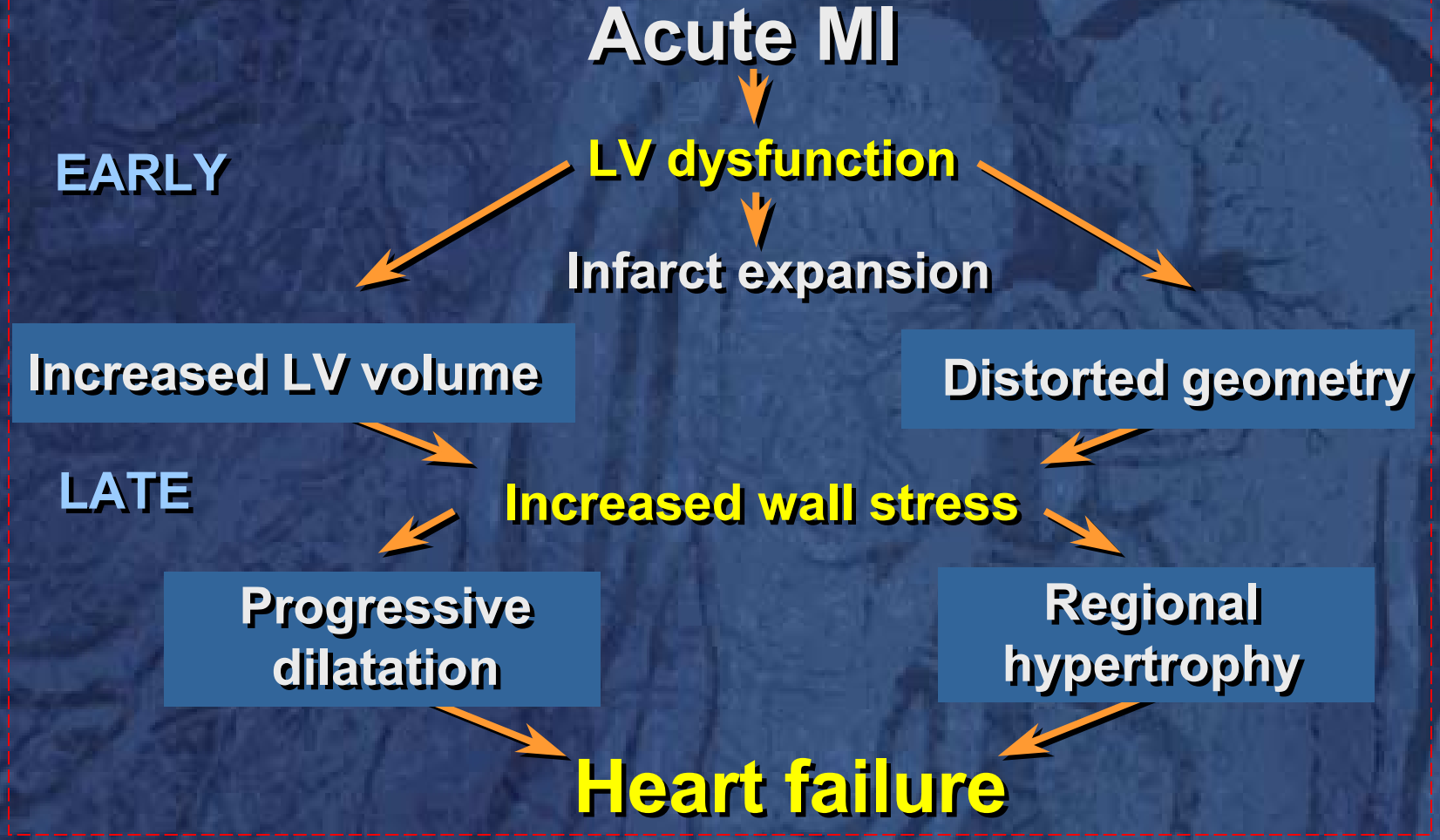
Element 24.00

Agati

The X's are ones that will be in workbook only. Keep the file intact now.

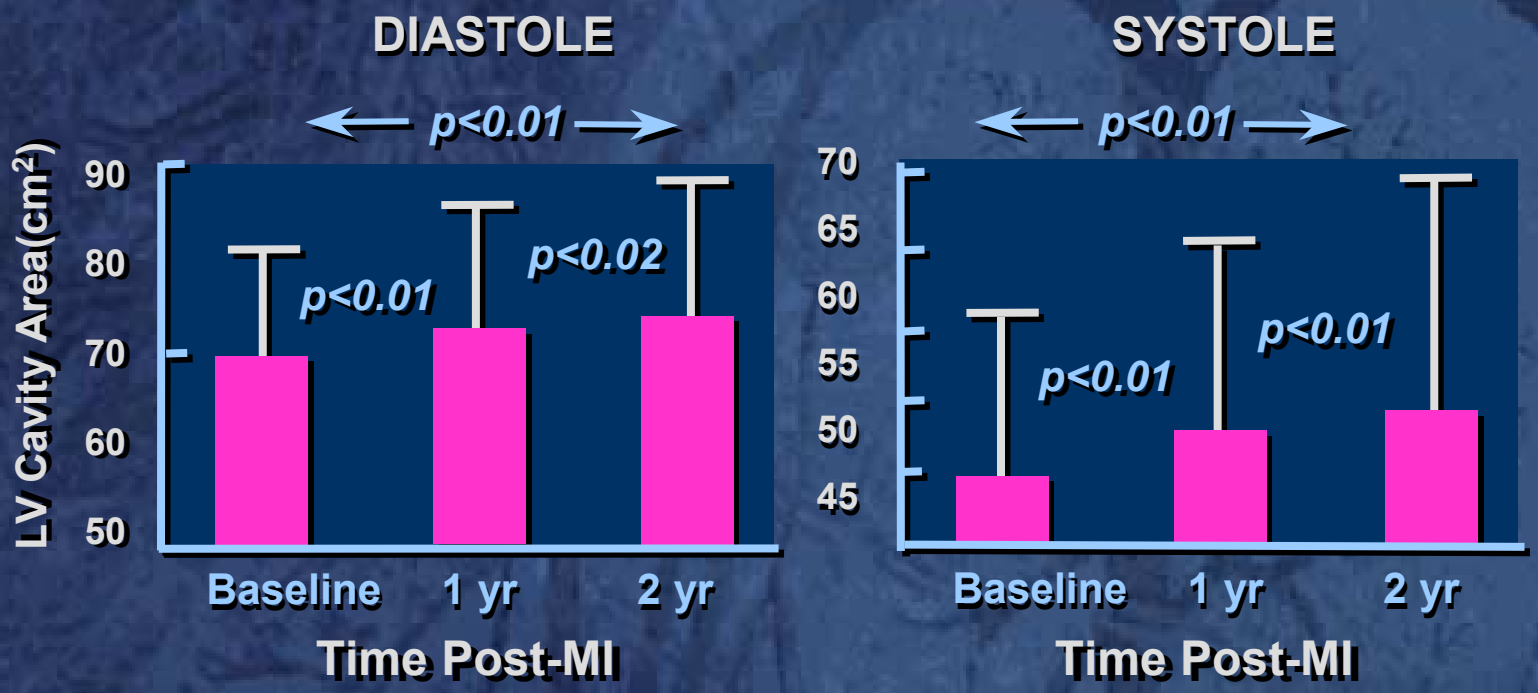
LV Remodeling after AMI



Timing of LV Dilation after AMI

Kostuk	*Circ 1973*	96 pts	4 d - 1 mo	chest x ray
Erlebacher	*AJC 1982*	13 pts	10 d - 3-30 mo	echo
Mc Kay	*Circ 1986*	30 pts	10 h - 2 wk	angiography
Warren	*JACC 1988*	36 pts	7 h- 10 mo	radionuclide
Sharpe	*Lancet 1988*	70 pts	1 d- 1 yr	echo
Gadsball	*AJC 1989*	57 pts	2 wk - 1 yr	radionuclide
Picard	*Circ 1990*	57 pts	hrs - 3 mo	echo
Ertl	*AJC 1991*	78 pts	3 d - 6 ms	radionuclide
Mitchell	*JACC 1992*	52 pts	3 wk - 1 yr	angiography
Gaudron	*Circ 1993*	70 pts	4 d - 3 yr	radionuclide

LV Remodeling in SAVE Study



St. John Sutton et al., Circ 1997

Timing of LV Remodeling

- **Early** remodeling (in-hospital):
  from 24-48 hrs to pre-discharge
- **Late** remodeling:
  from pre-discharge to 6 mos

