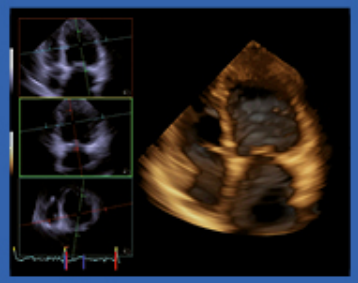


EuroValve

March 27 - 28, 2015

Improving risk stratification in asymptomatic severe aortic stenosis

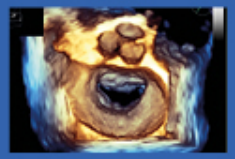
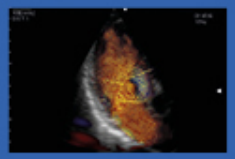
Myocardial fibrosis with MRI

Victoria Delgado, MD, PhD

Leiden University Medical Center

The Netherlands



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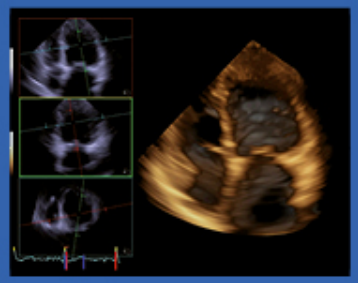

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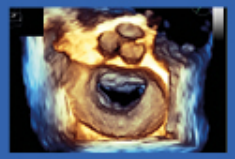
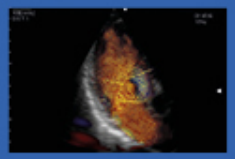
Faculty disclosure

Victoria Delgado

I disclose the following financial relationships:

Paid speaker for Abbott Vascular



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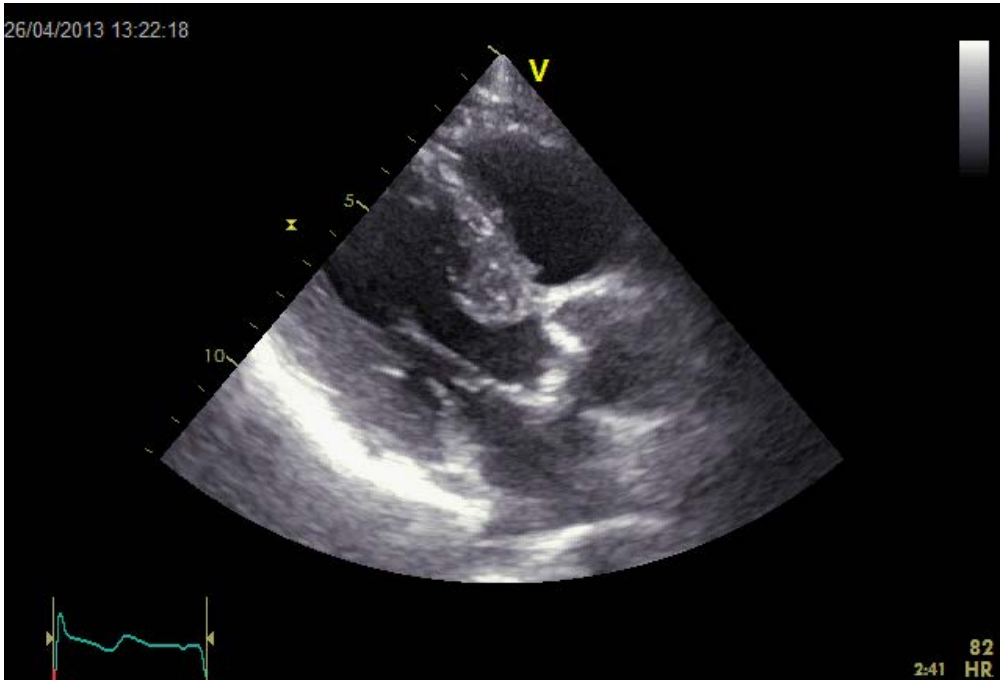
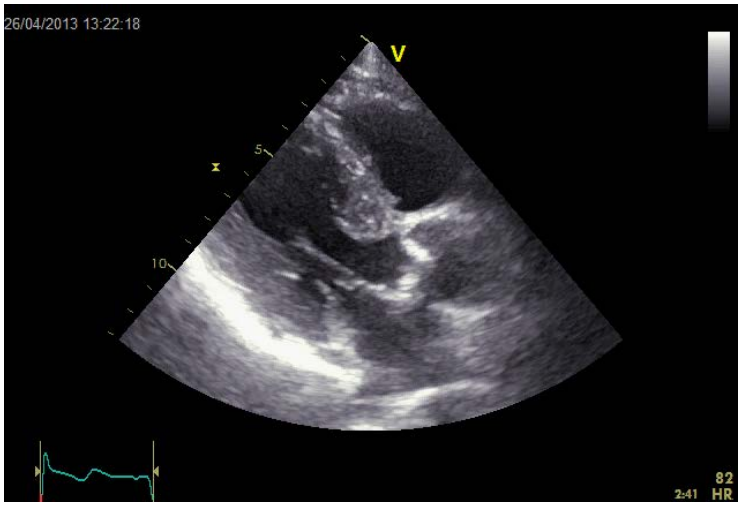
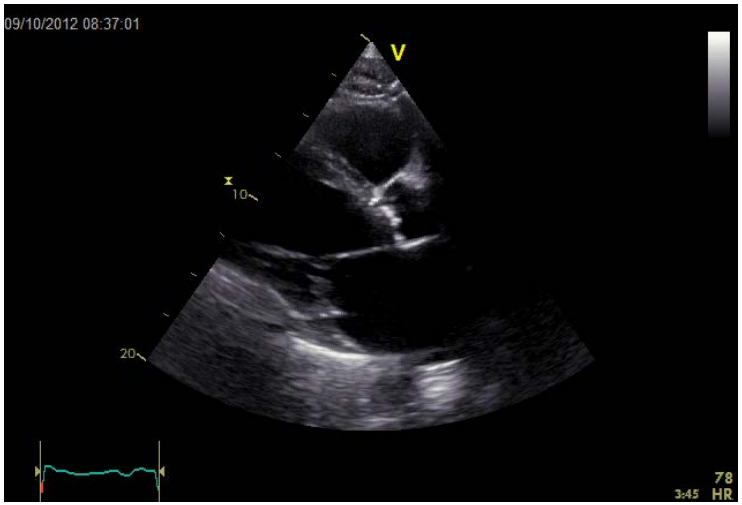


