Conoscere e Curare il Cuore 2018

SABATO 17 MARZO

STENOSI AORTICA MODERATA ED INSUFFICIENZA VENTRICOLARE SINISTRA. UNA BRUTTA ASSOCIAZIONE

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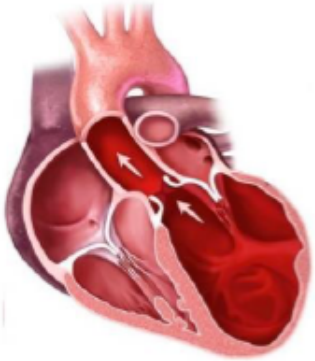
Moderate AS in Patients With LV Systolic Dysfunction: a new paradigm

Heart Failure

Leading cause of hospitalizations



Increased AFTERLOAD

(sympathetic activity)

Impaired LV systolic function

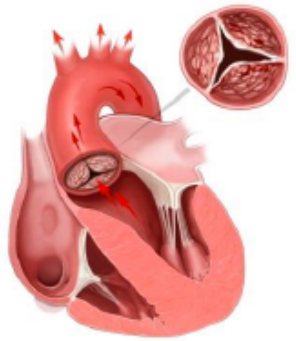
Diastolic dysfunction

Coexistence of Heart Failure and Moderate AS

High risk population

Aortic Stenosis

Most frequent valvulopathy



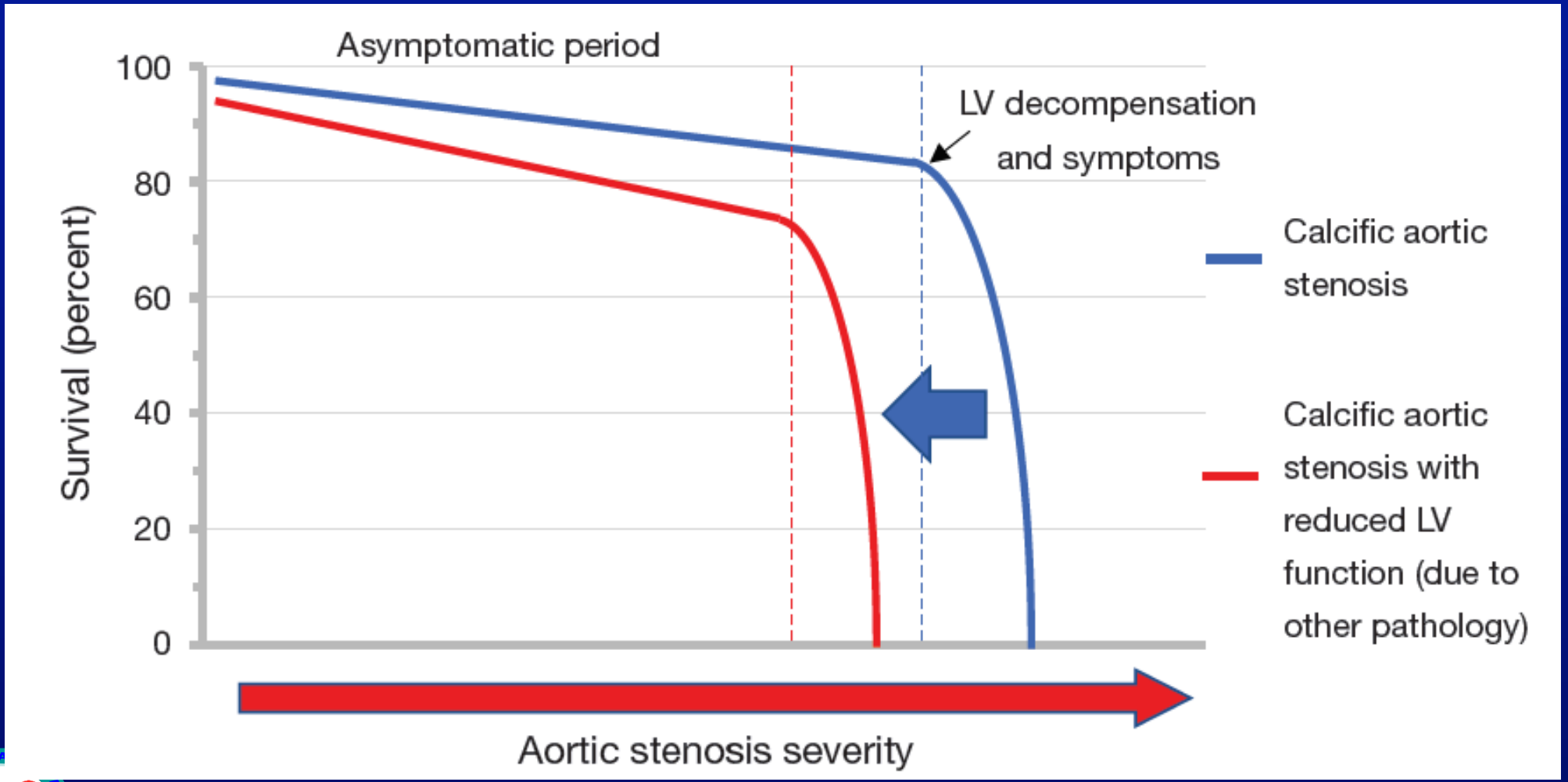
Increased AFTERLOAD

(trans-valvular gradient)

Impaired LV systolic function

Diastolic dysfunction

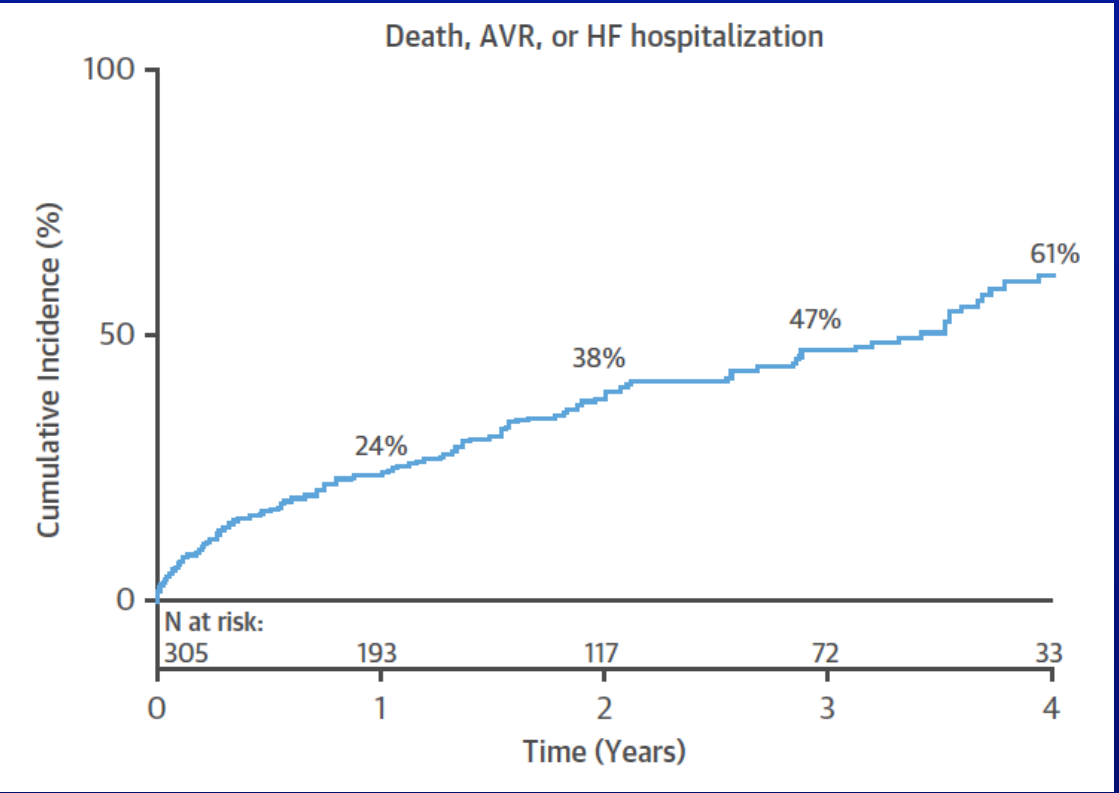
The potential impact of coexistent LV dysfunction on the natural history of calcific AS

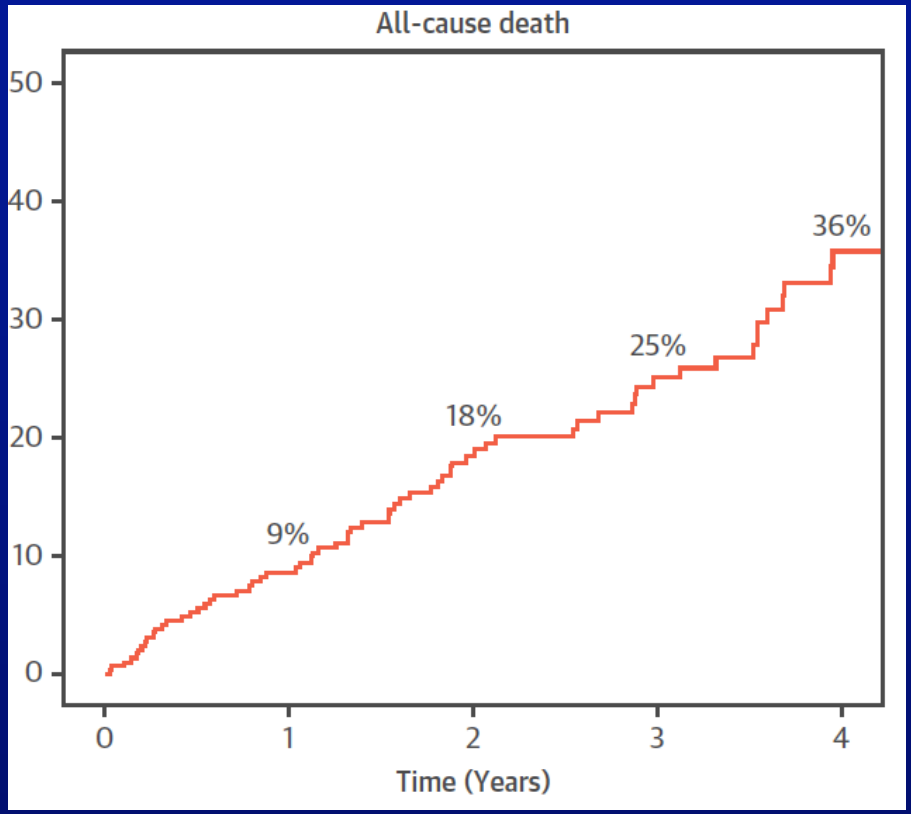


Everett RJ et al. J Thorac Dis 2017; 9:3560-3563

Prognostic Implications of Moderate AS in Patients With LV Systolic Dysfunction

305 pts from echo databases of 4 academic centers in the USA, Canada, and the Netherlands, between 2010 and 2015





