*Guidelines and Challenges in perspective*

# The 10 most powerful new commandments in managing valvular heart disease

Bernard Cosyns, MD, PhD, FESC, FEACVI


CHVZ- ICMI

*Disclosure: Educational grant Abbott*

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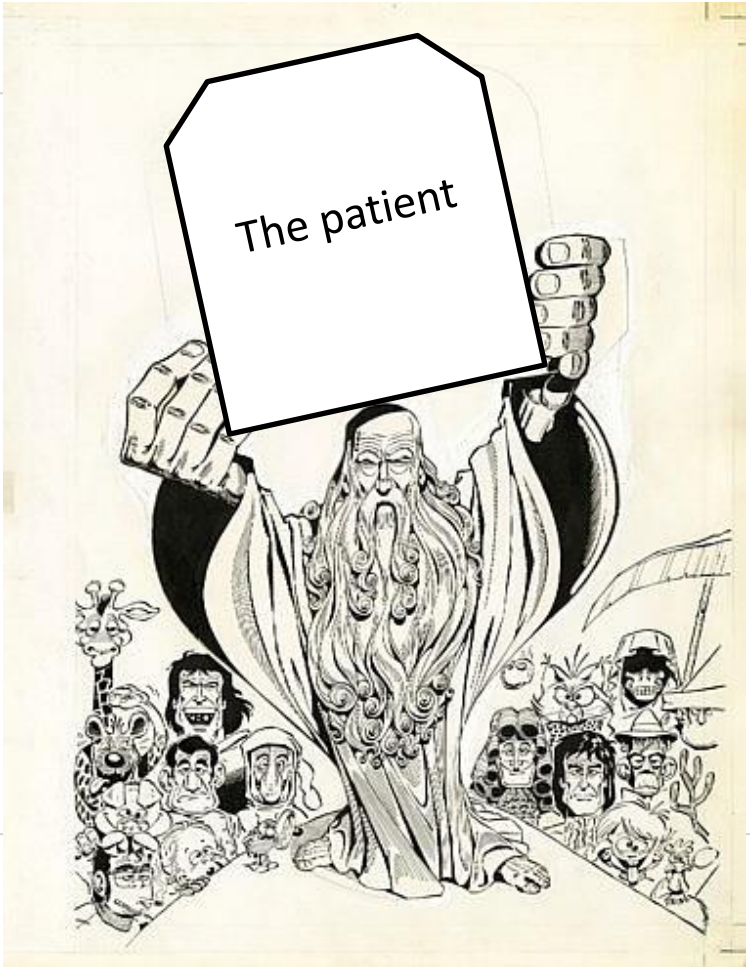
# N°1




*Adapted from Gotlib, Ragnagna T2*

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# The patient centered care and shared DM

## 2025 ESC/EACTS Guidelines for the management of valvular heart disease

**Developed by the task force for the management of valvular heart disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)**


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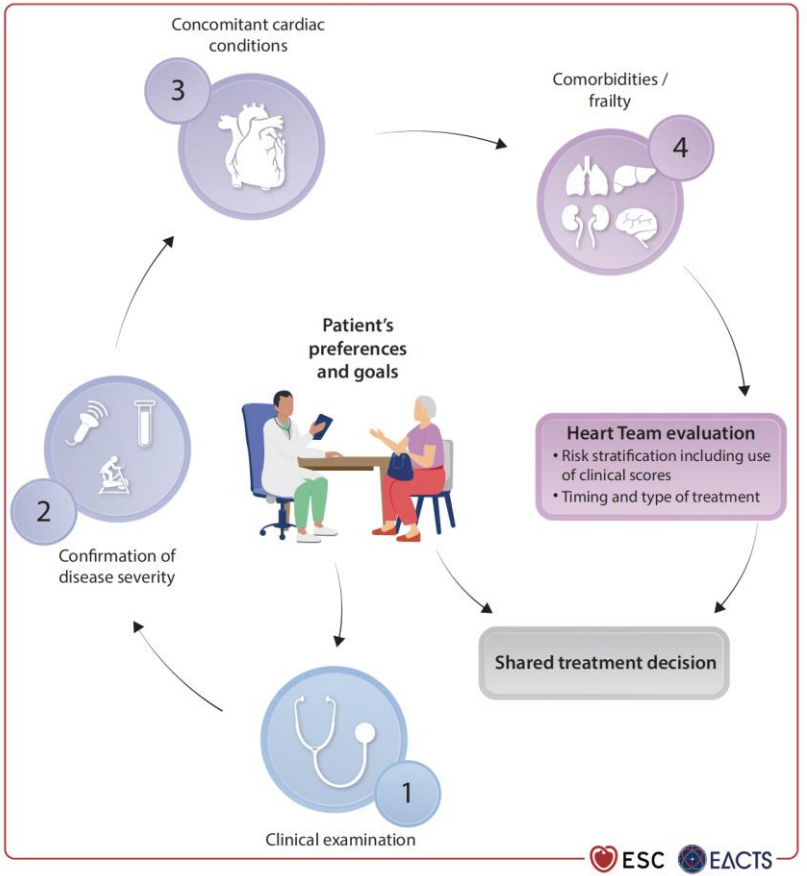
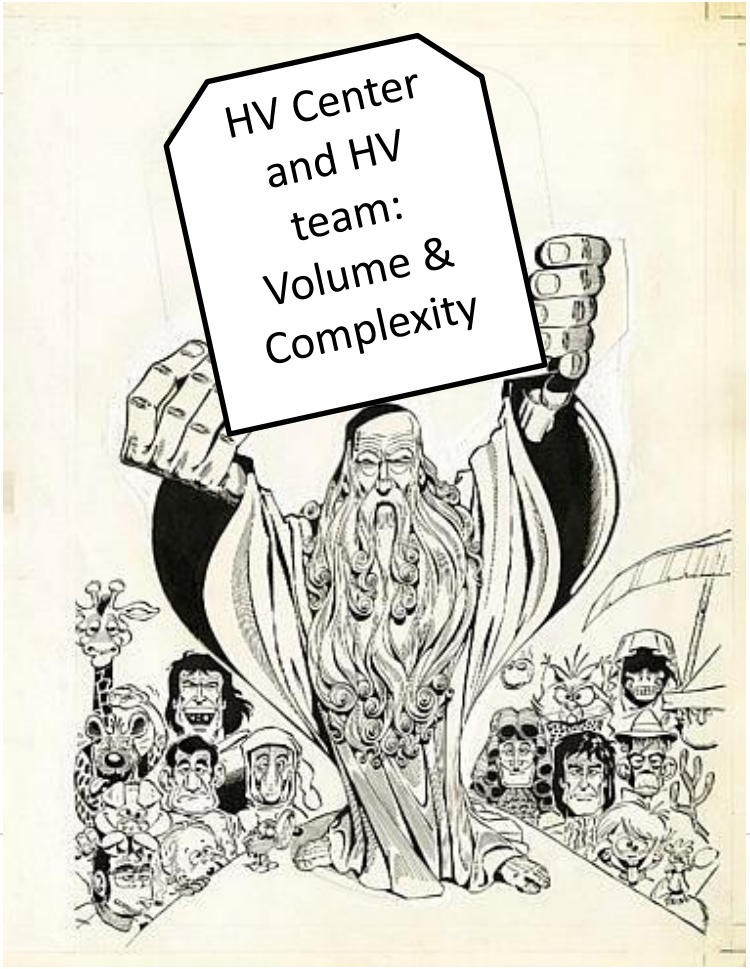


