -9% to predict cardiac outcomes with a sensitivity and specificity of 81% and 71% (AUC=0.80).
- A value of -9% allowed to determine patients with higher risk of cardiac events ($p < 0.01$)



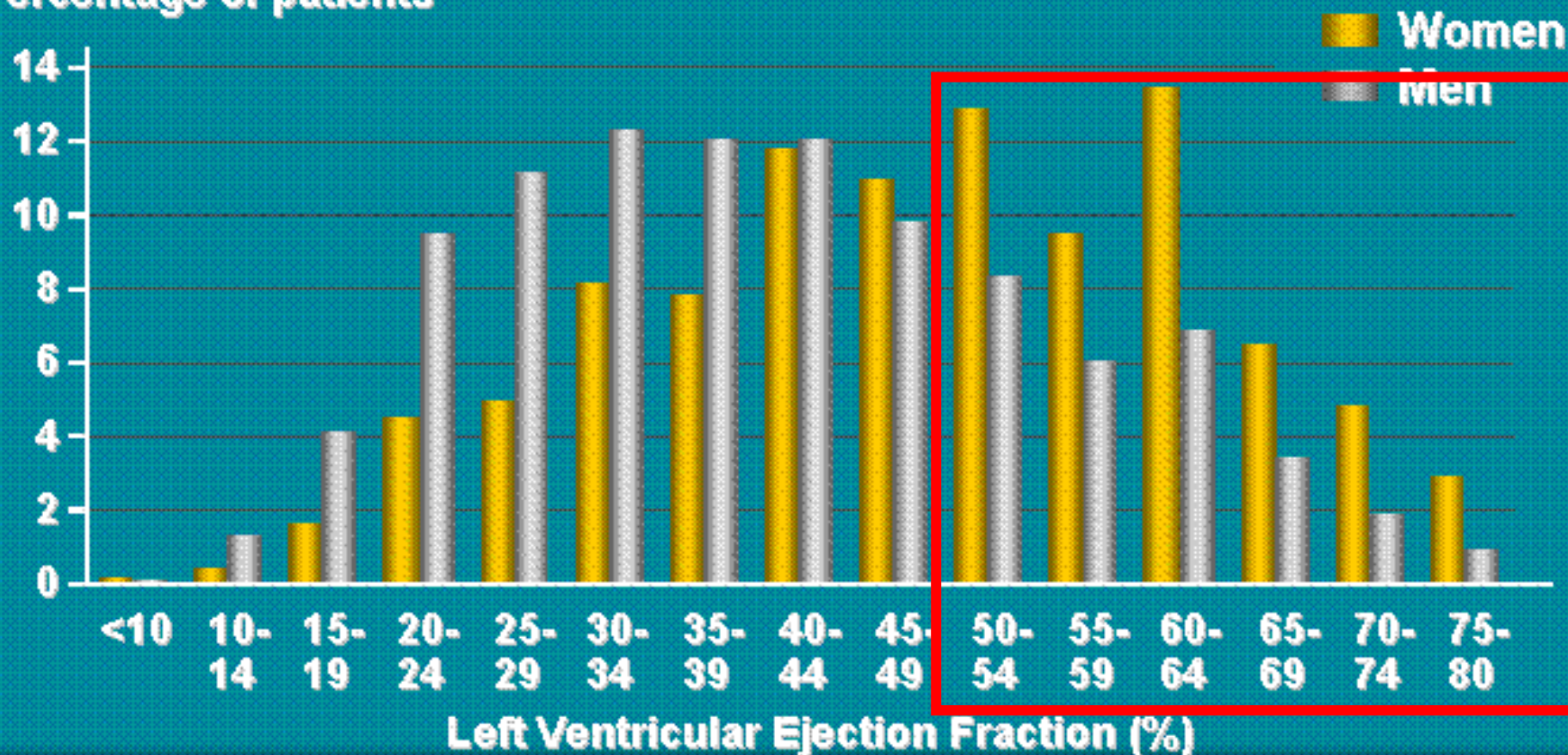
Euroheart Survey on HF

Distribution of Ejection Fraction