- Poor correlation between severity of aortic stenosis and symptom onset
- Management of asymptomatic severe AoS patients challenging



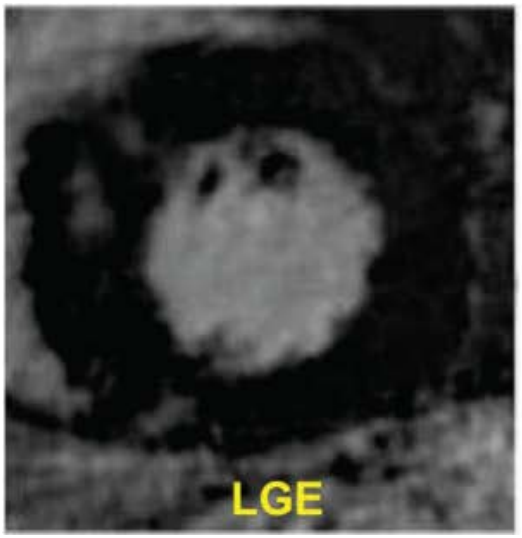


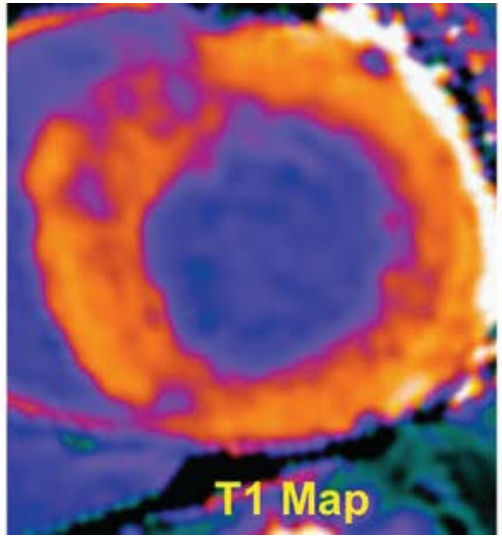
Hypertrophy → Heart failure

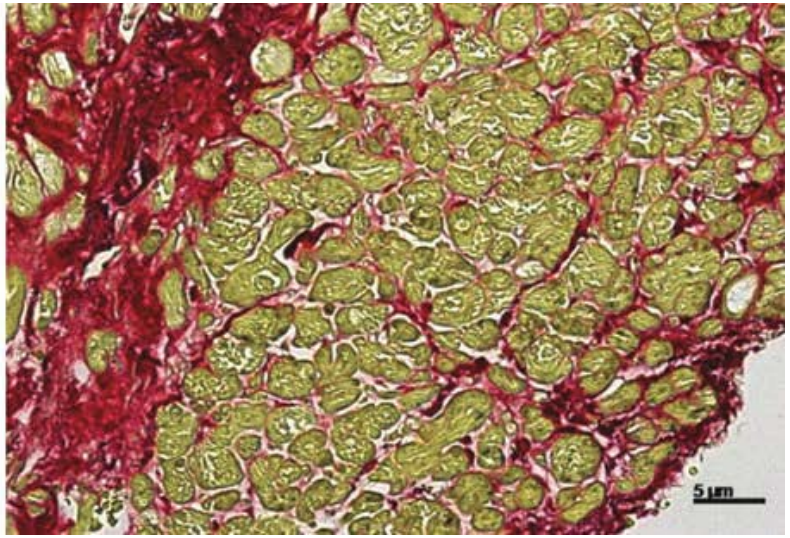
Cardiomyocyte death
Replacement fibrosis