# N°2

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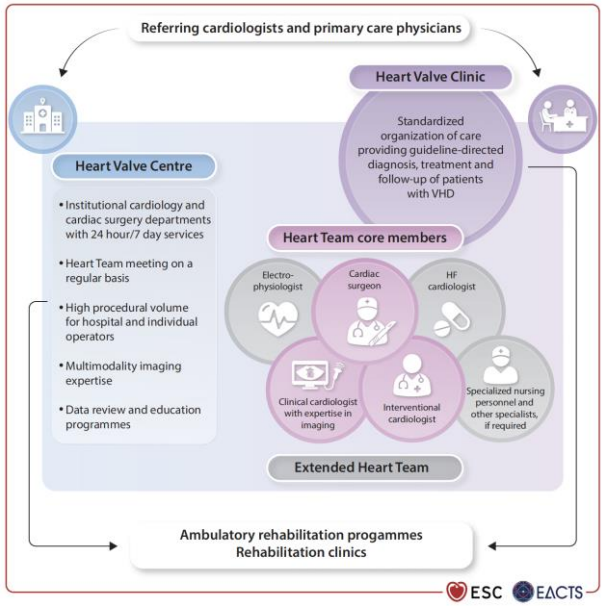
# Heart Valve Centre : high volumes for complex interventions

| Transcatheter interventions | Surgical interventions |
|---|---|
| • Transfemoral TAVI in patients with high-risk features:<br>  ○ Low coronary ostia<br>  ○ Difficult femoral anatomy<br>  ○ Bicuspid valve<br>  ○ Severe calcification protruding into the LVOT<br>  ○ Severe LV and/or RV impairment<br>  ○ Pure AV regurgitation<br>  ○ Multiple valve disease<br>  ○ Complex coronary artery disease<br>  ○ Severe extracardiac disease (e.g. renal failure, PH)<br>• Non-transfemoral TAVI<br>• Valve-in-valve (including TAV-in-TAV)<br>• All leaflet modification procedures (BASILICA, LAMPOON etc.)<br>• PVL closure<br>• Complex M-TEER<br>• Redo M-TEER procedures<br>• Tricuspid or mitral valve-in-ring or valve-in-valve, valve-in-MAC<br>• TMVI<br>• All tricuspid procedures | • High-risk procedures (especially in patients with LV and/or RV impairment)<br>• Redo procedures<br>• Minimally invasive and robotic valve surgery<br>• Complex MV repair<br>  ○ Barlow disease<br>  ○ Anterior or bileaflet prolapse<br>  ○ High risk of SAM<br>  ○ Severe MAC<br>• AV repair<br>• Ross procedure<br>• Valve surgery combined with complex surgery of the aorta<br>• Endocarditis surgery |

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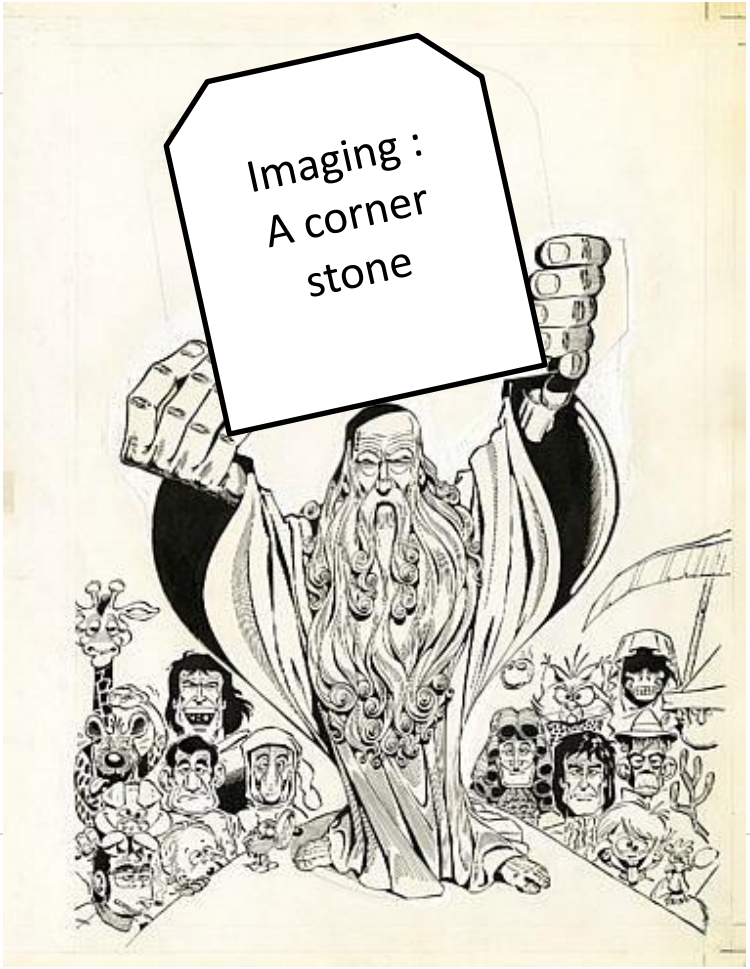
# N°3

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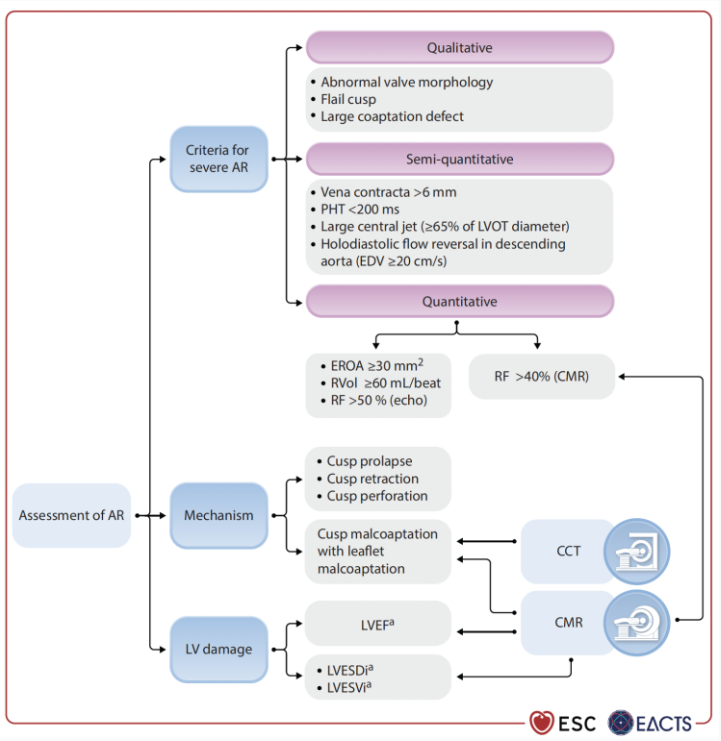
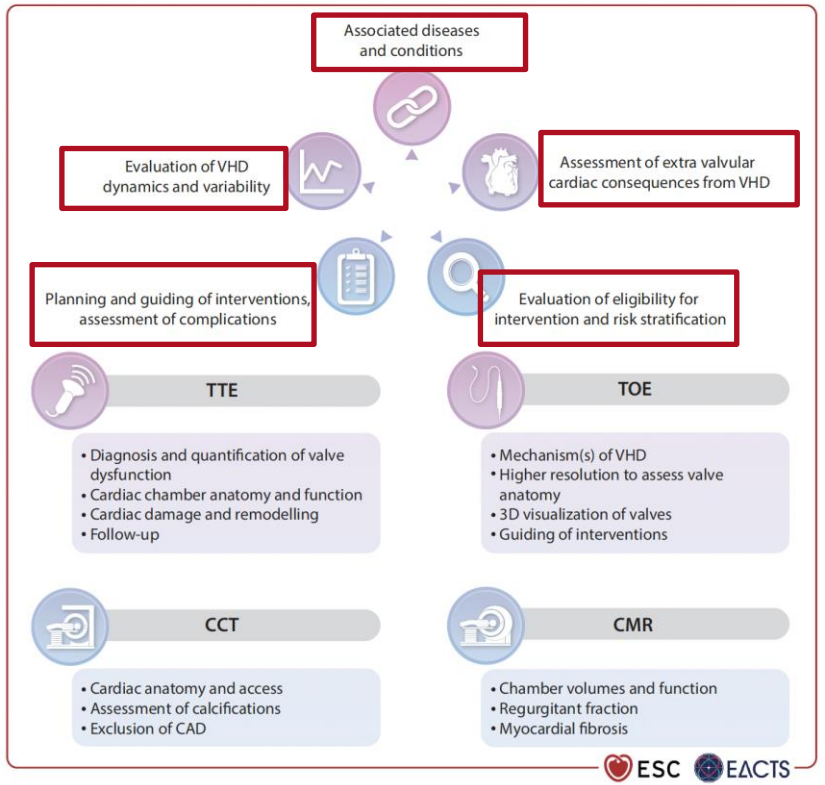
# Imaging : an holistic and integrative approach

