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The Asymptomatic Patient with Aortic Stenosis

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Disclosures

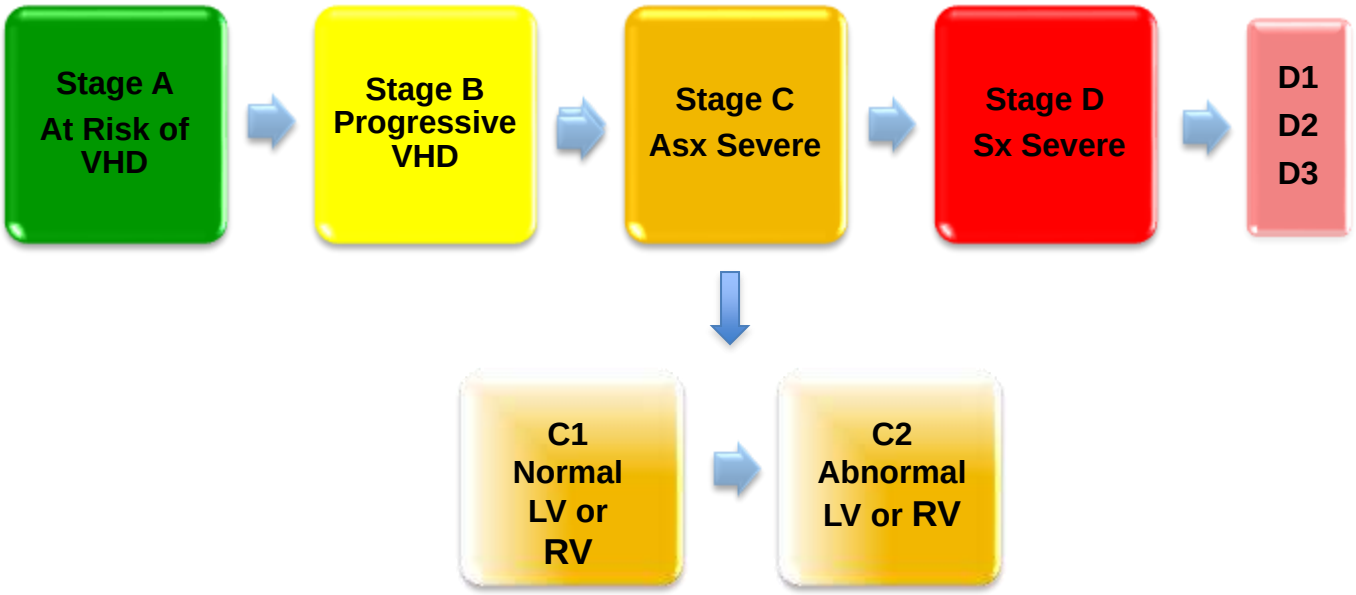
- **None**

Asymptomatic Aortic Stenosis

- **78-year-old woman with asymptomatic severe AS referred for 2nd opinion**
  - **Tired at the end of the day**
  - **Carotids parvus et tardus, late peaking Gr 2 systolic murmur**
- **TTE 9 months ago: Tri-leaflet Ao Valve, Vmax 5.1 m/s, mean gradient 61, AVA 0.7cm^2, LVH, EF 64%, RVSP 57 mm Hg, Ascending Aorta 4.5cm.**

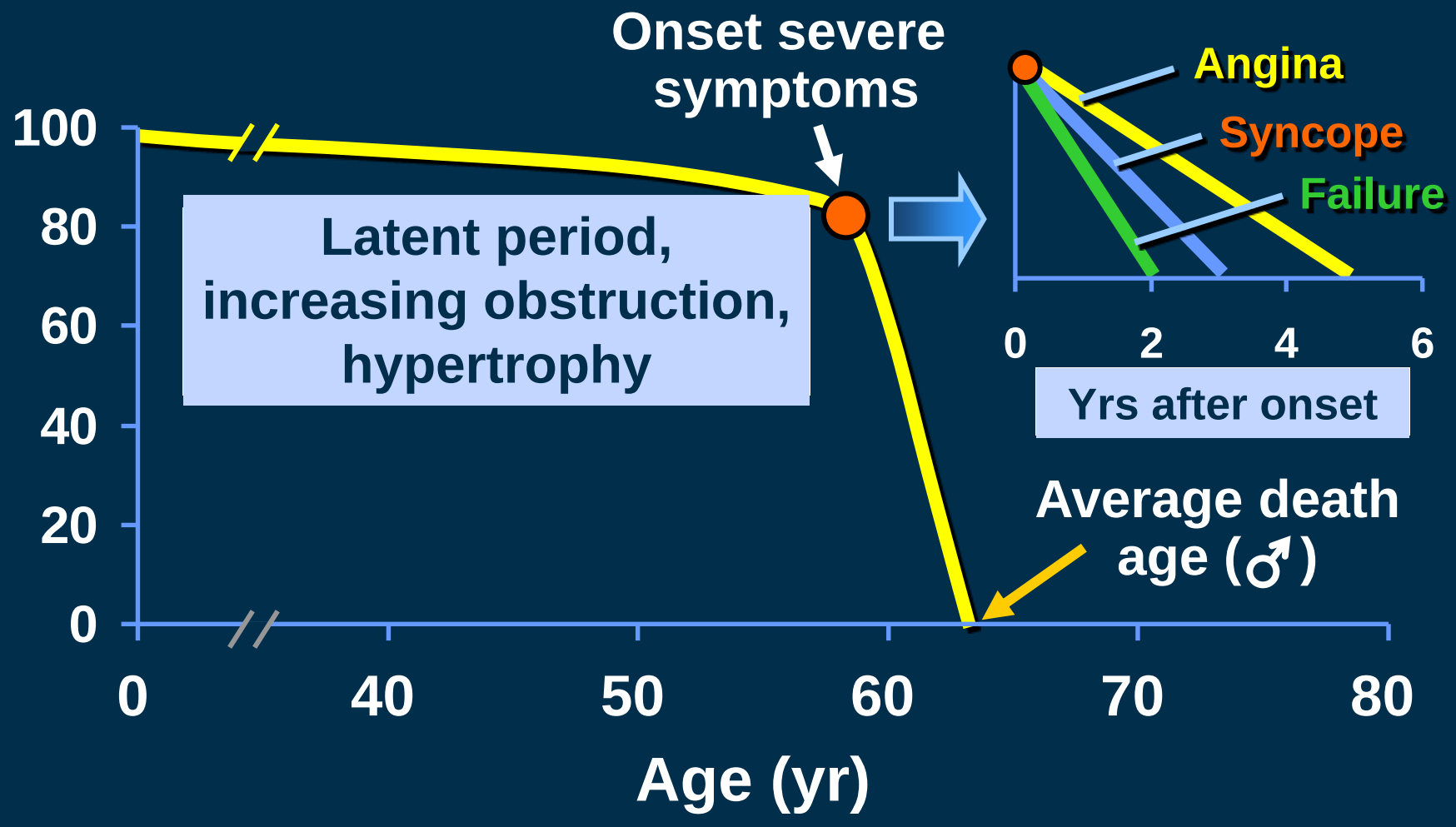
Watchful waiting vs intervention?