Magnetic resonance imaging

to detect myocardial fibrosis







Biomarkers

to detect cardiomyocyte death

Chin et al. Eur Heart J 2014

N=122, 71 [65–77] years, 67% males

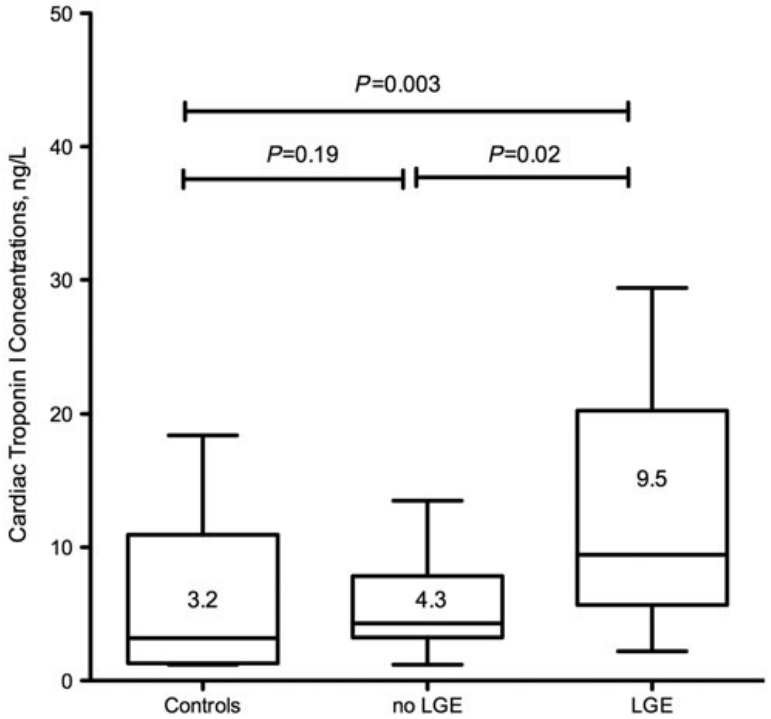
aortic valve area 1.0±0.4 cm^2

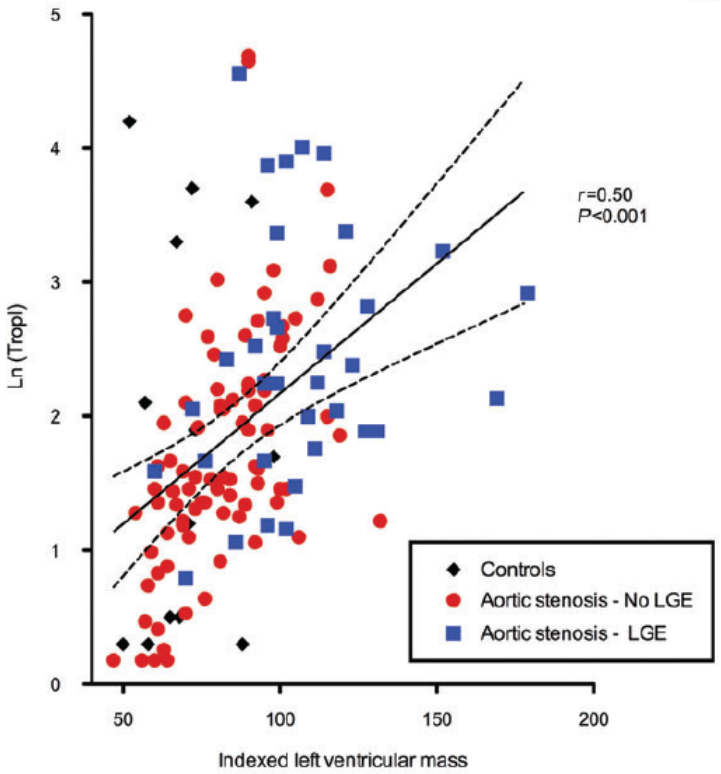
N=13 healthy volunteers

- Correlation between high-sensitivity TnI and LV hypertrophy
- Characterization with LGE and T1 mapping MRI techniques:
  - replacement fibrosis
  - interstitial fibrosis

Chin et al. Eur Heart J 2014

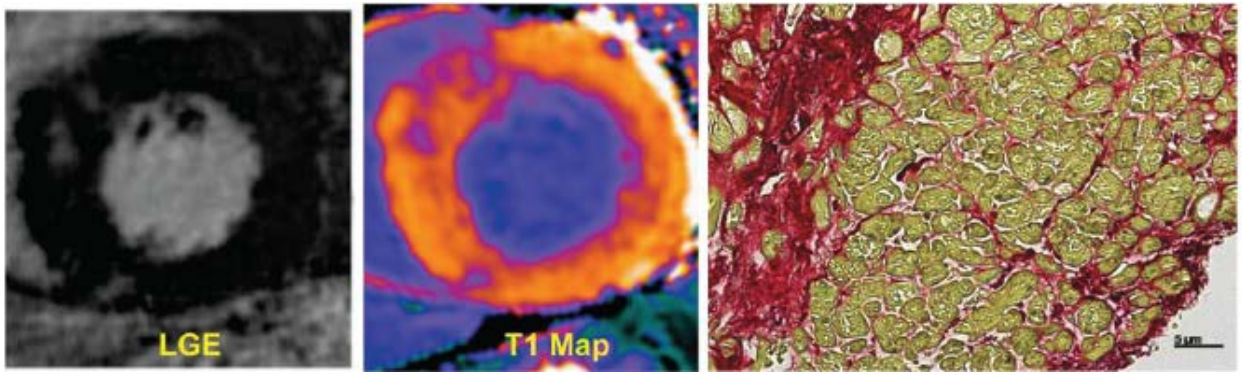
More advance grade of myocardial fibrosis
Increased high-sensitivity TnI levels



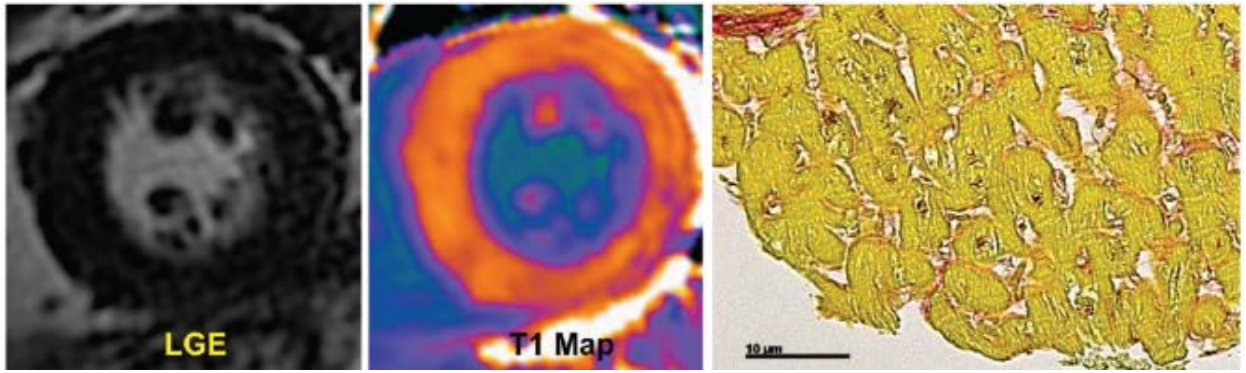


Chin et al. Eur Heart J 2014

Peak aortic velocity 4.8m/s
LV mass index 114 g/m^2
High-sensitivity TnI 11.9ng/L



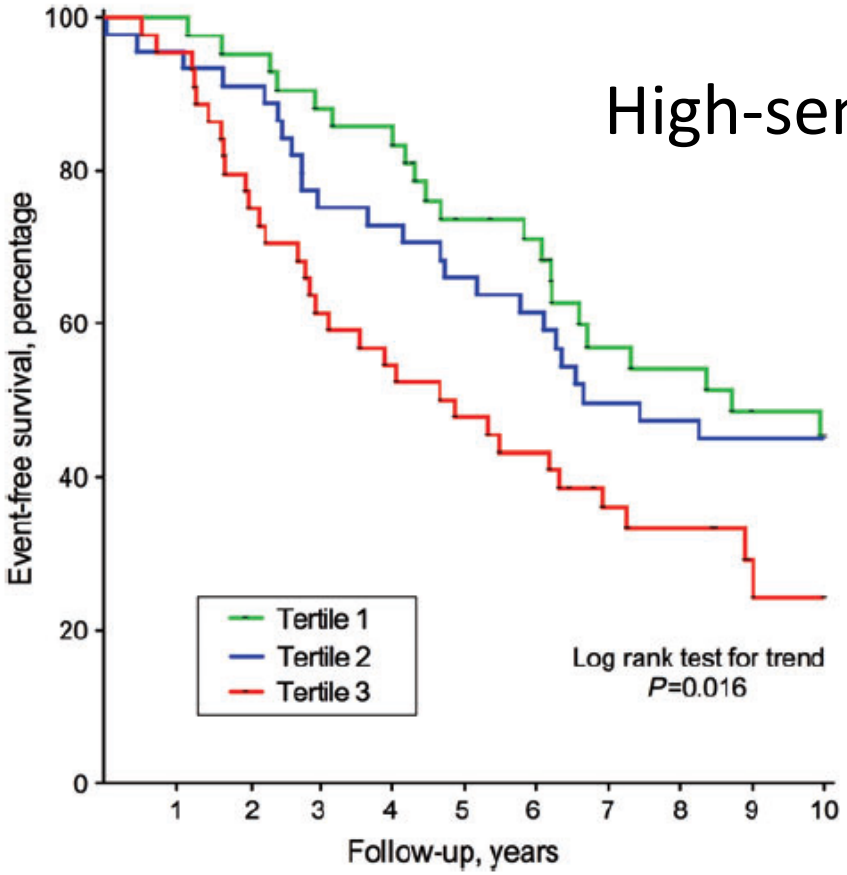
Peak aortic velocity 5.1m/s
LV mass index 81 g/m^2
High-sensitivity TnI 2.5ng/L



Chin et al. Eur Heart J 2014

Prognostic implications?