van Gils L et al. J Am Coll Cardiol 2017;69:2383–92

Pitfalls of van Gils et al. Observational analysis

- The analysis included a heterogenous population of pts: multiple underlying causes of LV dysfunction
- A third of pts in the study had moderate to severe AS
- Follow-up echo available in only 56% of pts
- 76% of pts were symptomatic but it is unclear to what extent symptoms and LV dysfunction were truly due to AS
- The decision-making process for timing and indications for AVR among the original study cohort are unclear

Moderate AS in Patients With LV Systolic Dysfunction: Key Issues

- *Is it truly moderate AS?*
- *What is the mechanism of LV dysfunction?*
- *Will SAVR or TAVR improve patient outcomes?*

Moderate AS Definition According to AVA, Gradient, LVEF, and Flow

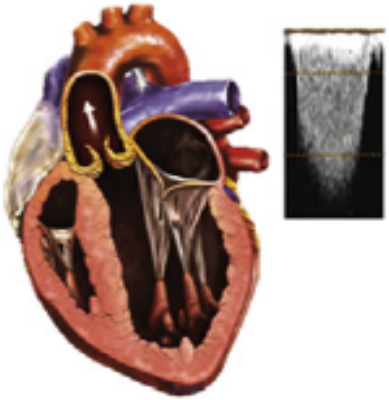
Table 3 Recommendations for grading of AS severity

	Aortic sclerosis	Mild	Moderate	Severe
Peak velocity (m/s)	≤2.5 m/s	2.6–2.9	3.0–4.0	≥4.0
Mean gradient (mmHg)	–	<20	20–40	≥40
AVA (cm^2)	–	> 1.5	1.0–1.5	<1.0
Indexed AVA (cm^2/m^2)	–	>0.85	0.60–0.85	<0.6
Velocity ratio	–	> 0.50	0.25–0.50	<0.25

Baumgartner H et al, EHJ- Cardiovascular Imaging 2017;18: 254–275

Moderate AS
AVA > 1.0 cm^2, AVAi > 0.6 cm^2/m^2
and MG < 40 mm Hg

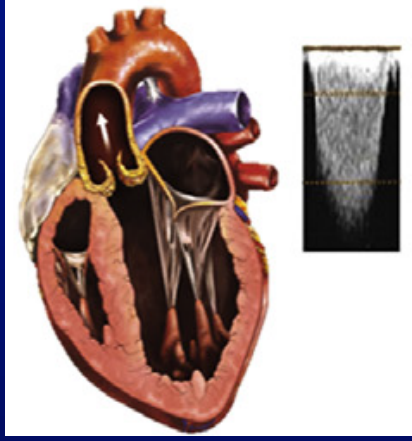
Moderate AS
Low LVEF
+ Symptoms
(Stage B2?)



Low Gradient AS
AVA ≤ 1.0 cm^2, AVAi ≤ 0.6 cm^2/m^2
and MG < 40 mm Hg

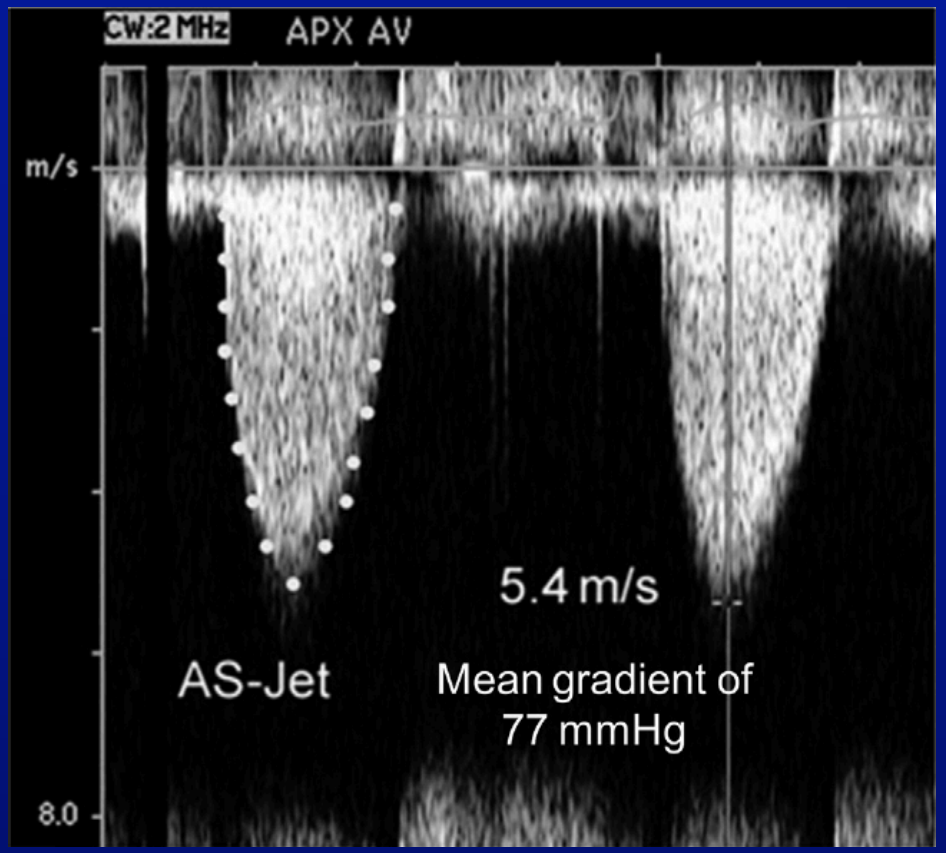
LVEF<50%

«Classical»
Low-Flow
Low-Gradient
(Stage D2)



Clavel MA et al. JACC Cardiovasc Imaging 2017;10:185-202

Mean gradient measurement



- Flow dependent
- A small error in this measurement may result in an important error in the evaluation of SA

- Optimal alignment of the CW Doppler beam with the direction of the aortic flow jet
- Multiwindow CW interrogation

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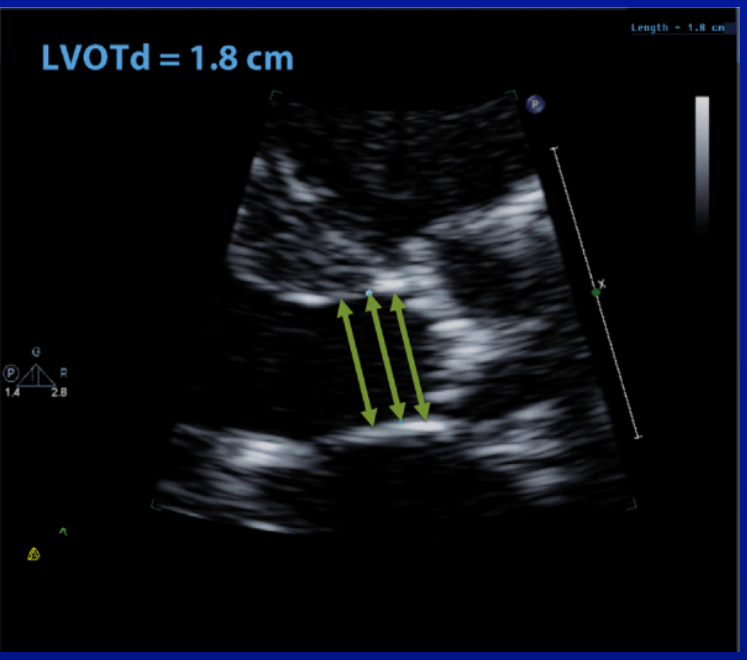
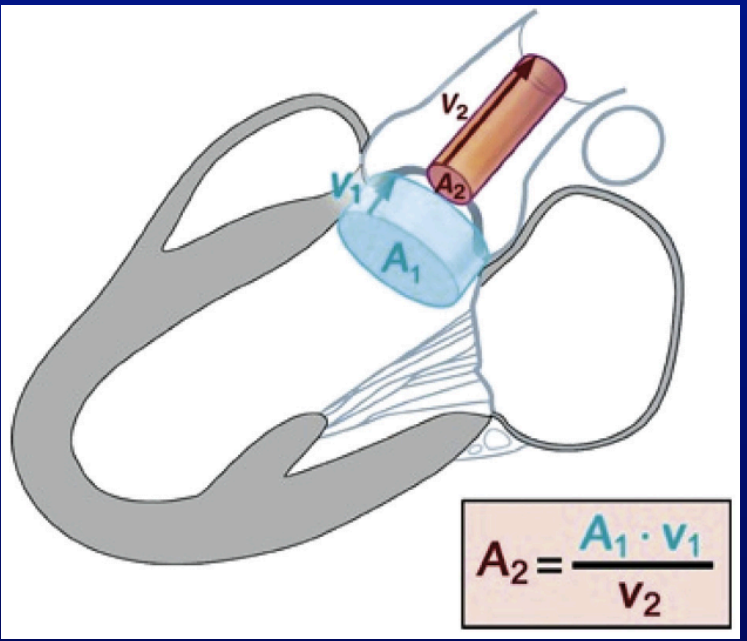
LVOT diameter measurement