Stages of Chronic AS



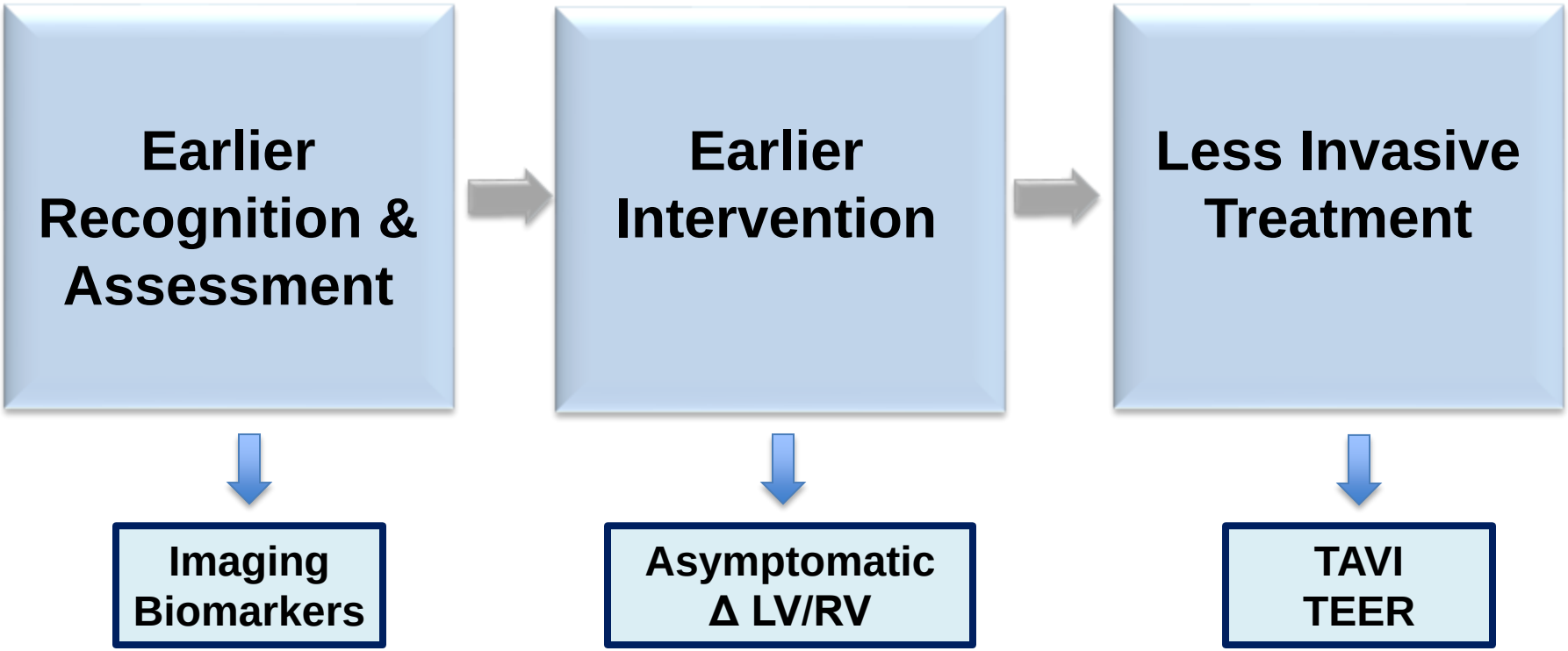
AHA/ACC VHD GL

Natural History of Aortic Stenosis



Ross J Jr. and Braunwald E: *Circ* 38(Suppl 5):61, 1968

Current Paradigm

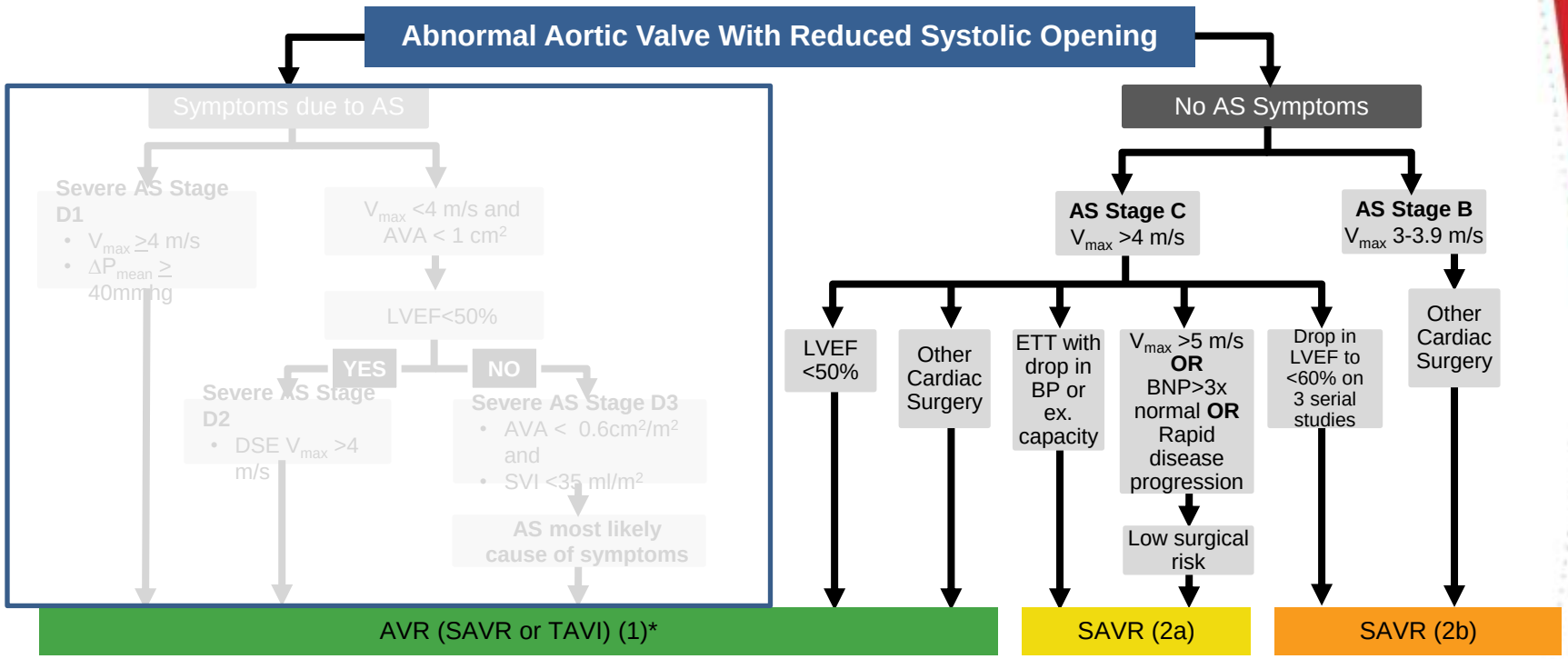


Asymptomatic Severe AS

Predictors of Reduced Event-free Survival

- **"Very severe" AS (Vm $\geq$ 5.0-5.5 m/s)**
- **Severe Ca^{++}, ↑rate progression, severe LVH**
- **Abnl response to exercise, ↑▼, ↑PA pressure**
- **↓ strain, strain rate; ↑ E/E' ratio**
- **LGE on cardiac MRI**
- **↑ BNP, NT-proBNP**

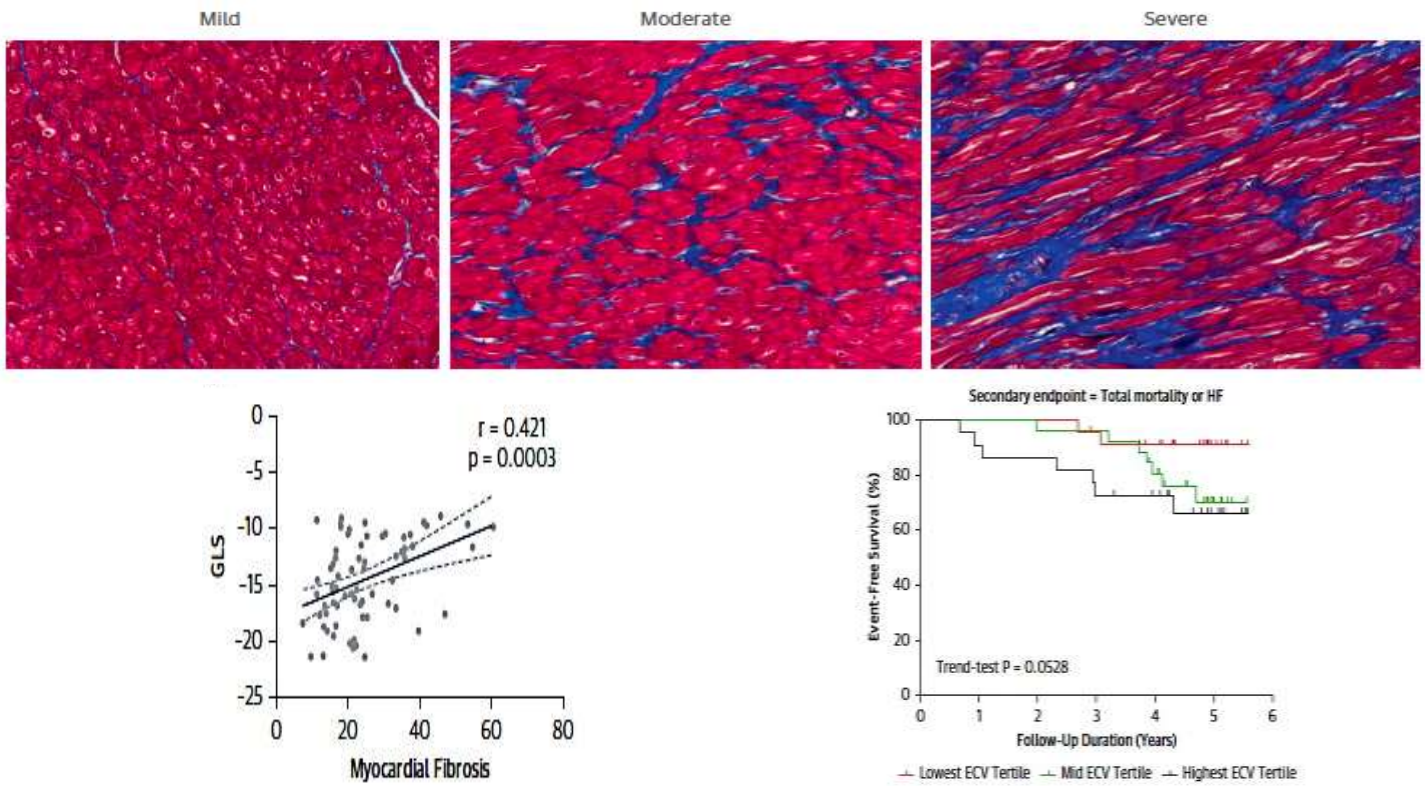
Timing of Intervention for Aortic Stenosis