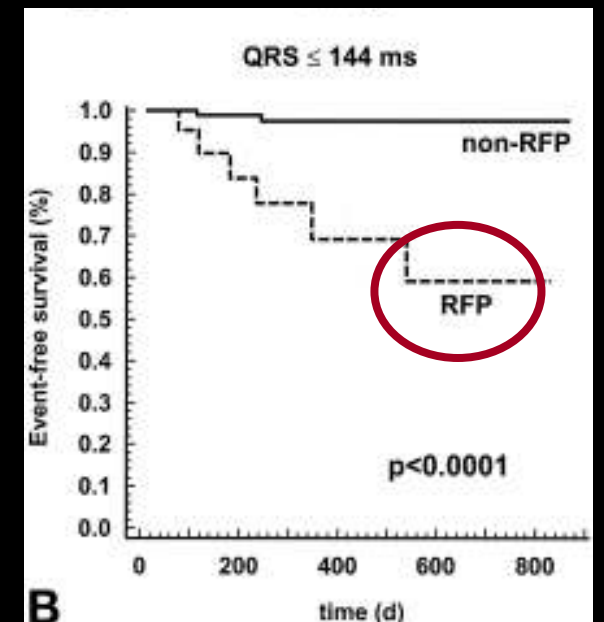
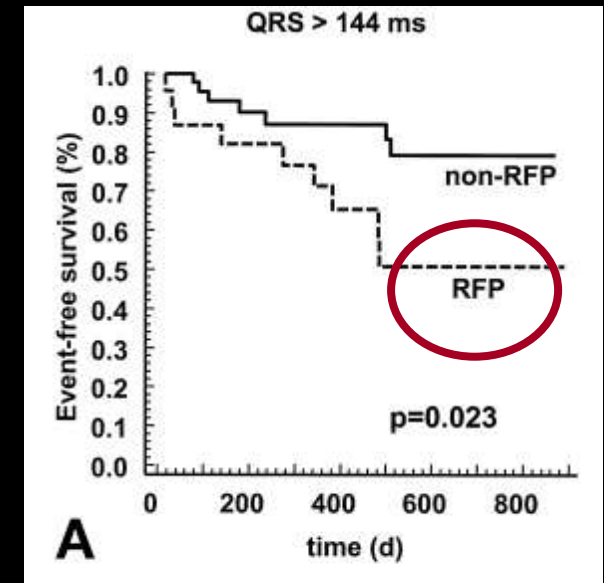
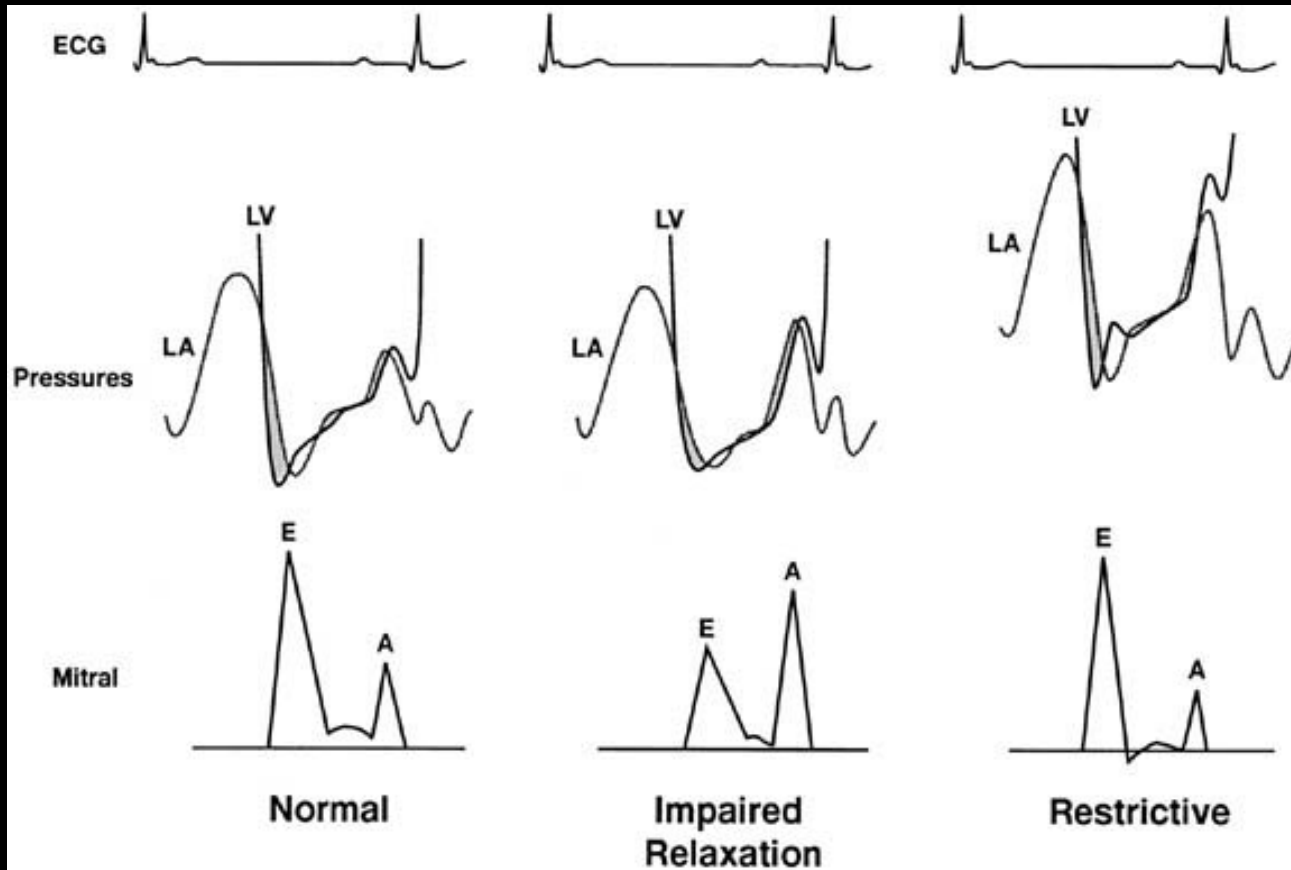
11 015 patients in 115 hospitals in 24 countries

Cleland et al Euroheart Survey EHJ 2003

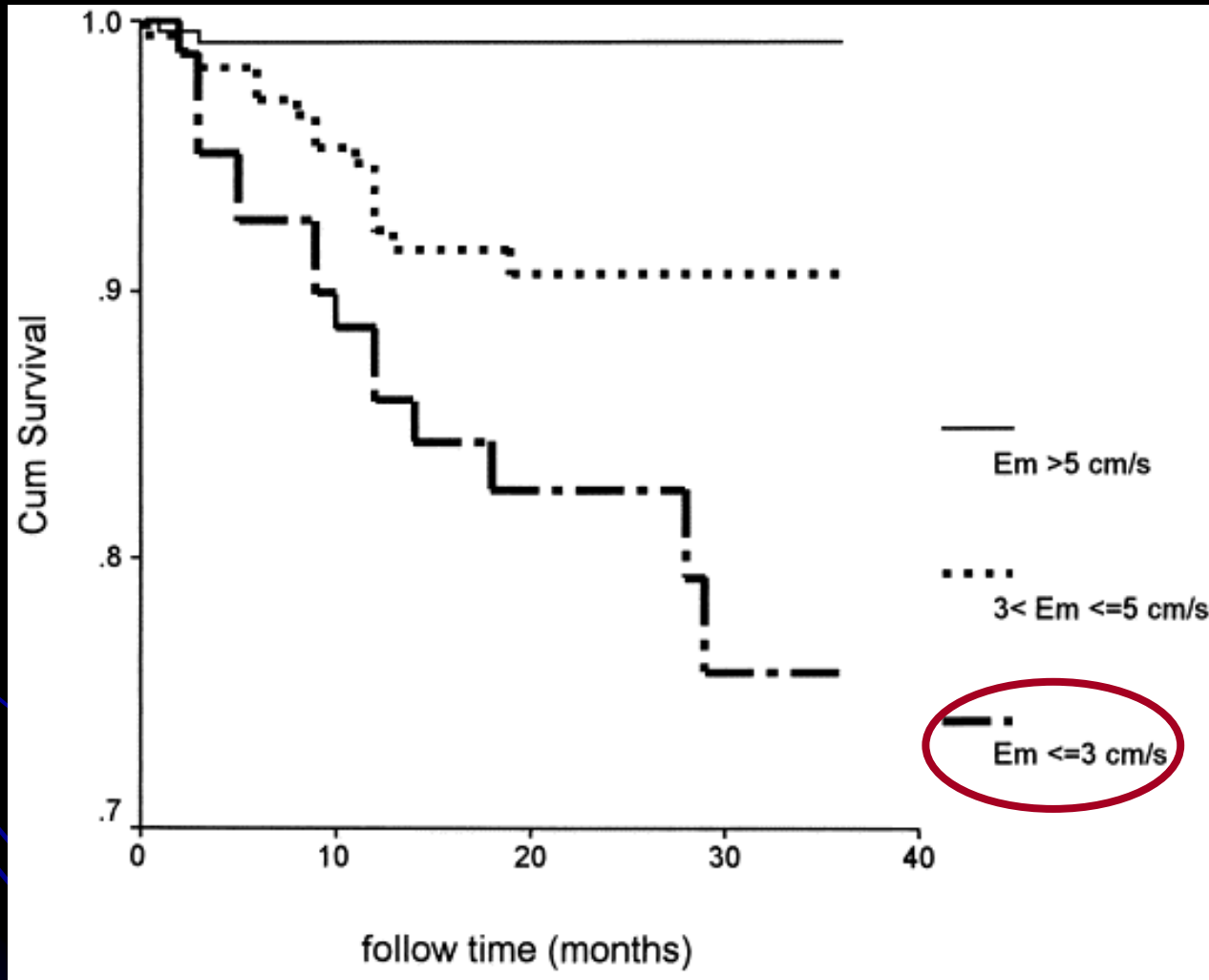
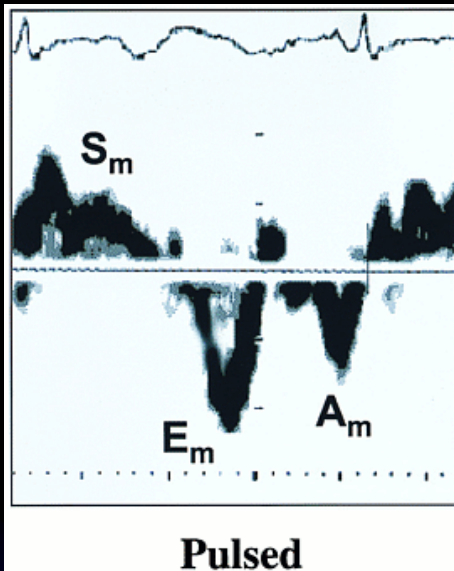
Percentage of patients