High-sensitivity TnI

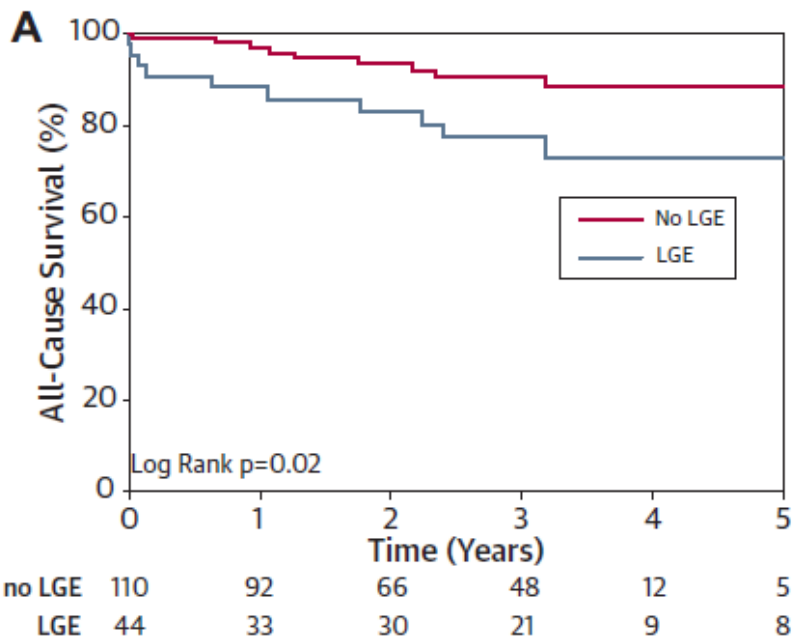


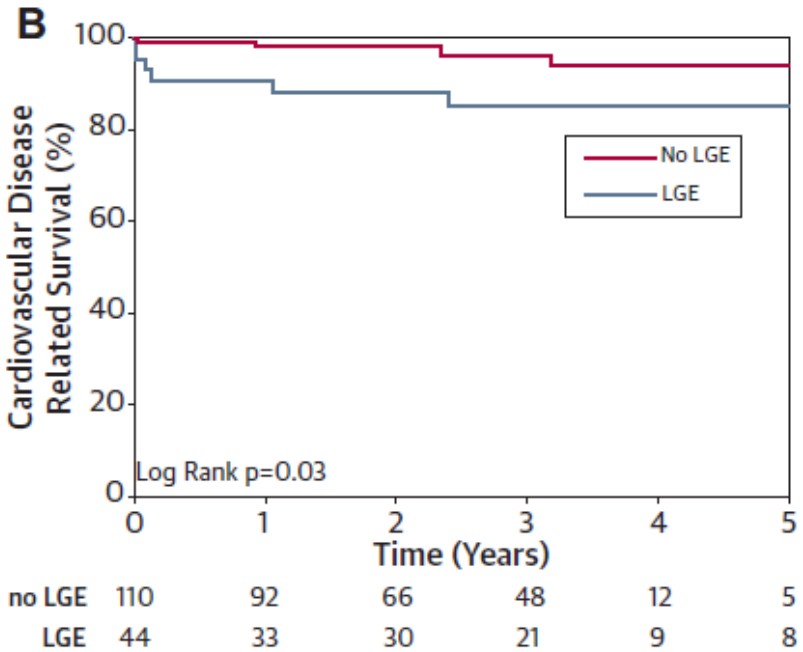
Chin et al. Eur Heart J 2014

Prognostic implications?