***See section 3.2.4.2**

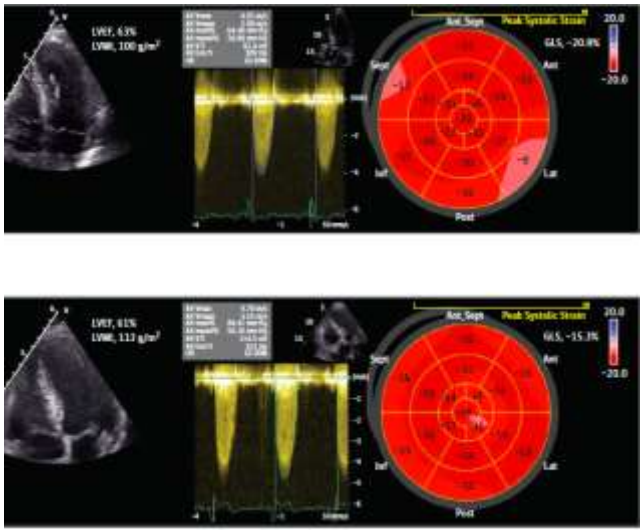
Abbreviations: AS indicates aortic stenosis; AVA, aortic valve area; cm, centimeter; AVR, aortic valve replacement; BNP, B-type natriuretic peptide; DSE, dobutamine stress echocardiography; ETT, exercise treadmill test; LVEF, left ventricular ejection fraction; mmHg, millimeters of mercury; ΔP_{mean}, average change in pressure; SAVR, surgical aortic valve replacement; SVI, stroke volume index; TAVI, transcatheter aortic valve implantation; and V_{max}, maximum transvalvular velocity.

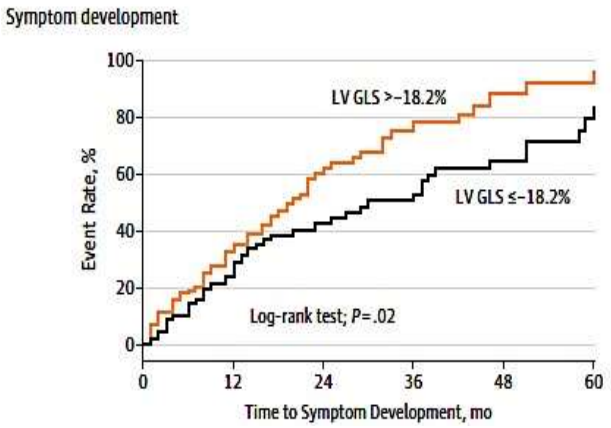
GLS and Myocardial Fibrosis



Park S-J et al. *JACC Imaging* 2019;12:109-19

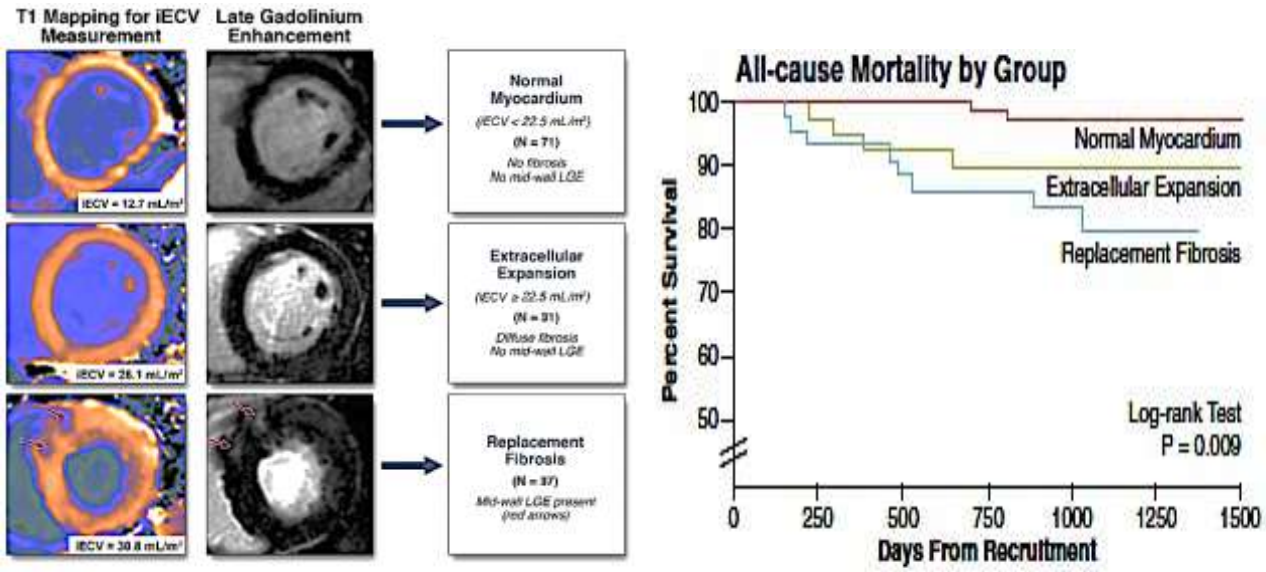
GLS and Symptom Development





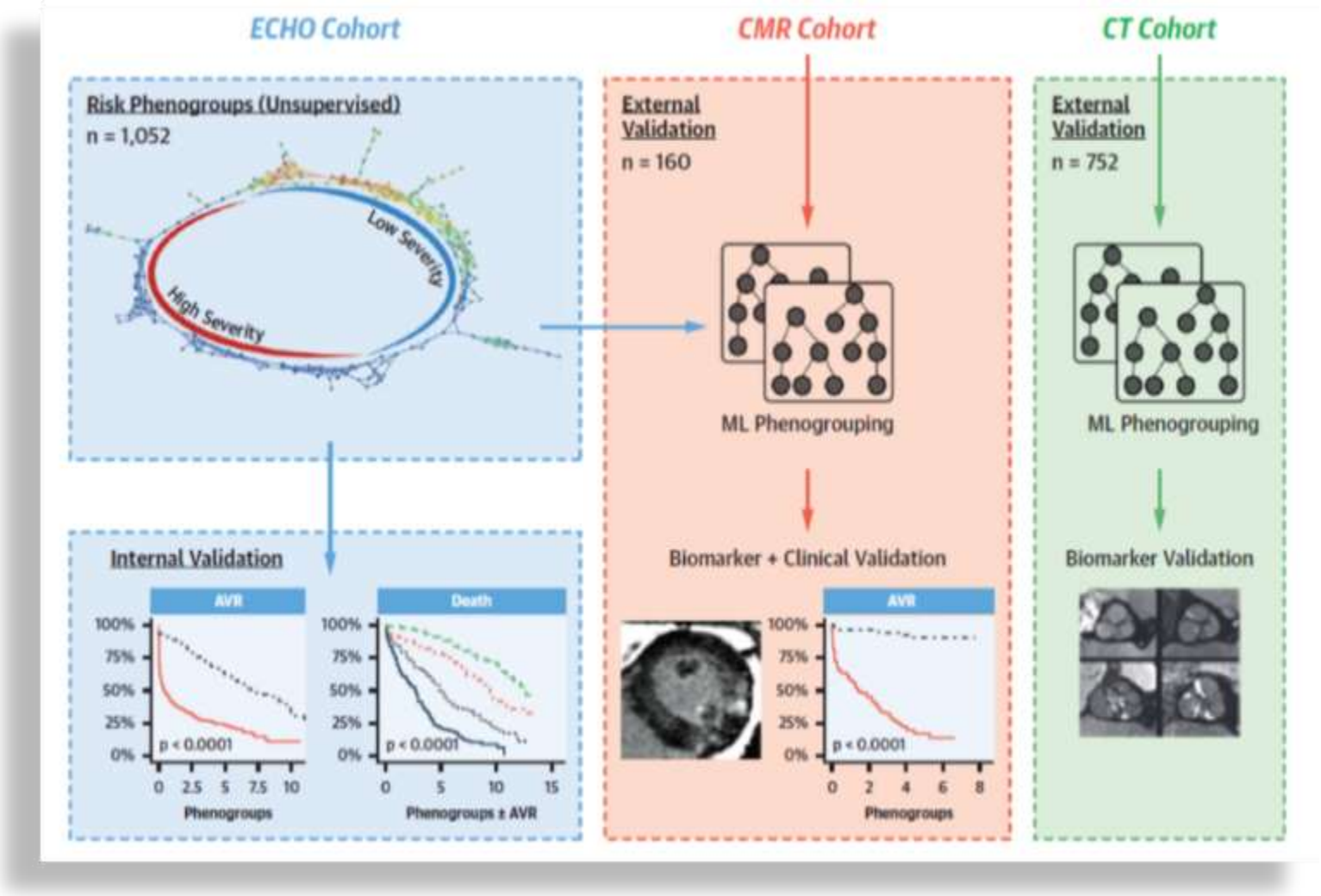
Vollema EM et al. *JAMA Cardio* 2018;3:839-47