Magnitude of Remodeling

End-diastolic volume index changes

>20% - severe dilation

5.1 ≤ Δ ≤ 20% - mild/moderate dilation

-5 ≤ Δ ≤ 5% - volume stability

≤ -5% - volume reduction

GISSI- 3

Study design

Patients with AMI

within 24 hours

Randomization

Control

Nitrates

Lisinopril

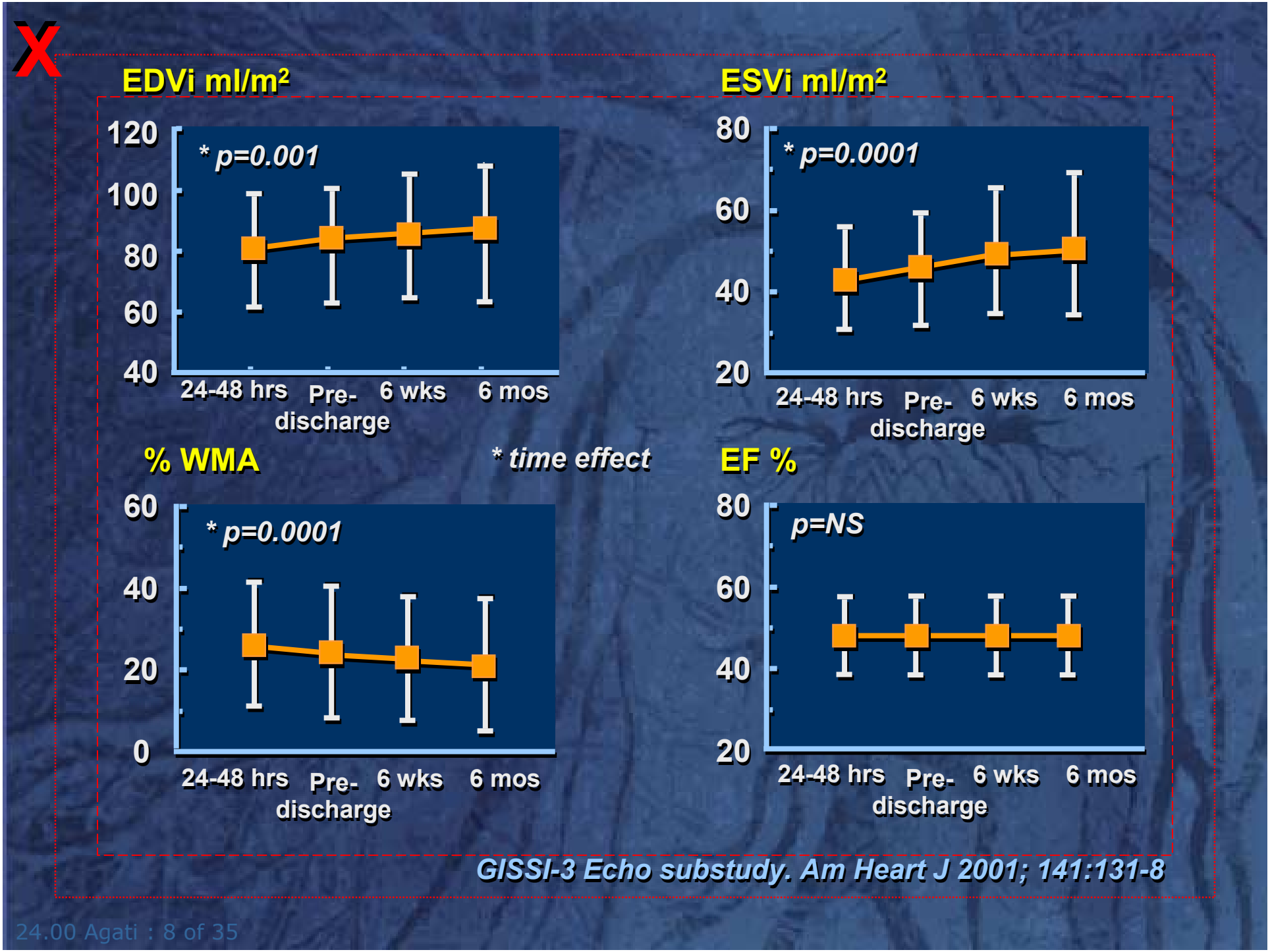
Lisinopril + Nitrates

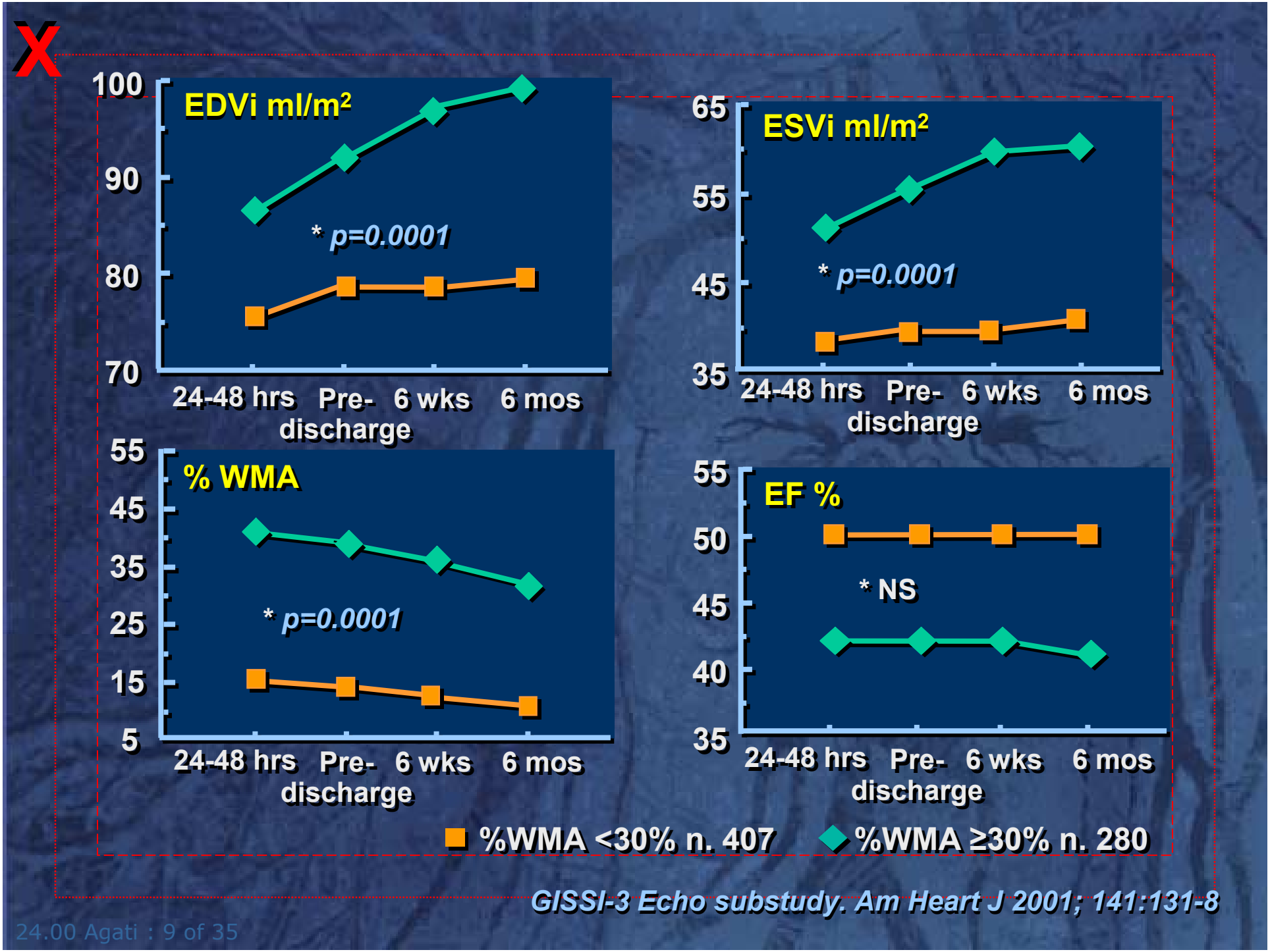
6 weeks evaluation
treatment withdrawal

6 months evaluation

Study Population

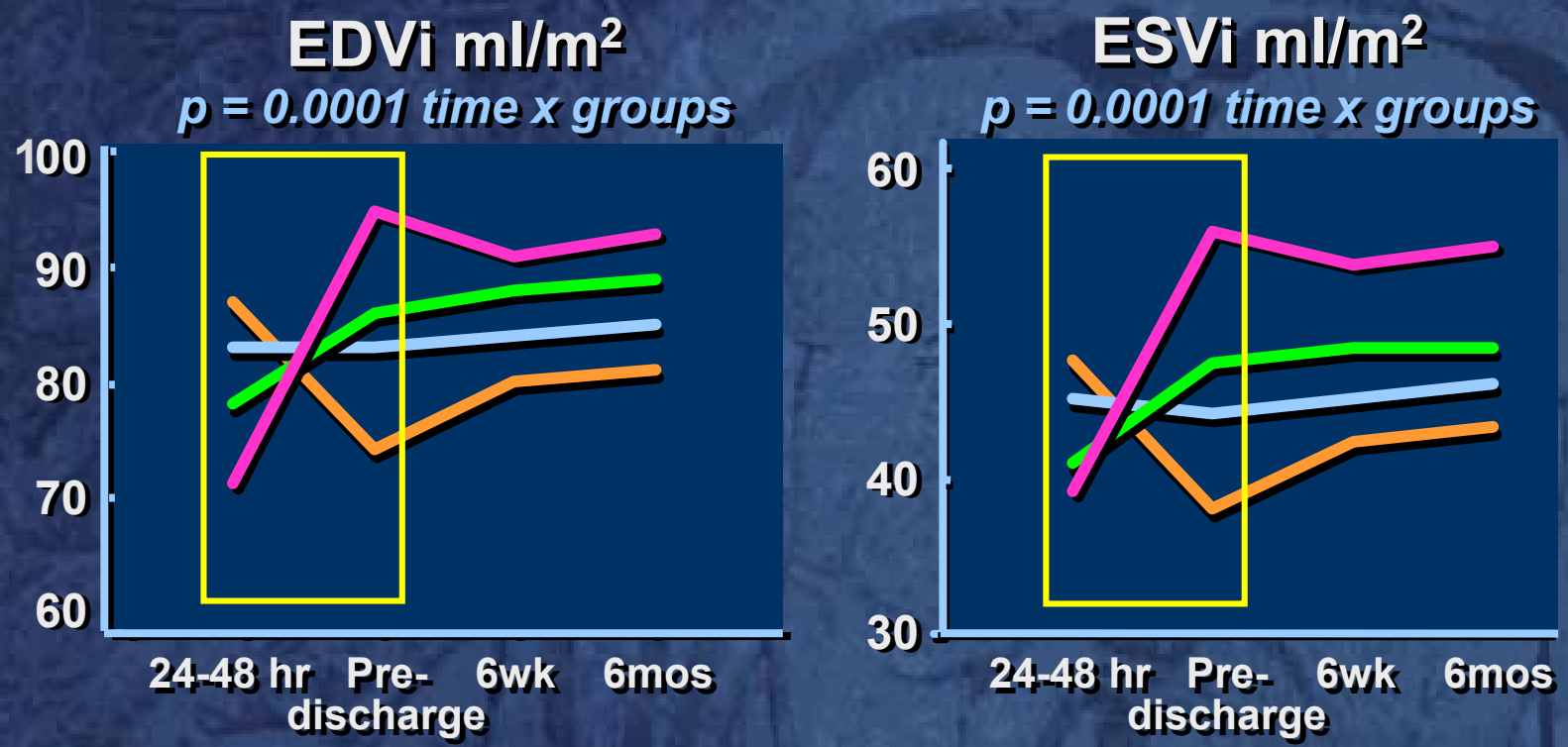
- Subset of 614 patients enrolled in the GISSI 3-ECHO substudy with no cardiac events during 6-month follow-up
- Serial echo studies at 24-48 hrs,at hospital discharge, at 6 wks and at 6 mos after AMI
- Centralized analysis