- The most problematic component of assessing valve area
- It assumes a circular shape of the LVOT that is, instead, often elliptical in shape
- A small error in this measurement may result in an important error in the calculation of the stroke volume and AVA

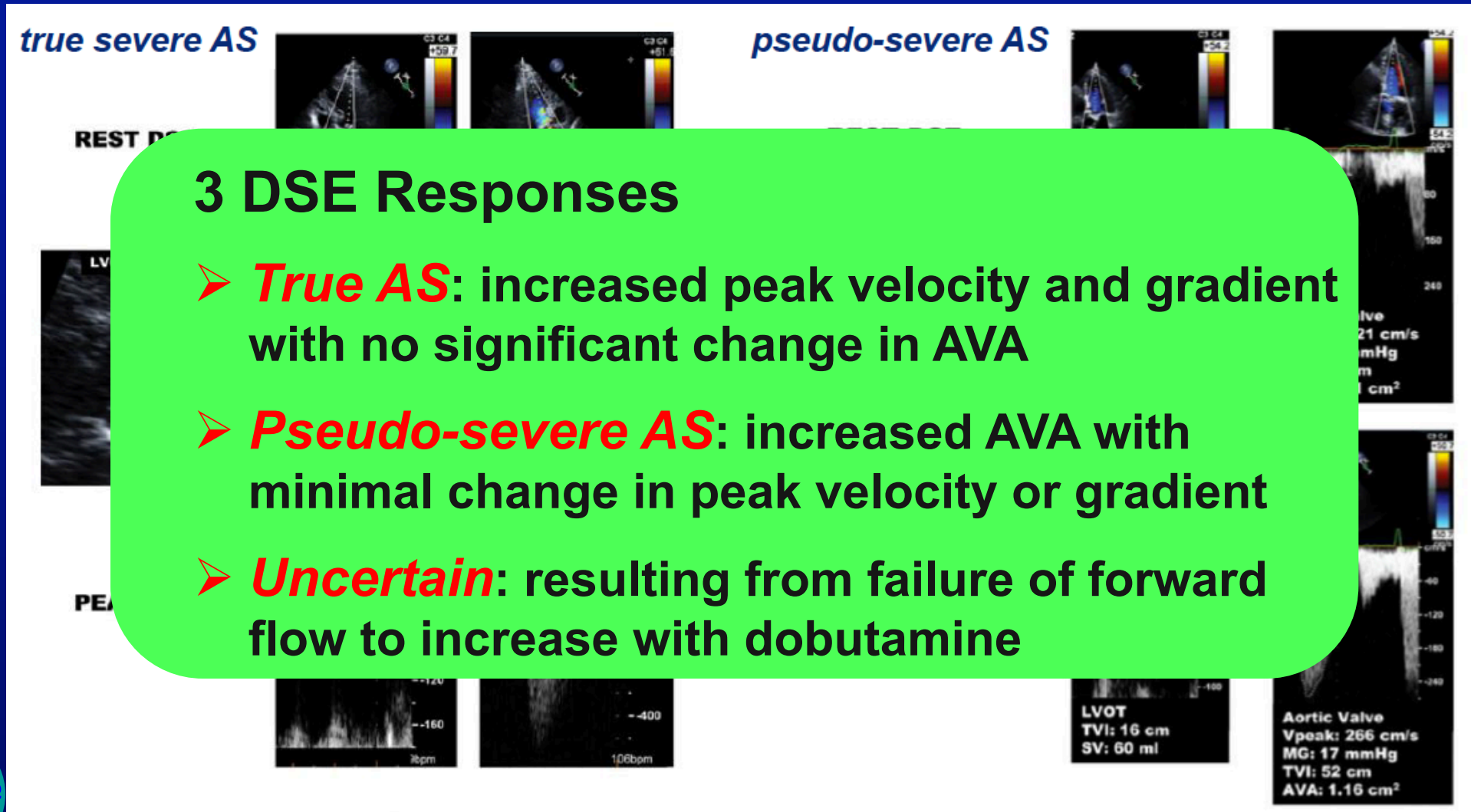


- 2D parasternal long-axis view
- Zoom mode
- Adjust gain to optimize the blood tissue interface

- Inner edge to inner edge
- Mid-systole
- Parallel and adjacent to the aortic valve or at the site of velocity measurement

Baumgartner H et al, EHJ- Cardiovascular Imaging 2017;18: 254–275

Dobutamine Stress Echocardiography
-Classical LF-LG AS -



3 DSE Responses

- ***True AS***: increased peak velocity and gradient with no significant change in AVA
- ***Pseudo-severe AS***: increased AVA with minimal change in peak velocity or gradient
- ***Uncertain***: resulting from failure of forward flow to increase with dobutamine

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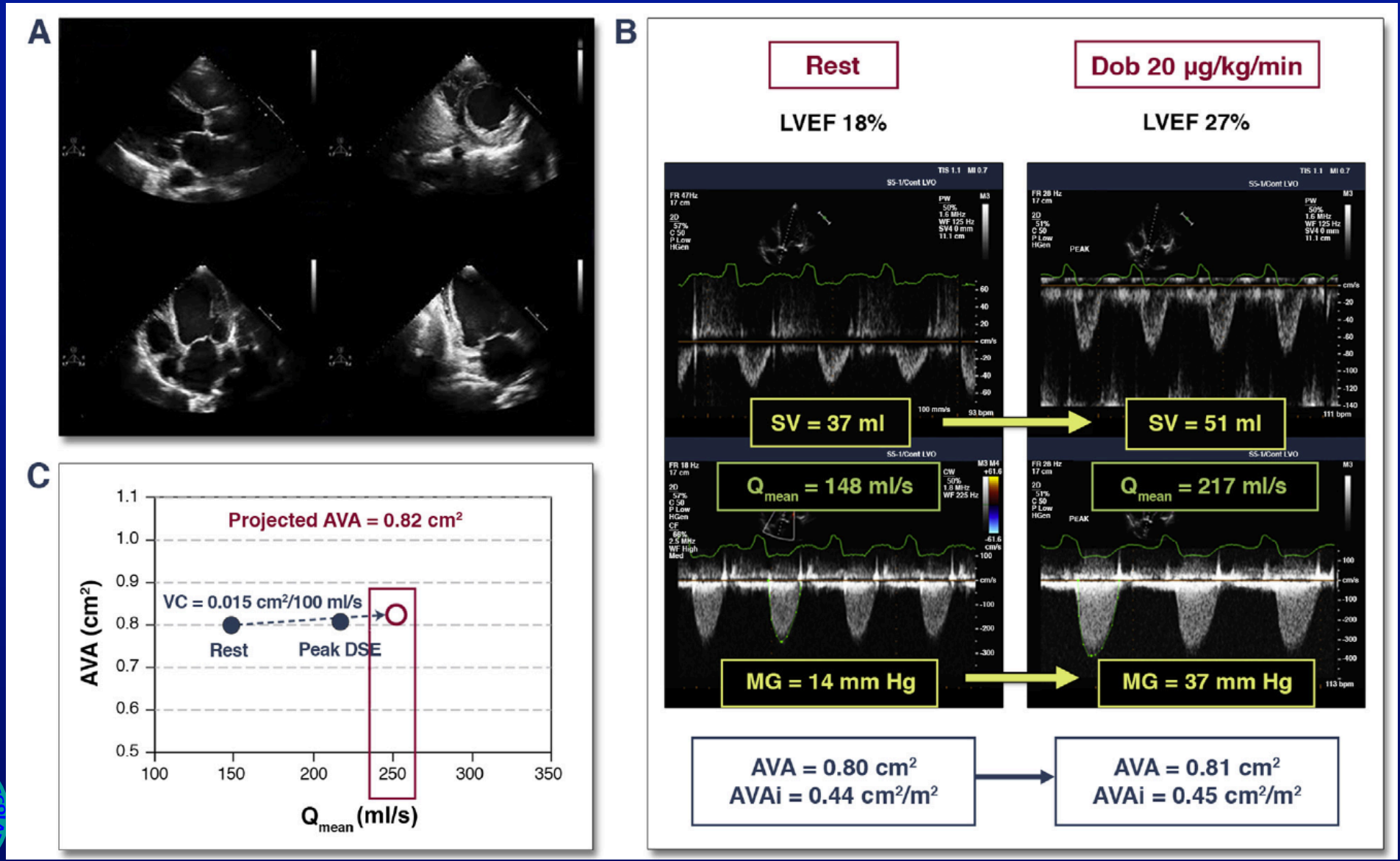
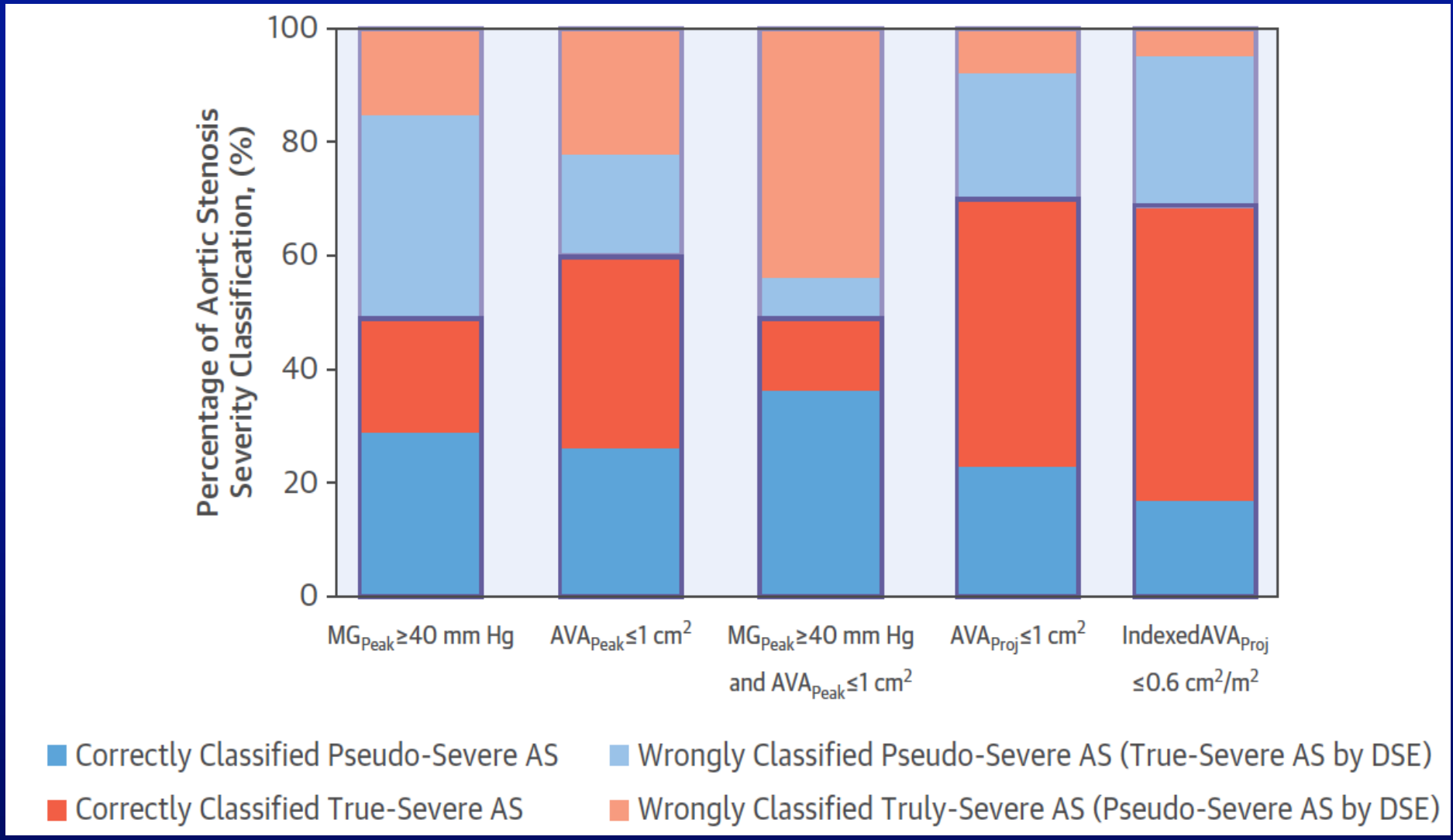
Multiparametric assessment of AS severity by DSE