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# New an revised recommendations

## Imaging : Prominent role of CCTA

| Recommendations | Class | Level |
|---|---|---|
| ***Diagnosis of coronary artery disease*** | | |
| Omission of invasive coronary angiography should be considered in TAVI candidates, if procedural planning CCTA is of sufficient quality to rule out significant CAD. | IIa | B |

NEW

| ***Management of coronary artery disease in patients with valvular heart disease*** | | | | | |
|---|---|---|---|---|---|
| CCTA should be considered as an alternative to coronary angiography before valve surgery in patients with severe VHD and low probability of CAD. | IIa | C | CCTA is recommended before valve intervention in patients with moderate or lower (≤50%) pre-test likelihood of obstructive CAD. | I | B |

# N°4


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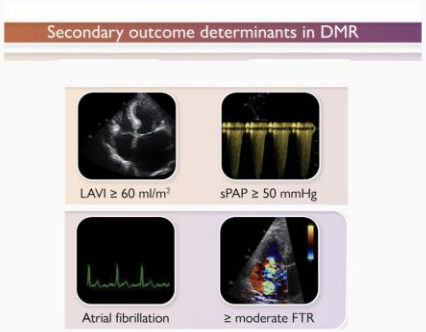
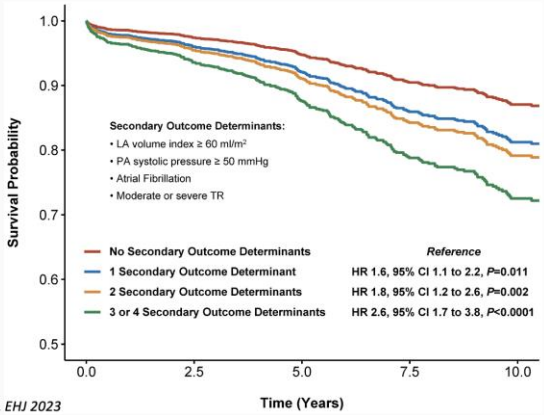
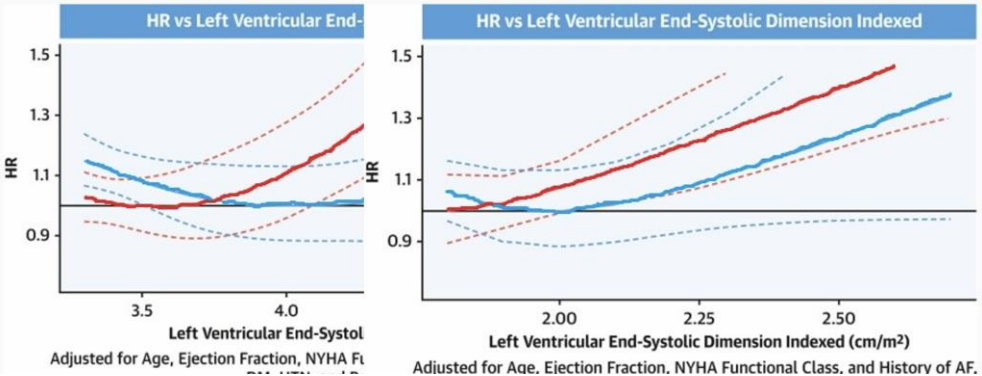
# Recommendations PMR

## Management




Butcher SC et al. EHJ 2023




| Recommendations | Class[a] | Level[b] |
|---|---|---|
| MV surgery is recommended in asymptomatic patients with severe PMR and LV dysfunction (LVESD ≥40 mm or LVESDi ≥20 mm/m² or LVEF ≤60%).[522,544,545] | I | B |
| Surgical MV repair is recommended in low-risk asymptomatic patients with severe PMR without LV dysfunction (LVESD <40 mm, LVESDi <20 mm/m², and LVEF >60%) when a durable result is likely, if at least three of the following criteria are fulfilled:[517,547,562–564]<br>• AF<br>• SPAP at rest >50 mmHg<br>• LA dilatation (LAVI ≥60 mL/m² or LA diameter ≥55 mm)<br>• Concomitant secondary TR ≥ moderate. | I | B |
| MV surgery should be considered in asymptomatic patients with severe PMR without LV dysfunction (LVESD <40 mm, LVESDi <20 mm/m², and LVEF >60%) in the presence of PH (SPAP at rest >50 mmHg), or AF secondary to MR.[517,518,562,565] | IIa | B |

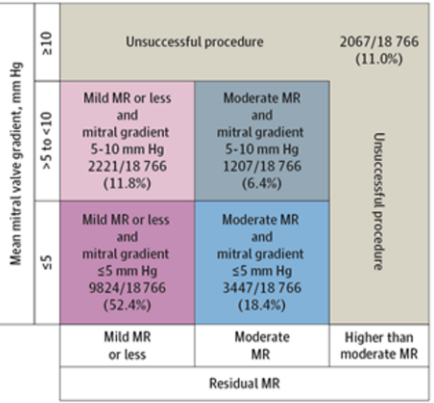
NEW

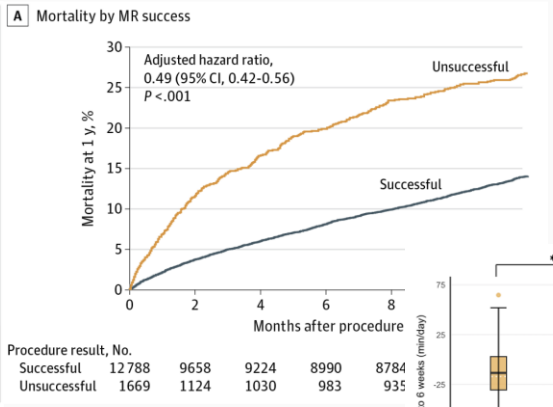
REVISED

# Recommendations PMR

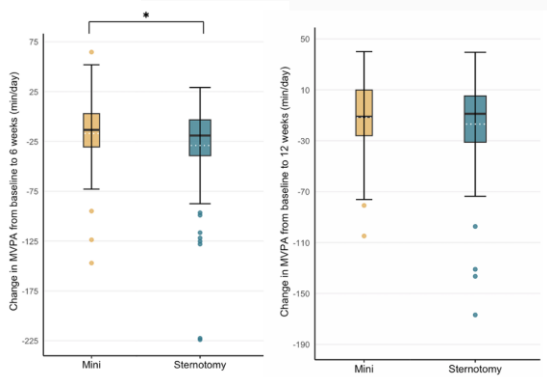
## Management

| | | | |
|---|---|---|---|
| REV. | TEER should be considered in symptomatic patients with severe PMR who are anatomically suitable and at high surgical risk according to the Heart Team. | IIa | B |
| NEW | Minimally invasive MV surgery may be considered at experienced centres to reduce the length of stay and accelerate recovery. | IIb | B |




