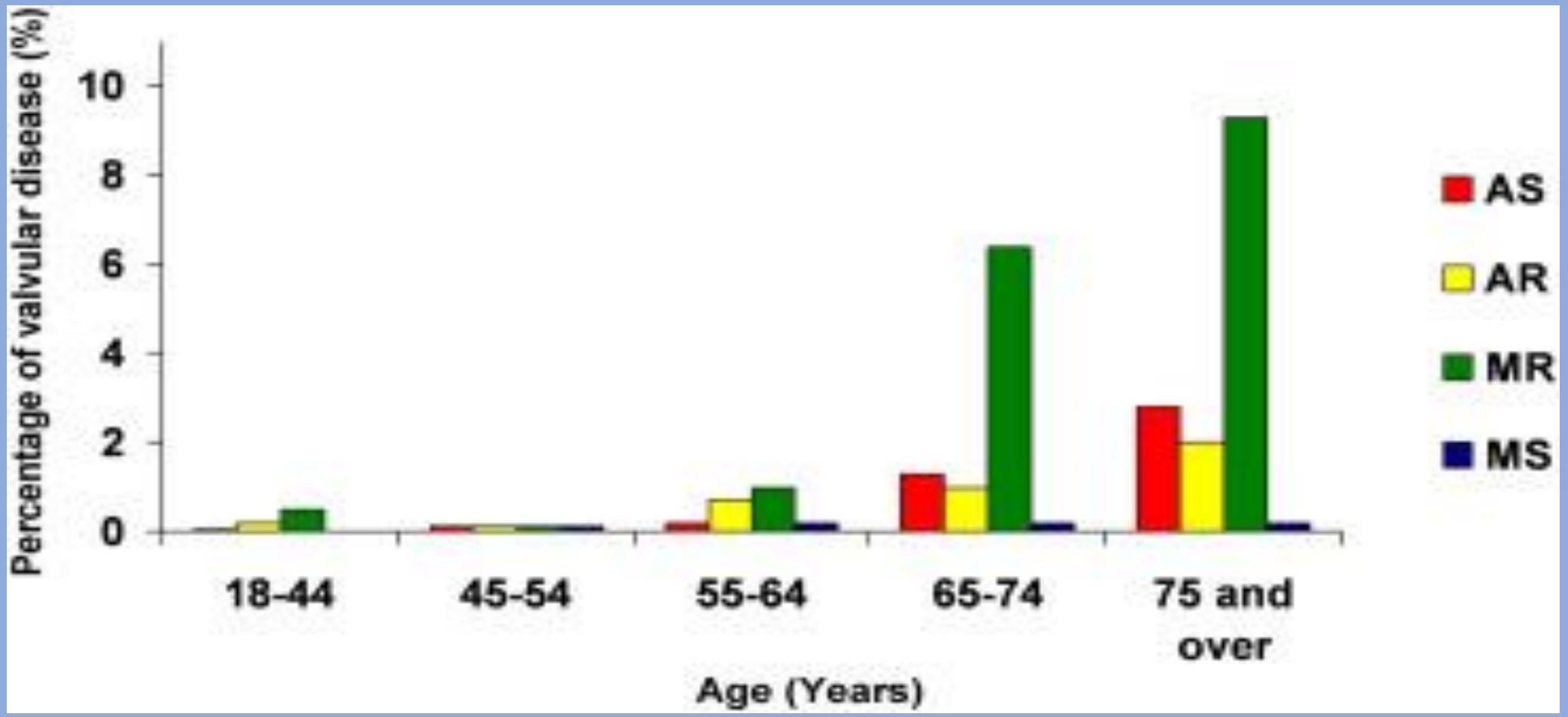
ΜΙΚΤΗ ΠΑΘΗΣΗ ΑΟΡΤΙΚΗΣ ΒΑΛΒΙΔΑΣ: ΑΠΟ ΤΗΝ ΠΟΣΟΤΙΚΟΠΟΙΗΣΗ ΣΤΗ ΛΗΨΗ ΑΠΟΦΑΣΕΩΝ

ΗΡΑΚΛΗΣ ΚΑΠΙΤΣΙΝΗΣ ΕΠΙΜΕΛΗΤΗΣ Α' ΚΑΡΔΙΟΛΟΓΟΣ

ΚΑΡΔΙΟΛΟΓΙΚΗ ΚΛΙΝΙΚΗ ΓΝ ΚΙΛΚΙΣ

No conflict of interest

EPIDIMIOLOGICAL DATA



Canadian Journal of Cardiology
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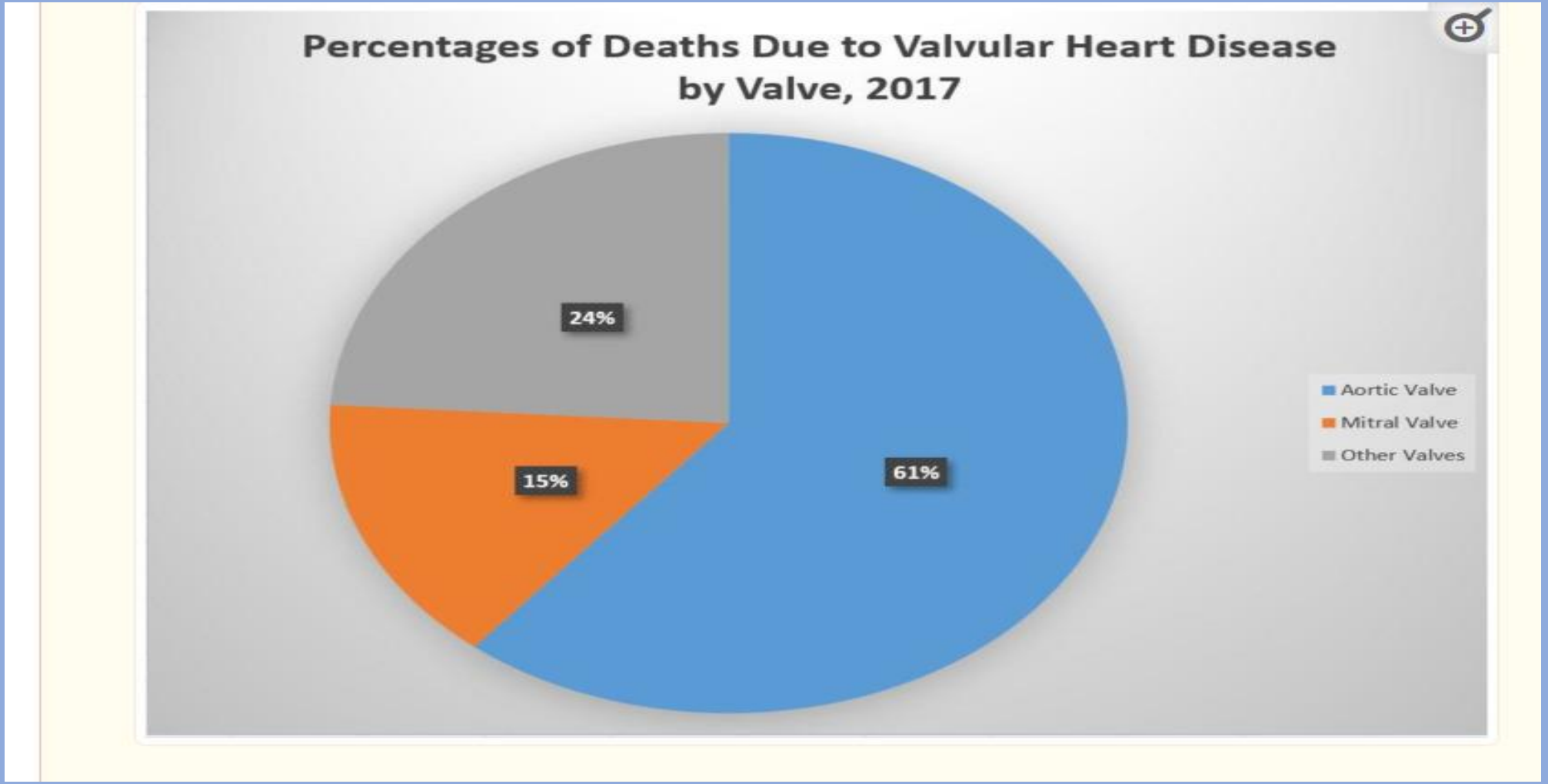
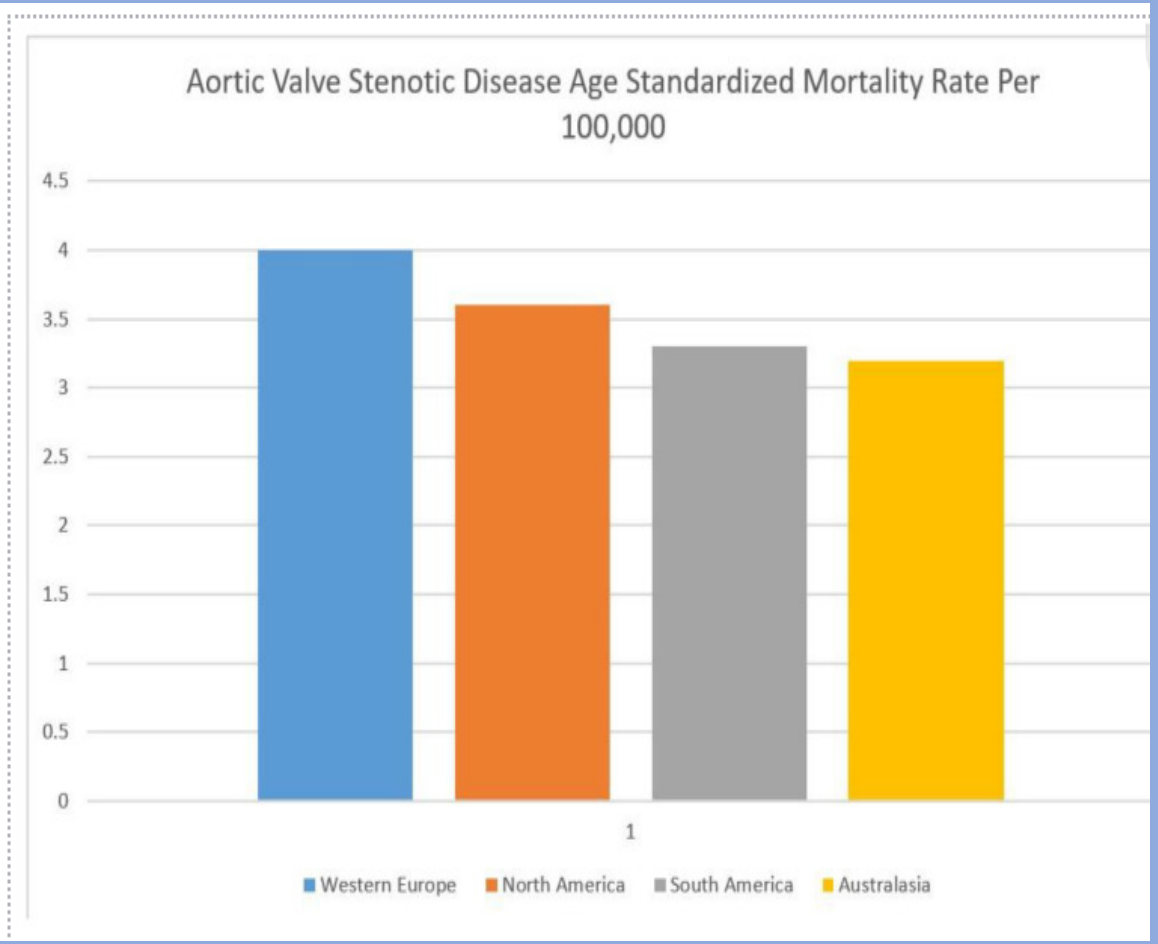
EPIDIMIOLOGICAL DATA(cont)



Percentages of deaths due to valvular heart disease, by valve, 2017—data obtained from CDC, Atlanta, GA, USA. Available online: https://www.cdc.gov/heartdisease/valvular_disease.htm (Accessed on 25 April 2022).