N=154, mean age 74±9 years, 62% male

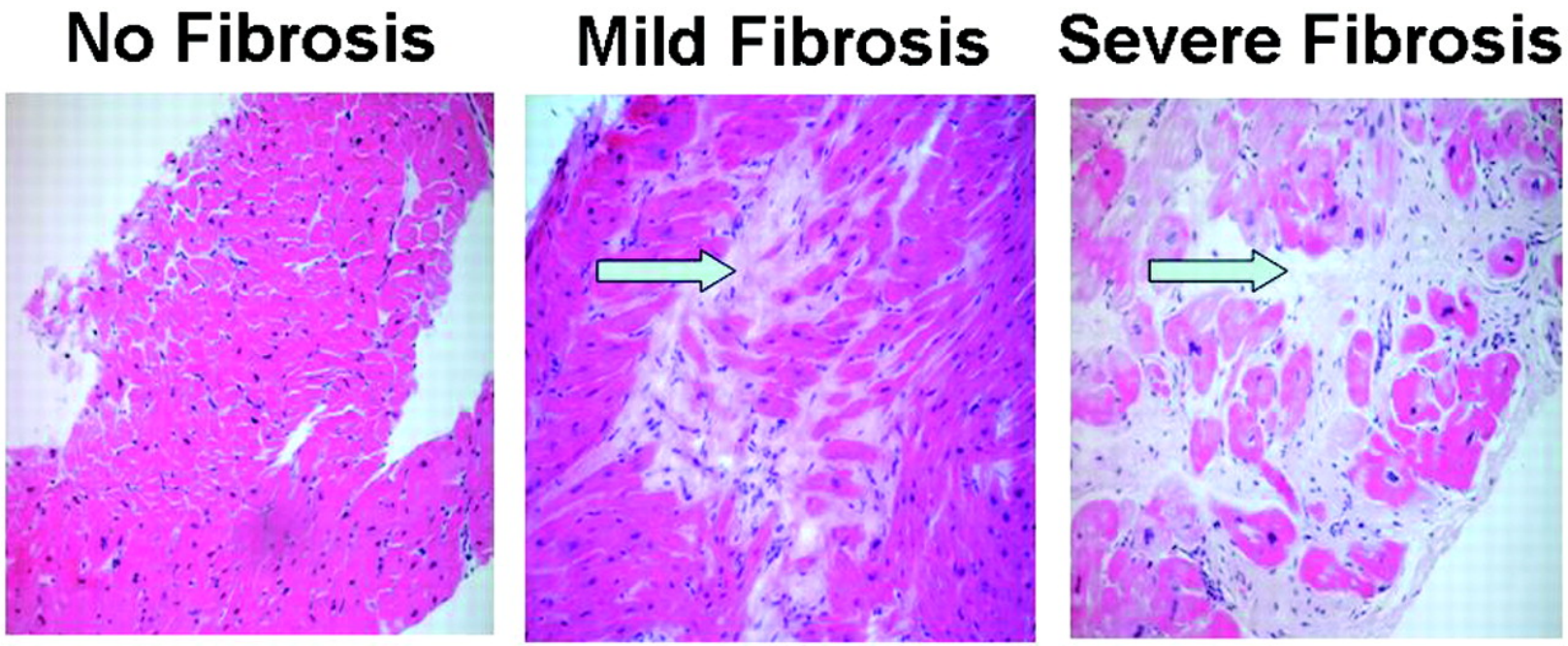
AVA 0.71±0.17 cm^2, 29% CAD





Barone-Rochette et al. JACC 2014

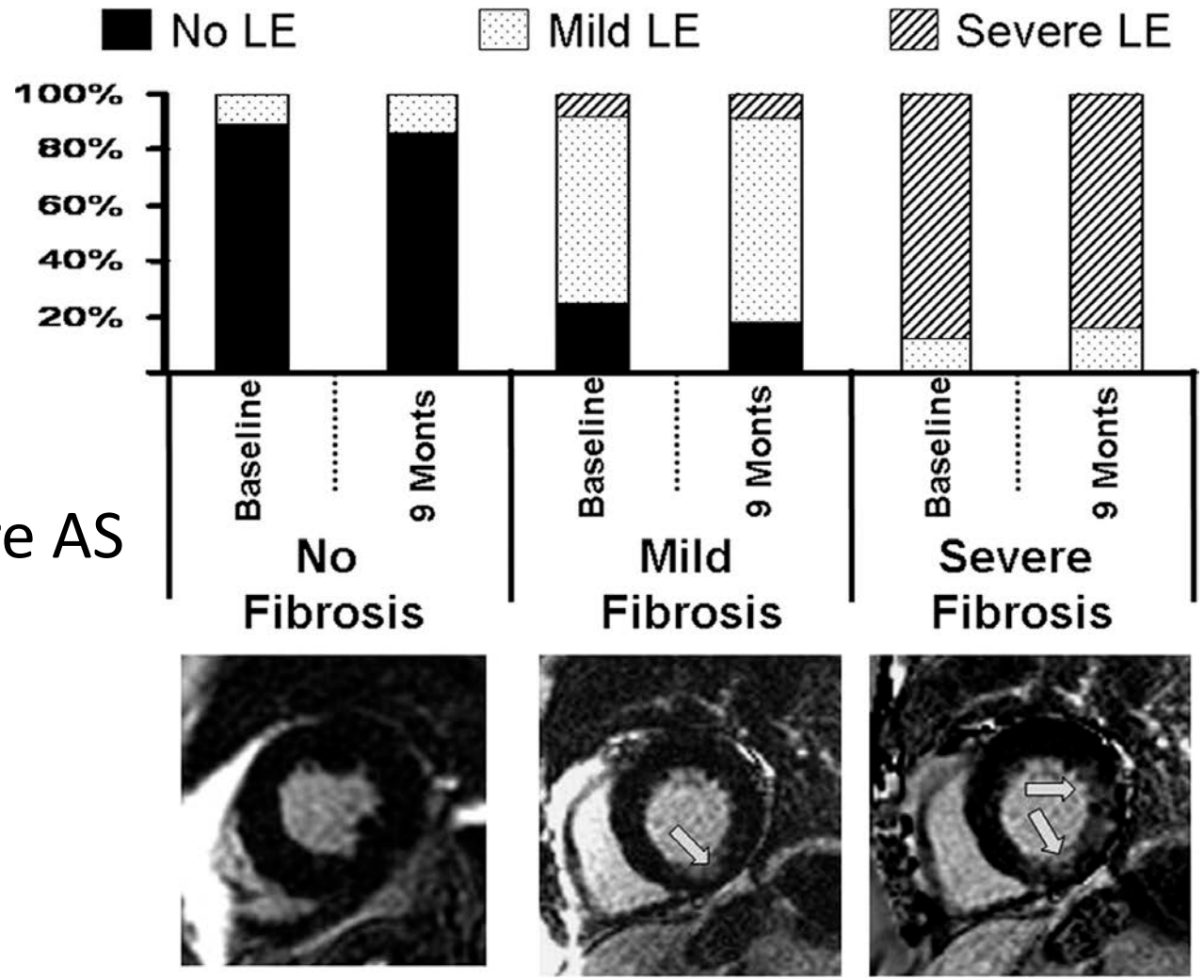
Fibrosis regression after AVR?