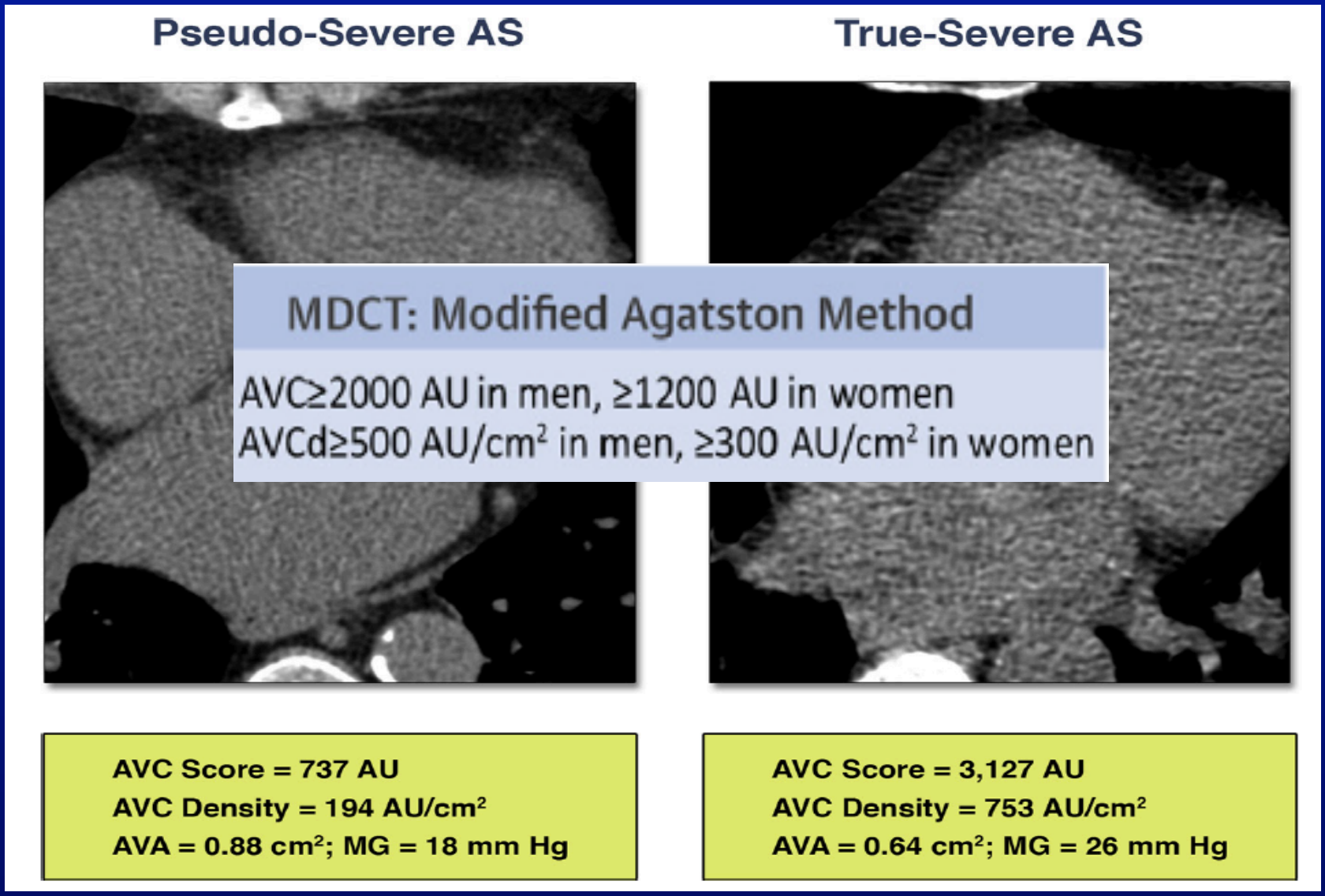
Clavel MA et al. JACC Cardiovasc Imaging 2017;10:185-202

Identification of Aortic Stenosis Severity by DSE Criteria: the TOPAS Registry



Annabi SM et al. J Am Coll Cardiol 2018;71:475–85

Quantitation of Aortic Valve Calcification by MDCT to Differentiate True Versus Pseudo-Severe Stenosis in Low-Gradient AS



Clavel MA et al. JACC Cardiovasc Imaging 2017;10:185-202

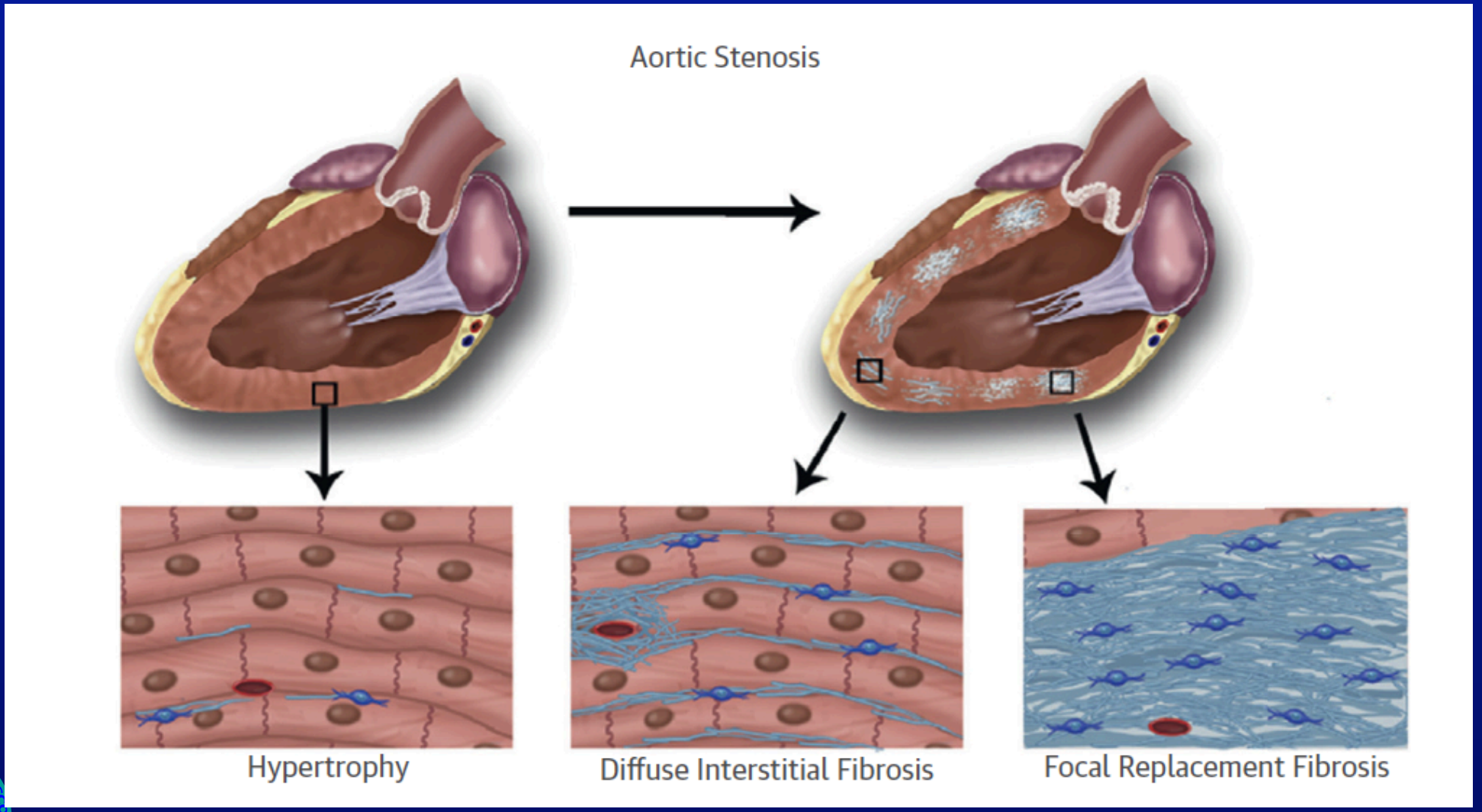
Moderate AS in Patients With LV Systolic Dysfunction: Key Issues