EPIDIMIOLOGICAL DATA(cont)



Med Sci (Basel). 2022 Jun; 10(2): 32.
Published online 2022 Jun 15. doi: 10.3390/medsci10020032

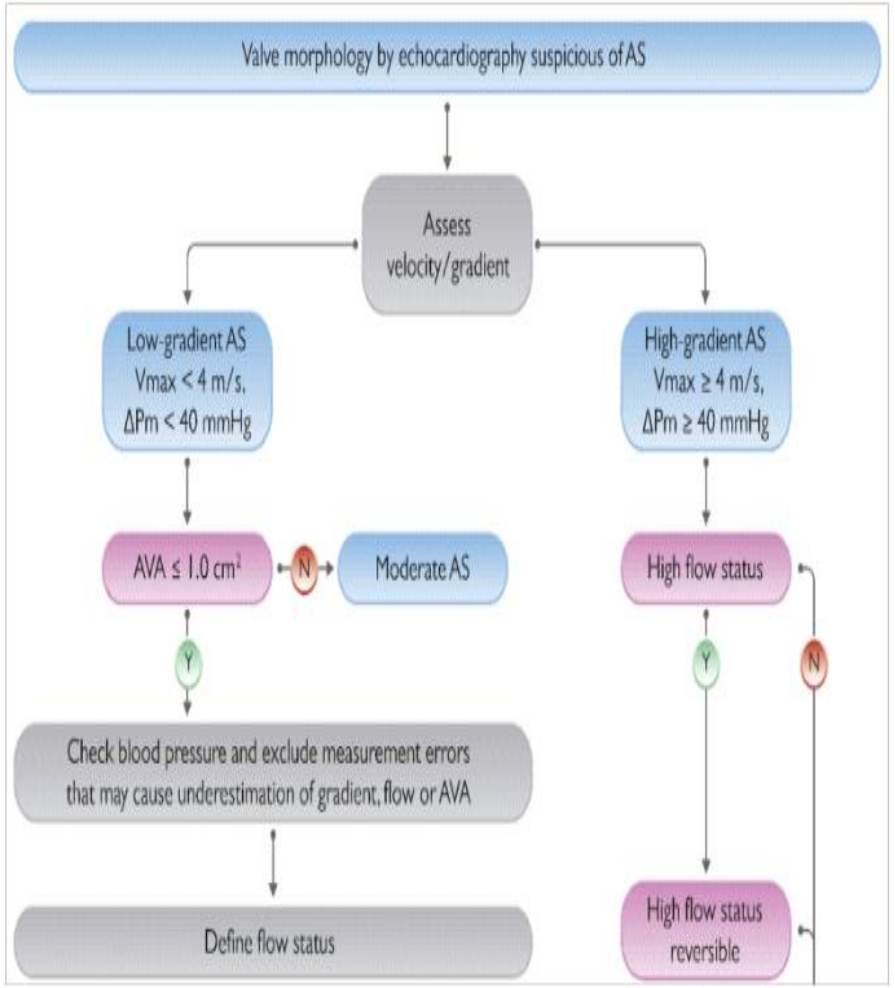
AORTIC REGURGITATION

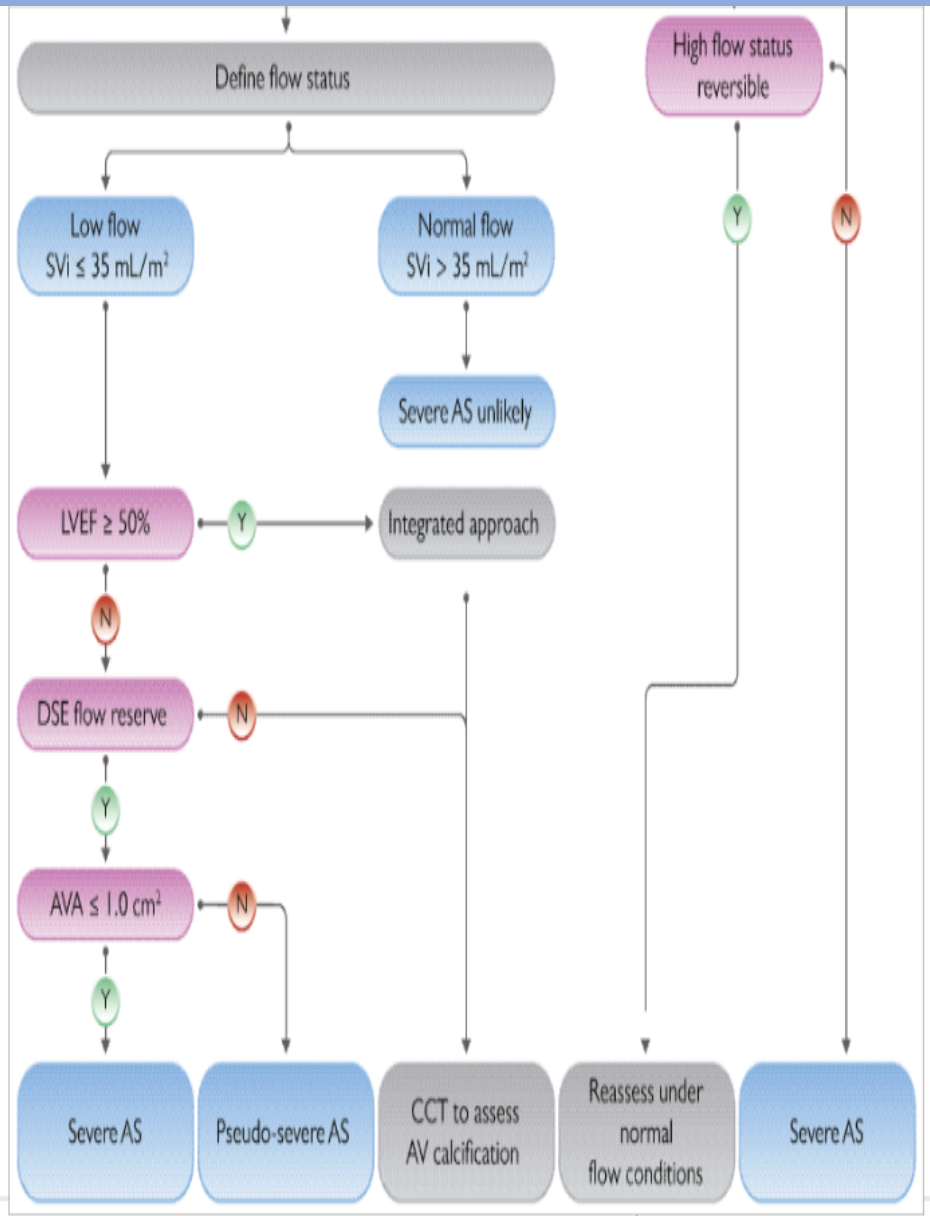
- Not precisely known in general population
- Trace AR in echo is common even in healthy individuals
- Estimated at 4 – 7% of general population
- Increases with age – especially above 50 years old
- Affects more men than women (13% vs 8,5%) – referring to severe AR

Nakeya Dewaswala1; Robert Chait. [1] University of Miami / JFK Medical Center
Last Update: August 8, 2023.

DEFINITION OF MAVD

- **The presence of combination of AS and AR***
- High frequency correlates with age
- Sparse data lack of specific guidelines for managing or interventions
- Gaps in evidence and pitfalls to quantify the lesions
- Generally poor prognosis if the choice of management is conservative
- Asymptomatic patients with MAVD are the biggest trouble


Valve morphology by echocardiography suspicious of AS
Assess velocity/gradient
Low-gradient AS Vmax < 4 m/s, ΔPm < 40 mmHg
High-gradient AS Vmax ≥ 4 m/s, ΔPm ≥ 40 mmHg
AVA ≤ 1.0 cm²
N
Moderate AS
Y
High flow status
Y
N
Check blood pressure and exclude measurement errors that may cause underestimation of gradient, flow or AVA
Define flow status
High flow status reversible
ESC
EACTS
©ESC/EACTS


Define flow status
High flow status reversible
Low flow SVi ≤ 35 mL/m²
Normal flow SVi > 35 mL/m²
Y
N
Severe AS unlikely
LVEF ≥ 50%
Y
Integrated approach
N
DSE flow reserve
N
Y
AVA ≤ 1.0 cm²
N
Y
Severe AS
Pseudo-severe AS
CCT to assess AV calcification
Reassess under normal flow conditions
Severe AS
ESC
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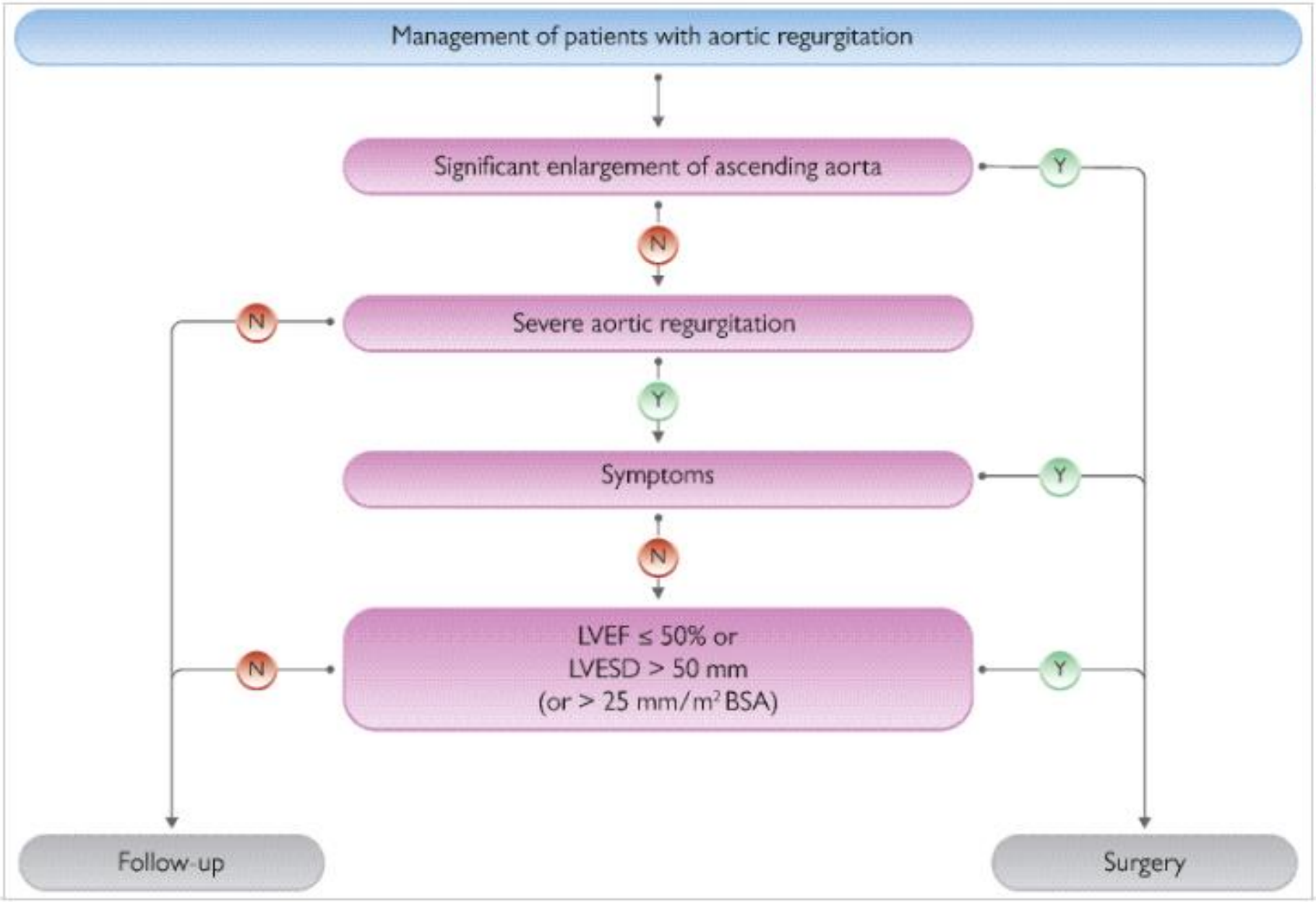