*Makkar RR et al JAMA 2023*

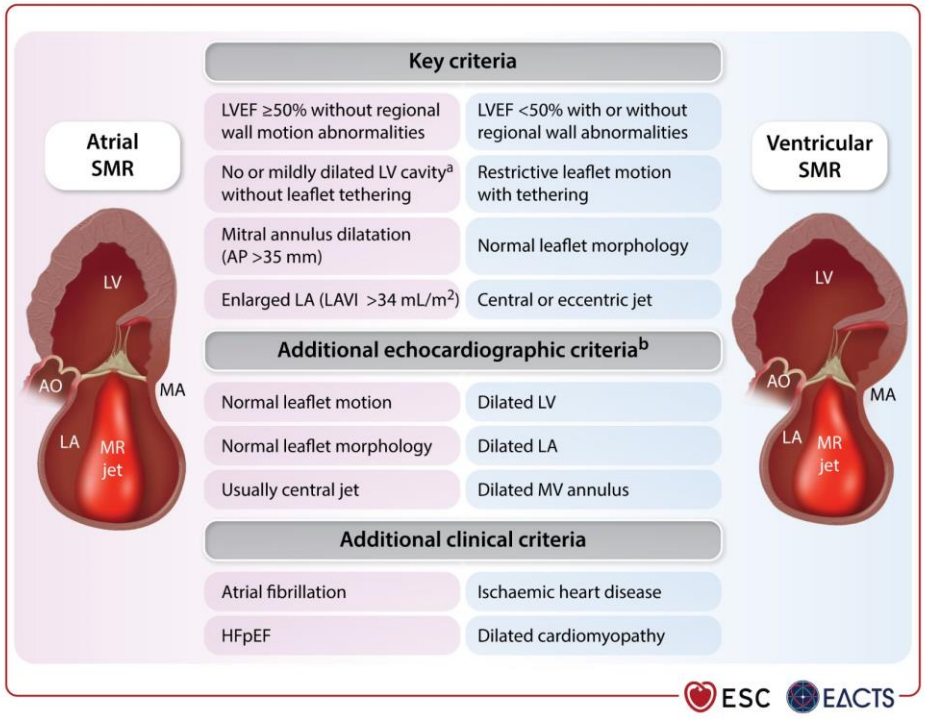


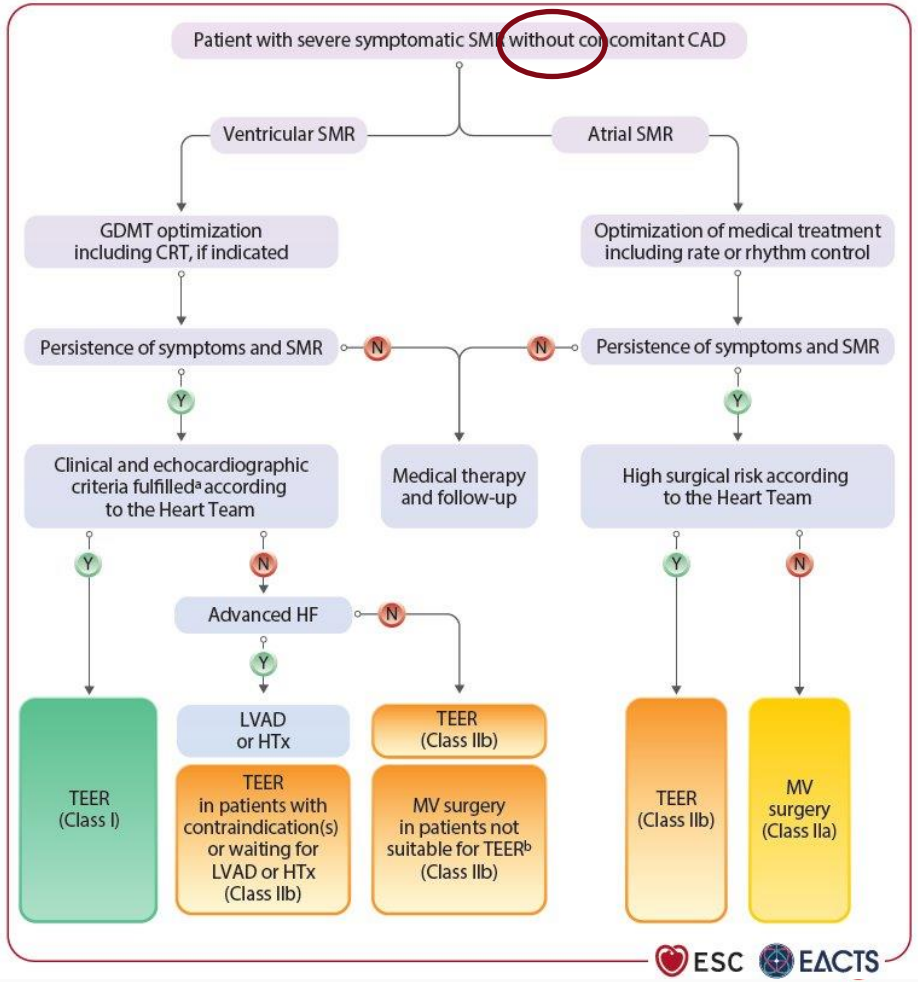

| | Mini (N=166) | Sternotomy (N=163) | |
|---|---|---|---|
| Hospital LOS in days (median (IQR)) | 5 (3) | 6 (3) | *p-value*: p=0.003 |
| Stay in intensive care (hours)-median (IQR) | 23.03 (21.6) | 21.7 (9.2) | |
| Early discharge (<=4 days post-surgery) | 55 (33.1) | 25 (15.3) | *Odds Ratio (95%CI); p-value* 2.81 (1.6,4.94); <0.001 |
| DAOH at 30 days after surgery (mean±SD; n) | 23.57±4.45; 161 | 22.38±5.13; 147 | *Difference (95%CI); p-value* 1.05 (1.01,1.11); 0.03 |
| DAOH at 90 days after surgery (mean±SD; n) | 82.7±9.96; 161 | 80.52±14.17; 147 | *Difference (95%CI); p-value* 1.03 (1,1.05); 0.03 |

*Akowuah EF et al JAMA 2023*

# Phenotypes of SMR

## Different management




A LV end-diastolic dimension of <56 mm in females and <63 mm in males; indexed LV end-diastolic volume <71 mL/m2 (in women) or <79 mL/m2 (in men).
B Additional echocardiographic criteria for atrial SMR may no longer be fulfilled in advanced stages.

# Recommendations VSMR

## Management

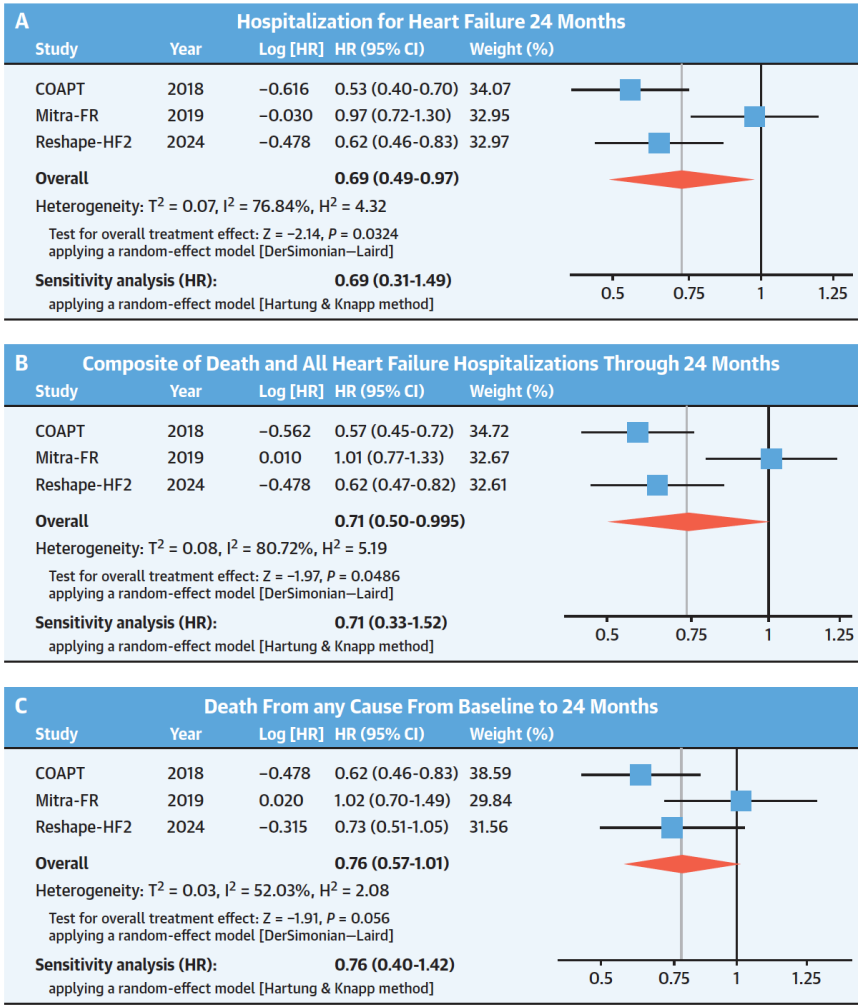
### Without CAD

| Recommendations | Class | Level |
|---|---|---|
| TEER is recommended to reduce HF hospitalizations and improve quality of life in haemodynamically stable, symptomatic patients with impaired LVEF (<50%) and persistent severe ventricular SMR, despite optimized GDMT and CRT (if indicated), fulfilling specific clinical and echocardiographic criteria. | I | A |