EDVi ml/m2
120
100
80
60
40
* p=0.001
24-48 hrs
Pre-discharge
6 wks
6 mos
ESVi ml/m2
80
60
40
20
* p=0.0001
24-48 hrs
Pre-discharge
6 wks
6 mos
% WMA
60
40
20
0
* p=0.0001
24-48 hrs
Pre-discharge
6 wks
6 mos
* time effect
EF %
80
60
40
20
p=NS
24-48 hrs
Pre-discharge
6 wks
6 mos
GISSI-3 Echo substudy. Am Heart J 2001; 141:131-8



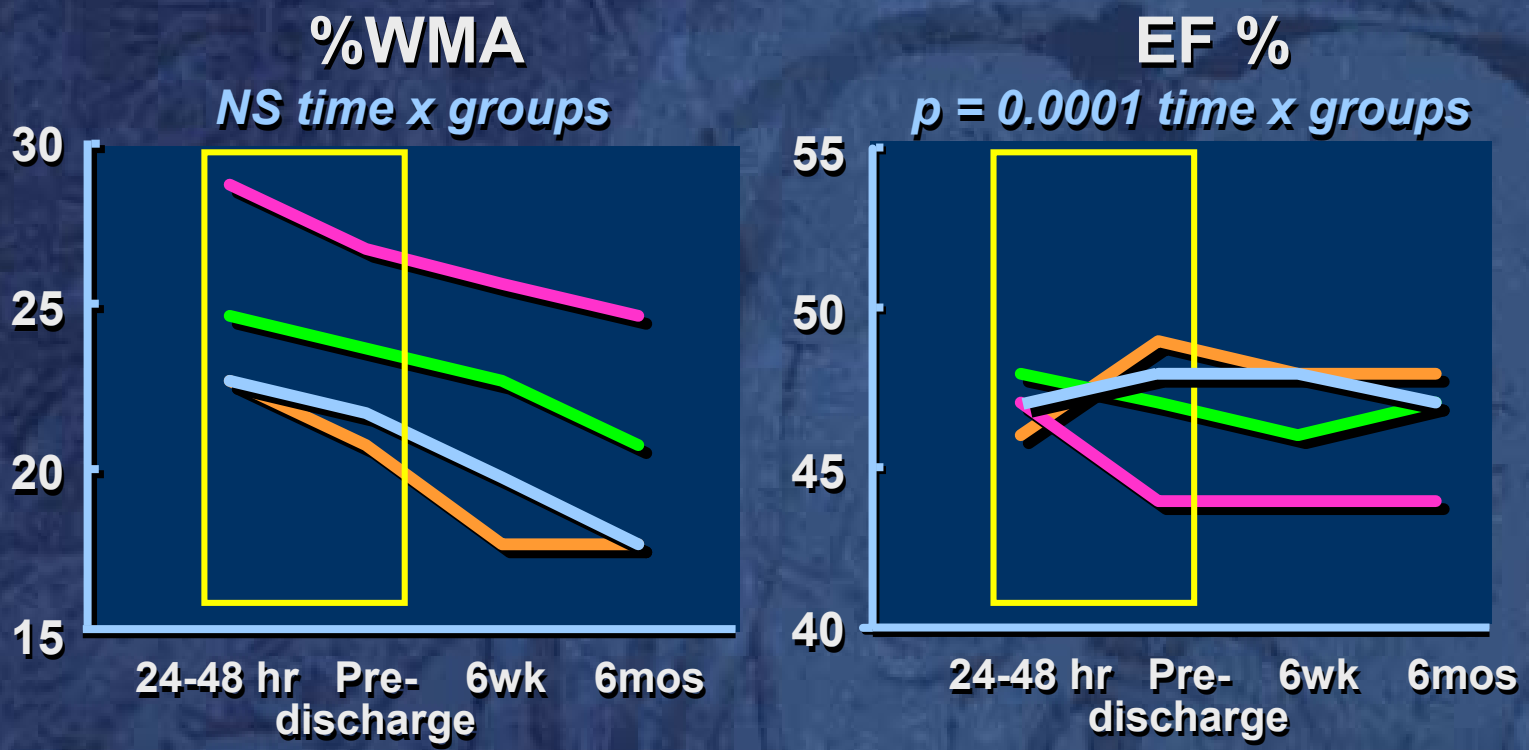
GISSI-3 Echo substudy. Am Heart J 2001; 141:131-8

Early Remodeling



GISSI-3 Echo substudy. Am Heart J 2001; 141:131-8

Early Remodeling



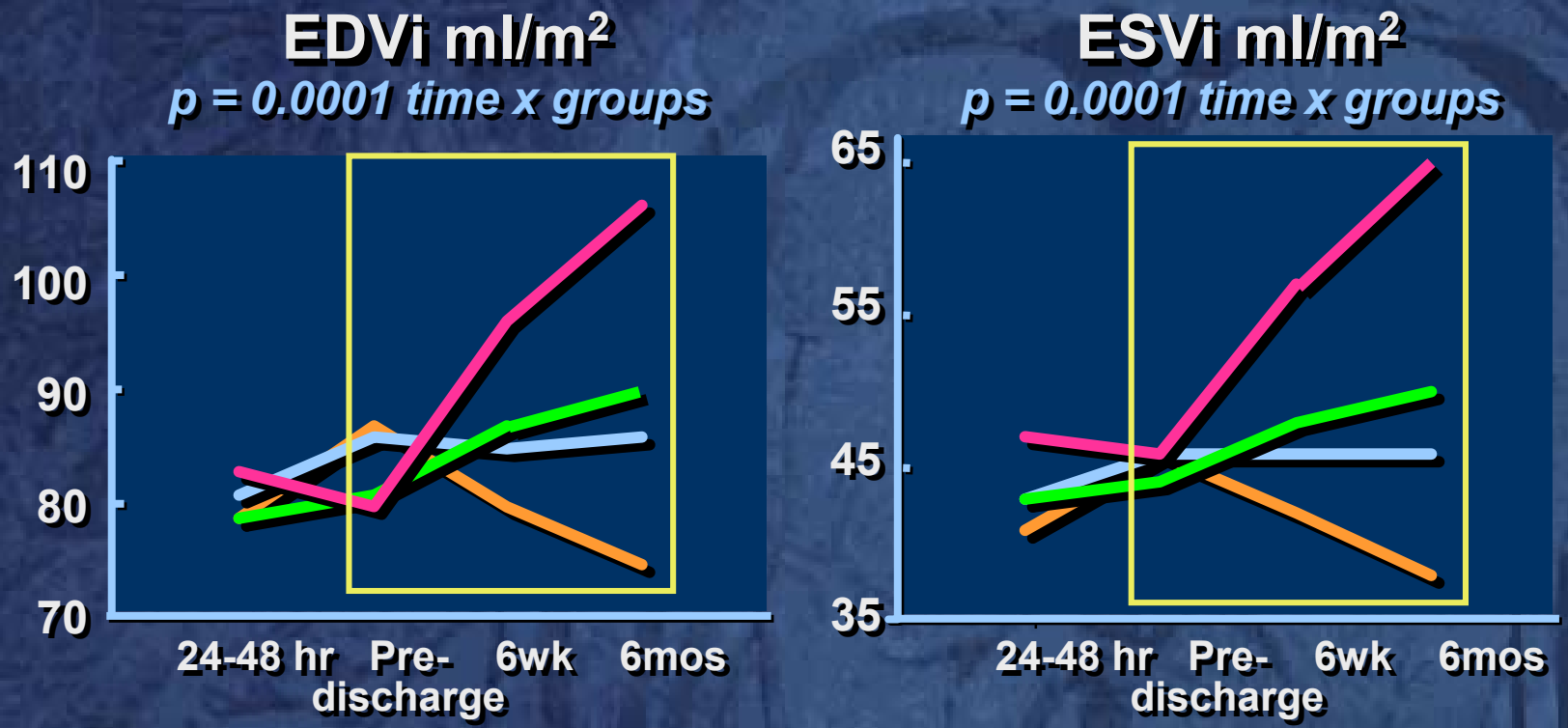
GISSI-3 Echo substudy. Am Heart J 2001; 141:131-8