2021 ESC/EACTS Guidelines for the management of valvular heart disease

www.escardio.org/guidelines (European Heart Journal; 2021 – doi: 10.1093/eurheartj/ehab395; European Journal of Cardio-Thoracic Surgery; 2021 – doi: 10.1093/ejcts/ezab389)

Recommendations on indications for intervention in asymptomatic aortic stenosis (1)

Recommendations	Class	Level
Intervention is recommended in asymptomatic patients with severe aortic stenosis and systolic LV dysfunction (LVEF <50%) without another cause.	I	B
Intervention is recommended in asymptomatic patients with severe aortic stenosis and demonstrable symptoms on exercise testing.	I	C
Intervention should be considered in asymptomatic patients with severe aortic stenosis and systolic LV dysfunction (LVEF <55%) without another cause.	IIa	B
Intervention should be considered in asymptomatic patients with severe aortic stenosis and a sustained fall in BP (>20 mmHg) during exercise testing.	IIa	C

Recommendations on indications for intervention in asymptomatic aortic stenosis (2)

Recommendations	Class	Level
Intervention should be considered in asymptomatic patients with LVEF >55% and a normal exercise test if the procedural risk is low and one of the following parameters is present: • Very severe aortic stenosis (mean gradient ≥60 mmHg or V_{max} >5 m/s). • Severe valve calcification (ideally assessed by CCT) and V_{max} progression ≥0.3 m/s/year. • Markedly elevated BNP levels (>3× age- and sex-corrected normal range) confirmed by repeated measurements and without other explanation.	IIa	B

PATHOPHYSIOLOGY

- Overestimation in peak aortic velocity as a result of increased stroke volume in MAVD vs lone AS
- MAVD has both pressure and volume overload that poses a unique hemodynamic stress in LV
- AR in in patients with MAVD has different effects in parameters such as LV dilation, hypertrophy and diastolic dysfunction

PATHOPHYSIOLOGY(CONT)

- Increased LV afterload: the hallmark of MAVD
- AS increases LV systolic pressure
- AR increases flow and secondary LV systolic pressure
- Hypertrophy develops, more severe than in isolated AS or AR
- Concentric hypertrophy prevents excessive dilation as in pure AR (between AS and AR)

HEMODYNAMIC CONSEQUENCIES OF THE MAVD

- Volume overload by AR disproportionately increases the LV diastolic filling pressure
- Increased afterload and filling pressure make patients develop symptoms before LVEDd reaches 50mm (the surgical cutoff for asymptomatic patients with AR and preserved EF)

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REVIEW ARTICLE

Mixed Aortic Valve Disease: A Diagnostic Challenge, a Prognostic Threat

Philippe Unger, MD, PhD [a] and Marie-Annick Clavel, DVM, PhD [b]

[a]Cardiology Department, CHU Saint-Pierre, Université Libre de Bruxelles, Brussels, Belgium; [b]Institut Universitaire de Cardiologie et de Pneumologie, Université Laval, Québec, Canada

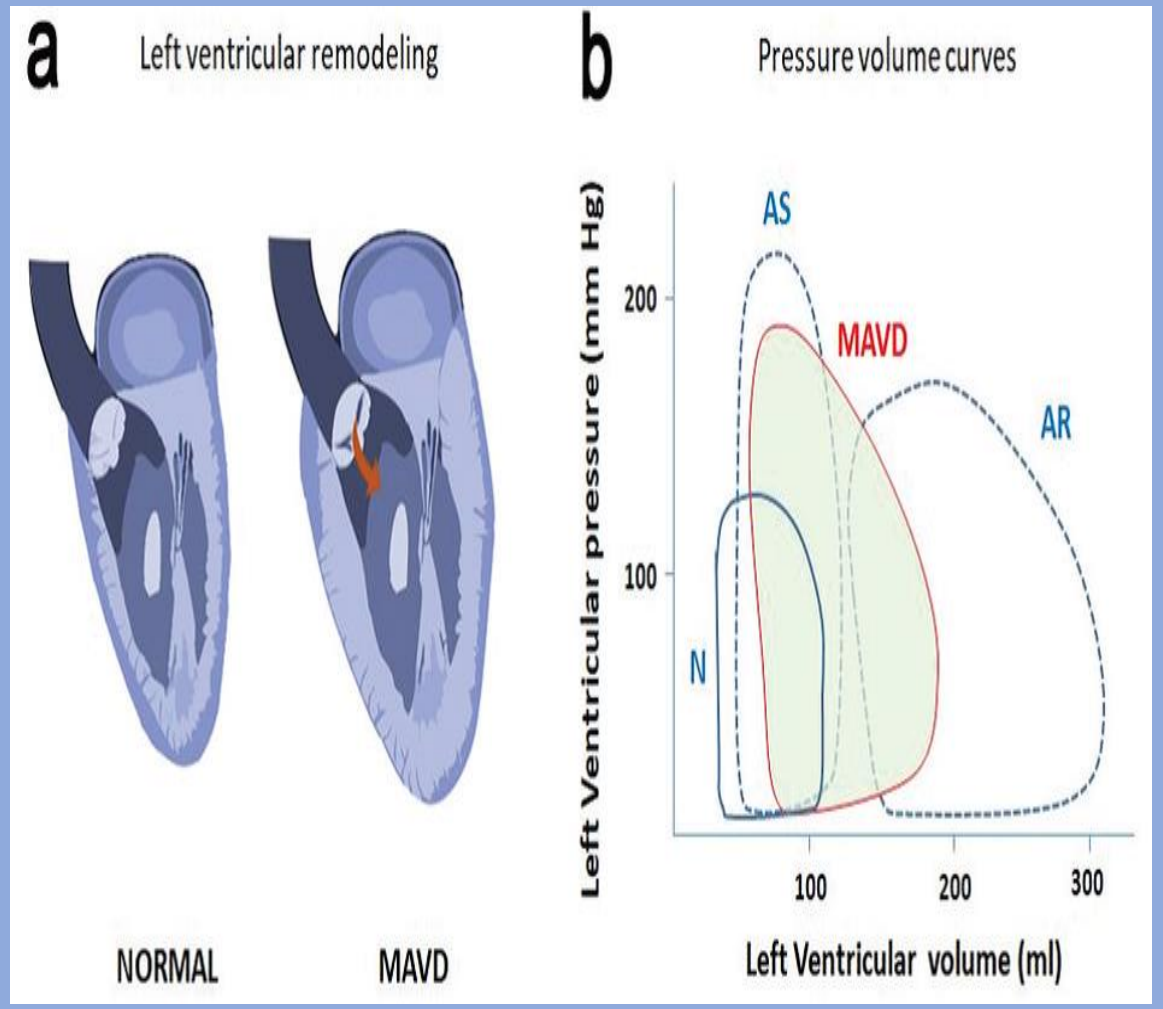


Figure 1. Left ventricular remodeling and pressure–volume curves. (a) The typical presentation of mixed aortic valve disease (MAVD) includes the combination of severe ventricular hypertrophy and mild dilation

(b)Pressure - volume curves in aortic valve disease showing that in MAVD left ventricular dilation is less than isolated aortic regurgitation (AR), whereas systolic pressure is higher, closer to that of aortic stenosis (AS). The severe LV hypertrophy without marked dilation and the resulting impaired LV compliance is associated with increased diastolic filling pressure (N, normal subject)

ADDITIONAL CONSEQUENCES

- Reduced CFR: Progressive myocardial fibrosis in both AS and AR
- Chronic elevated LV filling pressures:
  - Enlargement of LA
  - Atrial fibrillation
  - Secondary pulmonary hypertension
  - RV enlargement and dysfunction

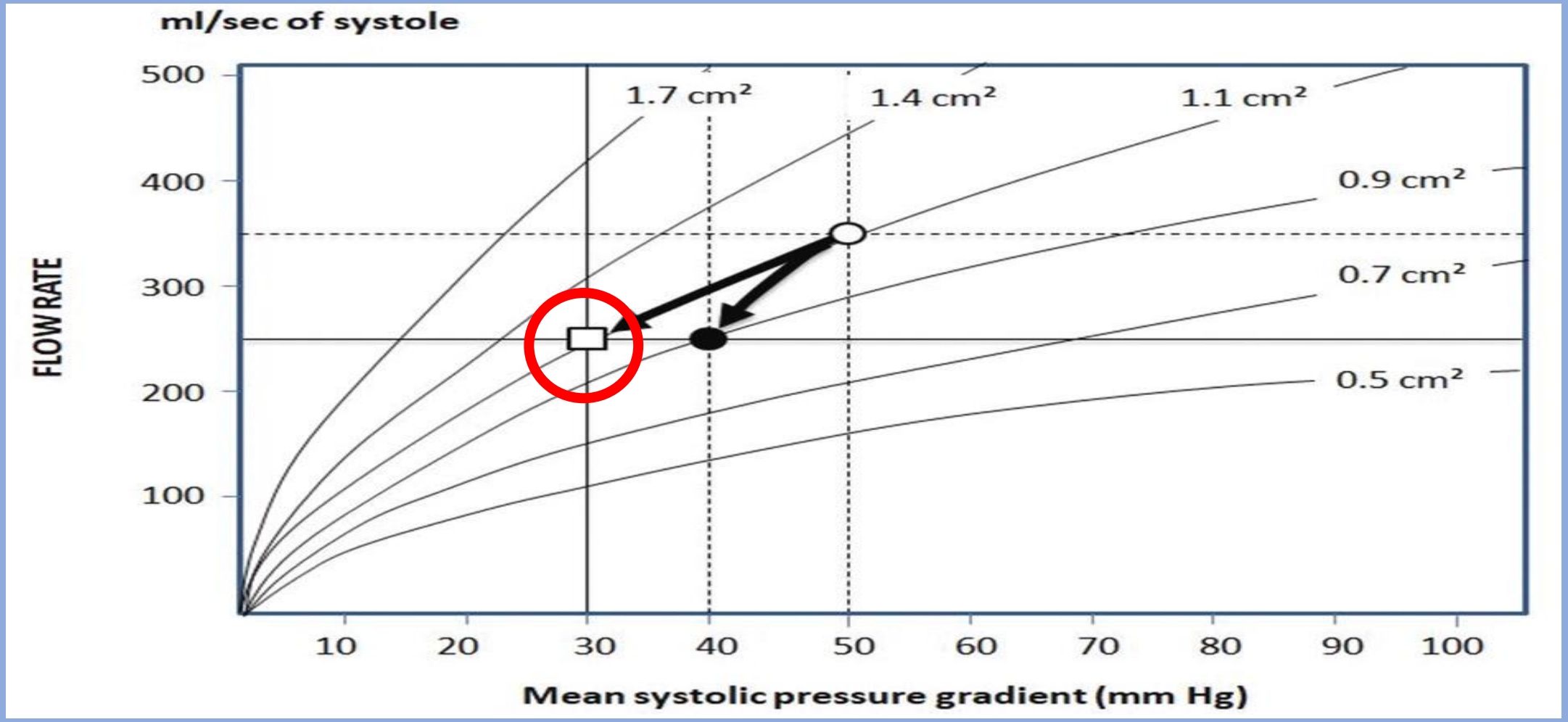
All above contribute to poor tolerance and affect physical history and outcomes of the MAVD