CMR Evaluation of AS



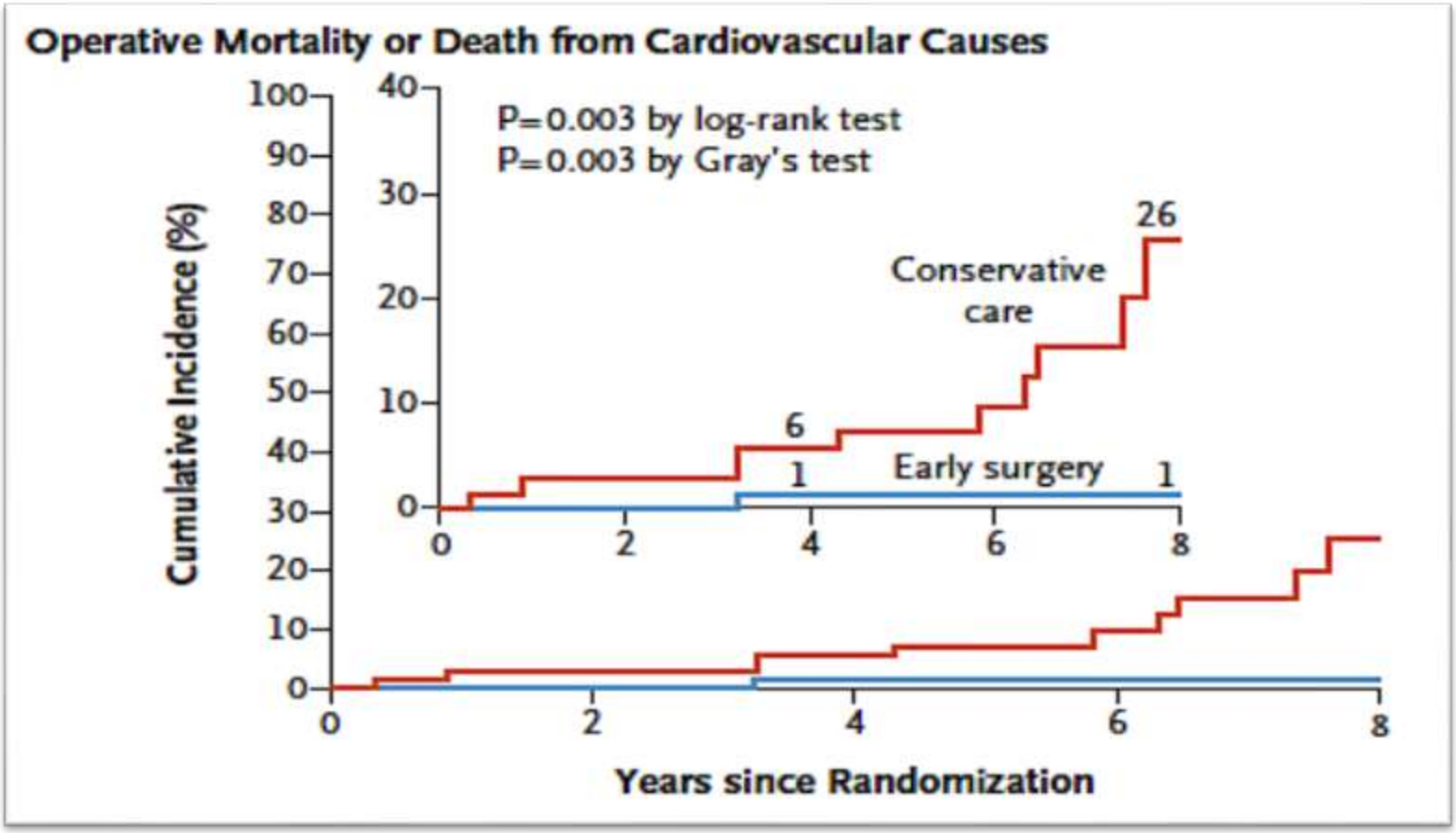
Chin CWL et al. *JACC Imaging* 2017;10:1320-33

AS Phenotypes



Sengupta PP et al. JACC Img 2021;14:1707

SAVR for Asymptomatic AS



Kang D-H et al. *NEJM* November 2019

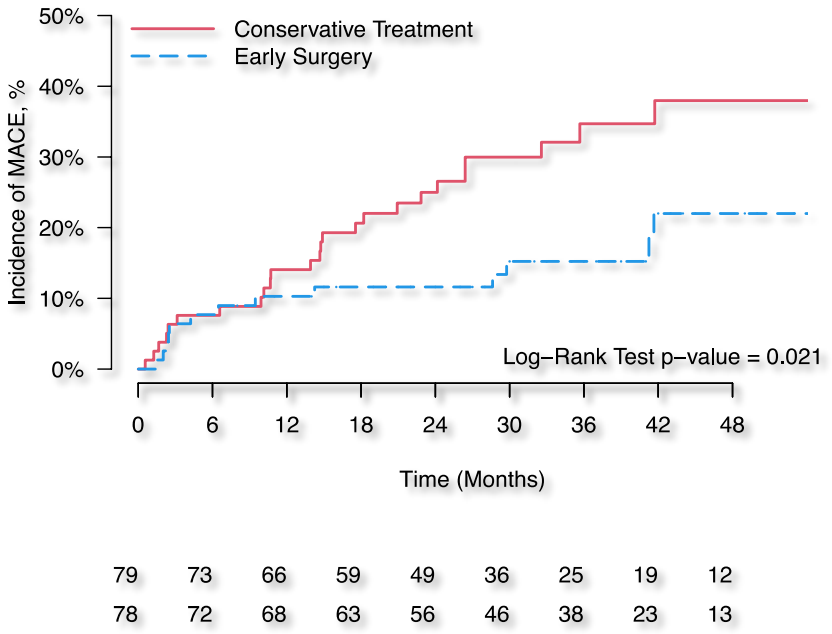
AVATAR Trial

Components of Primary Endpoint

Primary Endpoint Components	Group	
	Early Surgery n	Conservative n
All cause death	9	16
Heart Failure	1	7
Acute MI	1	2
Stroke	2	1
Total	**13**	**26**

Operative mortality in early surgery group = 1.4% (1/72)