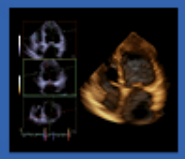
Weidemann et al. Circulation 2009

N= 58

Symptomatic severe AS



Weidemann et al. Circulation 2009



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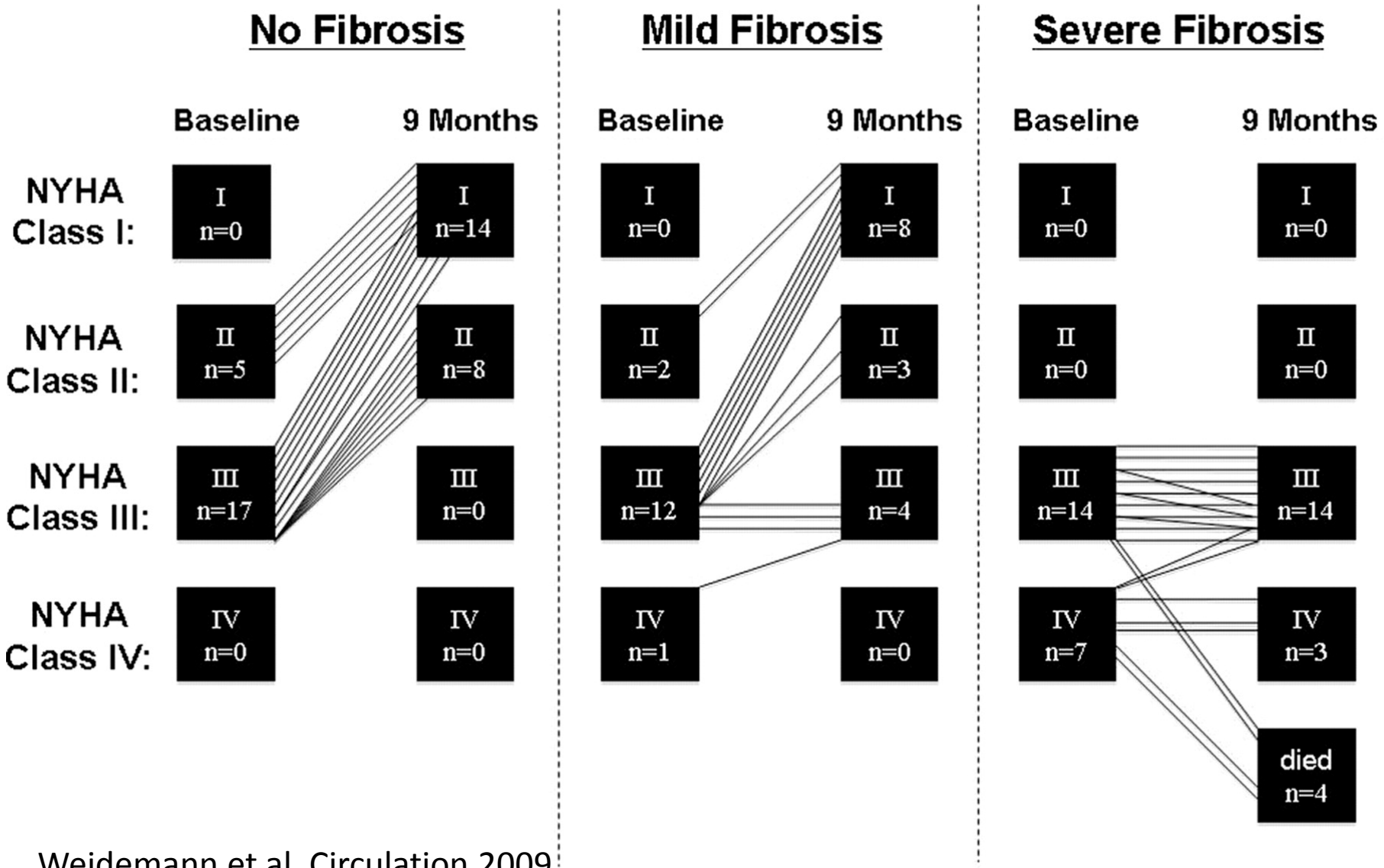
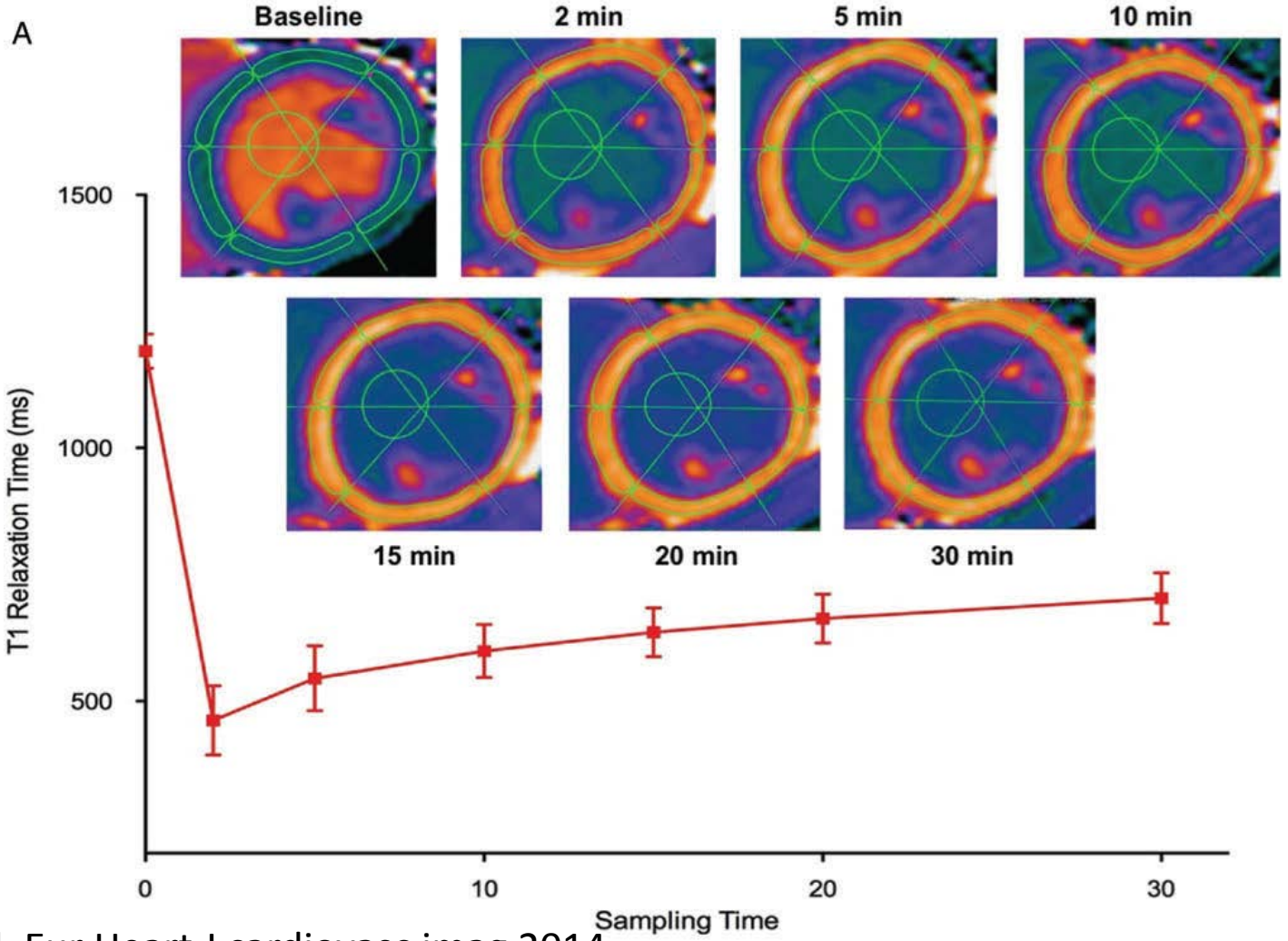
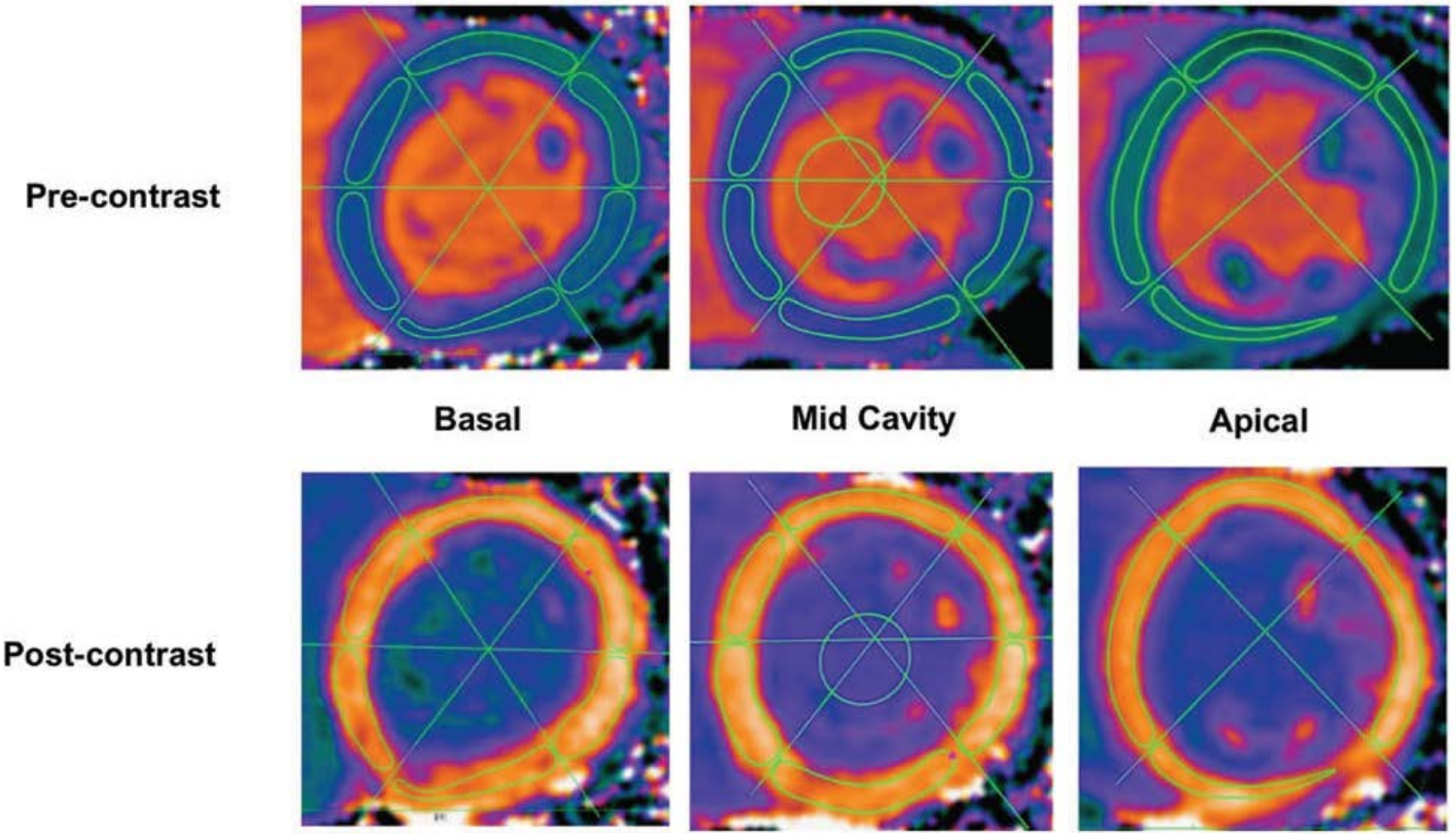