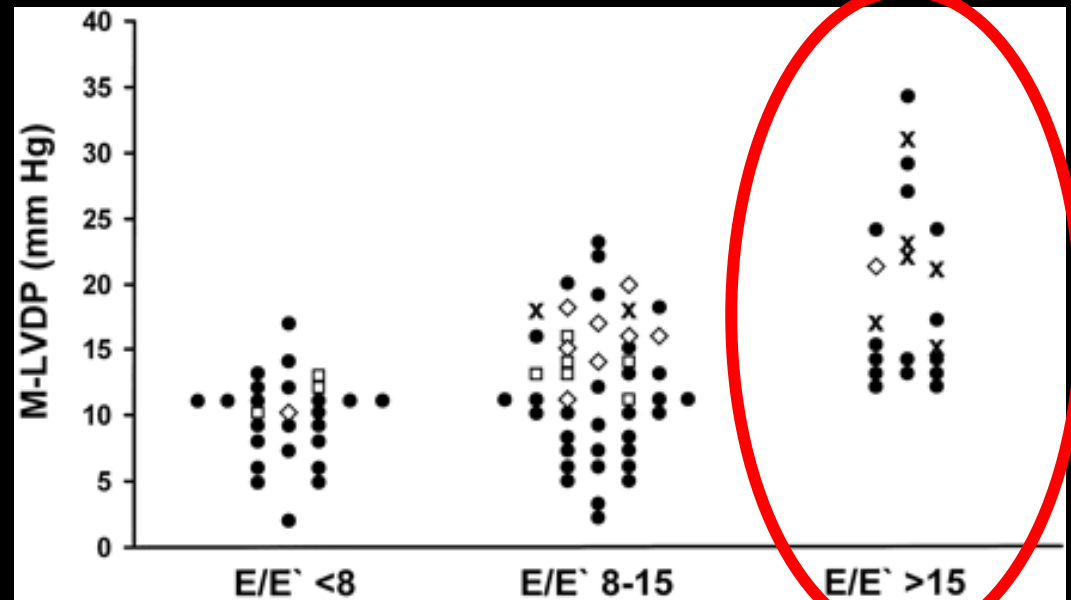
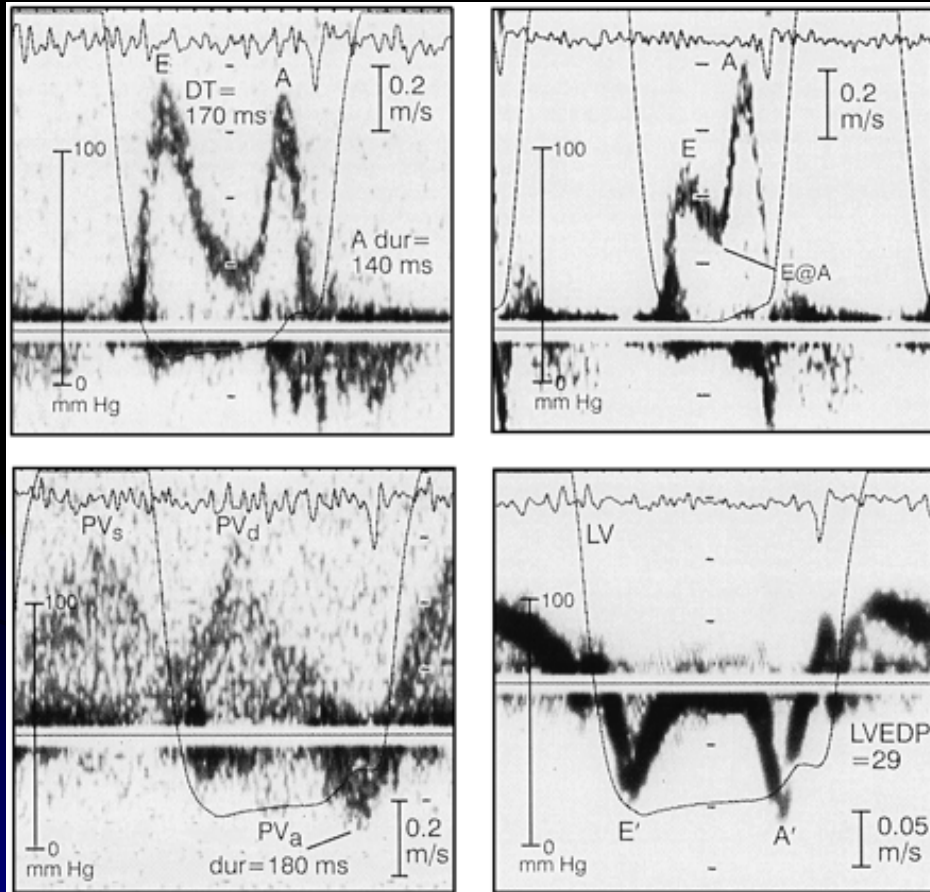
Prognostic value of mitral inflow restrictive pattern