DIAGNOSTIC APPROACH

- General rule is to quantify AS and AR separately
- An evaluation of the global effects of the two lesions should be performed
- Transthoracic echo is the cornerstone modality
- As a result of the special hemodynamics of MAVD operators should have these interactions in mind in order to avoid several diagnostic errors
- Additional modalities such as MDCT and/or MRI may be required occasionally

EXAMPLES OF DIAGNOSTIC IMPLICATIONS IN AS QUANTIFICATION IN THE FIELD OF MAVD

- Discordance in flow rate and AVA as a result of increased transvalvular flow rate (SV/LV ejection time): continuity equation is valid, DVI and other parameters ex. AT or AT/ET ratio may be useful
- Low flow – low gradient state and compliance of AV due to calcification – MDCT may help – further studies needed
- Special attention is needed in young patients with bicuspid AV
- Overestimation of gradient with simplified Bernoulli equation when LVOT velocities are increased: think to use modified Bernoulli equation
- MAVD precludes invasive determination of aortic valve area: SV at the right heart differs markedly than this across the AV



Relationship between flow rate, mean systolic pressure gradient and aortic valve area, and effects of valvular compliance at high flow rates.

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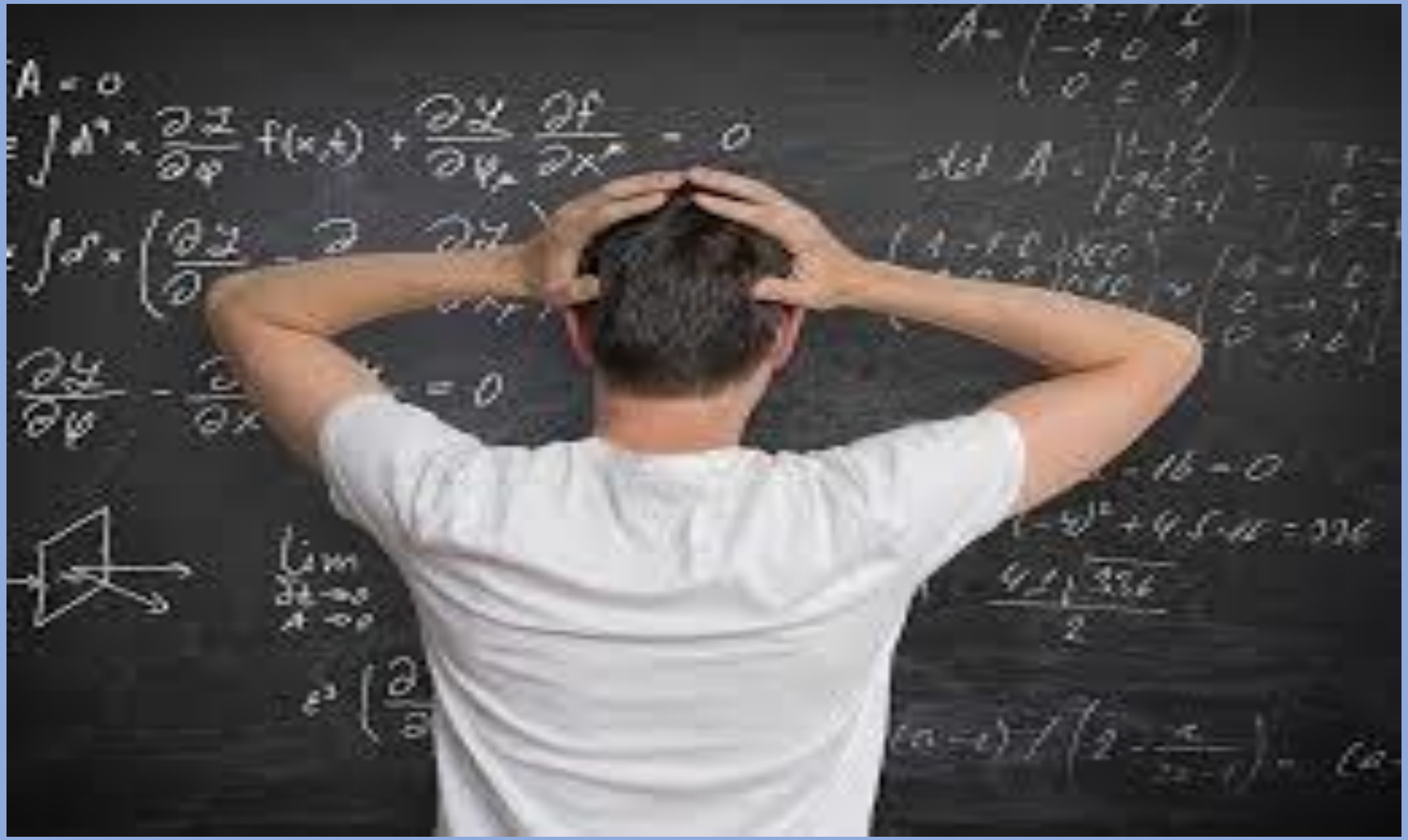
EXAMPLES OF DIAGNOSTIC IMPLICATIONS IN AR QUANTIFICATION IN THE FIELD OF MAVD

- Cautious use of markers of AR in MAVD due to the above hemodynamics
- Specially be aware of a moderate regurgitant flow in patients with mild or moderate LV dilation: use regurgitant fraction!
- PHT should be avoided in MAVD because it doesn't correlate with the severity due to LV hypertrophy and low compliance
- Alternative method for the above calculations is MRI
- MRI allows detection of myocardial fibrosis and hence associated with lesser LV recovery



MANAGEMENT

Table 1. Classification of the severity and proposed management of mixed aortic valve disease (MAVD) according to individual assessment of aortic stenosis (AS) and aortic regurgitation (AR).

	Mild AR	Moderate AR	Severe AR
Mild AS	Mild or moderate MAVD*	Moderate MAVD*	Severe MAVD**
Moderate AS	Moderate MAVD*	Likely severe MAVD***	Severe MAVD**
Severe AS	Severe MAVD**	Severe MAVD**	Severe MAVD**

* favorable outcome: conservative management advised

** poor outcome: interventional management indicated according to current guidelines for isolated AS and AR

*** overall poor prognosis: should be considered as likely severe MAVD. However, this situation is poorly covered by current guidelines, and aortic valve intervention should be based on a thorough assessment of the repercussions including symptomatic status and left ventricular function. Other factors associated with poor prognosis (see Table 2) should be considered in the decision-making process.

- When AS and AR are mild or if one is mild and one is moderate usually management is conservative
- Moderate AS and moderate AR is associated with poorer prognosis than isolated moderate lesions and similar to those with severe AS
- Symptoms?
- Effects on LV dimensions, ejection, and several echocardiographic parameters have been shown to predict a poor prognosis
- All above could/should be taken into account in decision making

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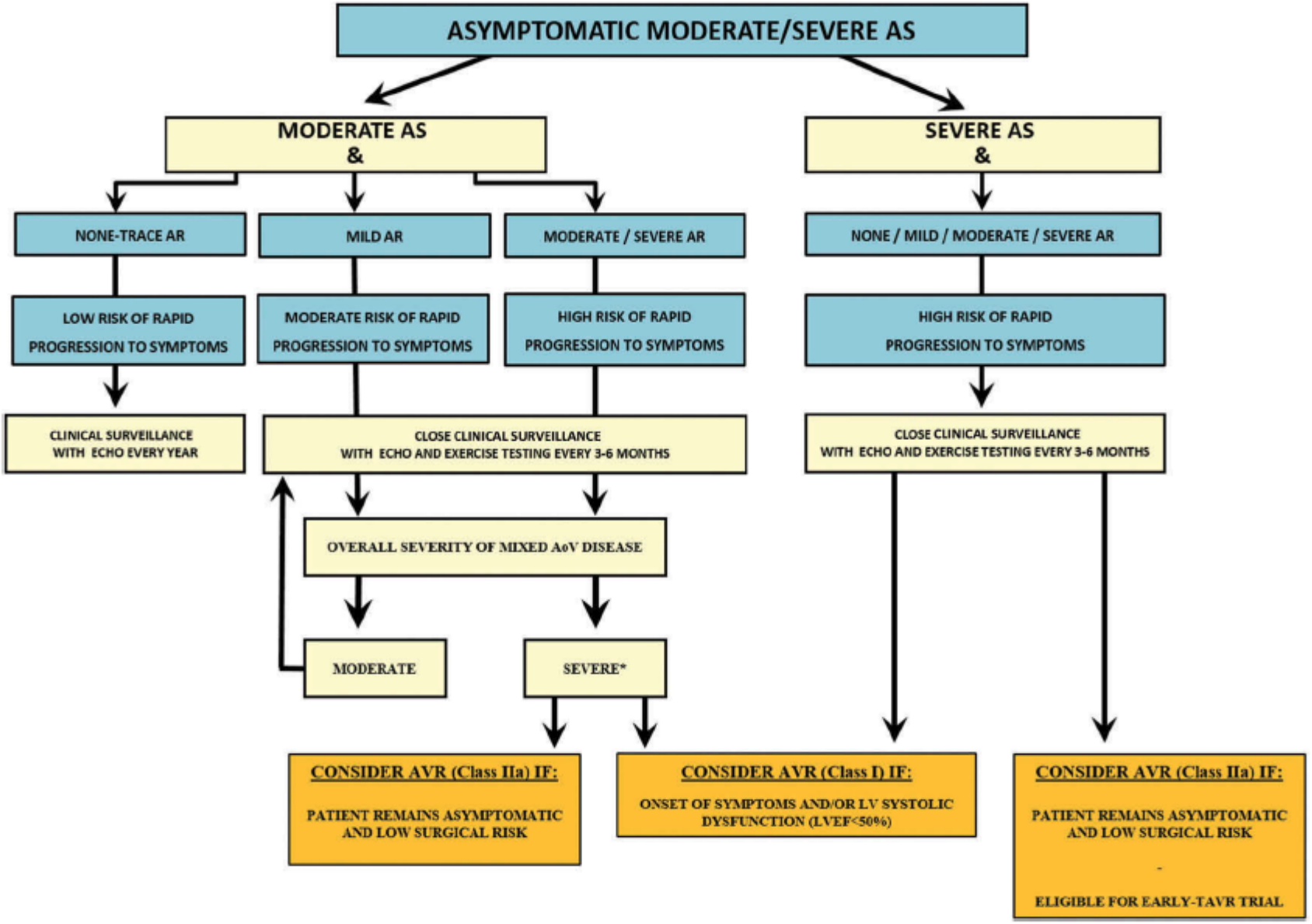

Figure 1. Management of mixed aortic valve disease. Mixed aortic valve disease is graded severe if peak aortic jet velocity ≥ 4 m/s and/or mean gradient ≥ 40 mmHg (even if aortic valve area is > 1.0 cm^2 and AR regurgitant orifice area is < 0.4 cm^2). AS, aortic stenosis; AR, aortic regurgitation; AoV, aortic valve; AVR, aortic valve replacement.