- *Is it truly moderate AS?*
- ***What is the mechanism of LV dysfunction?***
- *Will SAVR or TAVR improve patient outcomes?*

Causes of LV dysfunction in AS

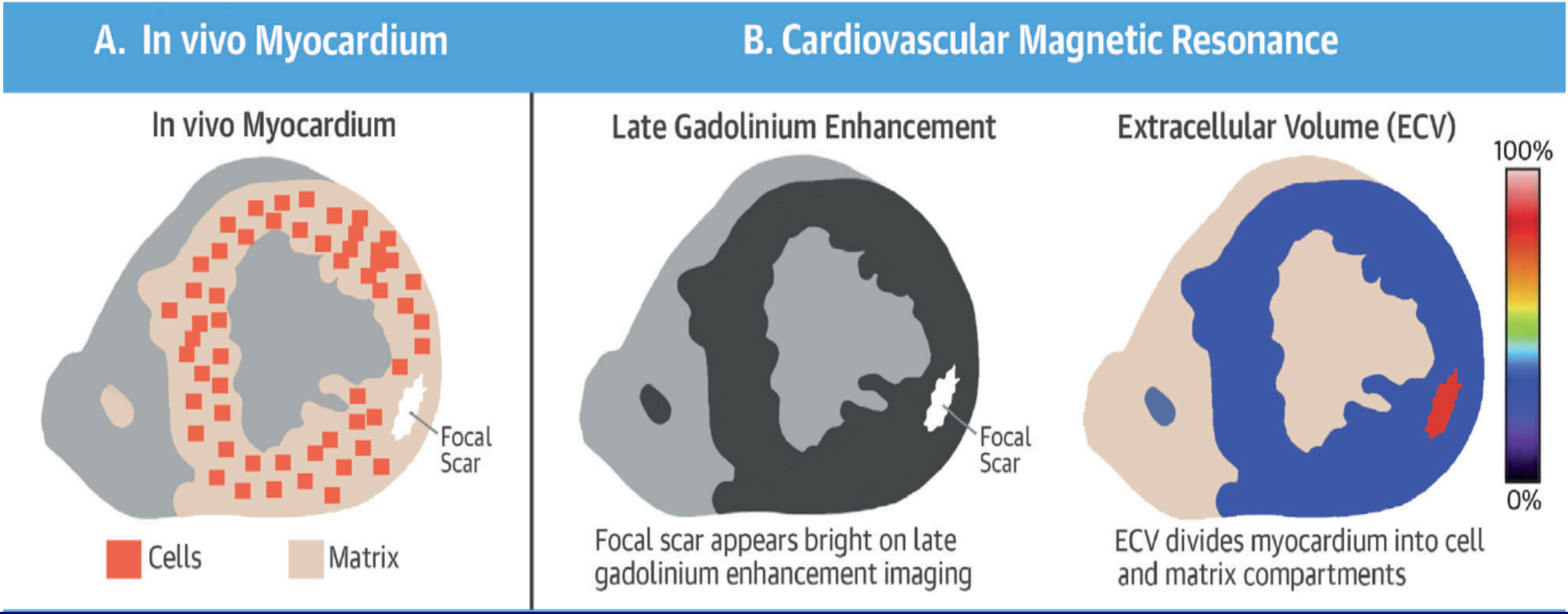
- AS and associated afterload mismatch
- Co-existing conditions (hypertension, ischemic heart disease, etc)
- Mid-wall fibrosis
- Amyloidosis

The remodeling response of the heart to the pressure overload



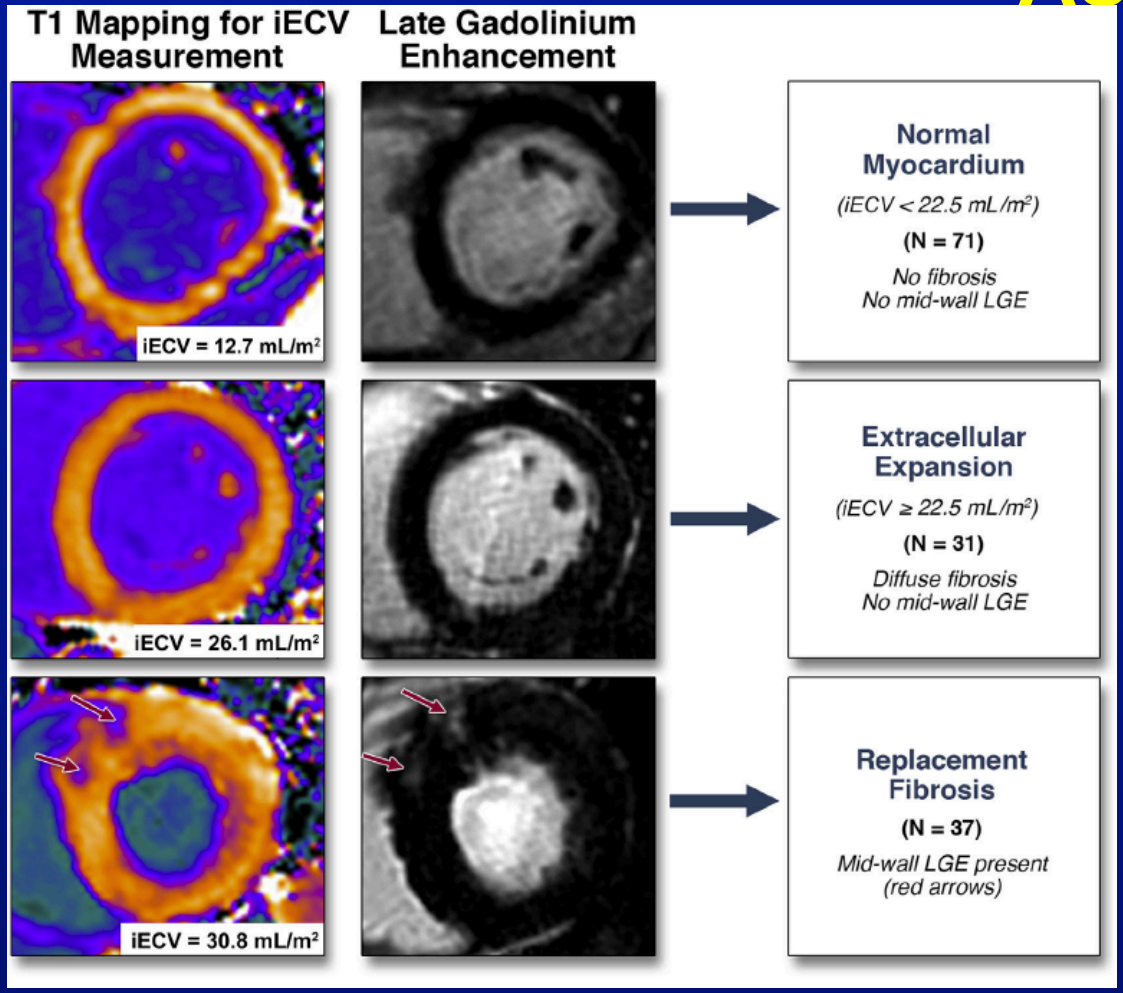
Steiner J et al J Am Coll Cardiol 2017;70:3026–41

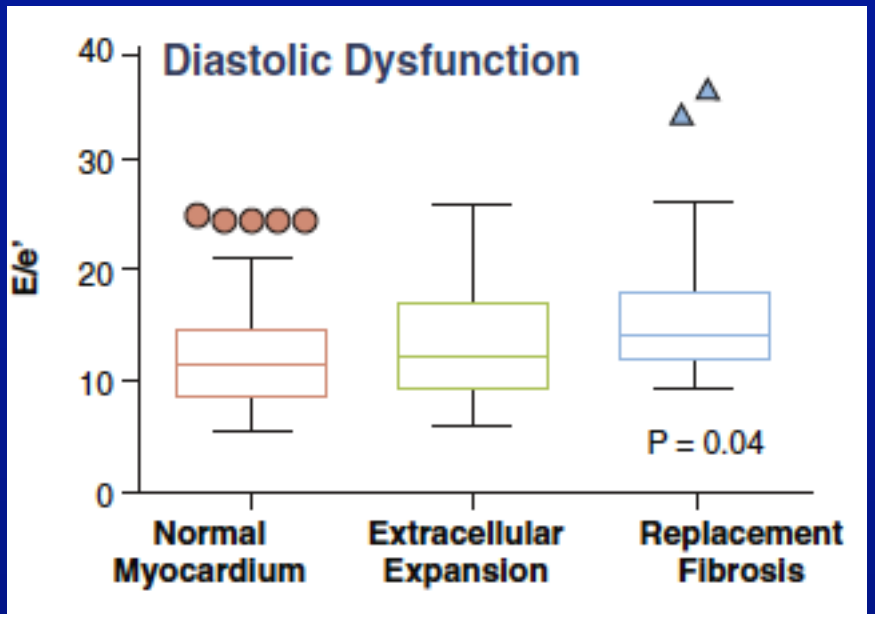
CMR for quantification of focal and diffuse fibrosis