Em and cumulative cardiac death

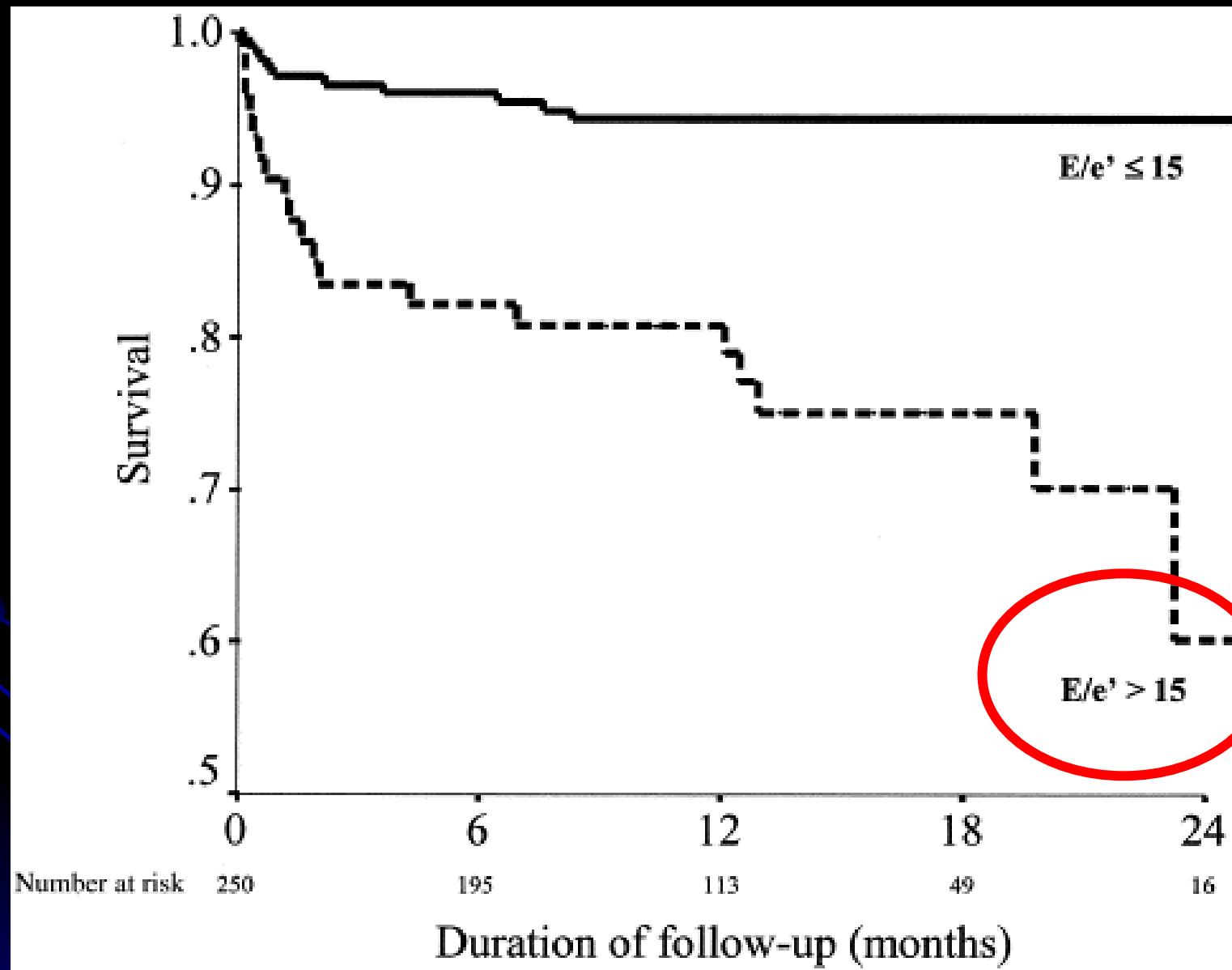


Estimation of LV filling pressures

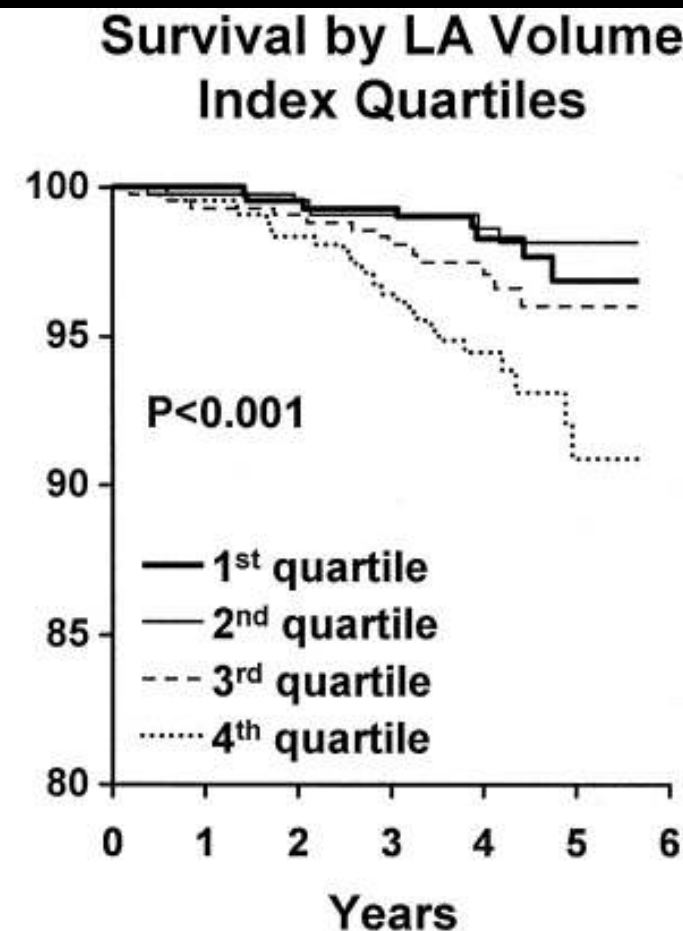
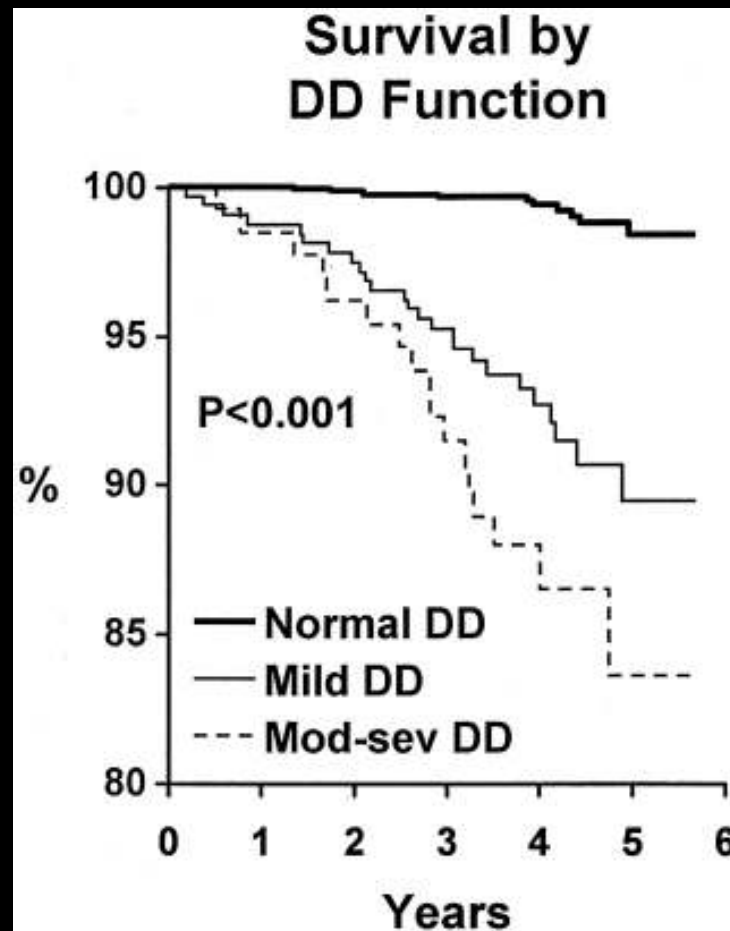
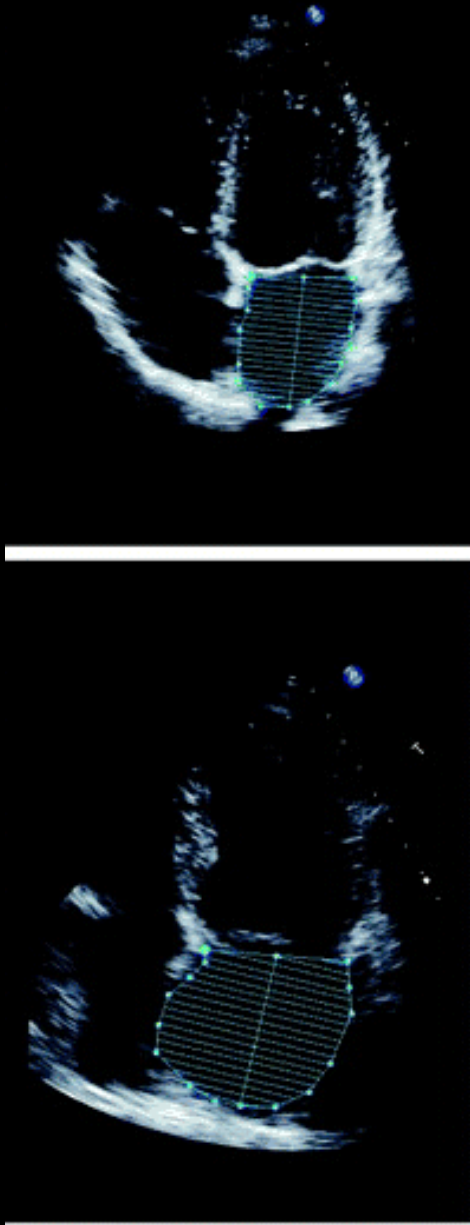




Assessing Filling Pressures: Prognostic Value