| Recommendations | Class | Level |
|---|---|---|
| TEER may be considered for symptom improvement in selected symptomatic patients with severe ventricular SMR not fulfilling the specific clinical and echocardiographic criteria, after careful evaluation of LVAD or HTx. | IIb | B |
| MV surgery may be considered in symptomatic patients with severe ventricular SMR without advanced HF who are not suitable for TEER. | IIb | C |

### With CAD

| Recommendations | Class | Level |
|---|---|---|
| MV surgery is recommended in patients with severe ventricular SMR undergoing CABG. | I | B |
| MV surgery may be considered in patients with moderate SMR undergoing CABG. | IIb | B |
| PCI followed by TEER after re-evaluation of MR may be considered in symptomatic patients with chronic severe ventricular SMR and non-complex CAD. | IIb | C |



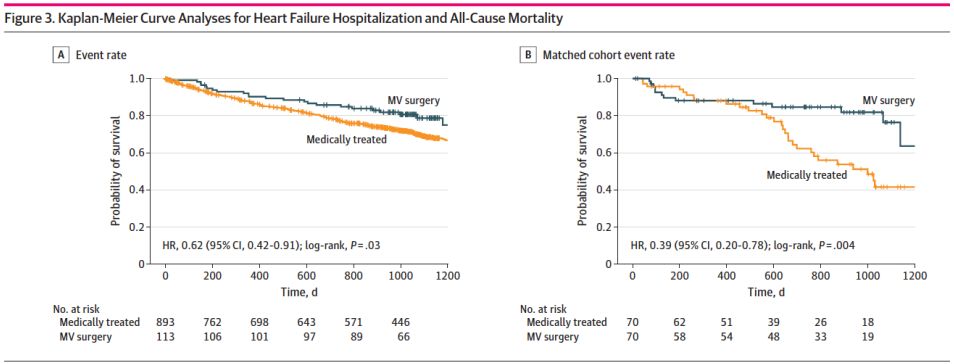

*Anker MS, et al. J Am Coll Cardiol. 2024 Dec 10;84(24):2364-2368.*

# Recommendations ASMR

## Management

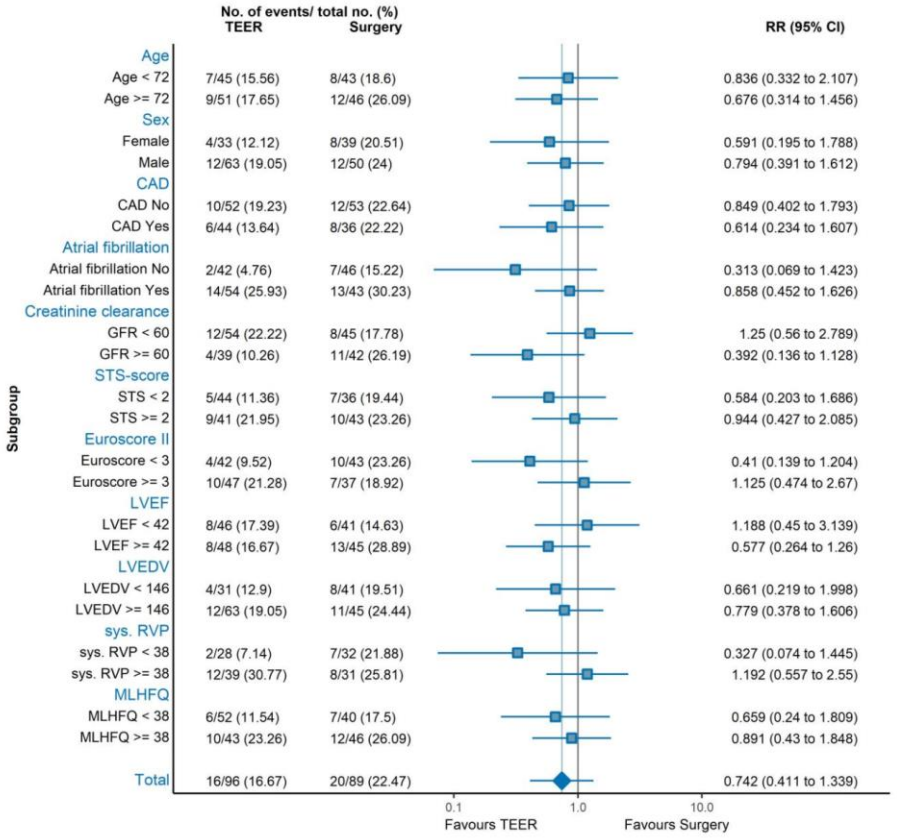
| Recommendations | Class | Level |
|---|---|---|
| MV surgery, surgical AF ablation, if indicated, and LAAO should be considered in symptomatic patients with severe atrial SMR under optimal medical therapy. | IIa | B |
| TEER may be considered in symptomatic patients with severe atrial SMR not eligible for surgery after optimization of medical therapy including rhythm control, when appropriate. | IIb | B |