Predictors of Early Remodeling

>20% LV dilation

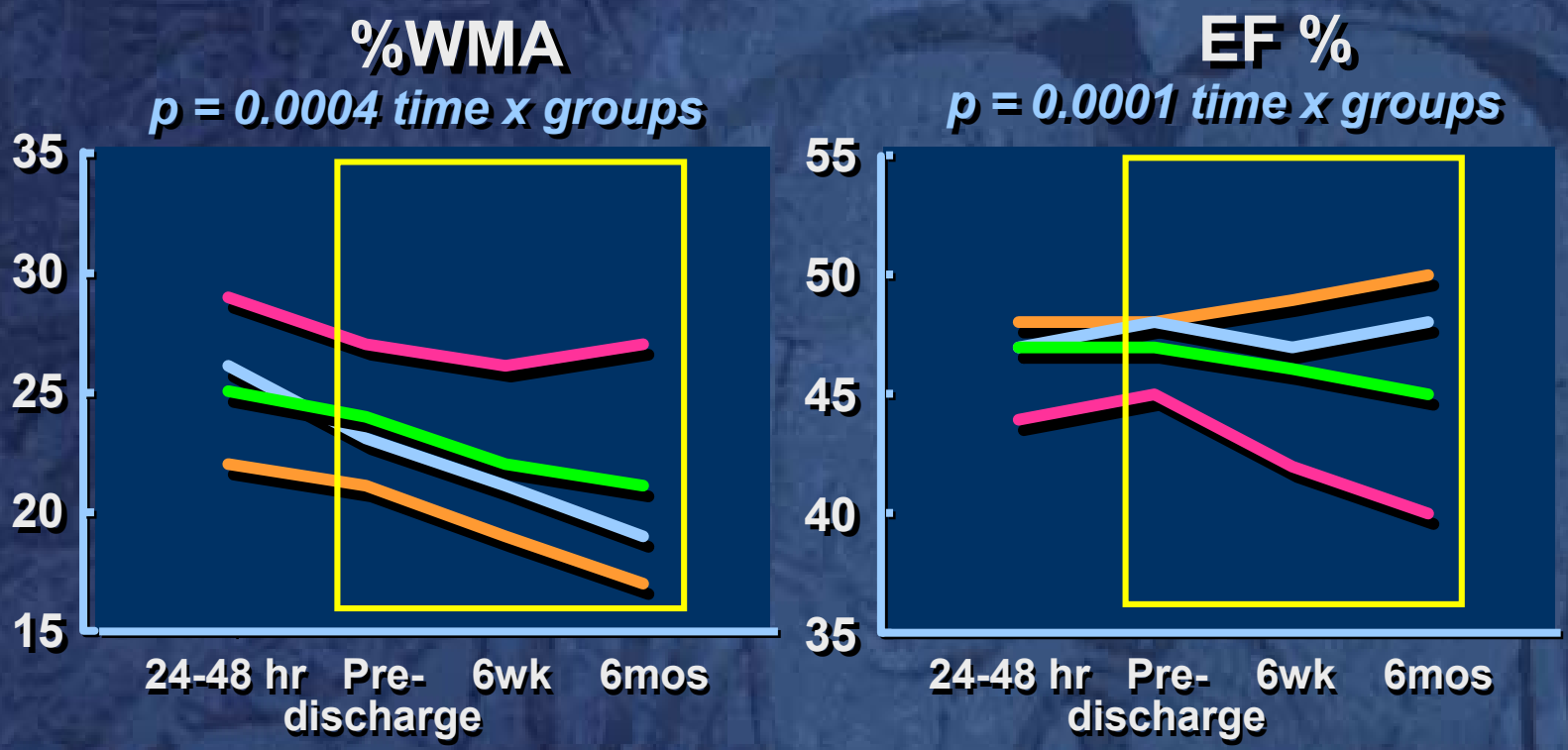
	OR	CI 95%	p value
Baseline %WMA	1.030	1.013-1.048	0.0005
Mitral reg. 3-4+ vs 1-2+	1.739	0.694 -4.348	0.2365
Anterior vs non-anterior MI	1.399	0.861 -2.272	0.1752
Thrombolysis Yes vs No	1.275	0.793 -2.050	0.3165
Nitrate Yes vs No	1.233	0.814 -1.868	0.3234
Lisinopril Yes vs No	0.900	0.592 -1.368	0.6220
Killip 2-3 vs Killip 1	1.119	0.593 -2.110	0.7285
Female vs Male	0.921	0.520 -1.632	0.7773
β-blockers i.v. no vs yes	1.067	0.660 -1.726	0.7908

Late Remodeling



GISSI-3 Echo substudy. Am Heart J 2001; 141:131-8

Late Remodeling



GISSI-3 Echo substudy. Am Heart J 2001; 141:131-8

Predictors of Late Remodeling

>20% LV dilation

	OR	CI 95%	p value
Pre-discharge %WMA	1.026	1.008-1.045	0.0147
Mitral reg. 3-4+ vs 1-2+	2.261	1.031-4.958	0.0417
Lisinopril no vs yes	0.649	0.417-1.009	0.0546
Age	0.990	0.969-1.011	0.3322
β-blockers i.v. no vs yes	0.857	0.523-1.404	0.5396
Thrombolysis no vs yes	0.886	0.523-1.501	0.6515
Nitrate no vs yes	0.914	0.588-1.420	0.6887
Undefined vs non anterior AMI	1.146	0.537-2.445	0.7248

Remodeling

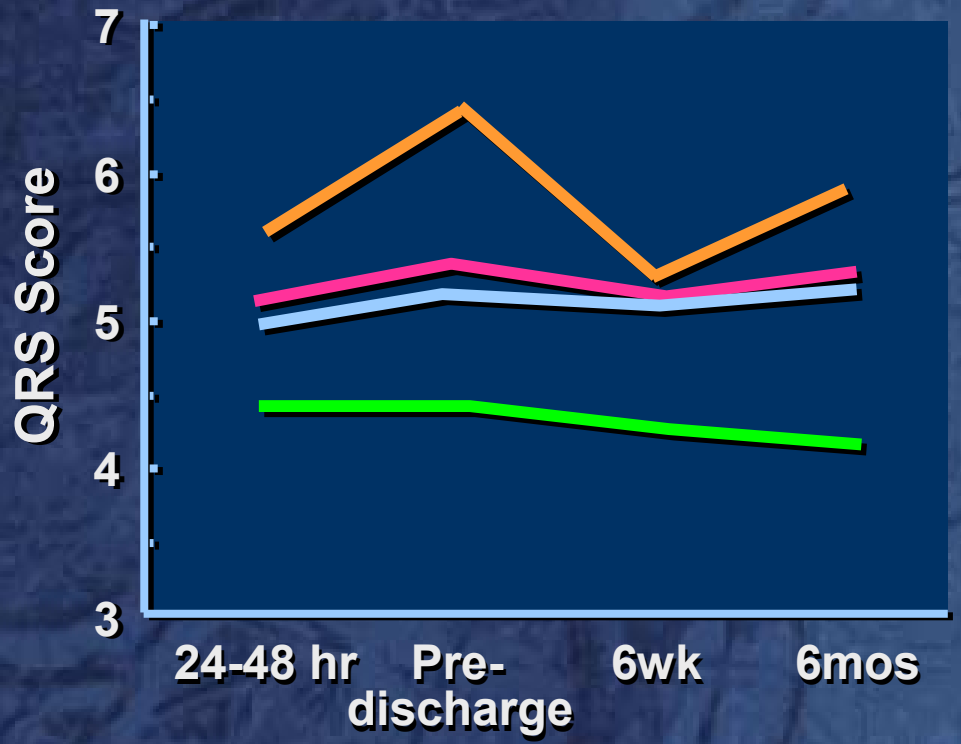
- Occurs after AMI *despite spontaneous recovery of regional function*
- With recovery of regional function, particularly evident in large infarcts

Remodeling Time

- Early *is not predictive of subsequent dilation/dysfunction*
- Late *associated with significant worsening of LV function*
- Anytime *more extensive %WMA indicates higher risk for progressive LV dilation*