Primary Composite Endpoint

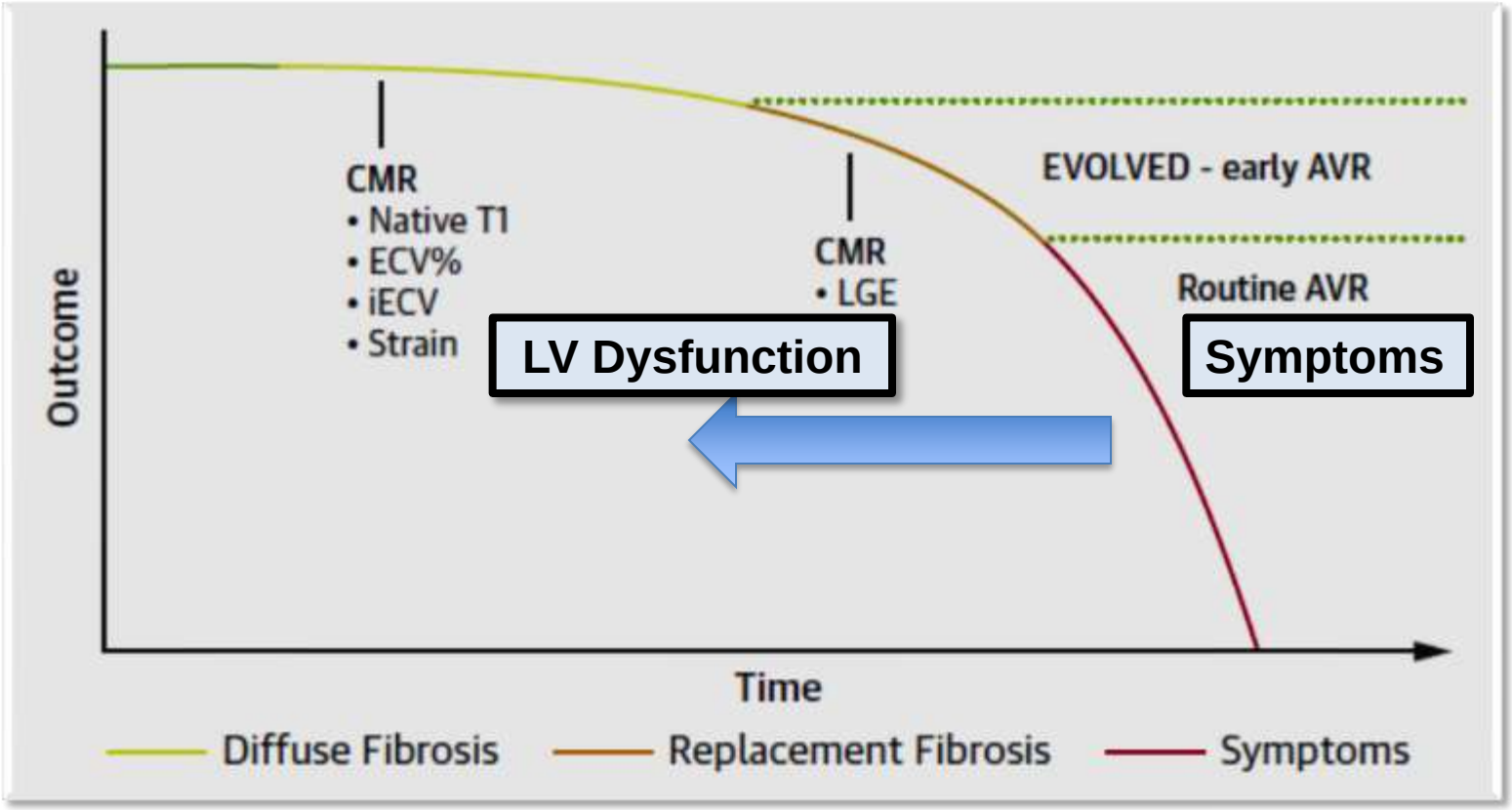


HR 0.46, 95% CI 0.23-0.90, p=0.02

Banovic M et al Circ 11/13/2021

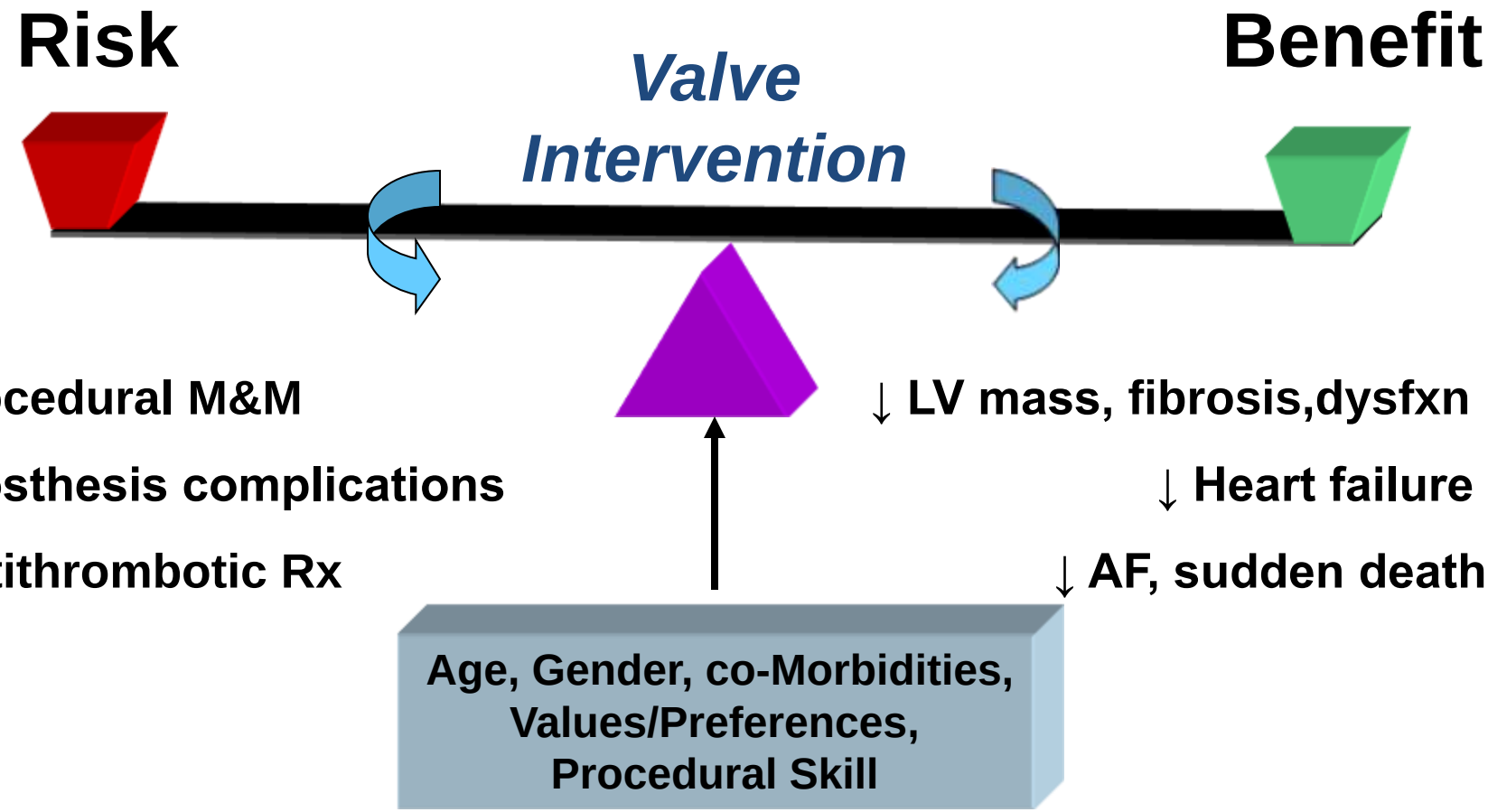
Revised Paradigm

LV Adaptation

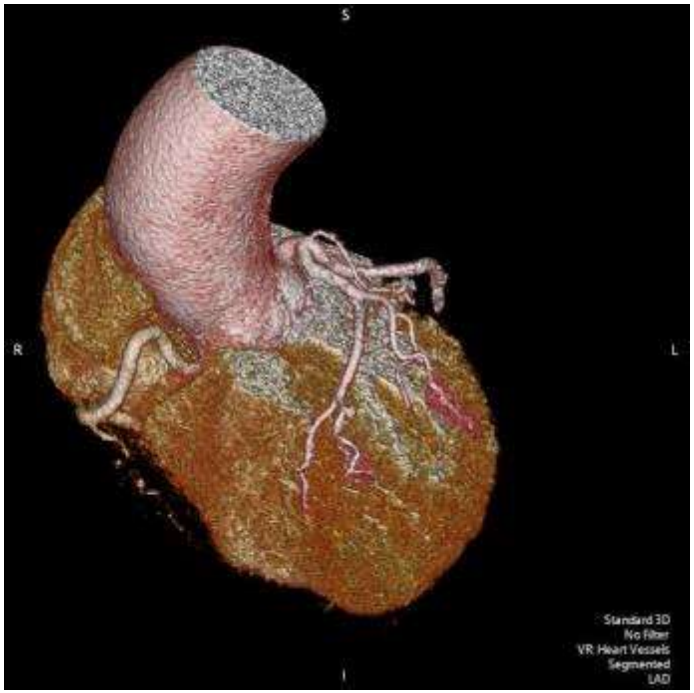


Bing R et al. JACC Img 2019; 12:283

Considerations in the Asymptomatic Patient



Asymptomatic Aortic Stenosis
78-year-old woman



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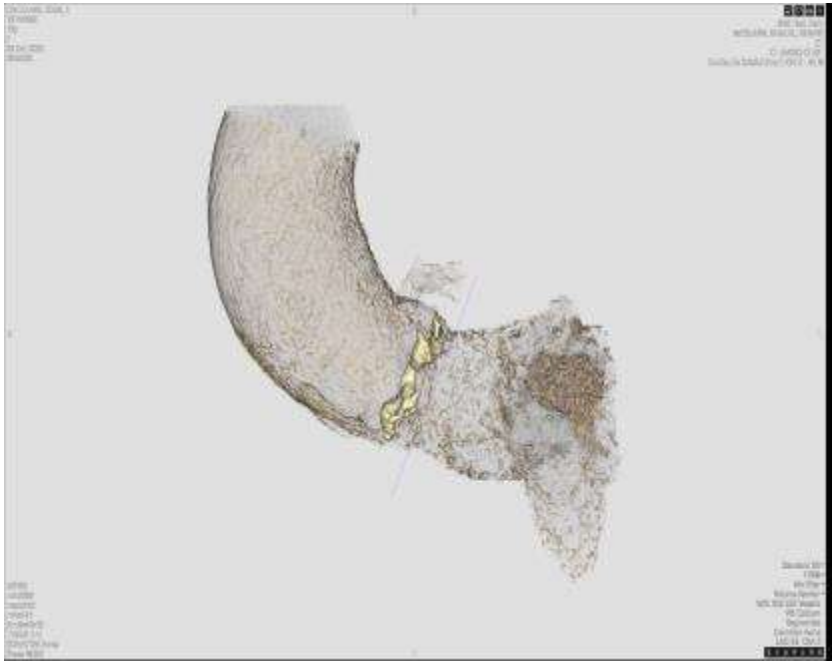
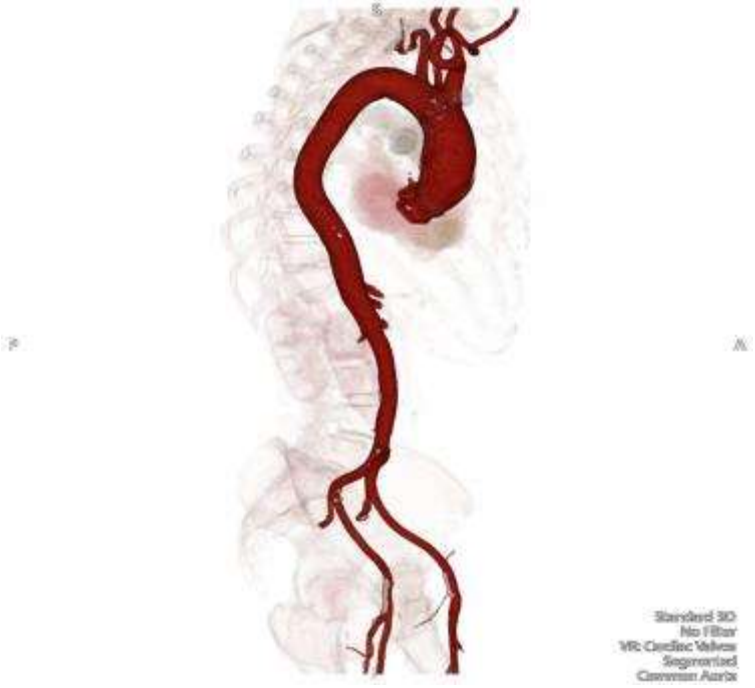




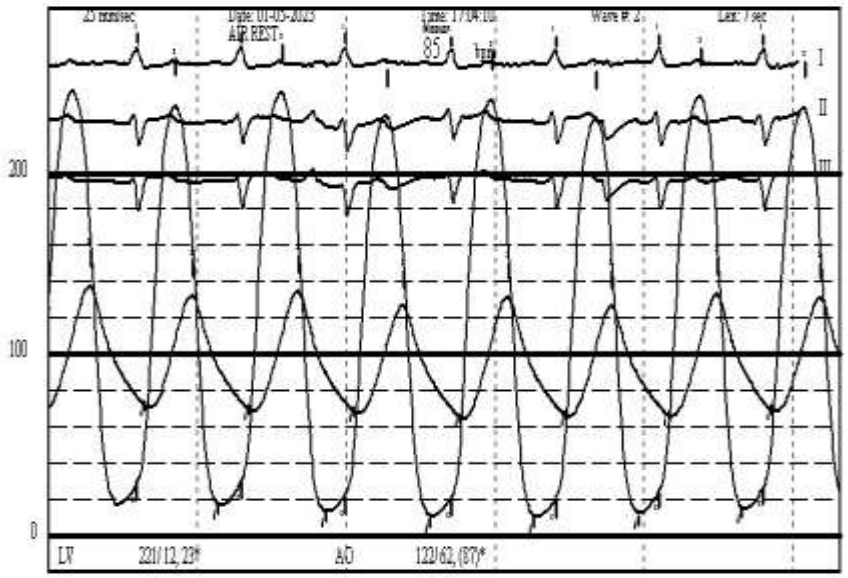
Asymptomatic Aortic Stenosis
78-year-old woman