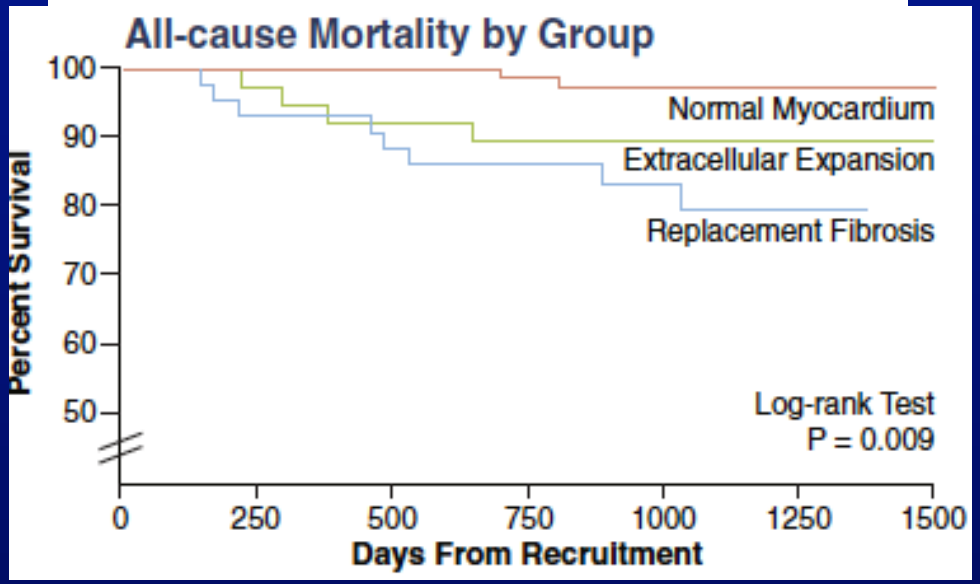


Treibel TA et al. J Am Coll Cardiol 2018;71:860–71

Myocardial Fibrosis and Cardiac Decompensation in AS

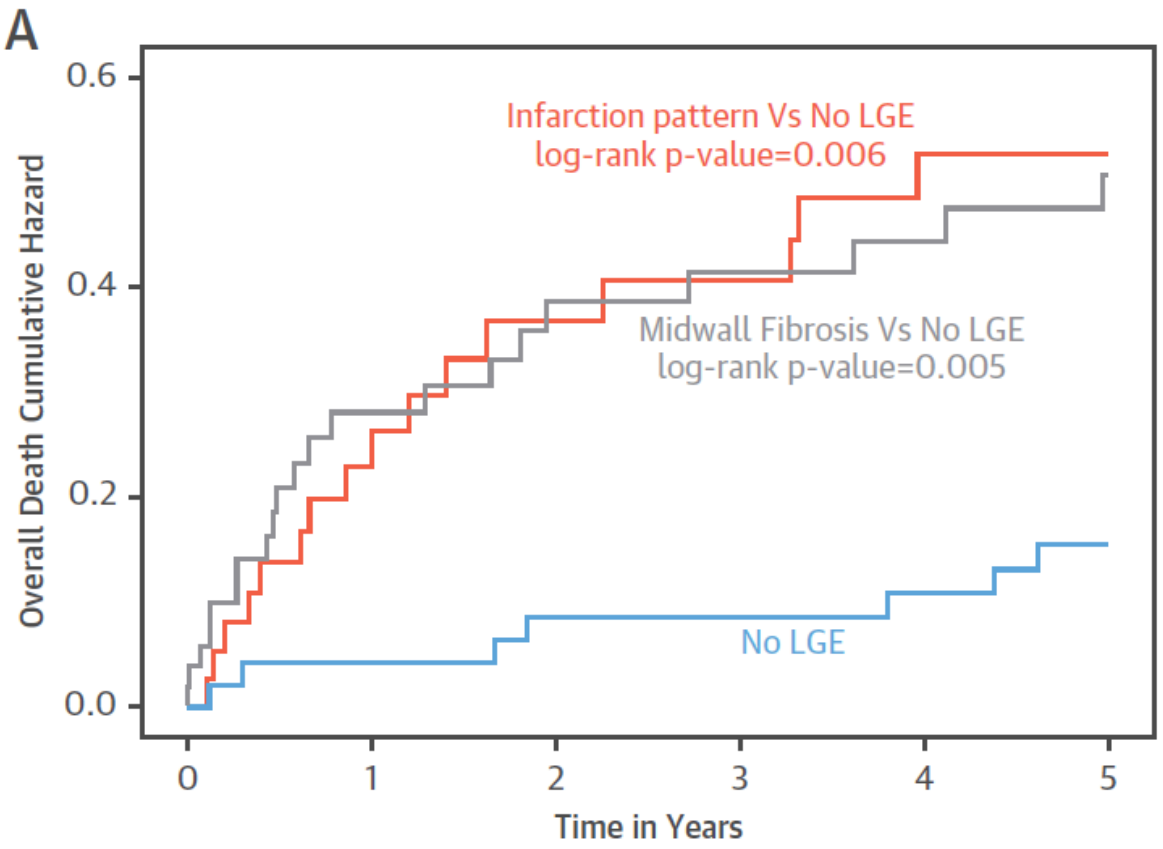


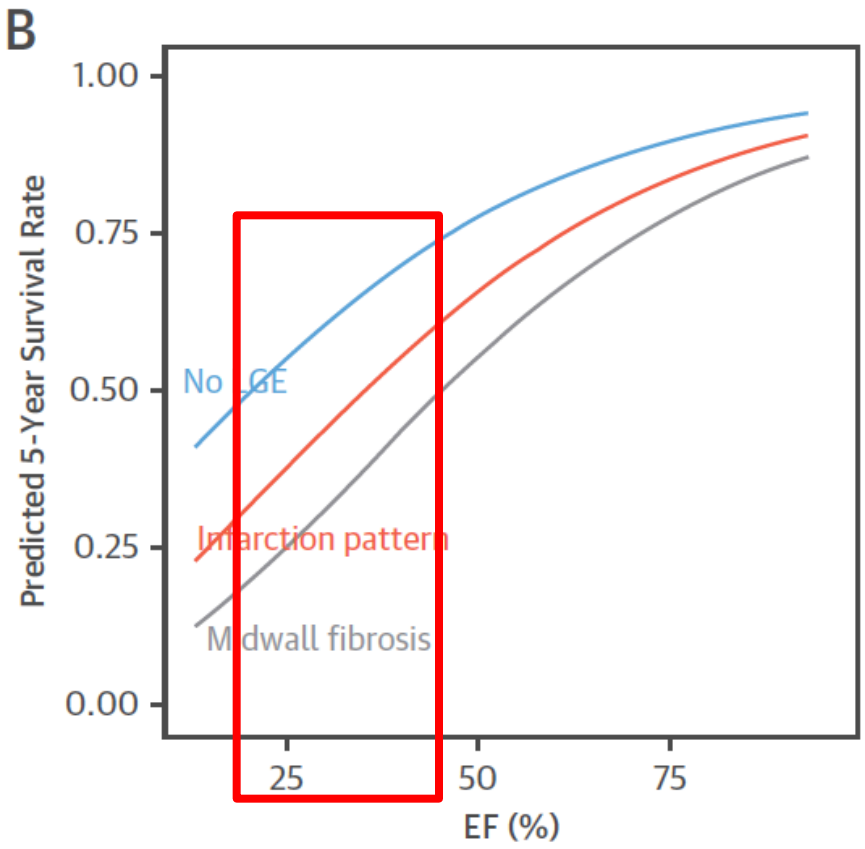




Chin CWL et al. J Am Coll Cardiol Img 2017;10:1320–33

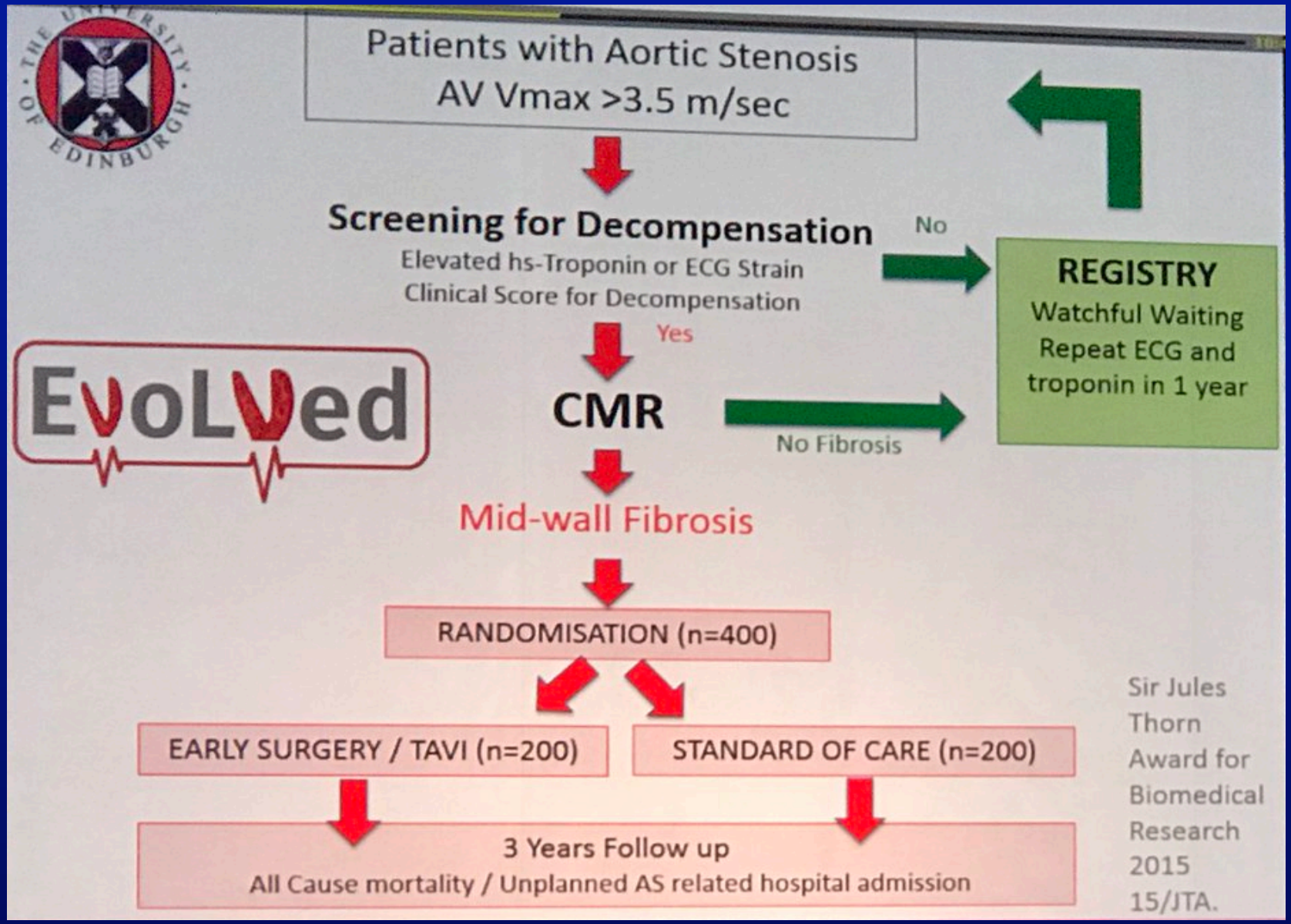
Midwall Fibrosis and 5-Year Outcome in Moderate and Severe Aortic Stenosis