STRUCTURAL HEART 2018, VOL. 2, NO. 5, 405–407 https://doi.org/10.1080/24748706.2018.1495858

Table 2. Parameters associated with poorer prognosis in patients with mixed aortic valve disease (MAVD).

Repercussion	Parameter	Threshold	End-point	Reference
Increased aortic flow rate	Peak aortic velocity	≥4 m/s	Cardiac death and/or indication for AVR	15,16
	Peak aortic valve gradient	>45 mm Hg	All-cause mortality	18
Elevated LV filling pressures	E/e'**	>14	Stroke, heart failure hospitalization, severe LV dysfunction, or cardiac death	30
LV remodeling	Relative wall thickness*	>0.42	Stroke, heart failure hospitalization, severe LV dysfunction, or cardiac death	30
	Relative wall thickness*	>0.46	All-cause mortality *or* post-operative LV dysfunction	31
	LVMI/LVEDD	>3.1	All-cause mortality *or* post-operative LV dysfunction	31
LV longitudinal dysfunction	Reduced GLS	> −13.6%	Aortic valve intervention or all-cause mortality	34

LV, left ventricle; LVMI, left ventricular mass index; LVEDD, Left ventricular end-diastolic diameter; GLS, left ventricular global longitudinal strain; AVR, aortic valve replacement

* calculated using the formula: (2Xposterior wall thickness)/left ventricular end-diastolic diameter;

** e' velocity as the mean of septal and lateral e' velocities.

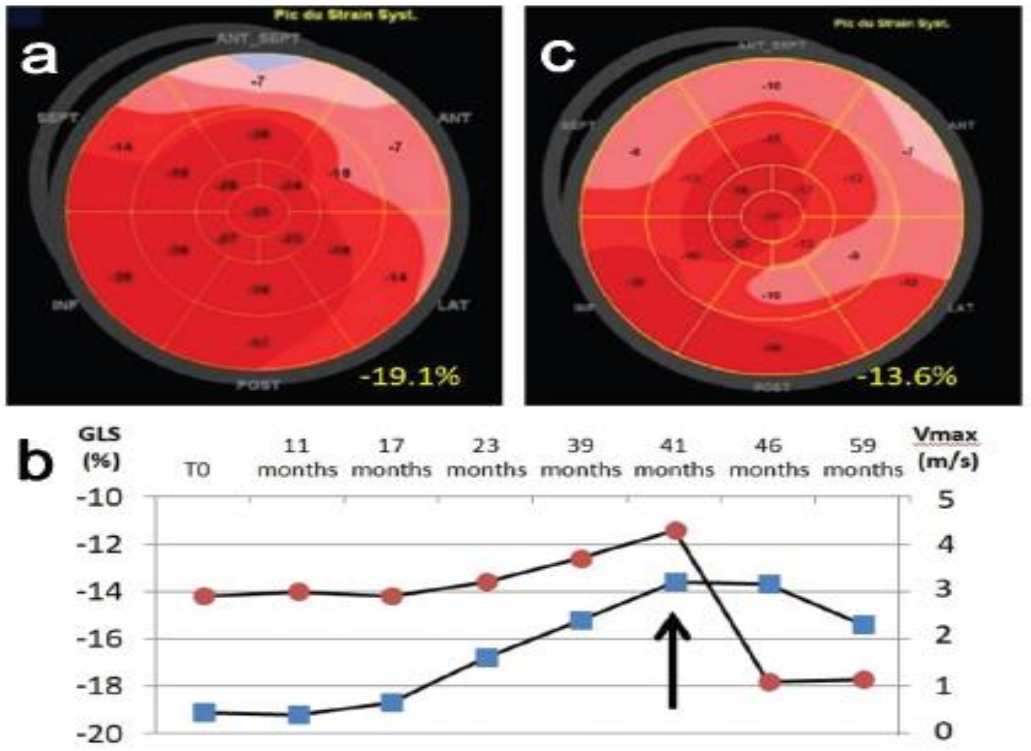

Figure 5. Case study illustrating the role of global longitudinal strain (GLS) assessment in mixed aortic valve disease (MAVD).

At the start of the follow-up (T0) of this 47 year-old asymptomatic man, the mean transvalvular pressure gradient was 20 mm Hg and aortic valve area 1.8 cm2. Aortic regurgitation was moderate. The left ventricular ejection fraction was 65%. There was concentric left ventricular hypertrophy. Maximal velocity across the aortic valve (Vmax, red circles) was 293 cm/s. (a) By speckle tracking imaging, the GLS (blue squares) was −19.1%. (b) During subsequent follow-up, the GLS progressively deteriorated. **C**: after 41 months, the patient developed dyspnea on moderate exertion and the GLS was −13.6% (arrow). At that time point, the aortic valve area was 1.3 cm2 and the mean pressure gradient 48 mm Hg; AR severity was unchanged. The patient was referred for surgery. Postoperatively, GLS tended to improve. This case illustrates the observation that changes in GLS may herald the development of symptoms in MAVD.

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BIOMARKERS IN MAVD

- Lack of studies to clearly testify their role of natriuretic peptides
- Few evidence show that their importance and prognostic value is similar to those states with isolated AS or AR
- Often patients that have a normal preoperative EF may have LV dysfunction postoperatively:

➢ Increasing evidence support the role of early surgery irrespective of symptoms **BUT**

➢ the use of the abovementioned additional markers to indicate early surgery improves outcome is unclear

ESTIMATION OF AORTIC ROOT IN PATIENTS WITH MAVD

- Aortic root dimensions and geometry and existence of bicuspid aortic valve is of highest importance
- No data to guide AOVR in MAVD with mild AS and mild AR with the these coexisting situations

Recommendations on indications for surgery in aortic root or tubular ascending aortic aneurysm* (2)

ESC
EACTS

Recommendations	Class	Level
Ascending aortic surgery should be considered in patients who have aortic root disease with maximal ascending aortic diameter: • ≥55 mm in all patients. • ≥45 mm in the presence of Marfan syndrome and additional risk factors** or patients with a *TGFBR1* or *TGFBR2* mutation (including Loeys–Dietz syndrome).*** • ≥50 mm in the presence of a bicuspid valve with additional risk factors** or coarctation.	IIa	C
When surgery is primarily indicated for the aortic valve, replacement of the aortic root or tubular ascending aorta should be considered when ≥45 mm.	IIa	C

**** Irrespective of the severity of aortic regurgitation.***

*** Family history of aortic dissection(or personal history of spontaneous vascular dissection),severe aortic regurgitation or mitral regurgitation, desire of pregnancy, systemic hypertension ,and/or aortic increase >3mm/year.*

****A lower threshold of 40 mm may be considered in women with low BSA, TGFBR2 mutation and severe extra-aortic features.*

www.escardio.org/guidelines

2021 ESC/EACTS Guidelines for the management of valvular heart disease (European Heart Journal; 2021 – doi: 10.1093/eurheartj/ehab395; European Journal of Cardio-Thoracic Surgery; 2021 – doi: 10.1093/ejcts/ezab389)

ESTIMATION OF ASYMPTOMATIC PATIENTS

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EDITORIAL

Mixed Aortic Valve Disease: A Double Trouble

Philippe Pibarot

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- MAVD is a double trouble for the patient and the LV
- It is a great challenge especially in patients with moderate lesions to identify who have hemodynamically critical disease and poorer prognosis with conservative treatment
- Among these populations even more challenging are the asymptomatics
- Careful exercise testing adds evidence to baseline echo and other parameters and unmasks concealed symptoms
- Reevaluation to prove LV dysfunction and/or other hemodynamic parameters during stress tests clarifies the severity in many cases

PROGNOSIS AND SURVIVAL

Long-Term Outcomes in Patients With Mixed Aortic Valve Disease and Preserved Left Ventricular Ejection Fraction

Nicolas Isaza, Milind Y. Desai, Samir R. Kapadia, Amar Krishnaswamy, L. Leonardo Rodriguez, Richard A. Grimm, Julijana Z. Conic, Yoshihito Saijo, Eric E. Roselli, A. Marc Gillinov, Douglas R. Johnston, Lars G. Svensson, Brian P. Griffin and Zoran B. Popović

Originally published 24 Mar 2020 | https://doi.org/10.1161/JAHA.119.014591 | Journal of the American Heart Association. 2020;9:e014591

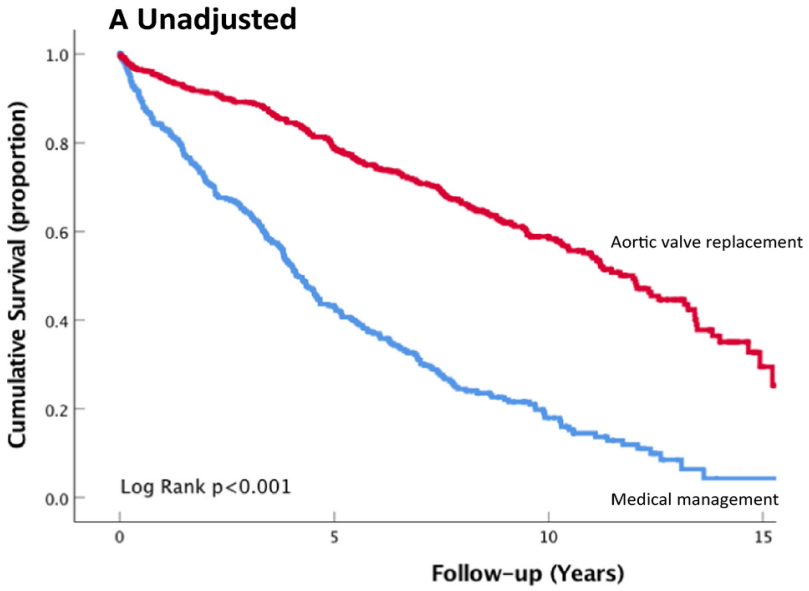
Methods and Results

This observational cohort study evaluated 862 adult patients (56.8% male) with preserved left ventricular ejection fraction and at least moderate aortic regurgitation and moderate aortic stenosis. Primary outcome was all-cause mortality. Subgroup analysis was based on treatment modality (aortic valve replacement [AVR] versus medical management). A regression analysis of longitudinal echocardiographic parameters was performed to assess the natural history of MAVD. Mean age was 68±15 years, and mean left ventricular ejection fraction was 58±5%. At 4.6 years (25th–75th percentile range, 1.0–8.7), 58.6% of patients underwent an AVR and 48.8% patients died. In both unadjusted and adjusted Cox survival analysis, AVR was associated with improved survival (hazard ratio, 0.41; 95% CI, 0.34–0.51, $P<0.001$). Impact of AVR persisted when stratifying the cohort by symptom status and baseline aortic valve area (log rank, $P<0.001$ for both) and after propensity-score matching (hazard ratio, 0.40; 95% CI, 0.32–0.50; $P<0.001$). In the longitudinal analysis, there were statistically significant changes over time in aortic valve peak gradient ($P<0.001$) and aortic valve area ($P<0.001$) and only mild increases in left ventricular end-diastolic ($P<0.007$) and -systolic ($P<0.001$) volumes.