- **Exercised for 9:12 minutes of a modified Bruce protocol. Normal HR and BP responses**

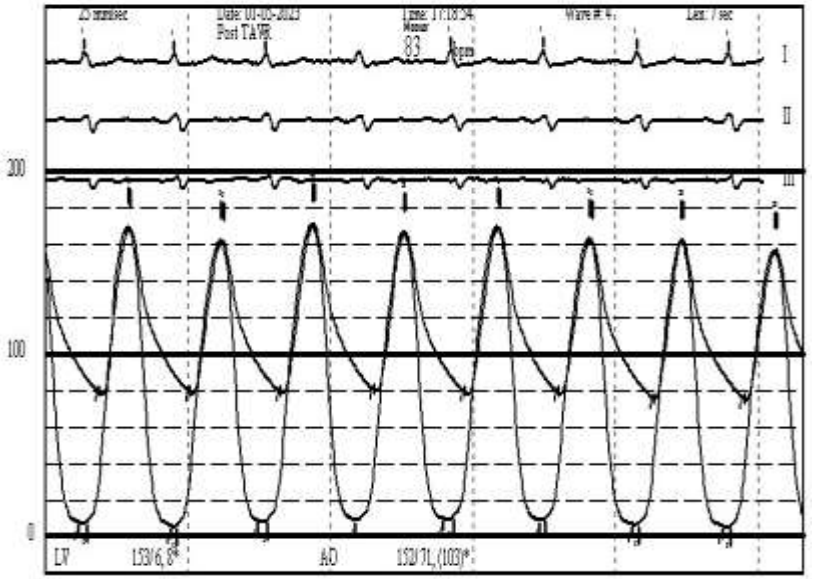
- **Exercise was terminated due to dyspnea and fatigue. The symptomatic response to exercise was non-ischemic.**

Phone call to discuss ETT results. Dyspnea ½ flight of stairs. Referred for TAVR.

Asymptomatic (Very Severe) Aortic Stenosis



Pre-TAVR



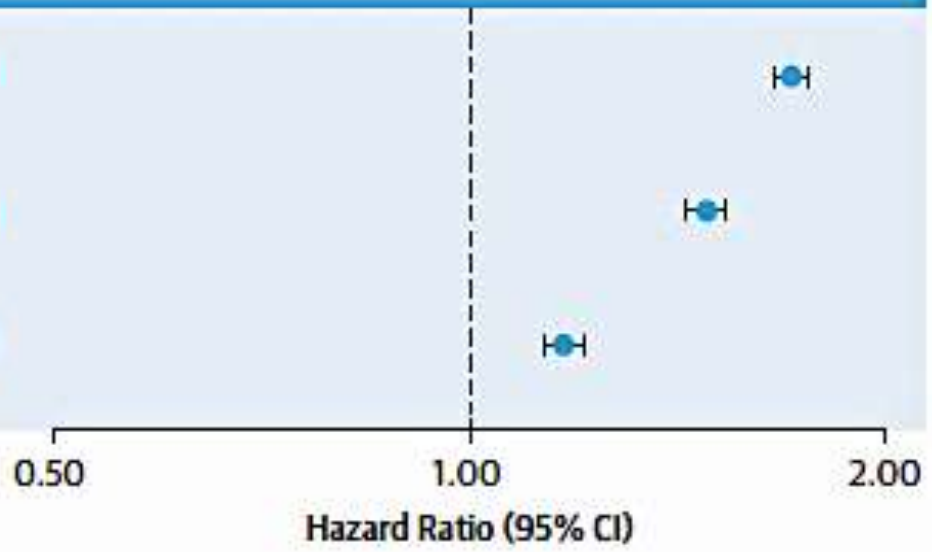
Post-TAVR

Summary

- **The paradigm is changing**
- **Patient selection for earlier intervention has improved**
- **LV structure and function are appropriate drivers**
- **We still need to expand screening and develop medical interventions to reduce the progression of AS**