LV remodeling

QRS score changes

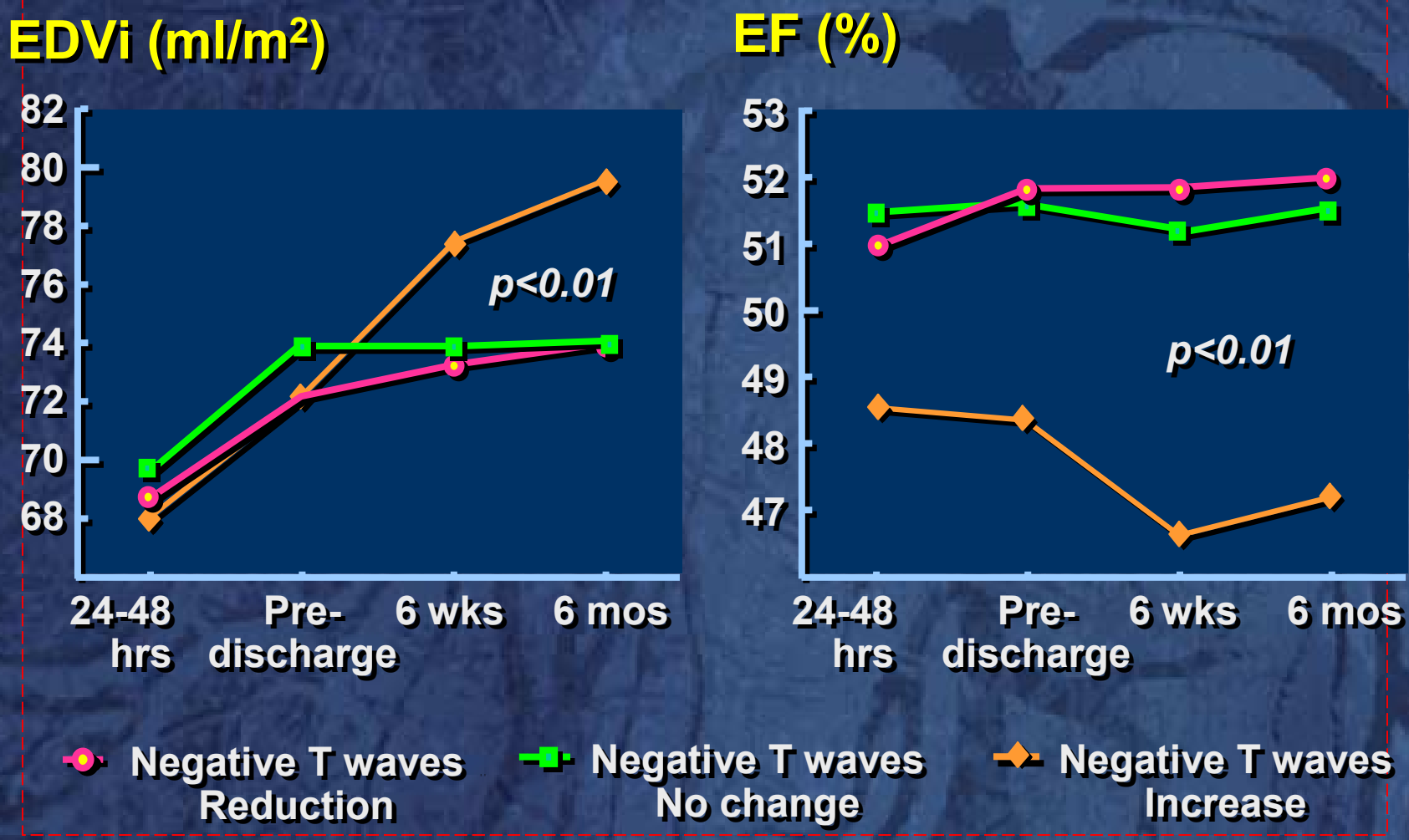


- EDVi reduction
- EDVi stability
- EDVi increase 10-25%
- EDVi increase >25%

between groups: p=0.05

interaction time x groups: p=NS

LV remodeling according to the evolutionary changes of the negative T waves



Electrocardiographic Evolutionary Changes and Left Ventricular Remodeling After Acute Myocardial Infarction

Results of the GISSI-3 Echo Substudy

Enzo Bosimini, MD,* Pantaleo Giannuzzi, MD,* Pier L. Temporelli, MD,* Francesco Gentile, MD,†
Donata Lucci, BS,‡ Aldo P. Maggioni, MD,‡ Luigi Tavazzi, MD,§ Luigi Badano, MD,‖
Ioanna Stoian, MD,¶ Rita Piazza, MD,# Ioanna Heyman, MD,** Giacomo Levantesi, MD,††
Eugenio Cervesato, PHD,¶ Enrico Geraci, MD,‡‡ Gian L. Nicolosi, MD,¶
for the GISSI-3 Echo Substudy Investigators

JACC 2000;35:127-35

"The analysis of serial ECGs can predict postinfarct LV remodeling. Lack of resolution and late appearance of new negative T waves predict unfavorable remodeling with progressive deterioration of ventricular function"

Determinants of LV Remodeling

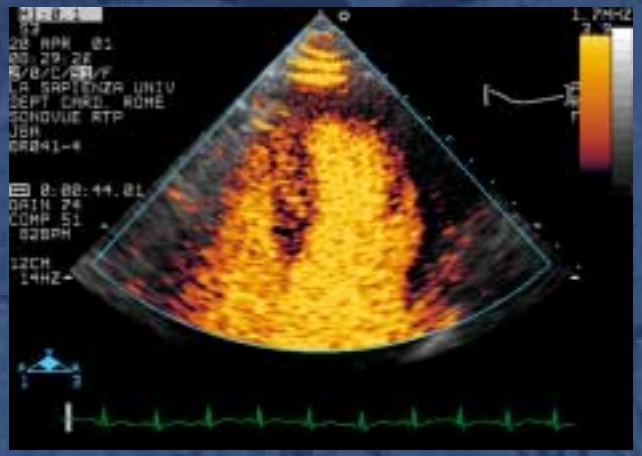
Open Issues

- Length of infarct segment
- IRA TIMI grade
- Role of diastolic filling pattern
- Role of microvascular damage
  (to be defined)