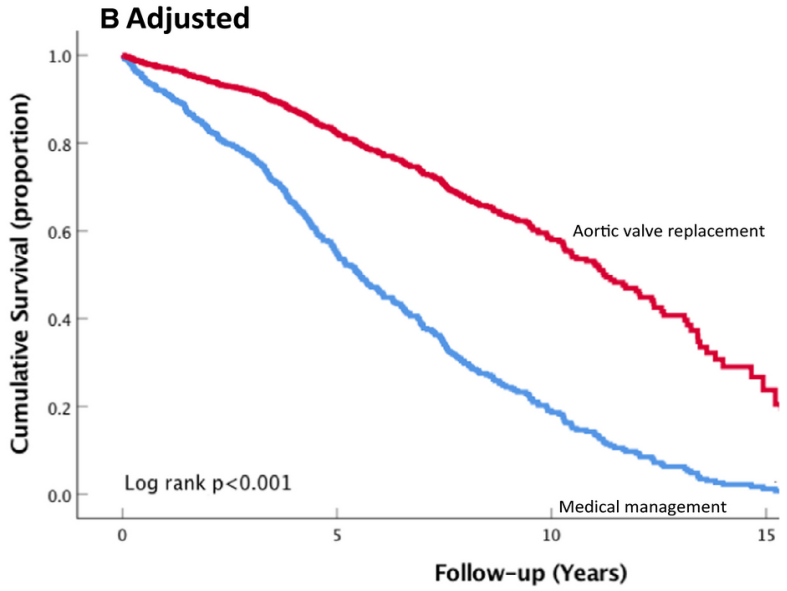
Conclusions

MAVD confers a high risk of all-cause mortality. Although AVR significantly reduced this risk, independent of valve area and symptom status, a substantial risk of death remained even after AVR. Peak aortic valve gradients >45 mm Hg are associated with poor prognosis in MAVD for those who did not undergo aortic valve intervention. These results build on previous knowledge and add to the notion that in the MAVD population, there may be a role for closer follow-up and earlier invasive treatment.

Additionally, the phenotypic characteristics of MAVD differ from isolated AS or AR given that these patients display only mild LV dilation. These features may have an important role in accelerating the development of symptoms and worsening the manifestations of MAVD.



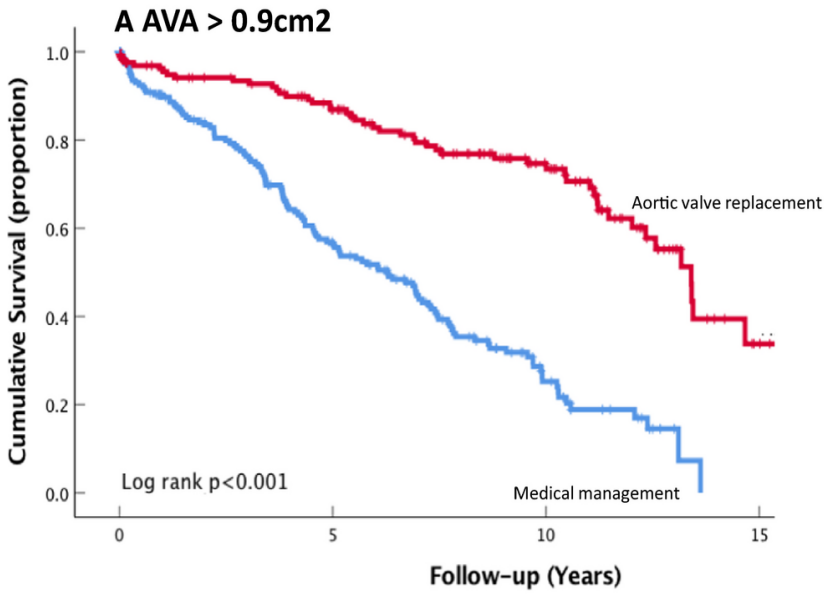
Years	0	2.5	5	7.5	10	12.5	15
AVR	504	355	293	218	114	55	8
Medical	356	200	117	64	28	7	1



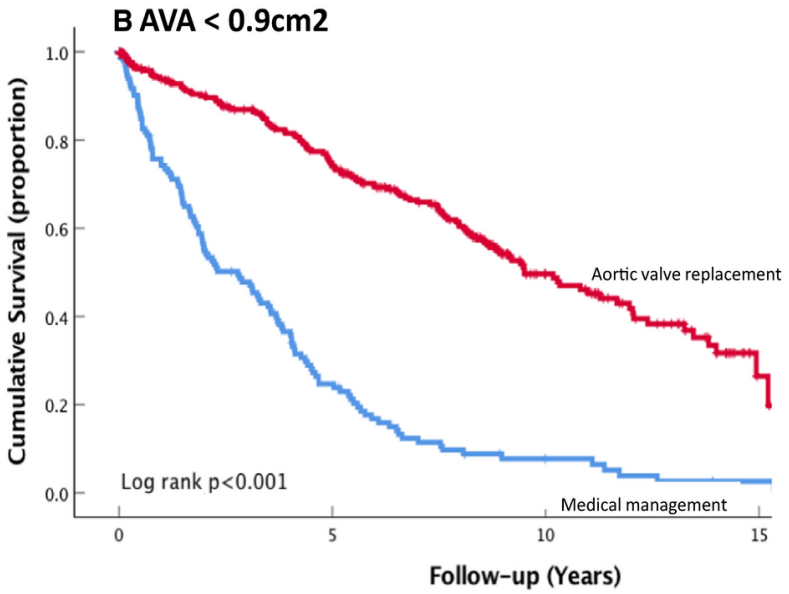
Years	0	2.5	5	7.5	10	12.5	15
AVR	504	355	293	218	114	55	8
Medical	356	200	117	64	28	7	1

Figure 1. Unadjusted (**A**) and adjusted (**B**) Kaplan–Meier curves for all-cause mortality in the AVR and medical management subgroups of patients with MAVD. AVR indicates aortic valve replacement; MAVD, mixed aortic valve disease.

Nicolas Isaza. Journal of the American Heart Association. Long-Term Outcomes in Patients With Mixed Aortic Valve Disease and Preserved Left Ventricular Ejection Fraction, Volume: 9, Issue: 7, DOI: (10.1161/JAHA.119.014591)



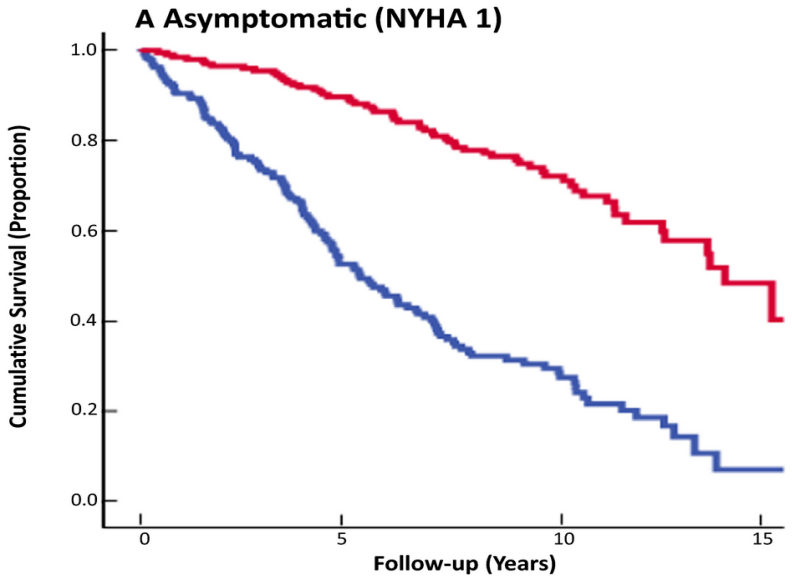
Years	0	2.5	5	7.5	10	12.5	15
AVR	170	134	115	90	58	23	4
Medical	206	136	88	51	22	4	0



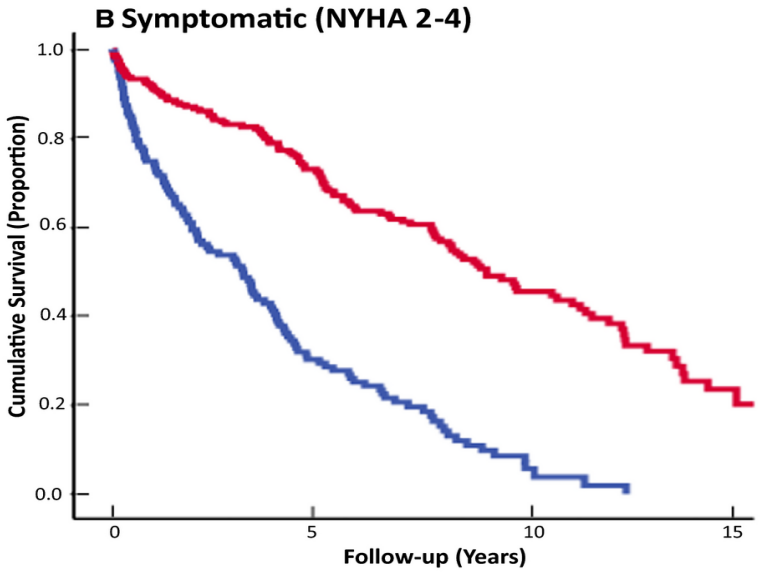
Years	0	2.5	5	7.5	10	12.5	15
AVR	333	221	178	128	56	32	4
Medical	149	64	29	13	6	3	1

Figure 2. Kaplan–Meier curves for all-cause mortality in the AVR and medical management subgroups of patients with MAVD stratified by AVA >1.0 cm^2 (**A**) or ≤1.0 cm^2 (**B**). AVA indicates aortic valve area; AVR, aortic valve replacement; MAVD, mixed aortic valve disease.

Nicolas Isaza. Journal of the American Heart Association. Long-Term Outcomes in Patients With Mixed Aortic Valve Disease and Preserved Left Ventricular Ejection Fraction, Volume: 9, Issue: 7, DOI: (10.1161/JAHA.119.014591)



Years	0	2.5	5	7.5	10	12.5	15
AVR	236	188	166	125	66	28	4
Medical	205	134	83	48	26	7	1



Years	0	2.5	5	7.5	10	12.5	15
AVR	267	167	127	93	48	27	4
Medical	150	66	34	16	2	0	0

Figure 3. Kaplan–Meier curves for all-cause mortality in the AVR and medical management subgroups of patients with MAVD stratified by NYHA class I (**A**) or NYHA class II to IV (**B**). AVR indicates aortic valve replacement; MAVD, mixed aortic valve disease; NYHA, New York Heart Association.