## REVEAL-AFMR registry



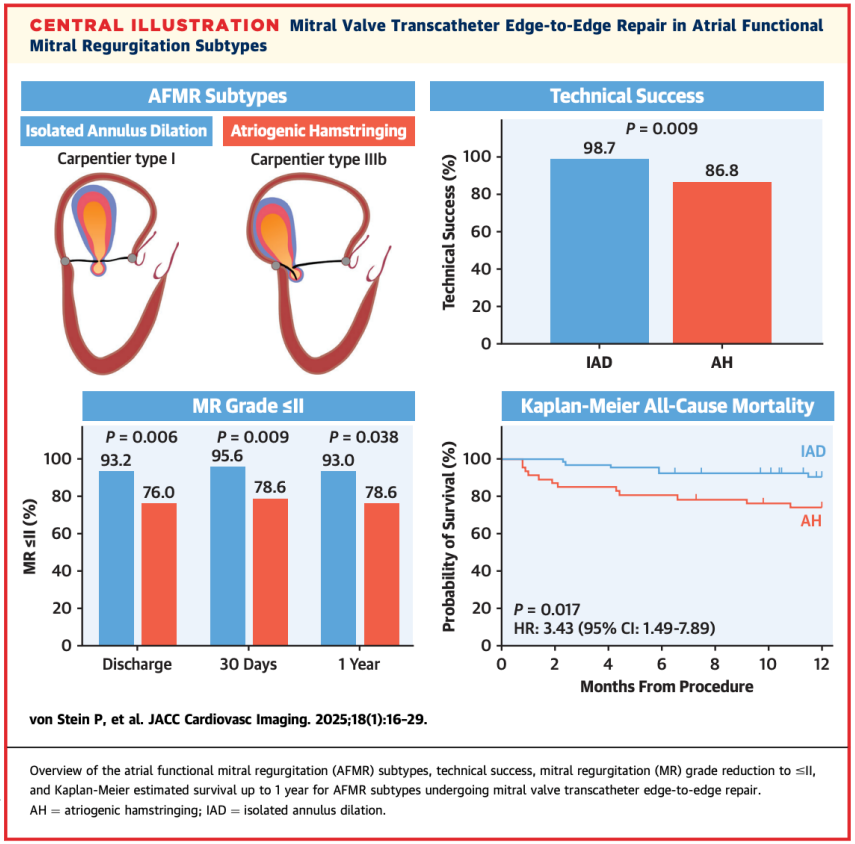

*Kagiyama et al. JAMA Netw Open. 2024;7(8):e2428032.*

## MATTERHORN



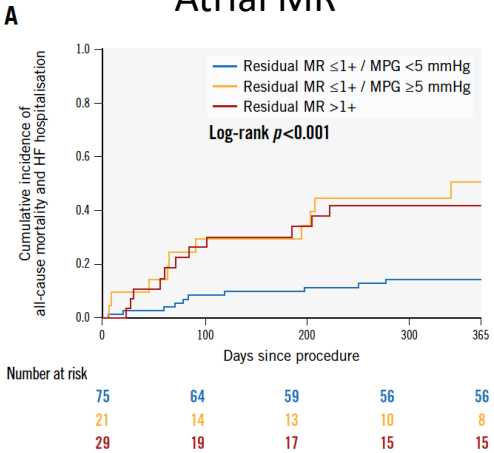
# Recommendations ASMR

## TEER

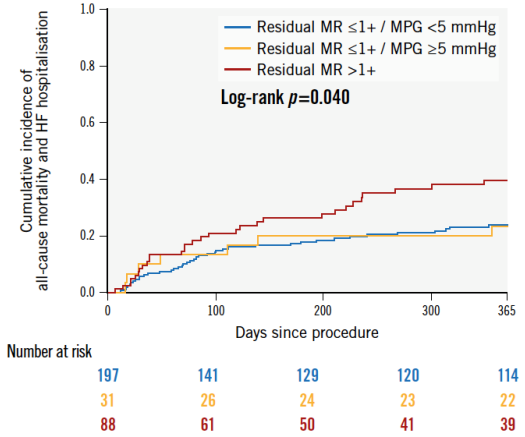



Overview of the atrial functional mitral regurgitation (AFMR) subtypes, technical success, mitral regurgitation (MR) grade reduction to ≤II, and Kaplan-Meier estimated survival up to 1 year for AFMR subtypes undergoing mitral valve transcatheter edge-to-edge repair.
AH = atriogenic hamstringing; IAD = isolated annulus dilation.

### Atrial MR




### Ventricular MR




*Tanaka et al. EuroIntervention. 2024 Feb 19;20(4):e250-e260.*

# N°5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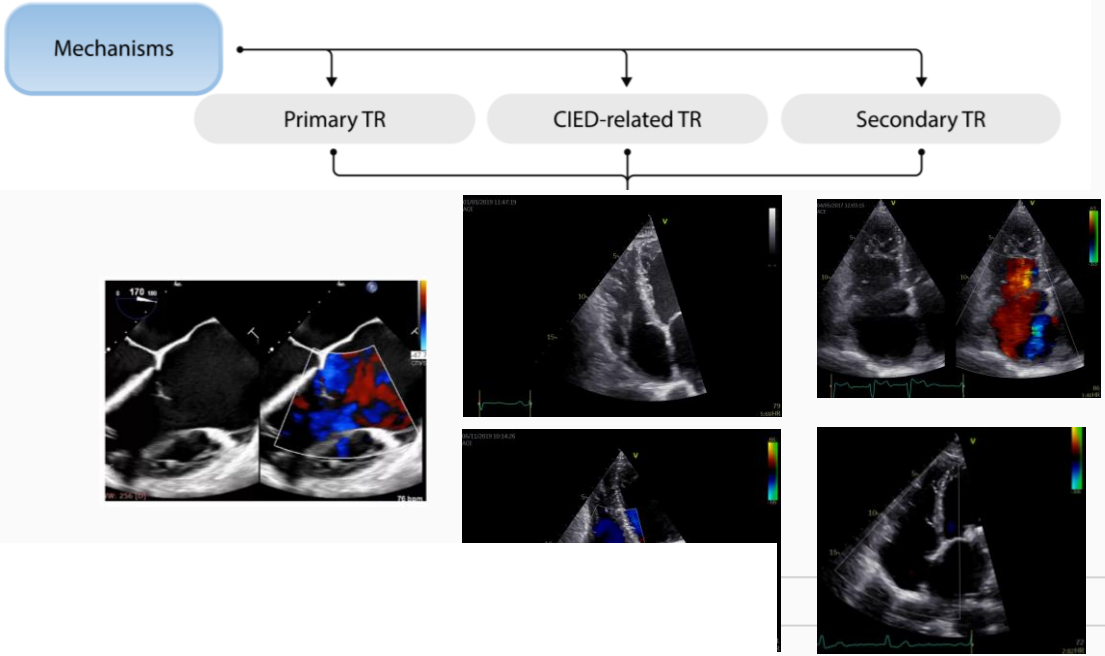
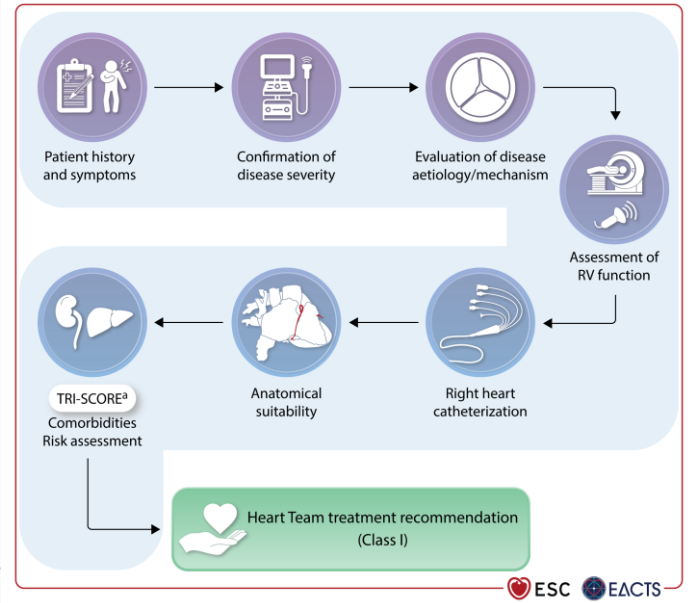
# Management of patients with tricuspid regurgitation (TR)

| Recommendations | Class | Level |
|---|---|---|
| Careful evaluation of TR aetiology, stage of the disease (i.e. degree of TR severity, RV and LV dysfunction, and PH), patient operative risk, and likelihood of recovery by a multidisciplinary Heart Team is recommended in patients with severe TR prior to intervention. | I | C |



# Recommendations on indications for intervention in tricuspid regurgitation

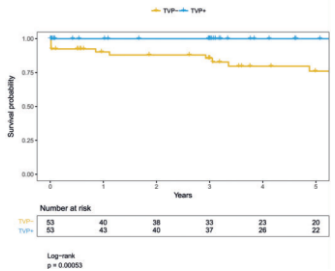
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

## Concomitant Tricuspid Repair in Patients with Degenerative Mitral Regurgitation

Table 2. Primary End Point.*

| Composite End Point | Mitral-Valve Surgery Alone (N=203) | Mitral-Valve Surgery plus TA (N=198) | Relative Risk (95% CI) | P Value |
|---|---|---|---|---|
| Imputed calculation — % (95% CI) | 10.2 (6.0–14.5) | 3.9 (1.1–6.7) | 0.37 (0.16–0.86) | 0.02 |
| Observed calculation — no./total no. (%) | 20/188 (10.6) | 7/185 (3.8) | 0.35 (0.15–0.81) | — |
| Reoperation for tricuspid regurgitation | 0 | 0 | — | — |
| Progression of tricuspid regurgitation | 11/179 (6.1) | 1/179 (0.6) | 0.09 (0.01–0.69) | — |
| Death | 9/199 (4.5) | 6/190 (3.2) | 0.69 (0.25–1.88) | — |