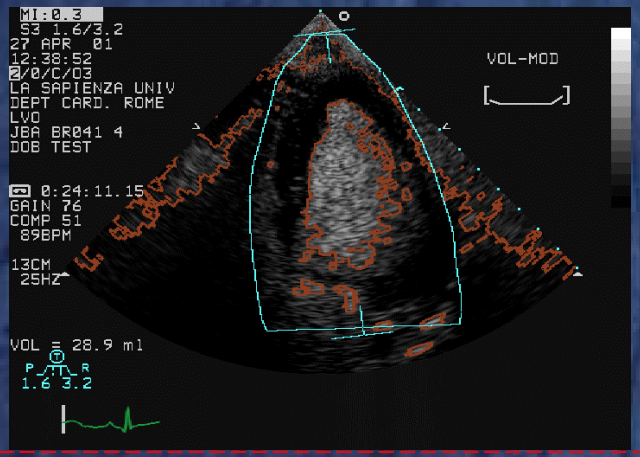
MOVIE

Influence of No-reflow on LV Remodeling

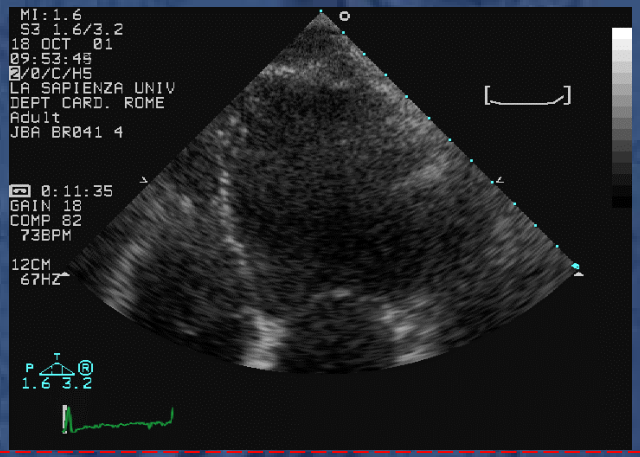
Day 1



Day 1

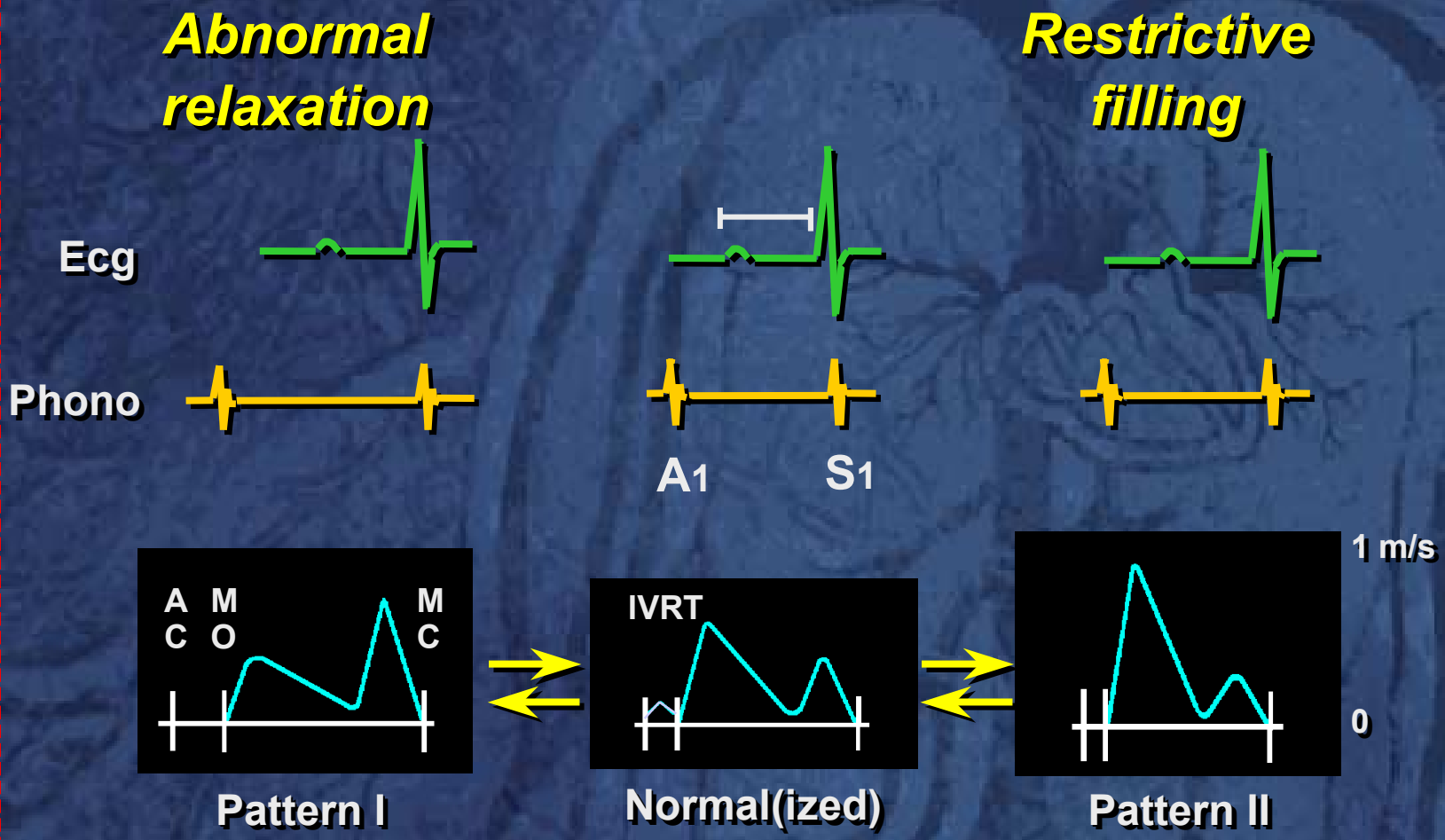


Day 7

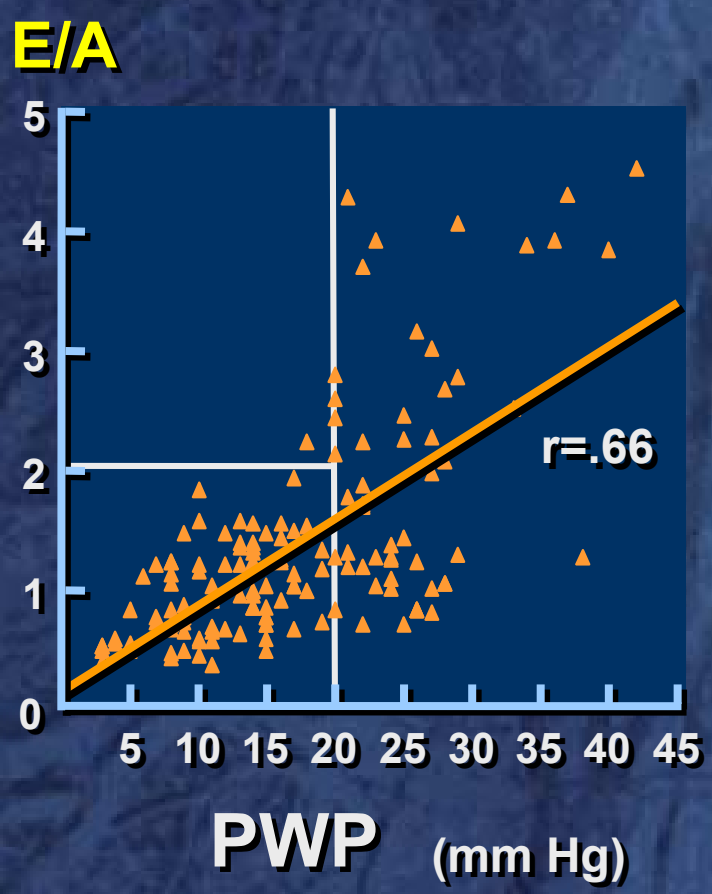


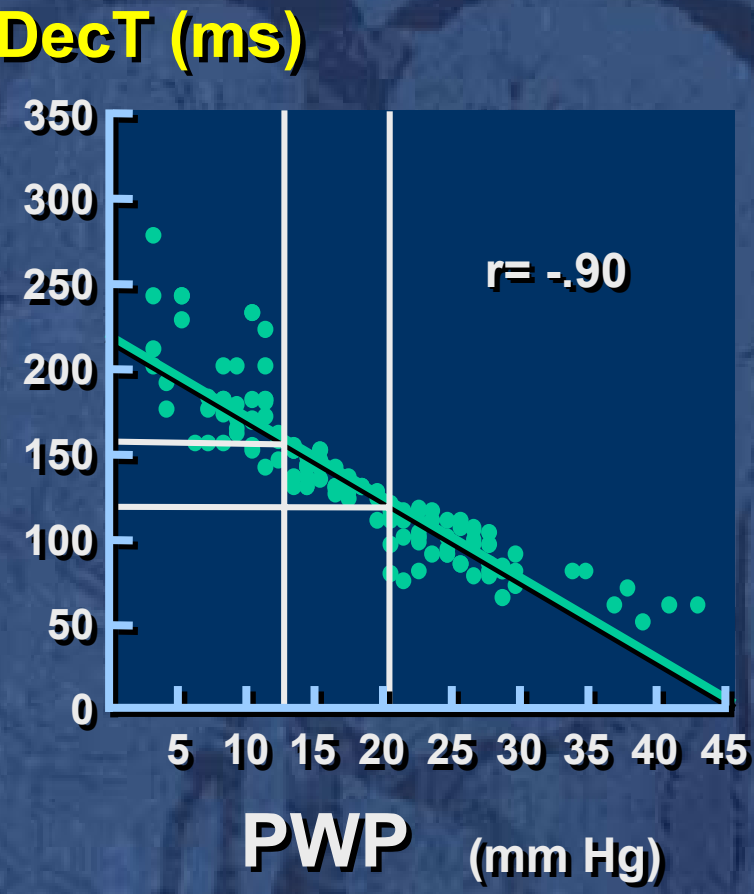
F/U

Mitral Doppler Flow Velocity Profile



Doppler - hemodynamic correlations in 140 pts with AMI and severe LV dysfunction





Giannuzzi et al. J Am Coll Cardiol 1994

Deceleration time and LV Remodeling in the GISSI-3 echo substudy

- 571 patients with uncomplicated MI
- Serial Doppler echocardiographic study

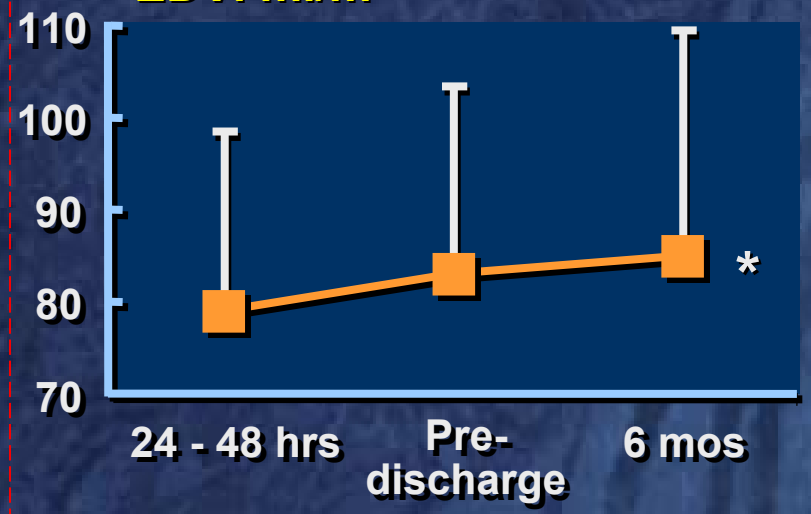
  at 24-48 hrs (mean 36±8),
  pre-discharge (mean 12±5 days)
  6 months (mean 194±16 days) after

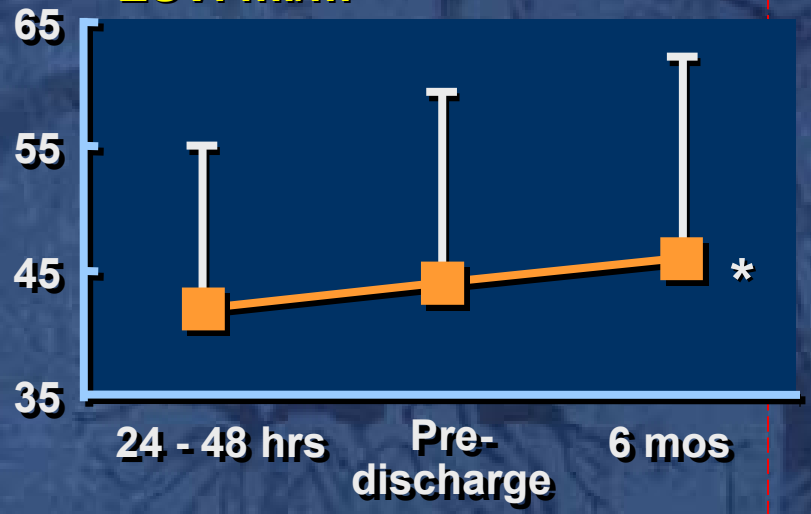
Changes in Doppler Variables From Baseline to 6 months

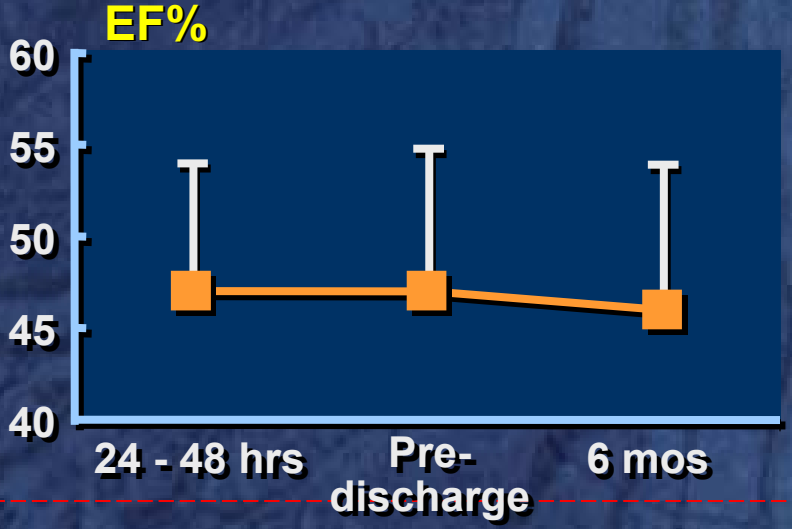
- Peak E from 64.8 - 65.1 cm/sec
- Peak A from 64.2 - 64.9 cm/sec
- E/A from 1.009 - 1.002
- DT from 158 - 177 msec* *(p<0.01)*