ASCVD Risk Factors and AS

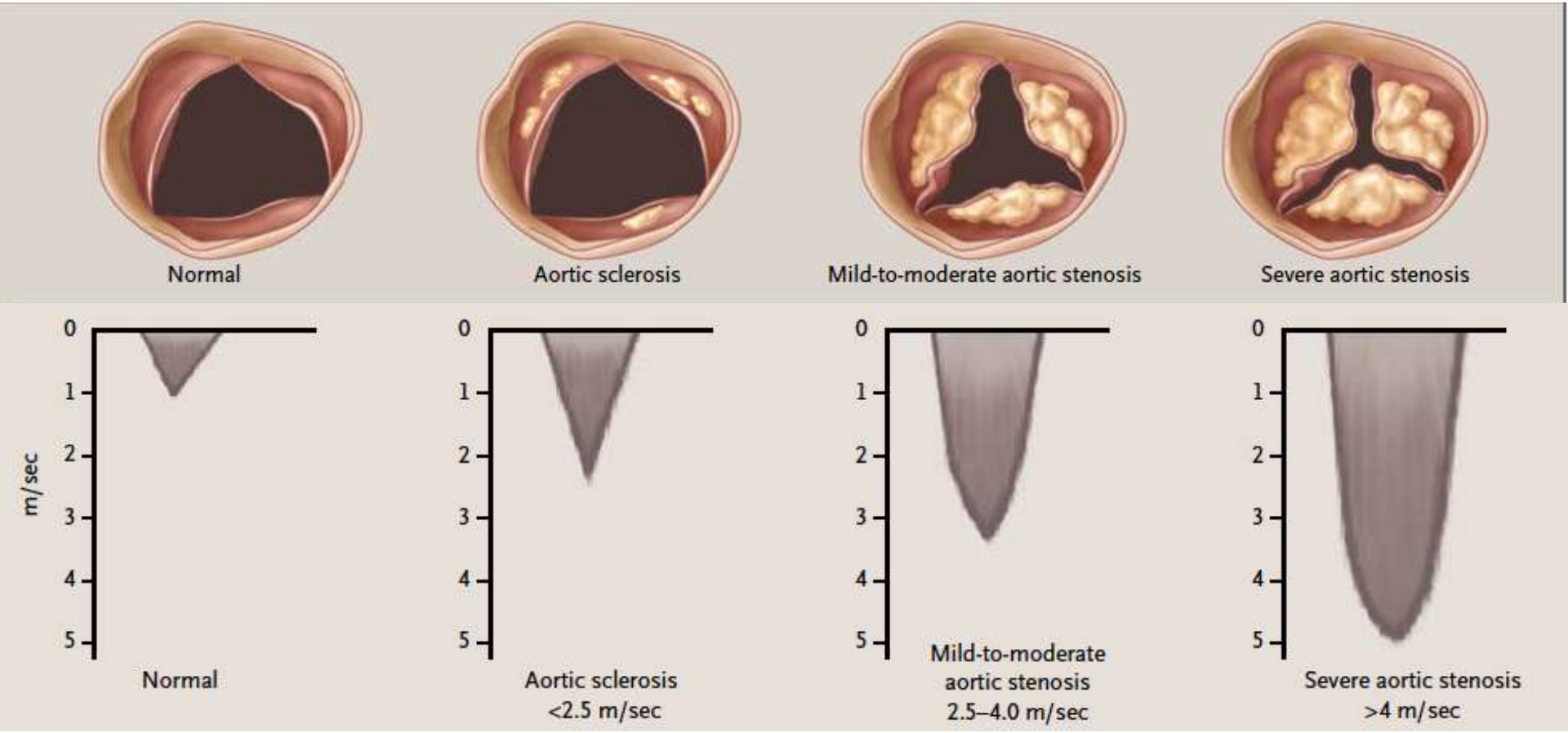
	Adjusted HR (95% CI)	p-value
Hypertension	1.71 (1.66-1.76)	<0.001
Diabetes	1.49 (1.44-1.54)	<0.001
Dyslipidemia	1.17 (1.14-1.21)	<0.001



Yan, A.T. et al. J Am Coll Cardiol. 2017;69(12):1523-32.

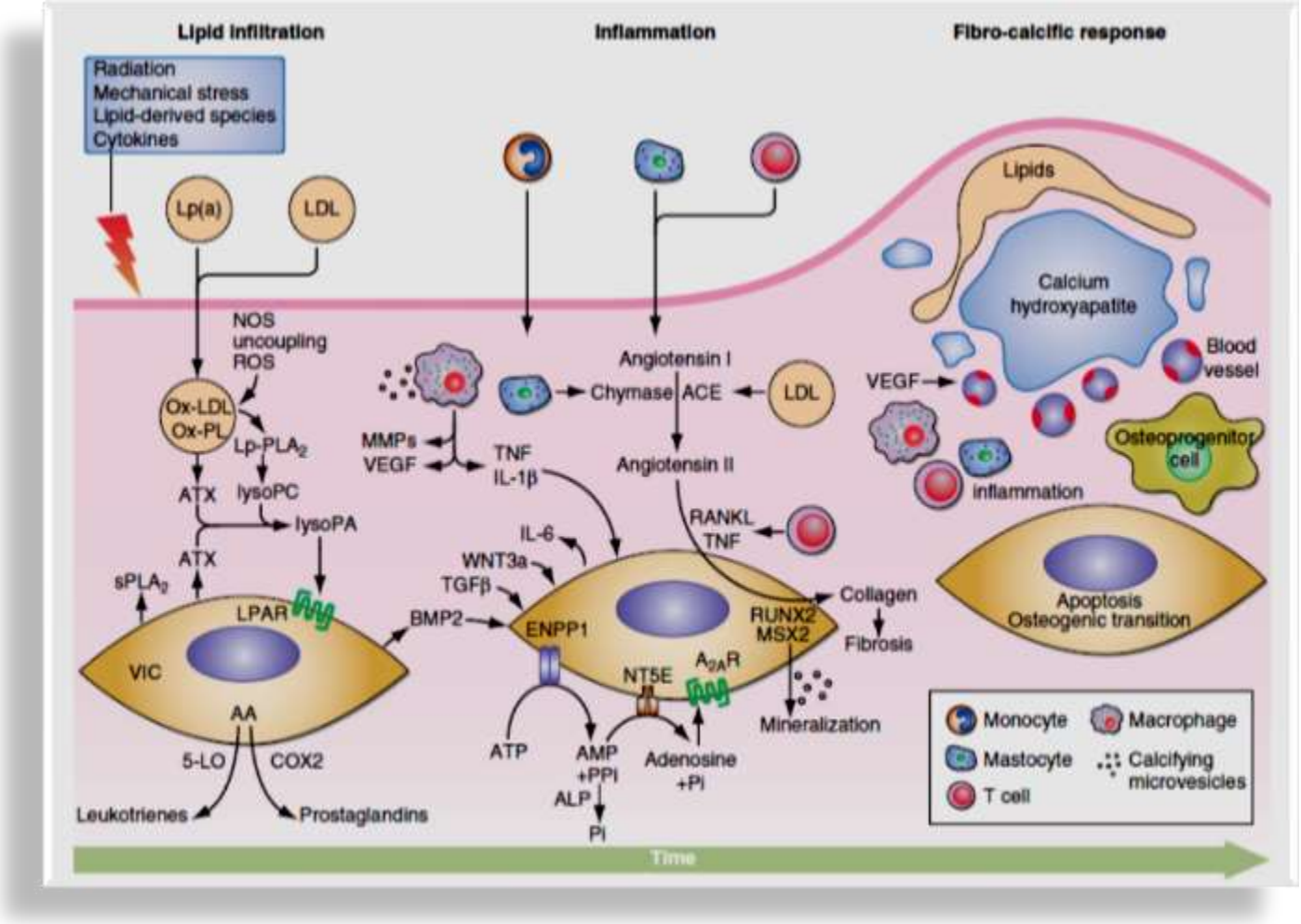
- **Incidence 144/100,000 p-yr**
- **PAR=34.4%**