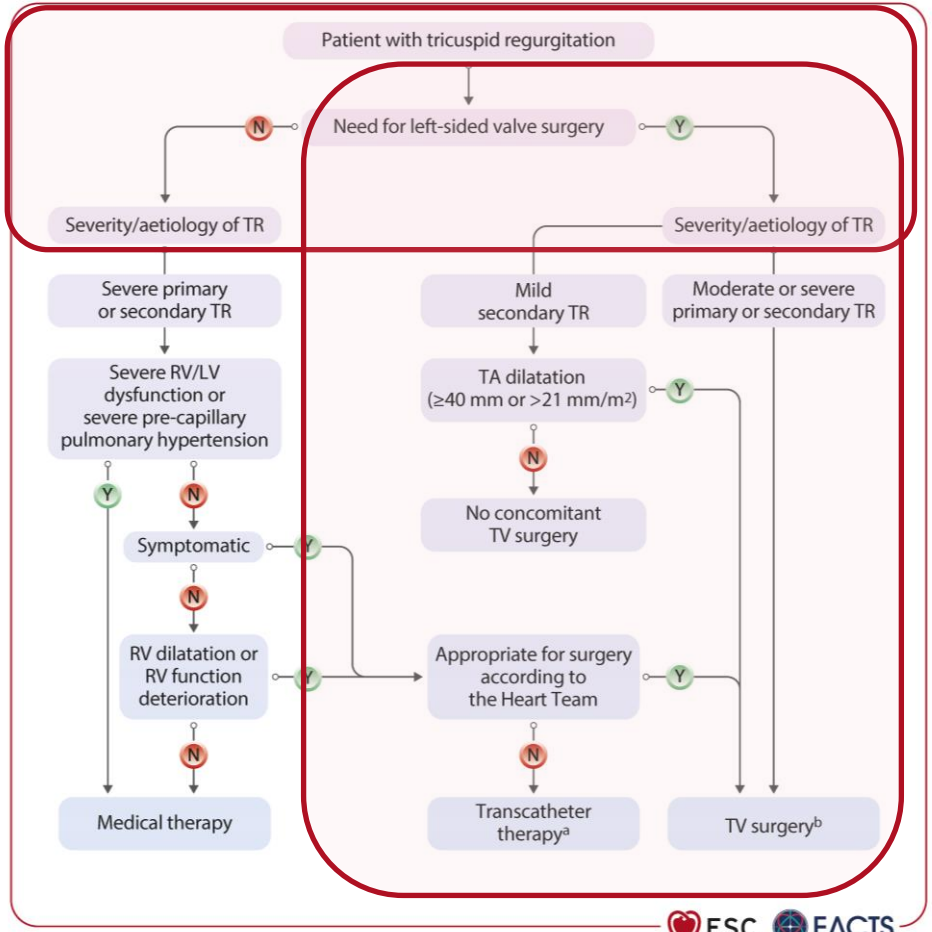

*Gammie et al, NEJM 2022*

*Ailawadi et al, J Thorac Cardiovasc Surg 2022*

*Pettinari et al, Eur J Cardiothorac Surg 2019*

New

| Recommendations | Class | Level |
|---|---|---|
| **Patients with tricuspid regurgitation and left-sided valvular heart disease requiring surgery** | | |
| Concomitant TV surgery is recommended in patients with severe primary or secondary TR. | I | B |
| Concomitant TV repair should be considered in patients with moderate primary or secondary TR, to avoid progression of TR and RV remodelling. | IIa | B |
| Concomitant TV repair may be considered in selected patients with mild secondary TR and tricuspid annulus dilatation (≥40 mm or >21 mm/m$^2$), to avoid progression of TR and RV remodelling. | IIb | B |

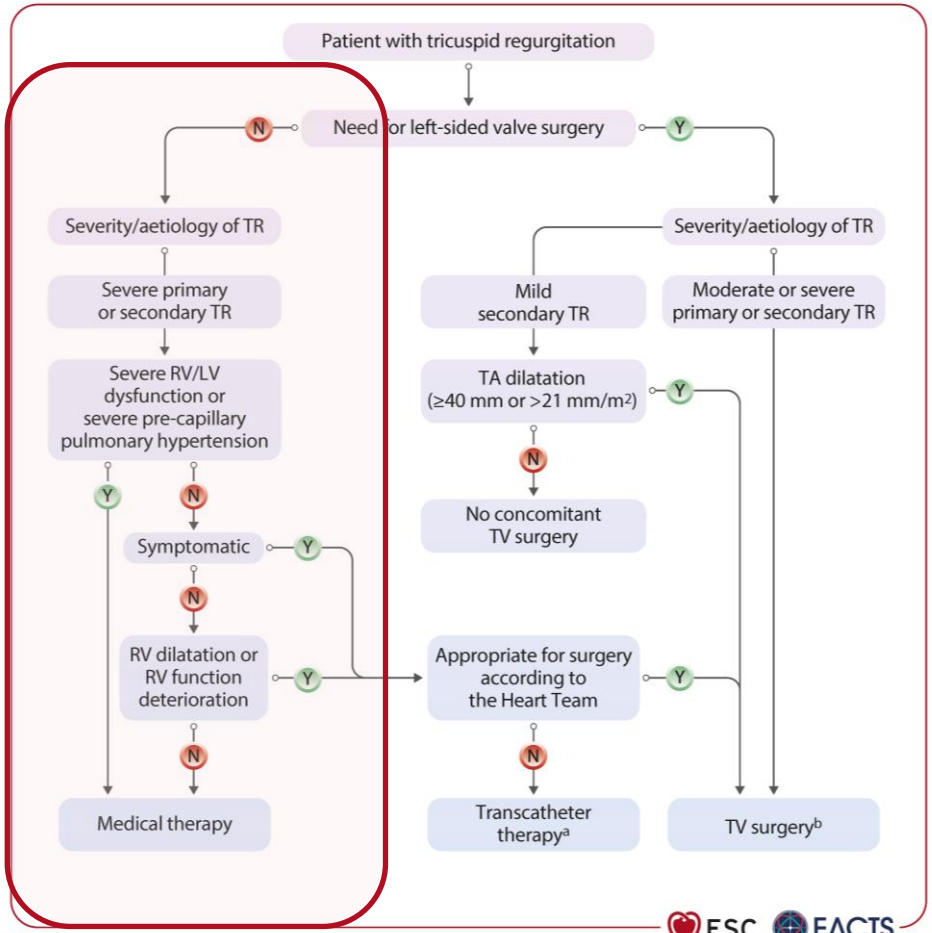



ESC EACTS

# Recommendations on indications for intervention in tricuspid regurgitation

**Cardiovascular changes**

| RV dilatation[a] | RV dysfunction[a] | Pulmonary pressures |
|---|---|---|
| **RV basal diameter index:** >24 mm/m² | **RV dysfunction:** TAPSE <17 mm; RV TDI s' <10 cm/s; RV FWS <23%; RV GLS <21%; 3D RV EF <50%; FAC ≤35% | **Pre-capillary PH:** mPAP >20 mmHg; PAWP ≤15 mmHg; PVR >2 WU |
| **RV mid-diameter index:** >21 mm/m² | | |
| **Tricuspid annulus index:** >21 mm/m² | **Severe RV dysfunction:** TAPSE <10 mm; RV TDI s' <6 cm/s; RV FWS <11%; RV GLS <9%; 3D RV EF <35%; FAC ≤22% | **Post-capillary PH:** mPAP >20 mmHg; PAWP >15 mmHg; PVR ≤2 WU |
| **RV end-diastolic volume index:** >95 mL/m² | | |
| **RV end-systolic volume index:** >37 mL/m² | | **Severe PH:** PVR >5 WU; mPAP >35 mmHg |




*TVARC, Hahn et al, Eur Heart J 2023*

*Mukherjee et al, JASE 2025*

# Recommendations on indications for intervention in tricuspid regurgitation

JAMA | Original Investigation

Transcatheter Edge-to-Edge Repair for Severe Isolated Tricuspid Regurgitation
The Tri.Fr Randomized Clinical Trial