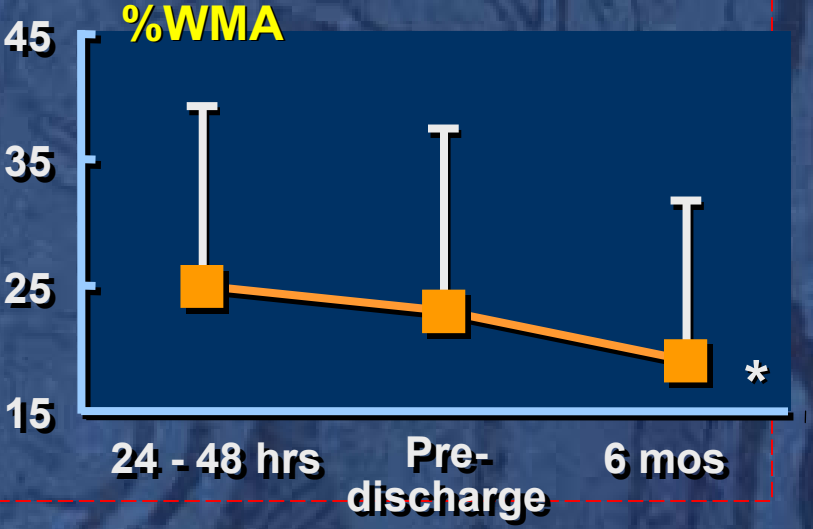
Total Population

* p<0.01



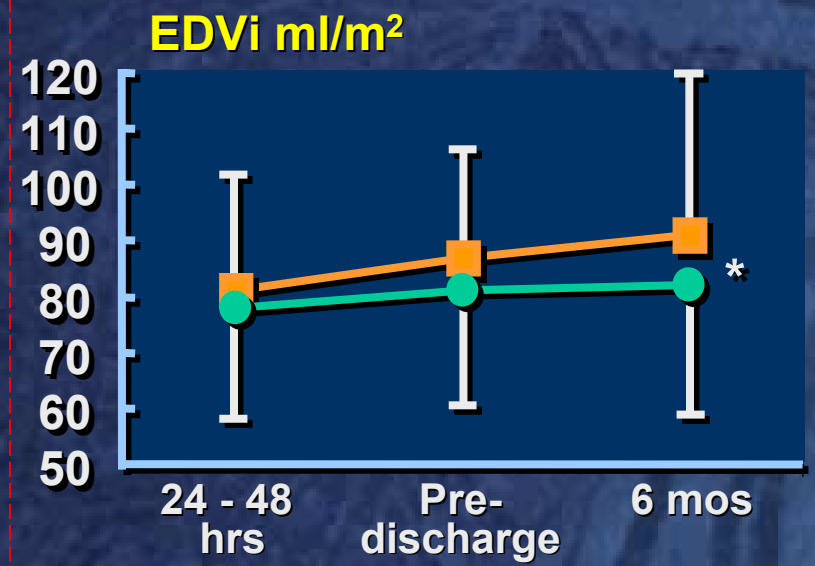


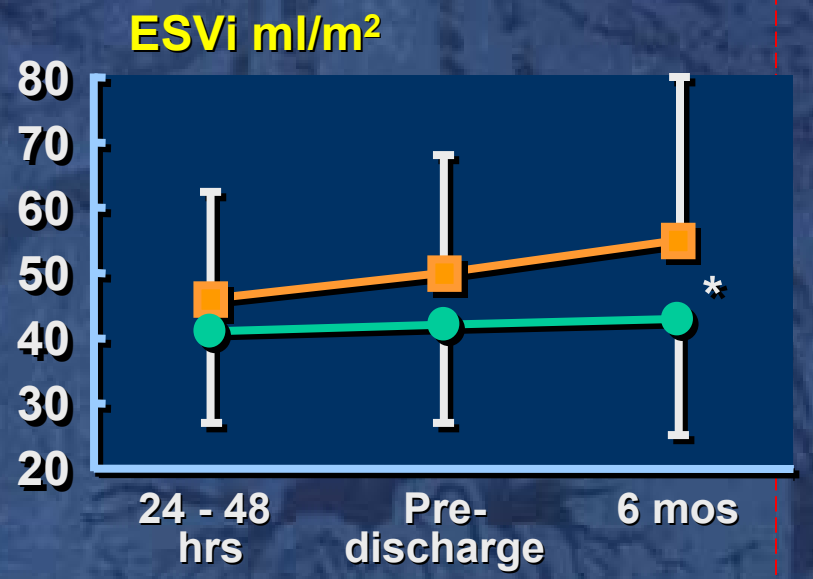


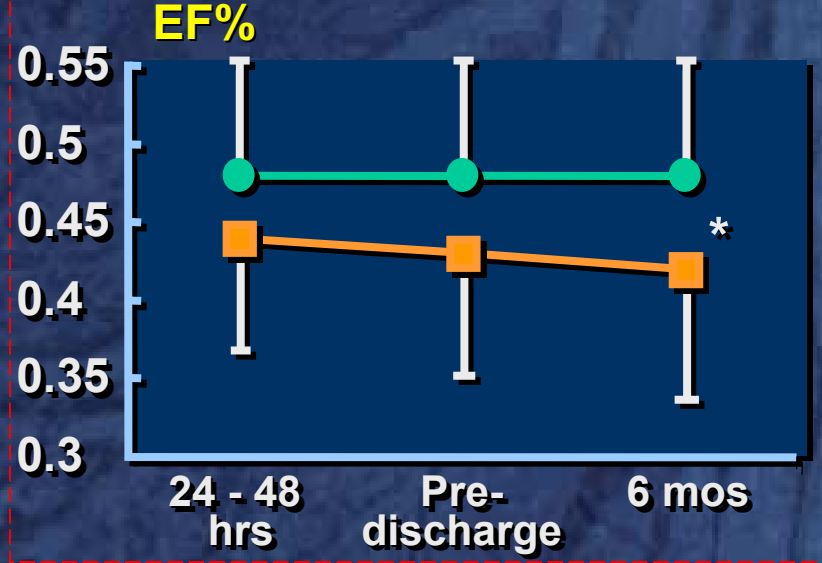


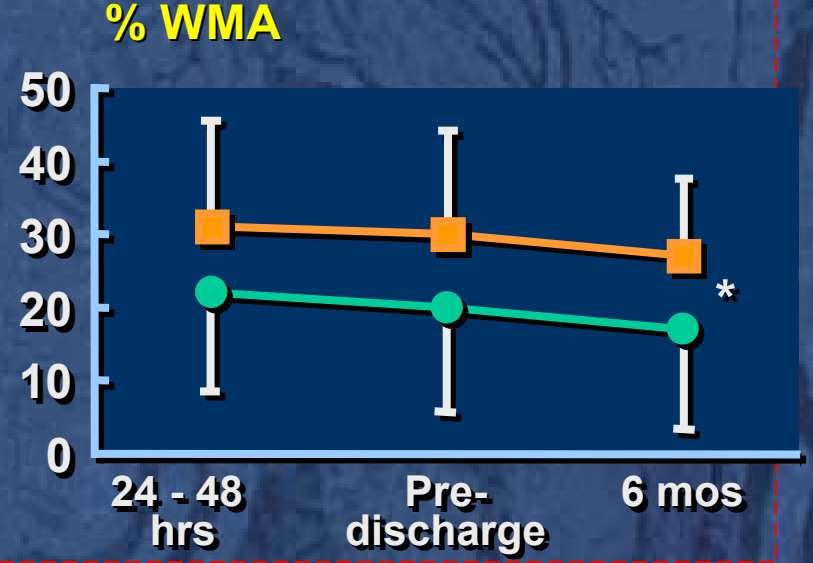
Temporelli et al. Submitted

Changes According to Baseline DT









* *p<0.001* interaction time x groups

■ Baseline DT <130 n= 147

● Baseline DT >130 n= 424

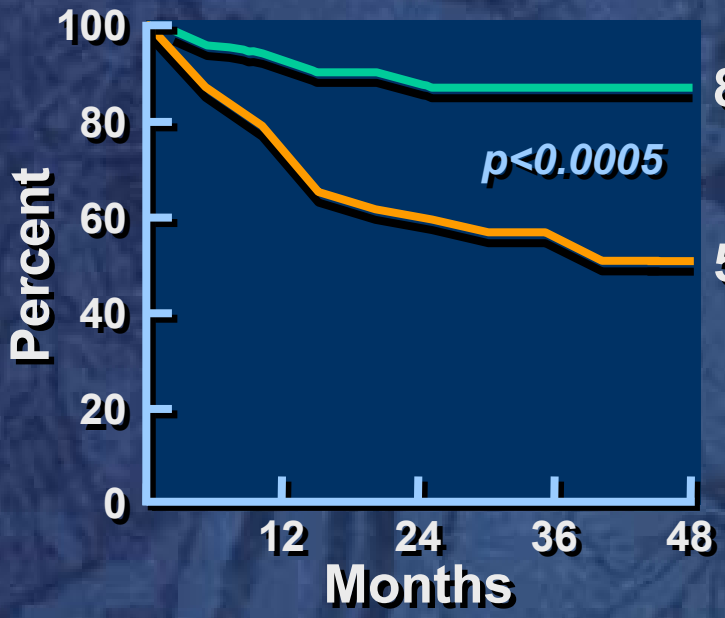
Independent Predictors of Dilation (>5%)