Relationships between severity of diastolic dysfunction (DD) (left) and left atrial (LA) volume index (right) and survival





LA volume and diastolic dysfunction

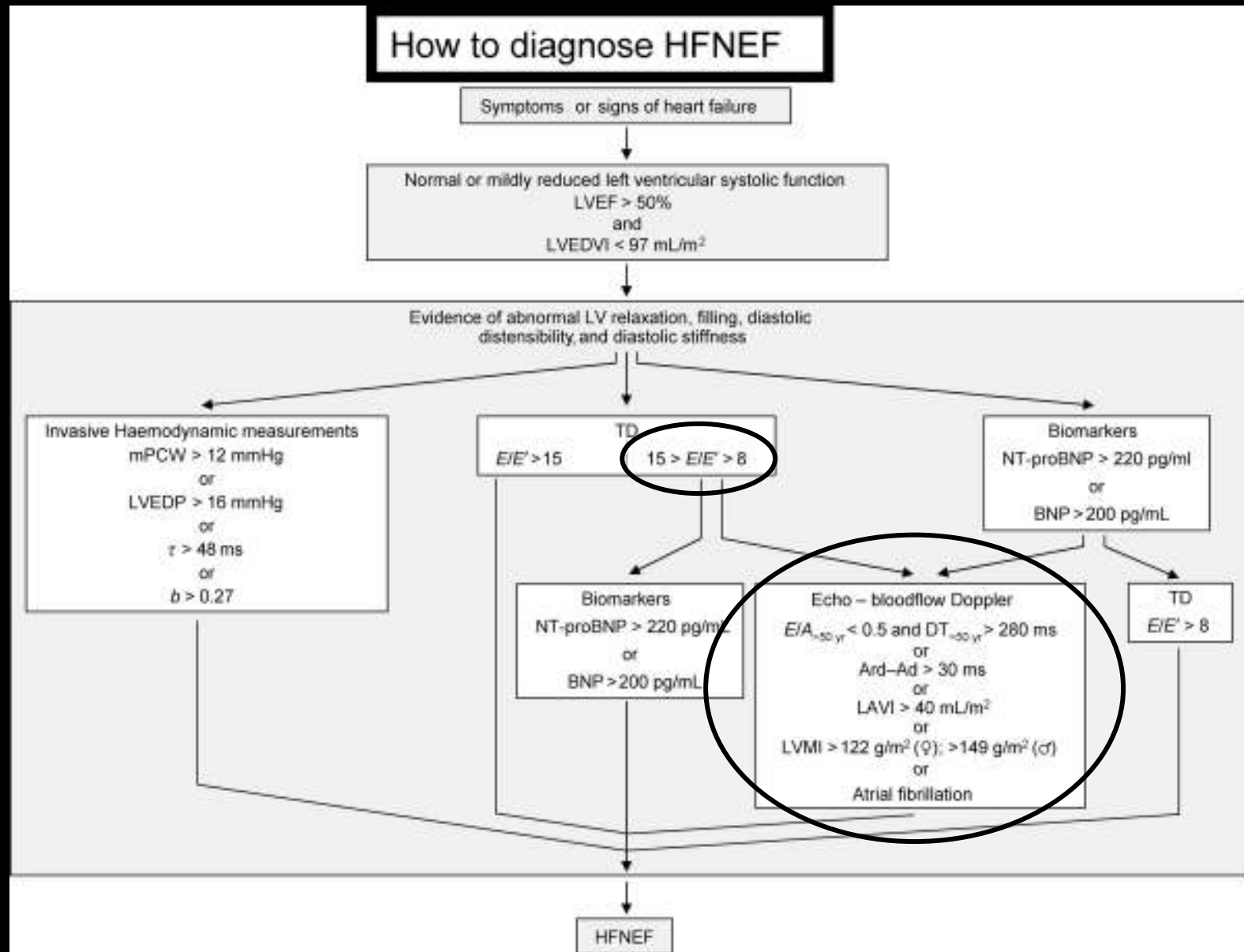
Table 3. LAVi According to Diastolic Function Grade