Vassiliou VS et al. J Am Coll Cardiol. 2017; 69:1755-1756

AVR guided by Mid-wall Fobrosis



Cavalcante et al. Journal of Cardiovascular Magnetic Resonance (2017) 19:98
DOI 10.1186/s12968-017-0415-x

Journal of Cardiovascular Magnetic Resonance

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European Heart Journal (2016) 37, 3525–3531

EHJ BRIEF COMMUNICATION

Cardiomyopathies

ESC European Society of Cardiology
European Heart Journal (2017) 38, 2879–2887
doi:10.1093/eurheartj/ehx350

CLINICAL RESEARCH
Heart failure/cardiomyopathy

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JACC: CARDIOVASCULAR IMAGING, VOL. 9, NO. 3, 2016
MARCH 2016:321–31

Coexistence of Degenerative Aortic Stenosis

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY VOL. 71, NO. 4, 2018

Prevalence of Cardiac Amyloidosis in Patients Referred for Transcatheter Aortic Valve Replacement

CrossMark

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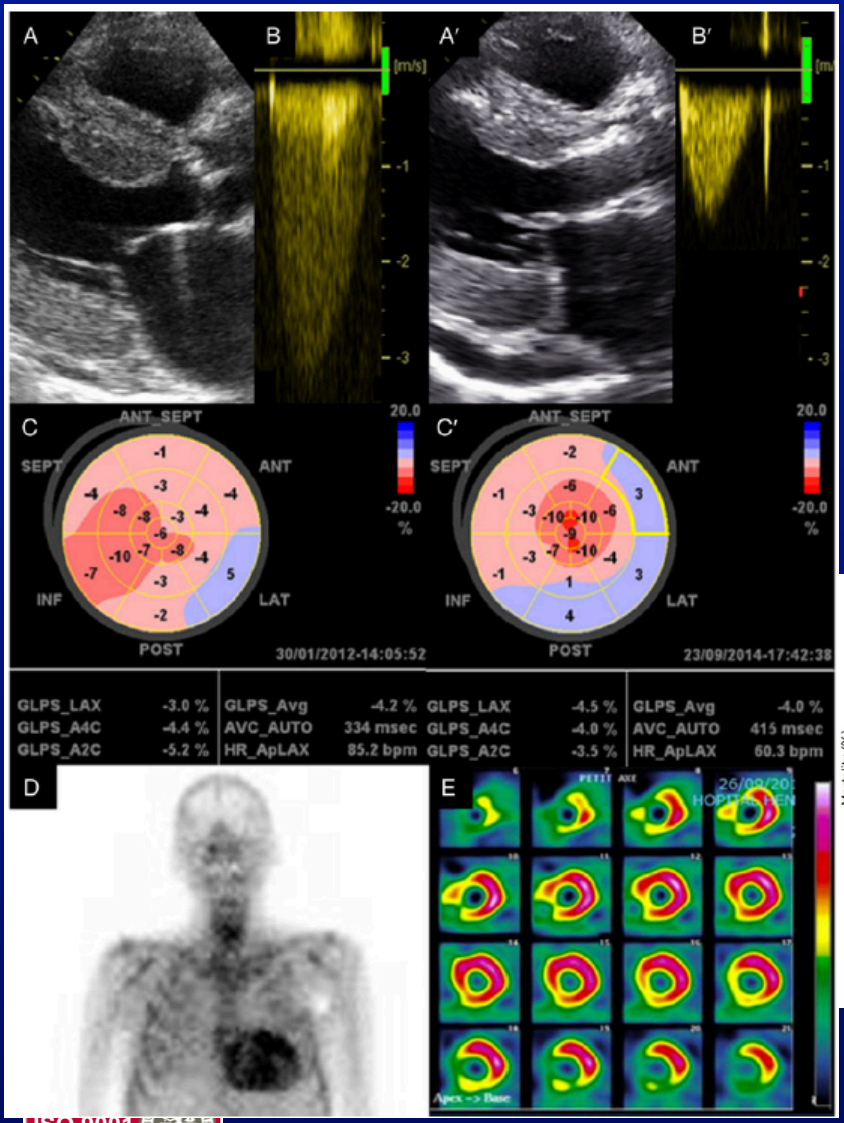
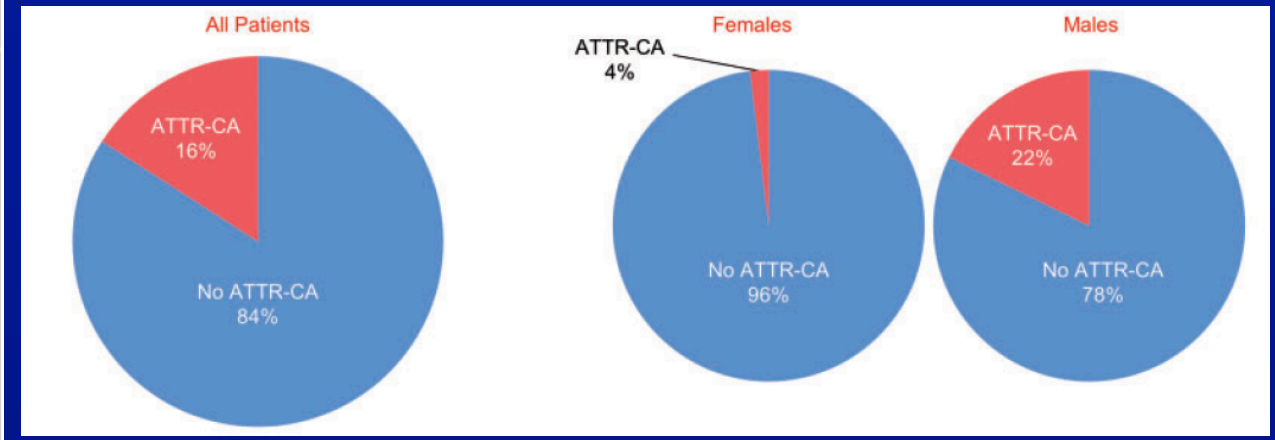
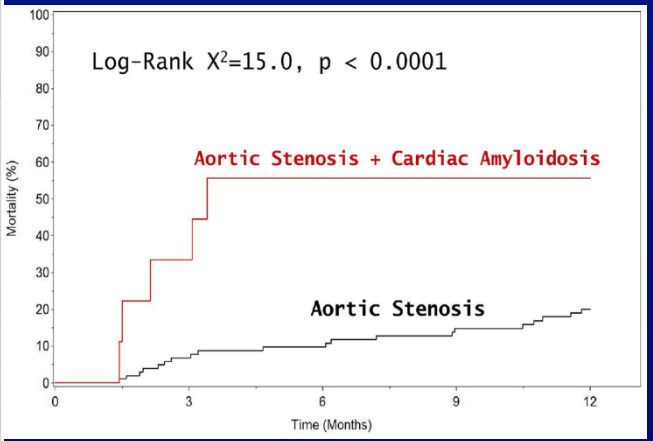
Transthyretin cardiac amyloidosis and AS

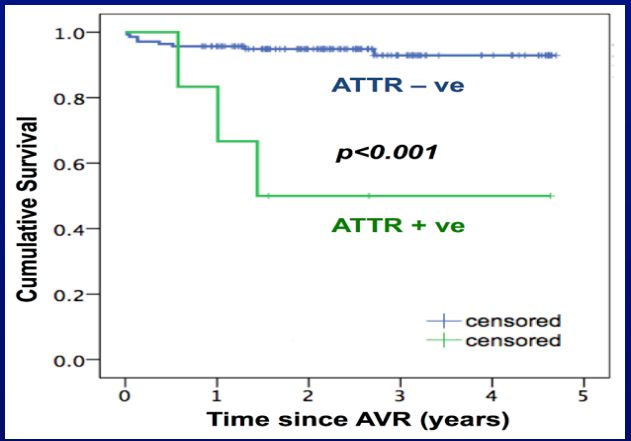
ATTR-CA is prevalent in 16% of patients with severe AS undergoing TAVR and is associated with a AS phenotype of low-flow low-gradient with mildly reduced EF





Castano A et al. Eur Heart J 2017; 38: 2879–2887





Treibel TA et al. Circ Cardiovasc Imaging. 2016
Cavalcante et al. J Cardiovasc Mag Res 2017; 19:98

Moderate AS in Patients With LV Systolic Dysfunction: Key Issues

- *Is it truly moderate AS?*
- *What is the mechanism of LV dysfunction?*
- ***Will SAVR or TAVR improve patient outcomes?***

ESC European Society of Cardiology

European Heart Journal (2017) **00**, 1–53
doi:10.1093/eurheartj/ehx391

2017 ESC/EACTS Guidelines for the management of valvular heart disease

A) Symptomatic aortic stenosis	Class[a]	Level[b]
Intervention is indicated in symptomatic patients with severe, high-gradient aortic stenosis (mean gradient ≥40 mmHg or peak velocity ≥4.0 m/s).[91–93]	I	B
Intervention i… tion and evid…	I	C
Intervention … fraction after …	IIa	C
Intervention … flow (contrac…	IIa	C
Intervention should not be performed in patients with severe comorbidities when the intervention is unlikely to improve quality of life or survival.	III	C
SAVR should be considered in patients with moderate aortic stenosis[e] undergoing CABG or surgery of the ascending aorta or of another valve after Heart Team decision.	IIa	C

Should AVR or TAVR be considered for patients with moderate AS and impaired LV function?