Nicolas Isaza. Journal of the American Heart Association. Long-Term Outcomes in Patients With Mixed Aortic Valve Disease and Preserved Left Ventricular Ejection Fraction, Volume: 9, Issue: 7, DOI: (10.1161/JAHA.119.014591)

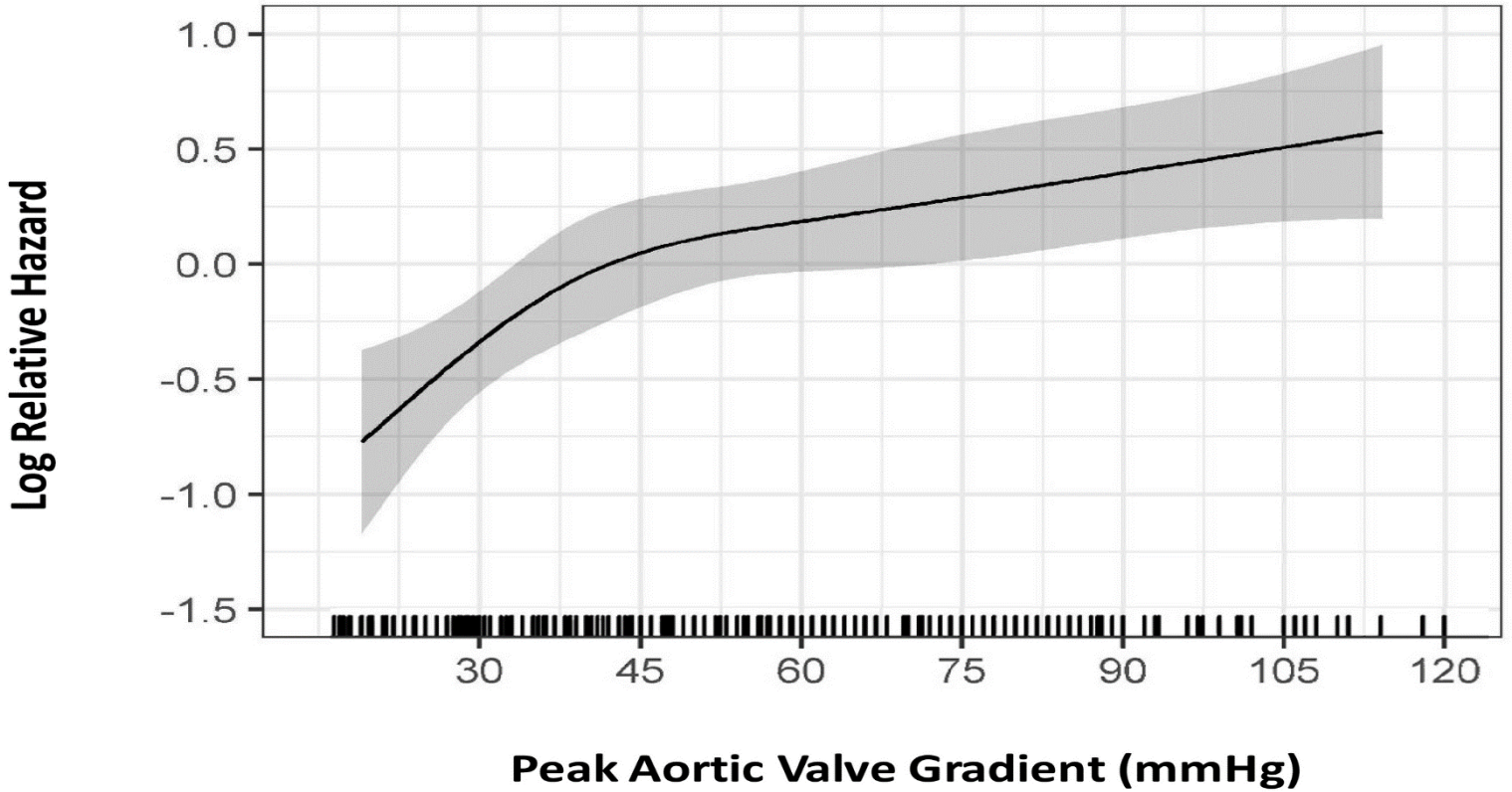


Figure 6. Relationship between relative hazard (*y* axis) and peak aortic valve gradient (*x* axis) in a subset of 357 mixed aortic valve disease patients who did not undergo aortic valve intervention during follow-up. Visual analysis of the curves shows a steep increase in relative hazard as the peak aortic valve gradient reaches 45 mm Hg, after which the hazard plateaus. This nonlinear impact of peak aortic valve gradient was modeled using restricted cubic splines in a multivariable Cox proportional hazards model (see Methods for details). Grayscale area represents 95% CIs.

Nicolas Isaza. Journal of the American Heart Association. Long-Term Outcomes in Patients With Mixed Aortic Valve Disease and Preserved Left Ventricular Ejection Fraction, Volume: 9, Issue: 7, DOI: (10.1161/JAHA.119.014591)

TAVI AND MAVD

Abstract

Objectives

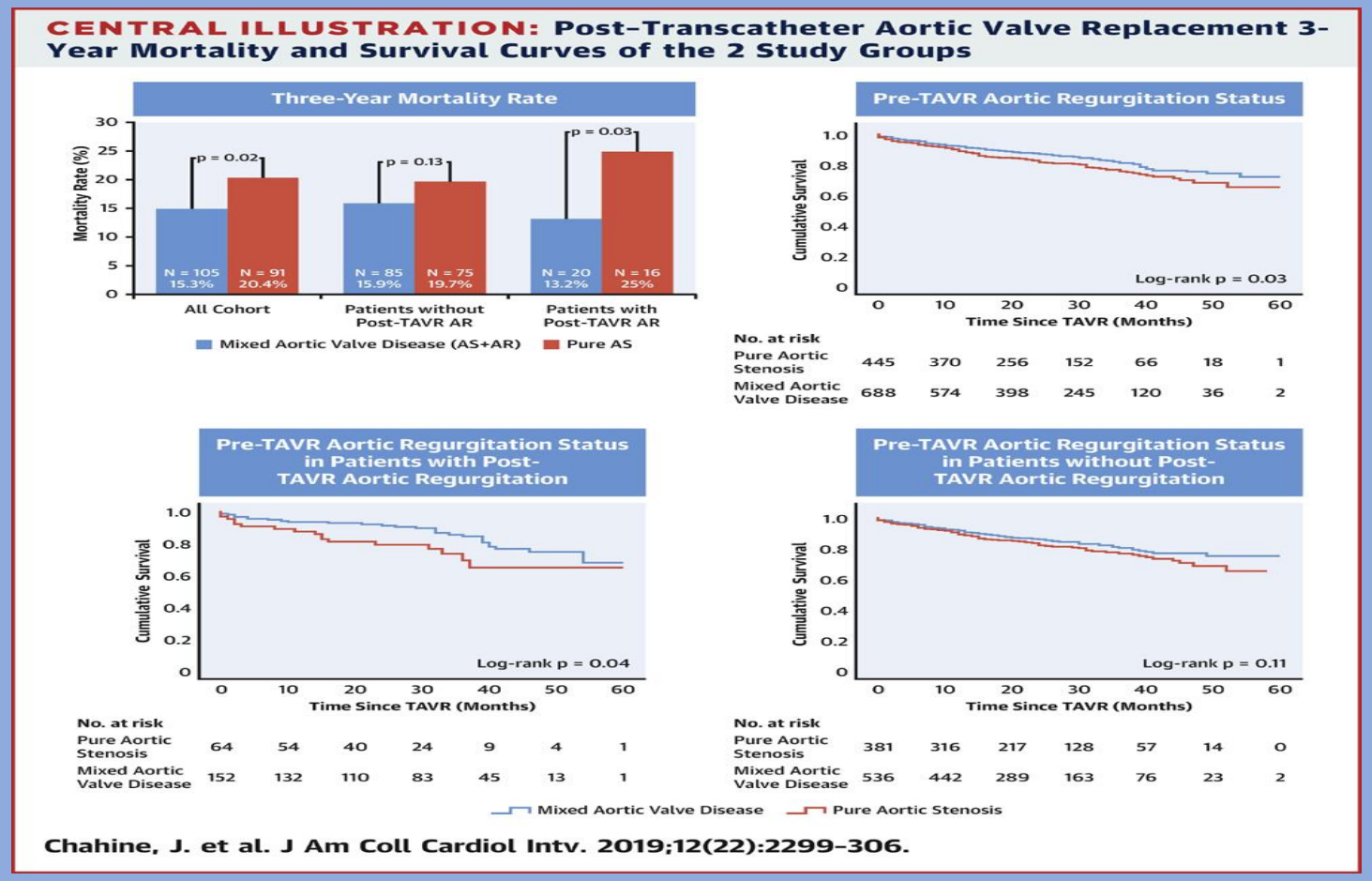
The aim of this study was to compare outcomes after transcatheter aortic valve replacement (TAVR) in patients with pure aortic stenosis (AS) (i.e., no or trivial associated aortic regurgitation [AR]) with those in patients with AS and mild or more severe AR (i.e., mixed aortic valve disease [MAVD]).

Background

TAVR is indicated in treating patients with severe AS. Limited data exist regarding the outcomes of TAVR in patients with MAVD.

Methods

A total of 1,133 patients who underwent TAVR between January 2014 and December 2017 were included. The primary outcome was all-cause mortality. The comparison was adjusted to account for post-TAVR AR development in both groups. The secondary outcomes included composite endpoints of early safety and clinical efficacy as specified in the Valve Academic Research Consortium-2 criteria. Variables were compared using Mann-Whitney, chi-square, and Fisher exact tests, while Kaplan-Meier analyses were used to compare survival.



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Conclusions

Patients with MAVD who underwent TAVR had better survival compared with patients with pure AS. This is explained by the better survival of patients with MAVD who developed post-TAVR AR, likely due to left ventricular adaptation to AR.

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Transcatheter aortic valve replacement outcomes in mixed aortic valve disease compared to predominant aortic stenosis

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Results

A total of 622 patients were enrolled. Mean age was 81 ± 8.9 years, and 263 (42.3%) were female. Median follow-up duration was 1.5 years. One hundred and sixteen patients (18.6%) had MAVD. Central or paravalvular leak was higher in MAVD patients post-TAVR (15.5% vs 6.7%, P = 0.004). Device success and VARC-2 in-hospital complications were similar between the two groups. The cumulative probability of survival at 3 years was 71.3% in MAVD patients vs. 62.6% in PAS patients (Log-Rank P = 0.024). In a multi-variant logistic regression analysis, MAVD was an independent negative predictor of all-cause mortality (HR = 0.53, 95% CI 0.3–0.89, P = 0.015).

Conclusions

A significant number of patients referred for TAVR have MAVD disease. Despite higher rates of paravalvular regurgitation, all-cause mortality at mid-term was lower in patients with MAVD compared with those with PAS. Our results show the safety and efficacy of TAVR in MAVD patients.

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Comparative Outcomes of TAVR in Mixed Aortic Valve Disease and Aortic Stenosis: A Meta-analysis

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Abstract

Go to:

Introduction

Transcatheter aortic valve replacement (TAVR) has become a suitable alternative to surgical aortic valve replacement (SAVR) for the treatment of symptomatic severe aortic stenosis (AS). A high proportion of patients with AS have mixed aortic valve disease (MAVD) with mild or more concurrent aortic regurgitation (AR). Differential outcomes of TAVR among patients with AS and MAVD have not been well characterized. We compared 1-year mortalities following TAVR among patients with MAVD and AS.

Methods

We conducted a meta-analysis of studies published in PubMed/Medline. The primary outcome was 1-year all-cause mortality following TAVR among patients with MAVD vs. AS. Secondary endpoints were: (1) incidence of AR within 30 days following TAVR (post TAVR AR); and (2) 1-year all-cause mortality within each group stratified according to severity of post TAVR AR.