Diastolic Grade	n	% of Cohort	LAVi, ml/m ² (Mean $\pm$ SD)	% Meeting Criteria for LAE
Normal	1,212	73	23 $\pm$ 6	9
Grade I	315	19	25 $\pm$ 8	17
Grade II	118	7	31 $\pm$ 8	48
Grade III to IV	12	1	48 $\pm$ 12	100

* ≥ 30 ml/m² in women or ≥ 33 ml/m² in men.

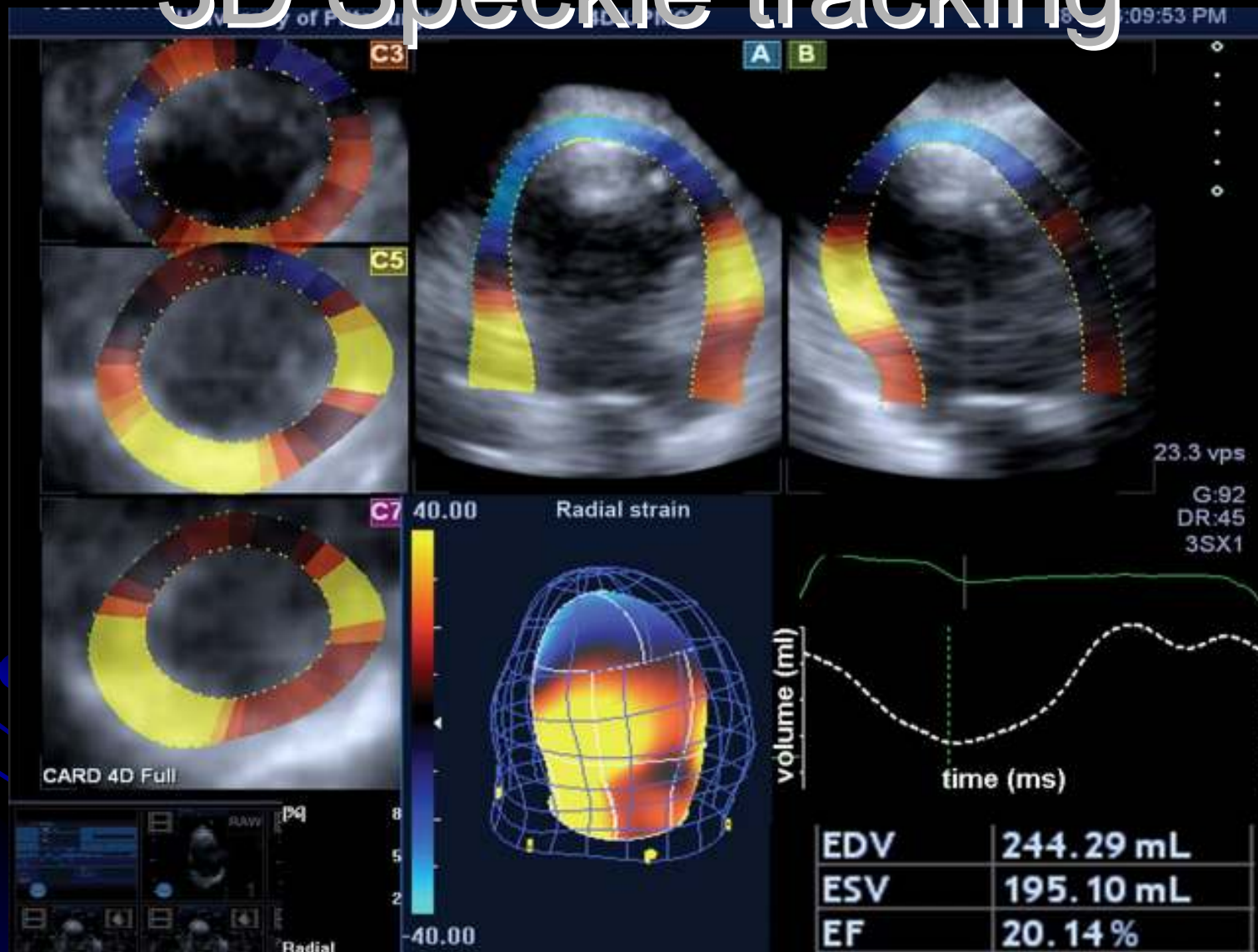
LAE = left atrial enlargement; LAVi = left atrial volume index.