AVR for Moderate AS

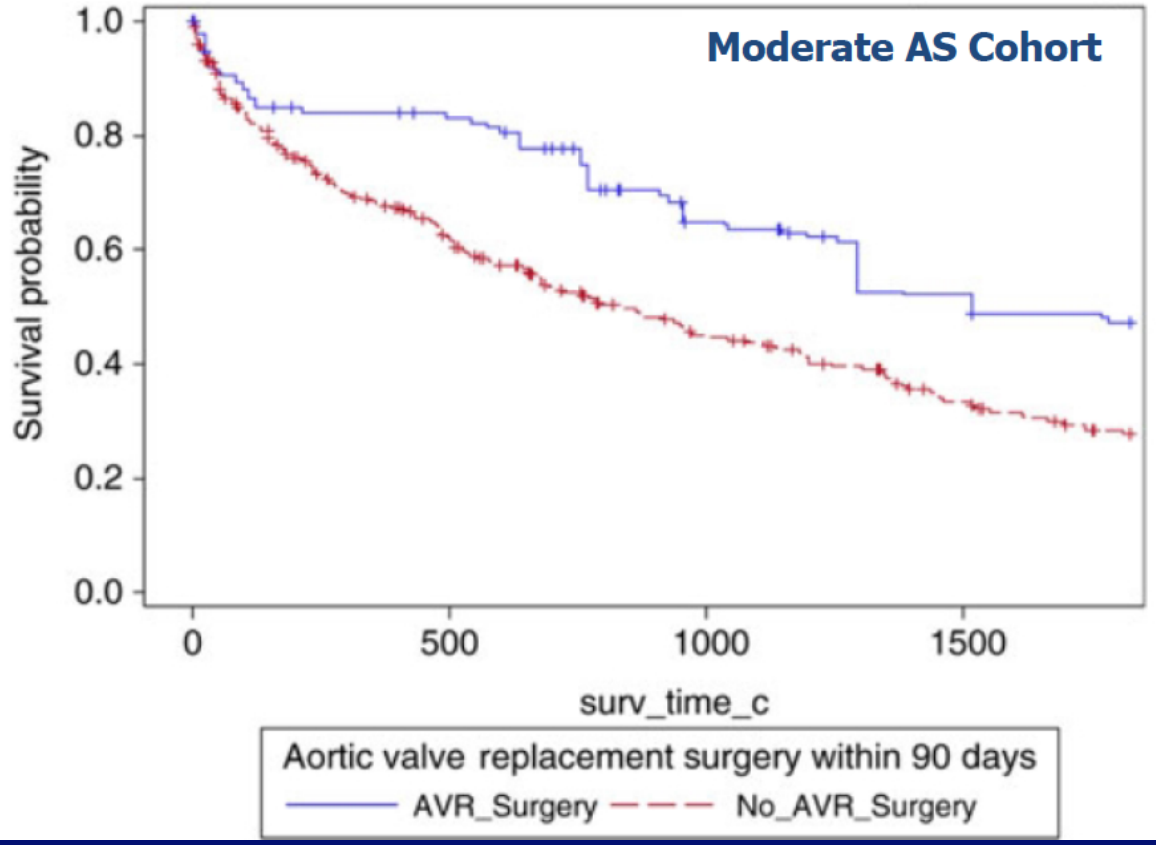
Duke Echocardiographic Database

N = 132804

AS defined as MG > 25 mmHg or v_{max} 3 m/s

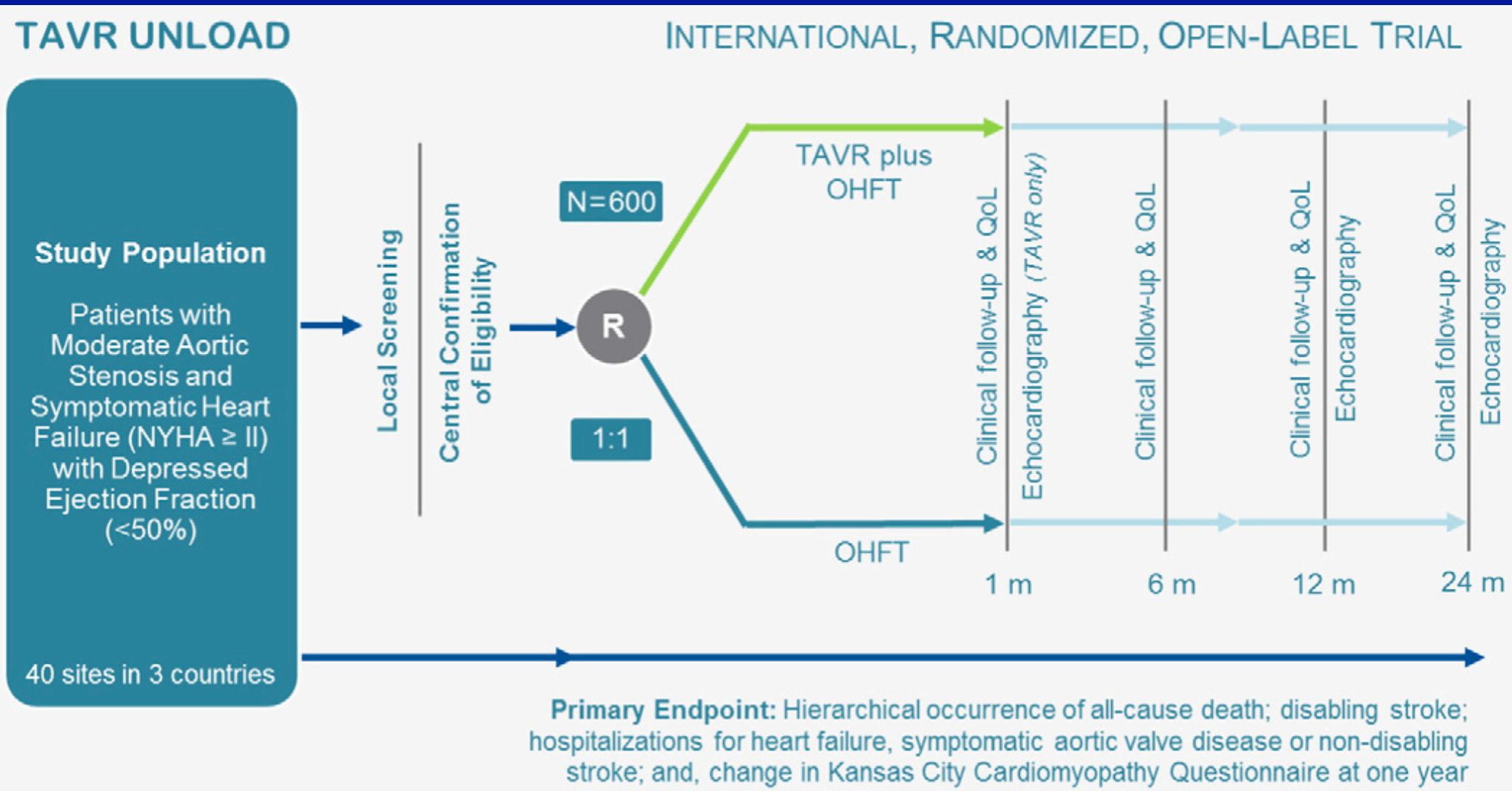
N = 1634 patients with AS

- **N = 1090 with moderate AS, 26% SAVR**
- **N = 544 with severe AS, 48% SAVR**



Samad et al. Eur Heart J 2016;37:2276-86

Transcatheter Aortic Valve Replacement to UNload the Left ventricle in patients with ADvanced heart failure (TAVR UNLOAD) trial



Spitzer et al. AHJ 2016;182:80-88

TAVR UNLOAD Trial: Key Considerations

- Is there a significant evidence base to justify any intervention in these patients?
- TAVR UNLOAD trial only randomizes patients to transfemoral TAVR
- Highly heterogeneous composite endpoint. The study will not be powered to assess survival
- Health policy implications and cost-effectiveness compared to more aggressive echocardiographic surveillance imaging

Take-home Messages

- Patients with moderate AS and LV dysfunction are a high-risk but heterogeneous and controversial group
- Observational data force us to re-consider our approach to these patients
- There is insufficient evidence to recommend SAVR or TAVR in all pts and would advocate a ***patient stratified approach*** after clarifying the severity of AS, the mechanism of LV dysfunction, and the likelihood of LV recovery post intervention
- Mechanical intervention for these patients is a pathophysiologically appealing approach to reducing afterload effectively; ongoing clinical trial will provide important data on outcome for these pts

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