AS Progression



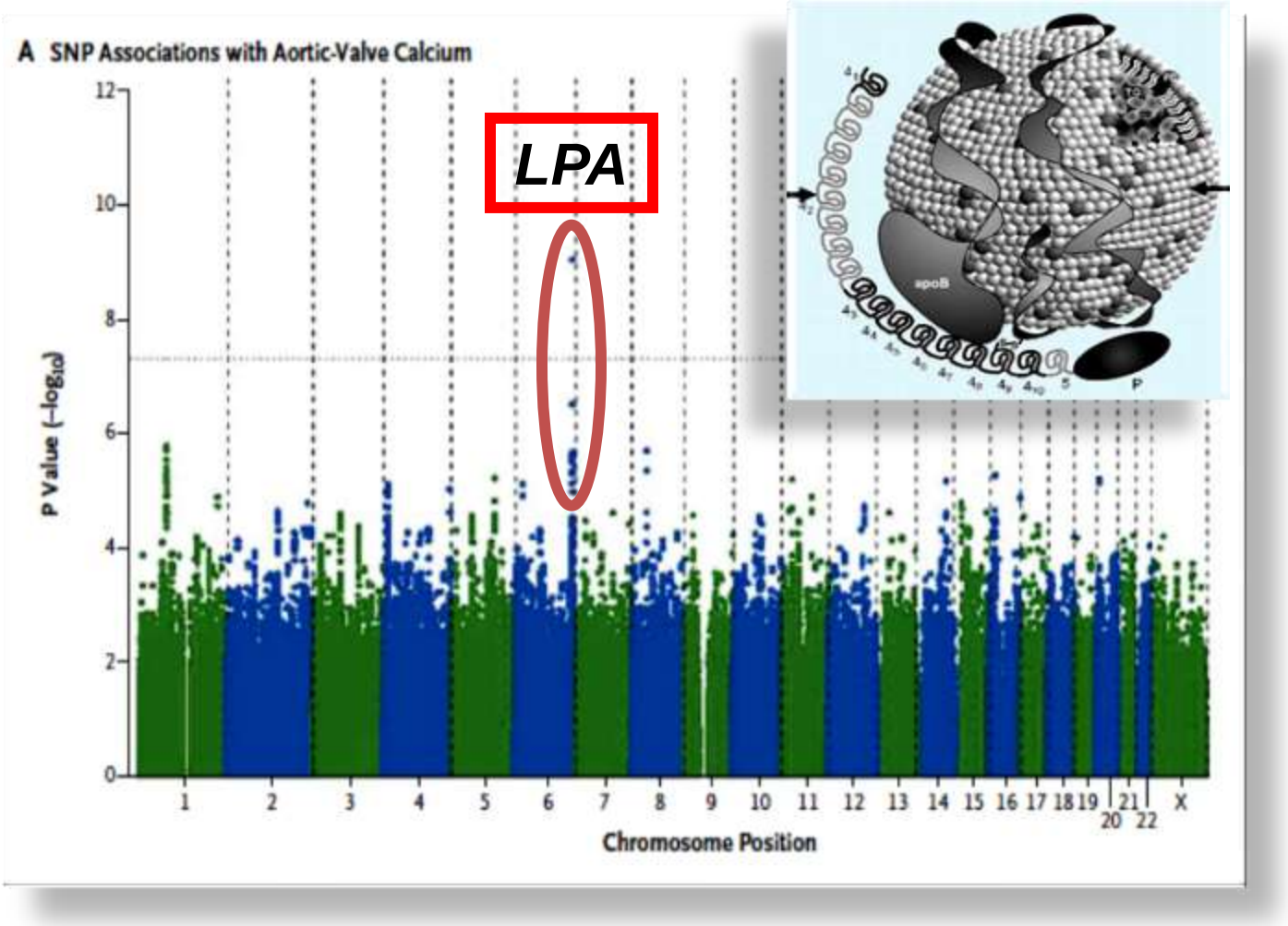
Otto CM. NEJM 2008; 359:1395-8

Pathogenesis of Calcific AS



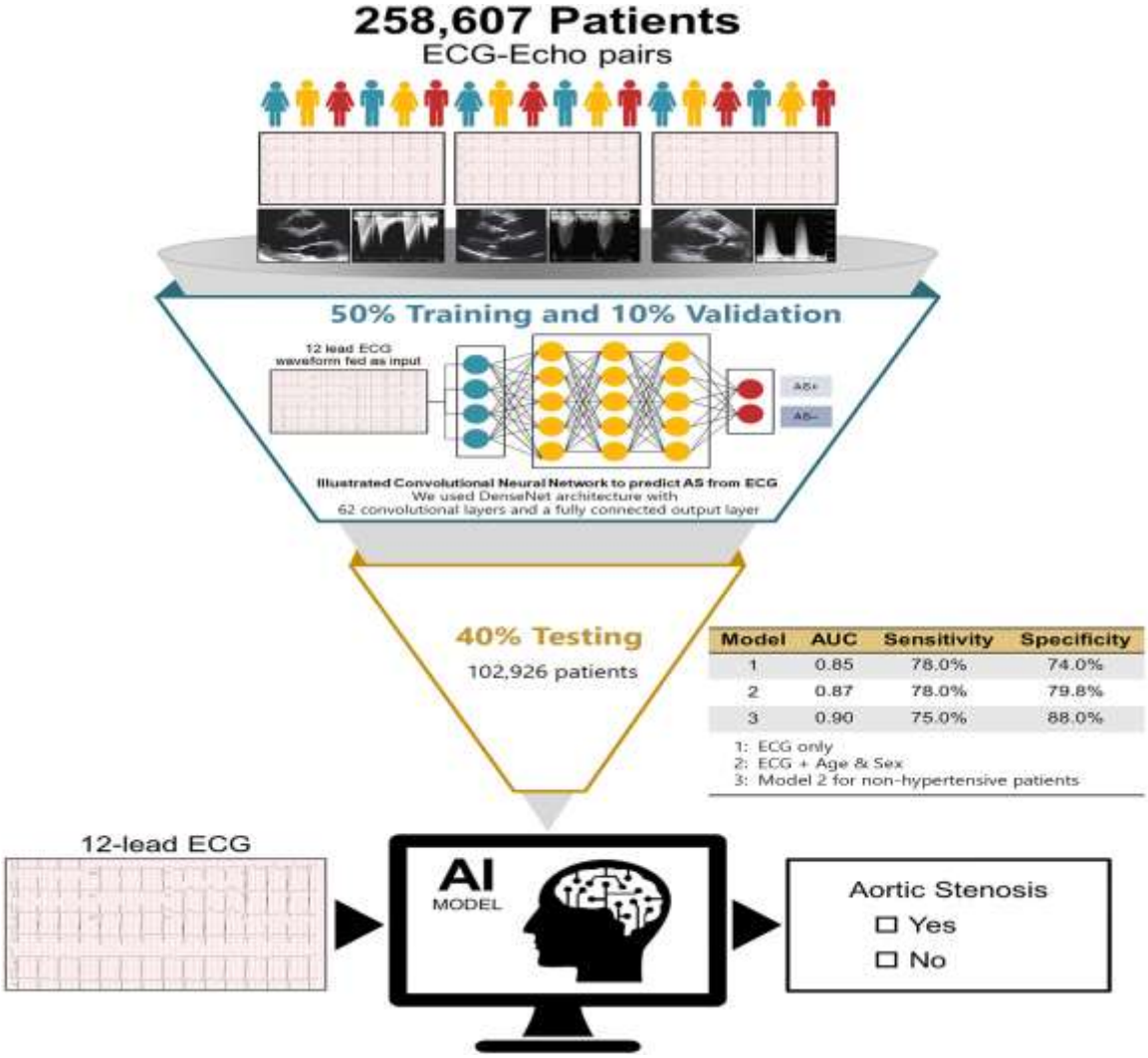
Lindman B et al. Nat Rev Dis Primers 2; 2016:16006

Single-Nucleotide Polymorphism Associations with Aortic-Valve Calcium



Thanassoulis G et al. *NEJM* 2013;368:503-512

Artificial Intelligence



Model	AUC	Sensitivity	Specificity
1	0.85	78.0%	74.0%
2	0.87	78.0%	79.8%
3	0.90	75.0%	88.0%

1: ECG only
2: ECG + Age & Sex
3: Model 2 for non-hypertensive patients

Cohen-Shelly M et al. Eur Heart J 2020;42:2885