Diagnostic flowchart on How to diagnose HFNEF in a patient suspected of HFNEF



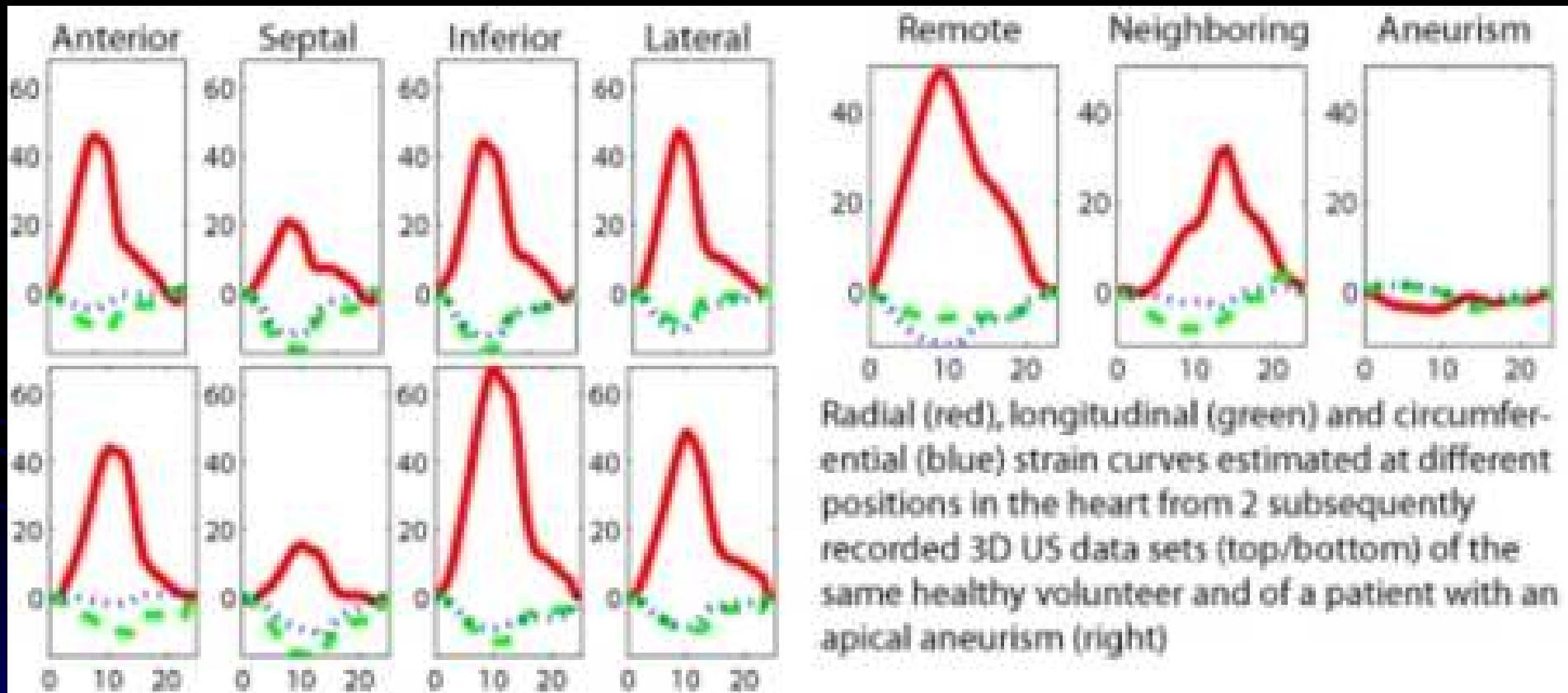


3D Speckle tracking



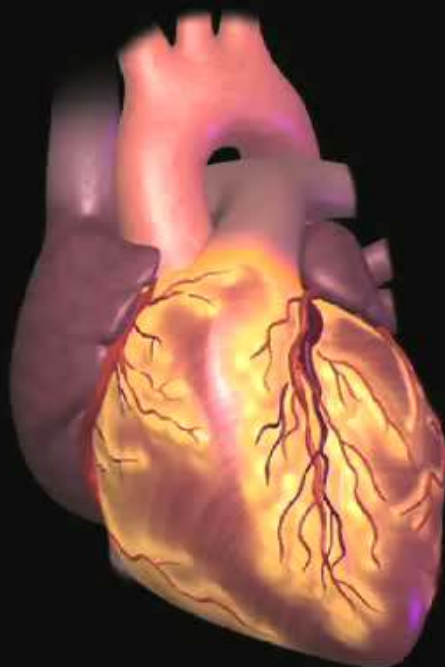
Flu, W.-J. et al. Eur Heart J 2009 0:ehp343v1-343; doi:10.1093/eurheartj/ehp343

3D myocardial strain estimation: first results in-vivo

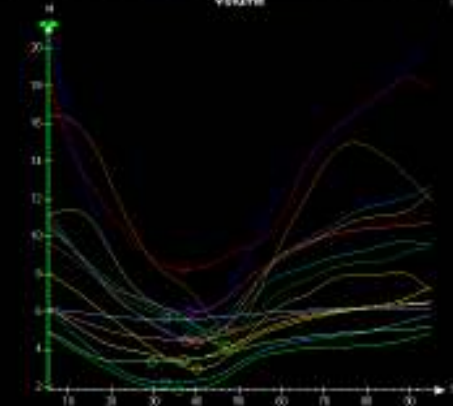
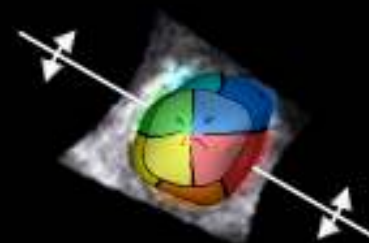