Variable	Odds ratio	*p* value
Baseline EDVi	0.96	0.0001
Baseline DT <130 ms	2.31	0.0001
Baseline %WMA	1.02	0.0001

Temporelli et al. Submitted

Restrictive Diastolic Filling in CHF

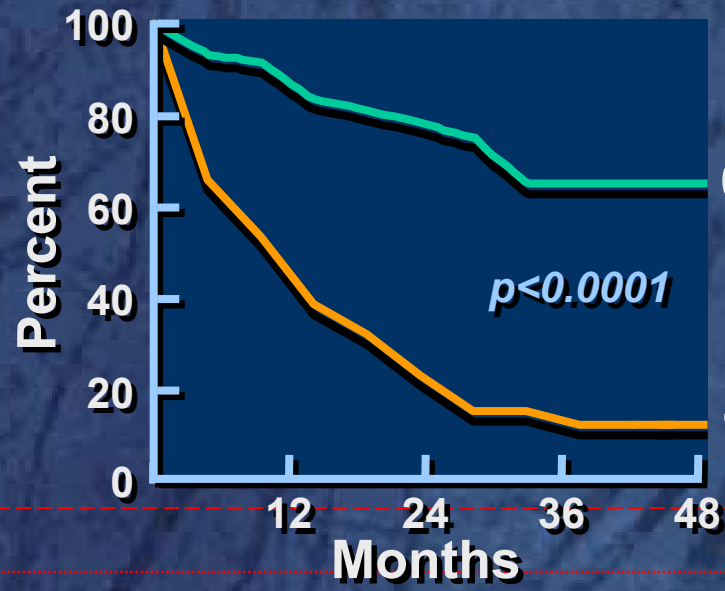
Cumulative Survival



86%
Prolonged DT (>125 ms)

52%
Persistent short DT (<125 ms)

Survival free of all Cardiac Events

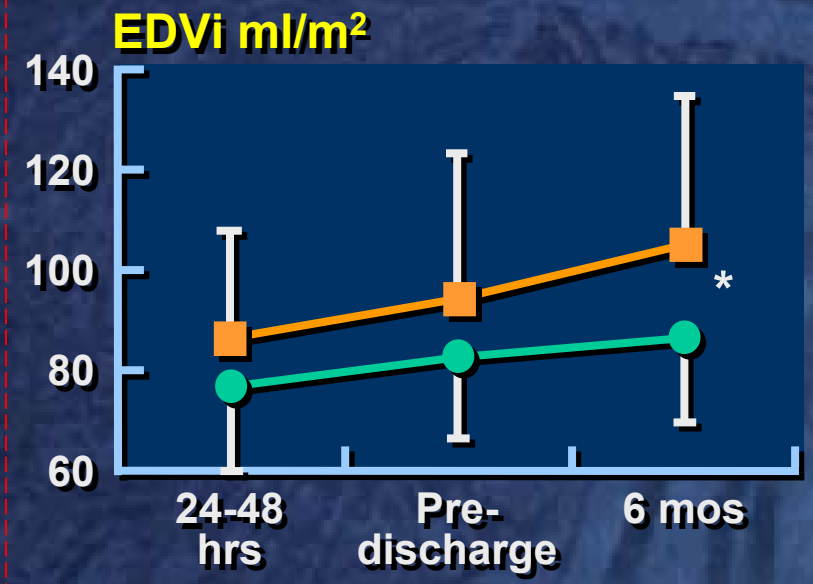


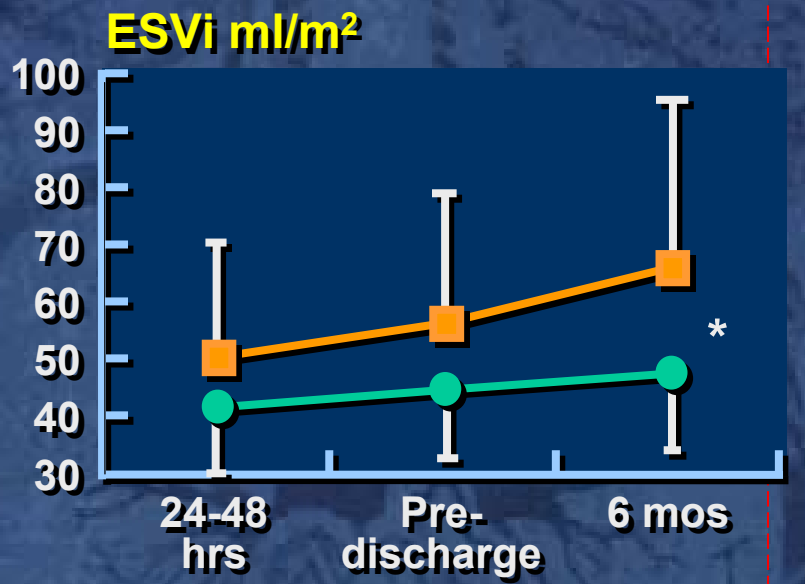
64%
Prolonged DT (>125 ms)

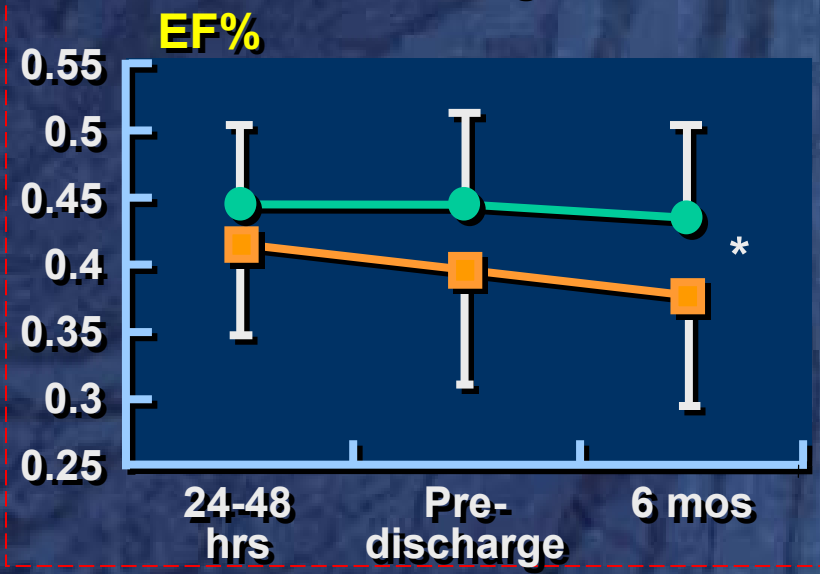
14%
Persistent short DT (<125 ms)

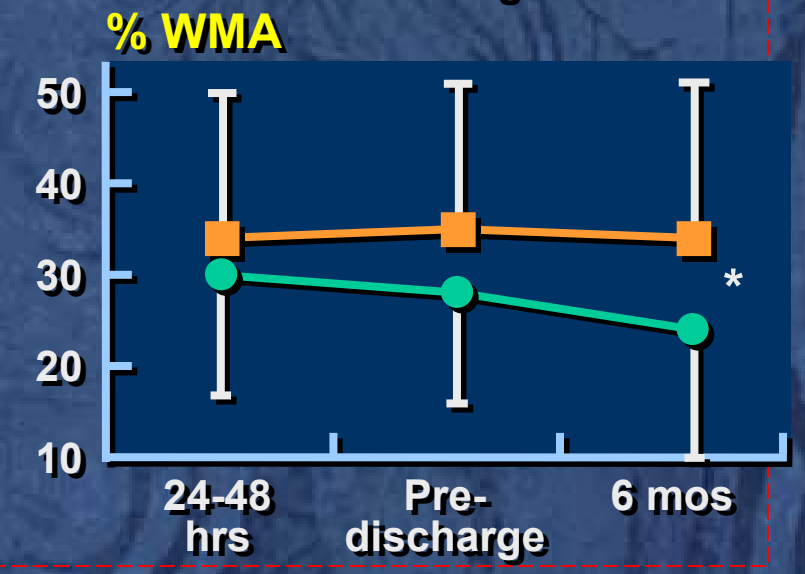
Temporelli et al. JACC 1998

Changes According to Pre-Discharge DT









* *p<0.001* interaction time x groups

Pre-discharge DT <130 n= 56

Pre-discharge DT >130 n= 91

Independent Predictors

Severe (>20%) dilation

Variable	Odds ratio	*p* value
Pre-discharge DT <130 ms	3.06	0.0001
Baseline EDVi	0.95	0.0001
Baseline %WMA	1.02	0.0001

Temporelli et al. Submitted

LV Changes

Post-AMI pts

- **LV dilation occurs**

  even in uncomplicated MI, in spite of significant recovery of %WMA and improvement in LV filling

- **A short (<130 ms) DT**

  occurs at baseline, which persists at pre-discharge, allows identification of pts more compromised and at high risk of progressive late dilation

LV Diastolic Filling

Post-AMI pts

- Adds important information to indices of global and regional function
- Allows identification of those at increased risk of progressive LV dilation and dysfunction