Results

Nine studies involving 9505 participants were included in the analysis. At 1 year following TAVR, mortality was lower in MAVD than in AS; HR 0.89, 95% CI 0.81–0.98. The mortality advantage increased when pre-TAVR AR was moderate or more; HR 0.84, 95% CI 0.72–0.99. The mortality advantage was attenuated after correction for publication bias. There was a higher risk of post TAVR AR in the MAVD group; OR 1.51, 95% CI 1.20–1.90 but the impact on mortality of moderate vs. mild post TAVR AR was greater among patients with AS than in patients with MAVD HR 1.67 95% CI 0.89–3.14 vs. 0.93 95% CI 0.47–1.85.

Conclusions

Patients with MAVD have similar or improved survival 1 year after TAVR compared to those with AS.

Impact of Transcatheter Aortic Valve Replacement on Cardiac Reverse Remodeling and Prognosis in Mixed Aortic Valve Disease

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Other version(s) of this article

Abstract

Background

The management of mixed aortic valve disease (MAVD), defined as the concomitant presence of aortic stenosis (AS) and aortic regurgitation, remains a clinical challenging. The present study assessed the impact of transcatheter aortic valve replacement (TAVR) on cardiac geometry and prognosis in patients with MAVD.

Methods and Results

A retrospective multicenter TAVR registry was conducted, including patients who underwent TAVR for severe symptomatic AS between January 2015 and March 2019. Patients were subdivided into 2 groups according to concomitant presence of moderate or more severe aortic regurgitation as the MAVD group, and with mild or less severe aortic regurgitation as the isolated AS group. The primary outcome was a composite of cardiovascular death and rehospitalization due to cardiovascular causes. A total of 1742 patients (isolated AS, 1522 patients; MAVD, 220 patients) were included (84.0±5.2 years). Although MAVD exhibited significantly larger left ventricular volumes and higher left ventricular mass index at the TAVR procedure than isolated AS (respectively, $P<0.001$), MAVD showed a greater improvement of left ventricular volumes and left ventricular mass index after TAVR (respectively, $P\leq0.001$). During a median follow-up of 747 days, 301 patients achieved the primary event. The prognosis post-TAVR was comparable between the 2 groups (log-rank $P=0.65$). Even after adjustment using propensity score matching to reduce the potential bias between the 2 groups, similar results were obtained for the entire cohort.

Conclusions

Despite more advanced cardiac remodeling in MAVD at the time of TAVR compared with isolated AS, a greater improvement of cardiac reverse remodeling was found in MAVD, and the prognosis following TAVR was comparable between the 2 groups.

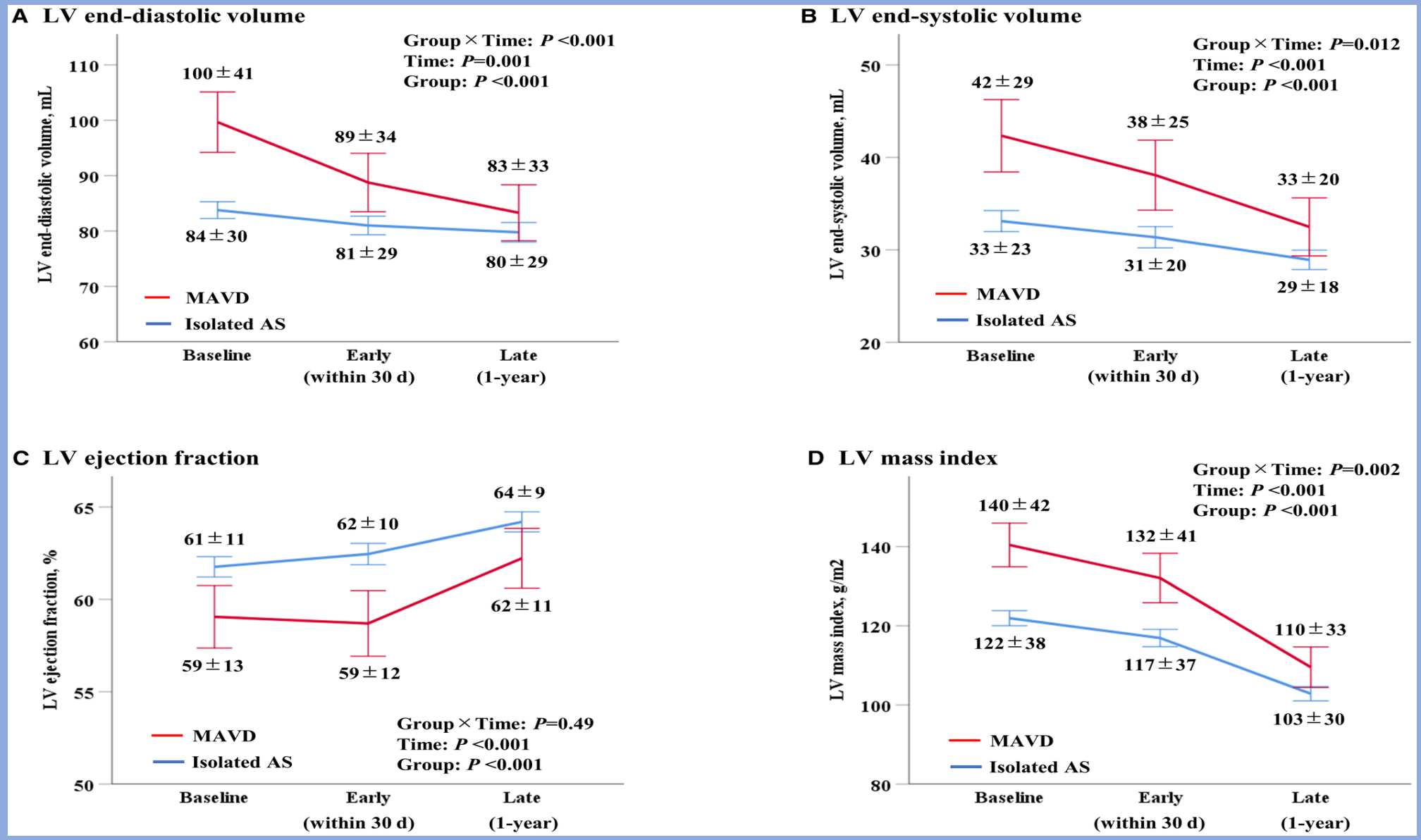


Figure 4. Consequence changes of cardiac geometry following TAVR in the entire cohort.

Consequence changes of cardiac geometry following TAVR in LV end-diastolic volume (**A**), LV end-systolic volume (**B**), LV ejection fraction (**C**), and LV mass index (**D**). Bars indicate 95% CIs. AS indicates aortic stenosis; LV, left ventricular; MAVD, mixed aortic valve disease; and TAVR, transcatheter aortic valve replacement.

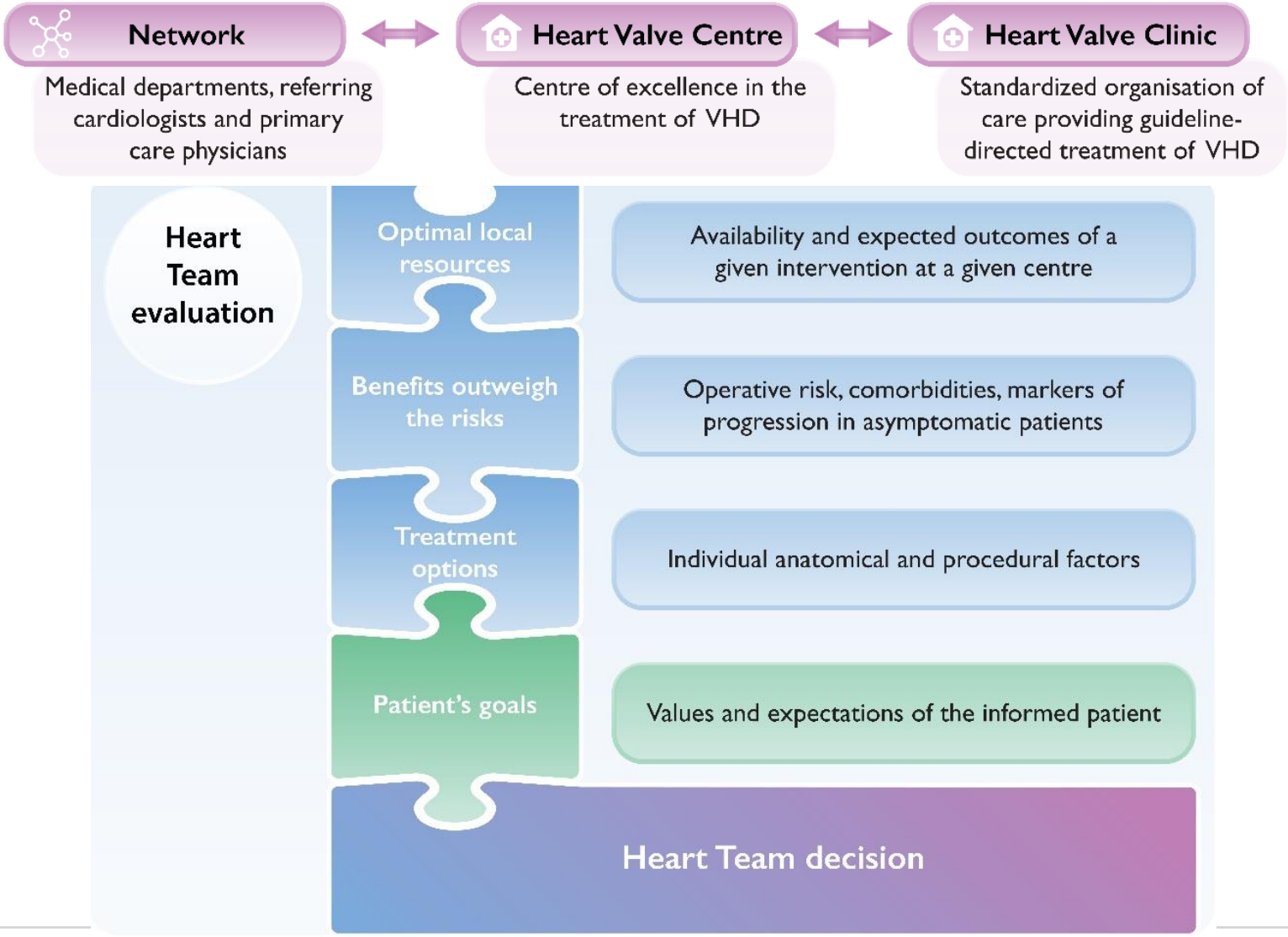
TAKE HOME MESSAGES(1)

- MAVD is a special lesion more often degenerative
- Percentages of the lesion seem to elevate as survival rates of elderly people elevate
- Physical history and pathophysiology are different than isolated lesions
- Echocardiographic studies, MDCT and MRI are used to approach the disease

TAKE HOME MESSAGES(2)

- Special attention is needed in:
  - Asymptomatic patients
  - Use of biomarkers
  - Pitfalls in quantifying the lesions
- Prognosis is generally poor especially if the conservative route is chosen
- TAVI seems to offer better prognosis in these patients – we shouldn't forget the existence of comorbidities
- Further evaluation, studies and research are needed for the physicians to cope better with the disease

Patient-centred evaluation for intervention



2021 ESC/EACTS Guidelines for the management of valvular heart disease
(European Heart Journal; 2021 – doi: 10.1093/eurheartj/ehab395; European Journal of Cardio-Thoracic Surgery; 2021 – doi: 10.1093/ejcts/ezab389)

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