Real Time 3D

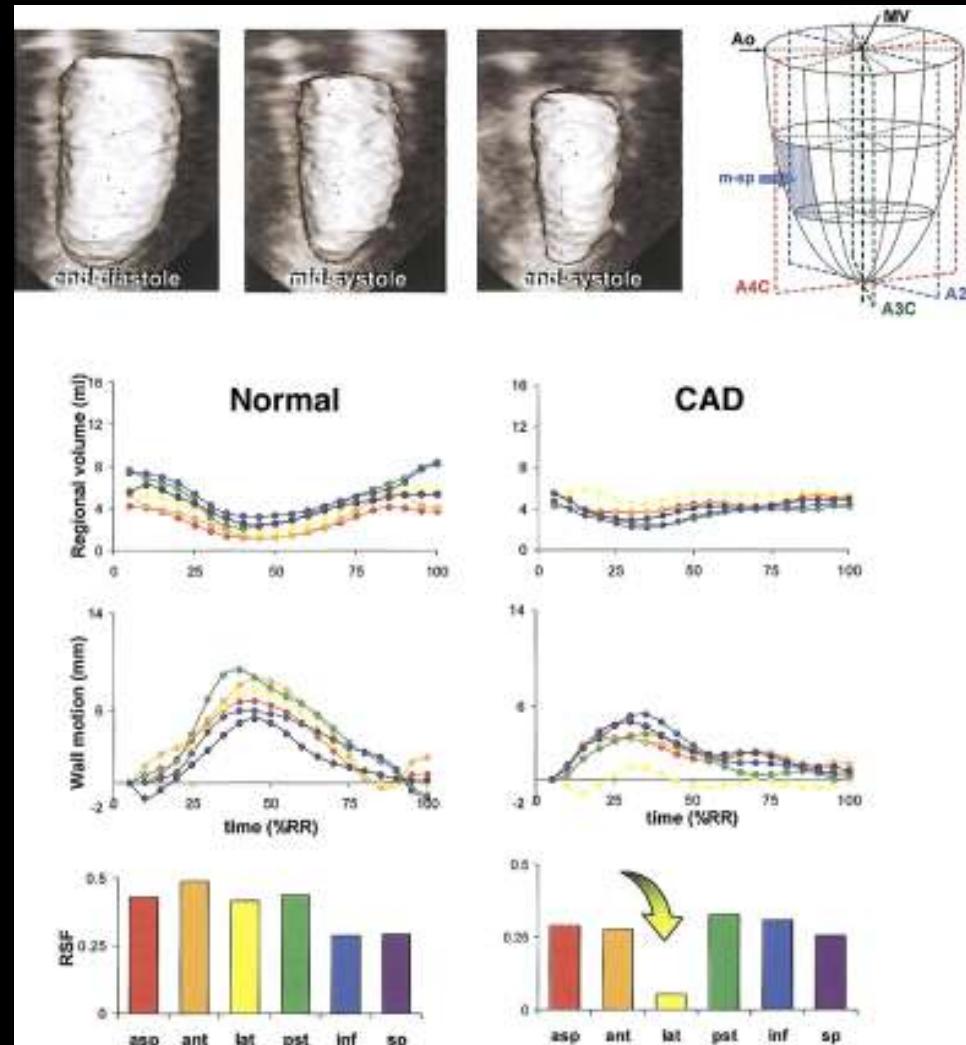


Images and animations are the property of GE Healthcare





Volumetric analysis of regional left ventricular (LV) function



Lang, R. M. et al. J Am Coll Cardiol 2006;48:2053-2069

Valvuloarterial impedance

- **Valvuloarterial impedance (Z_{va}) - global LV load**

$$Z_{va} = \frac{\text{Systolic BP} + \text{Mean transvalvular G}}{\text{LV stroke volume index}}$$

- **Adverse events and symptom occurrence should better correlate with the global burden faced by the LV**

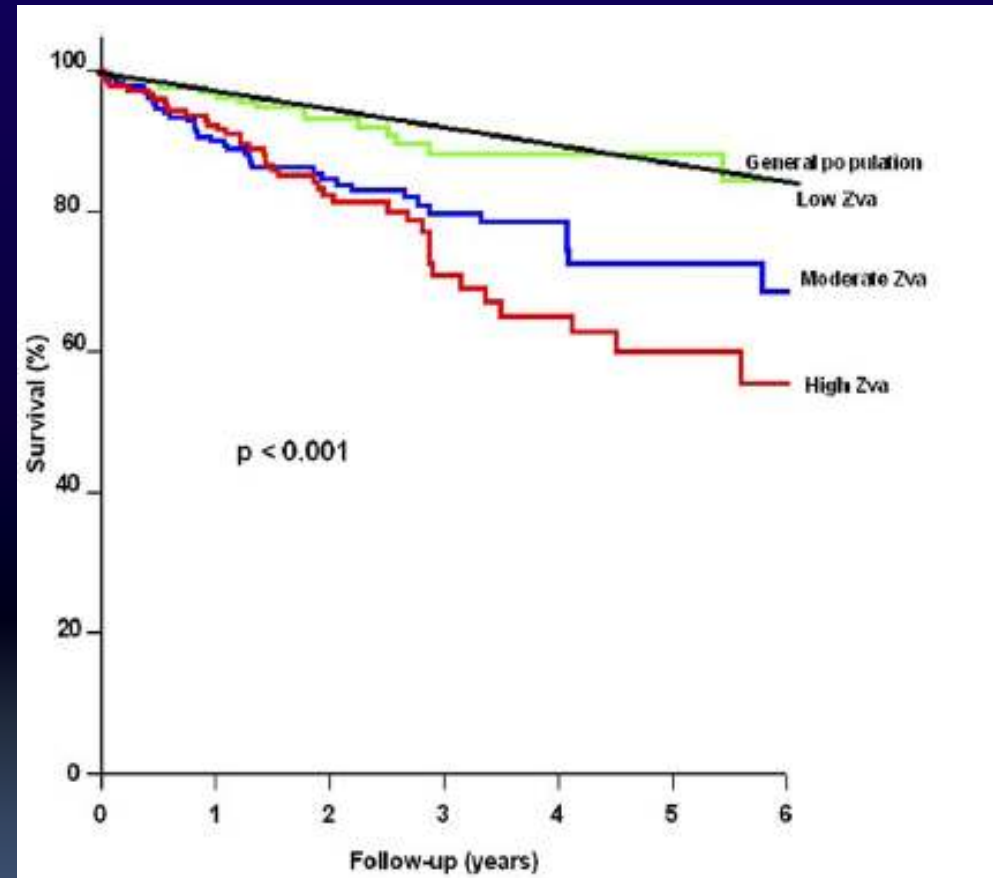
- **HTN pts with AS who develop symptoms have on average larger EOA than normotensive pts referred with the same symptoms**

- **Increased Z_{va}— independent prognostic value for LV dysfunction**

Hachicha Z, Dumesnil JG, Pibarot P. in J. Am. Coll. Cardiol. 2009;54;1003-1011
Antonini-Canterin F, Huang G, Cervesato E, et al. Hypertension 2003;41:1268 –72

Valvuloarterial impedance

- Zva predicts adverse outcome in asymptomatic patients with at least moderate AS
- $Zva > 4,5 \text{ mm Hg} \cdot \text{ml}^{-1} \cdot \text{m}^2$ was associated with a significant increase in the risk of overall and cardiovascular mortality





Future (Continuous) challenges for Echocg/Imaging

- The continuous role of echo/imaging as an added value to patient care
- The continuous identification of important clinical/scientific questions (“Curiosity driven”)
- Continuous technological development (“Technoscience”)
- Control of quality (individual and institutional)