Weidemann et al. Circulation 2009

T1 mapping MRI



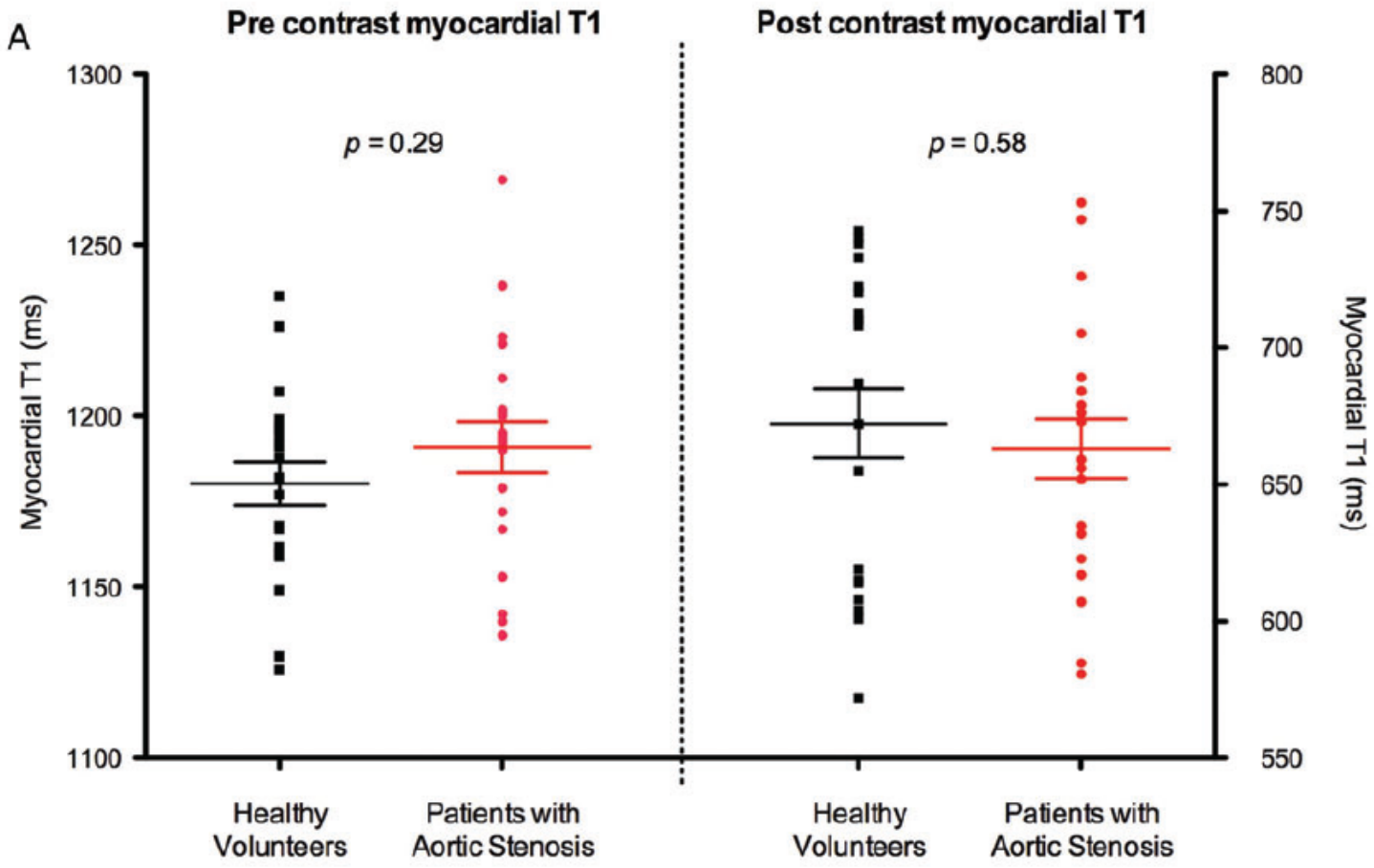
Chin et al. Eur Heart J cardiovasc imag 2014



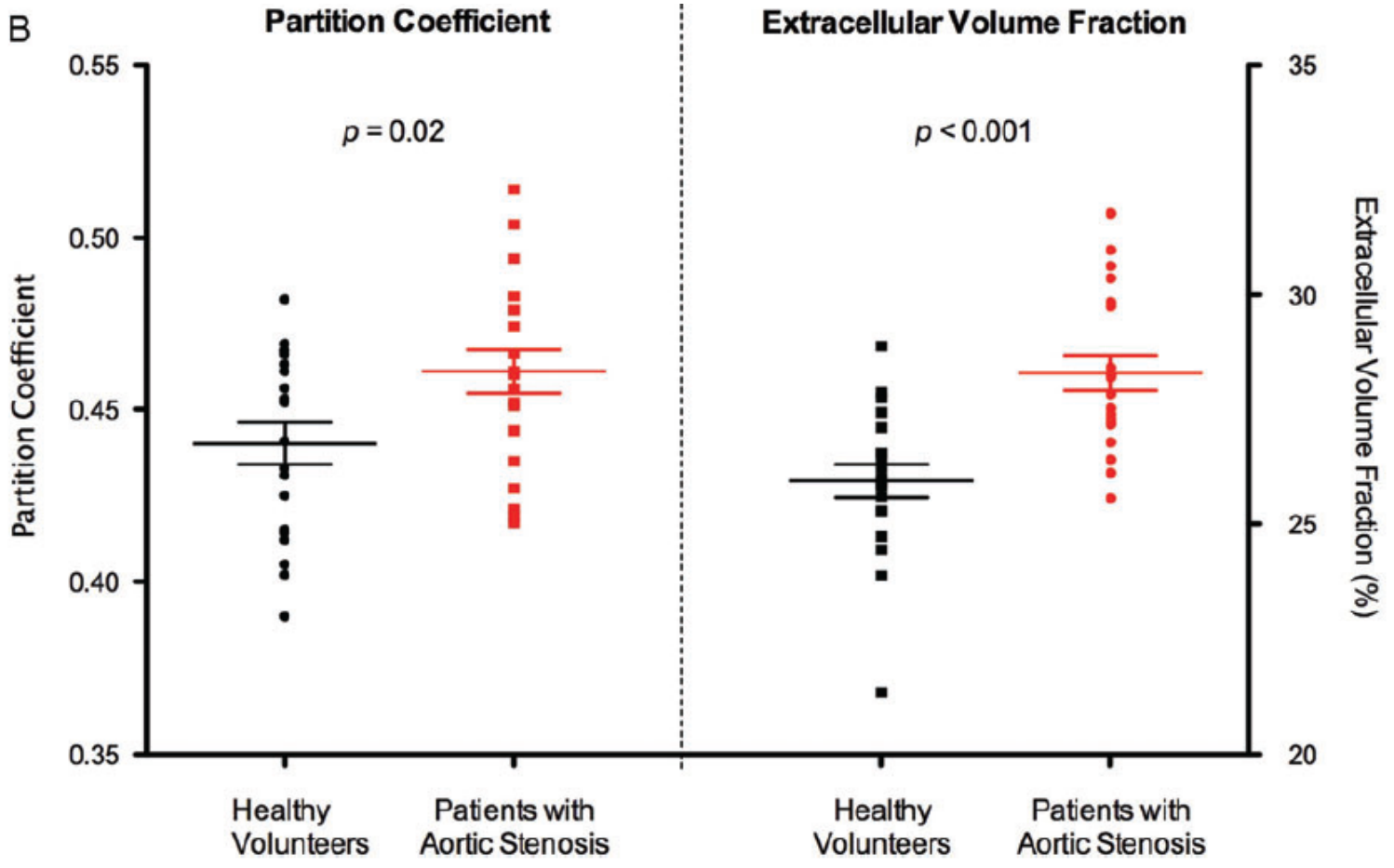
$$\lambda = \Delta R1_{myocardium} / \Delta R1_{blood\,pool}, \text{ where } R1 = 1/T1$$

$$ECV = (1 - \text{hematocrit}) \times \lambda$$

Chin et al. Eur Heart J cardiovasc imag 2014



Chin et al. Eur Heart J cardiovasc imag 2014



Chin et al. Eur Heart J cardiovasc imag 2014

Conclusions

- In asymptomatic aortic stenosis patients, detection of myocardial fibrosis may help to:
  - Identify patients at risk of developing heart failure
  - Refine the decision making
- Which technique to use?
  - Replacement fibrosis (may be late)
  - Diffuse fibrosis (ideal, but still validation studies)