The NEW ENGLAND JOURNAL of MEDICINE
ESTABLISHED IN 1812 MAY 18, 2023 VOL. 388 NO. 20

Transcatheter Repair for Patients with Tricuspid Regurgitation

Paul Sorajja, M.D., Brian Whisenant, M.D., Nadira Hamid, M.D., Hursh Naik, M.D., Raj Makkar, M.D., Peter Tadros, M.D., Matthew J. Price, M.D., Gagan Singh, M.D., Neil Fam, M.D., Saibal Kar, M.D., Jonathan G. Schwartz, M.D., Shamir Mehta, M.D., Richard Bae, M.D., Nishant Sekaran, M.D., Travis Warner, M.D., Moody Makar, M.D., George Zorn, M.D., Erin M. Spinner, Ph.D., Phillip M. Trusty, Ph.D., Raymond Benza, M.D., Ulrich Jorde, M.D., Patrick McCarthy, M.D., Vinod Thourani, M.D., Gilbert H.L. Tang, M.D., for the TRILUMINATE Pivotal Investigators*

The NEW ENGLAND JOURNAL of MEDICINE

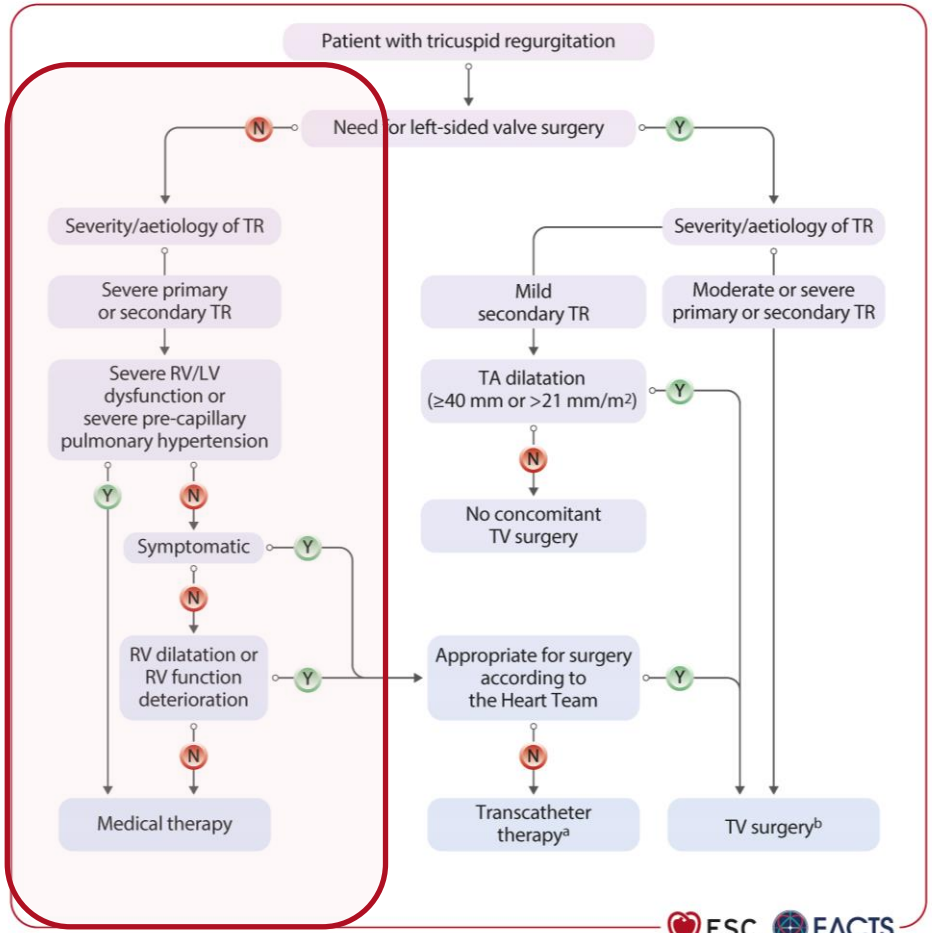
ORIGINAL ARTICLE

Transcatheter Valve Replacement in Severe Tricuspid Regurgitation

R.T. Hahn, R. Makkar, V.H. Thourani, M. Makar, R.P. Sharma, C. Haeffele, C.J. Davidson, A. Narang, B. O'Neill, J. Lee, P. Yadav, F. Zahr, S. Chadderdon, M. Eleid, S. Pislaru, R. Smith, M. Szerlip, B. Whisenant, N.K. Sekaran, S. Garcia, T. Stewart-Dehner, H. Thiele, R. Kipperman, K. Koulogiannis, D.S. Lim, D. Fowler, S. Kapadia, S.C. Harb, P.A. Grayburn, A. Sannino, M.J. Mack, M.B. Leon, P. Lurz, and S.K. Kodali, for the TRISCEND II Trial Investigators*

New

| Recommendations | Class | Level |
|---|---|---|
| **Patients with severe tricuspid regurgitation without left-sided valvular heart disease requiring surgery** | | |
| Transcatheter TV treatment should be considered to improve quality of life and RV remodelling in high-risk patients with symptomatic severe TR despite optimal medical therapy in the absence of severe RV dysfunction or pre-capillary PH. | IIa | A |



# N°6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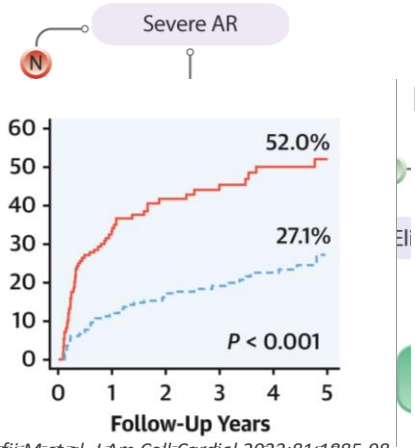
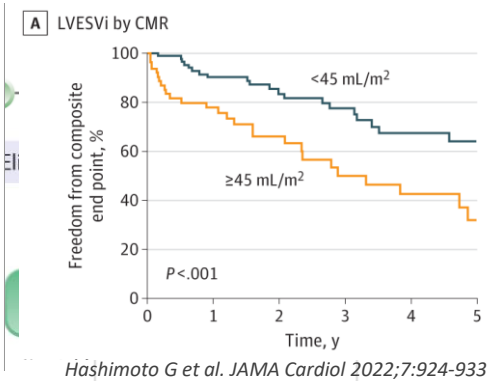
# Indication for intervention in AR

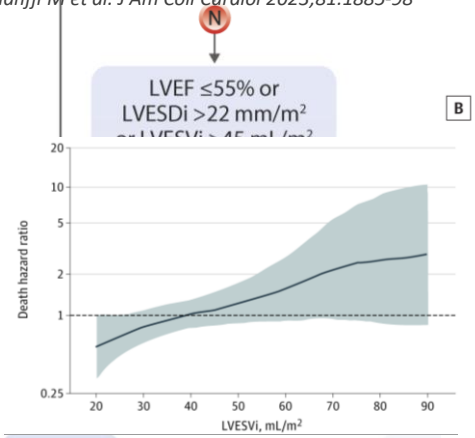
| Recommendations | Class | Level |
|---|---|---|
| AV surgery is recommended in symptomatic patients with severe AR regardless of LV function. | I | B |
| AV surgery is recommended in asymptomatic patients with severe AR and LVESD >50 mm or LVESDi >25 mm/m$^2$ [especially in patients with small body size (BSA <1.68 m$^2$)] or resting LVEF ≤50%. | I | B |
| AV surgery may be considered in asymptomatic patients with severe AR and LVESDi >22 mm/m$^2$, LVESVi >45 mL/m$^2$ [especially in patients with small body size (BSA <1.68 m$^2$)], or resting LVEF ≤55%, if the surgical risk is low. | IIb | Revised B |



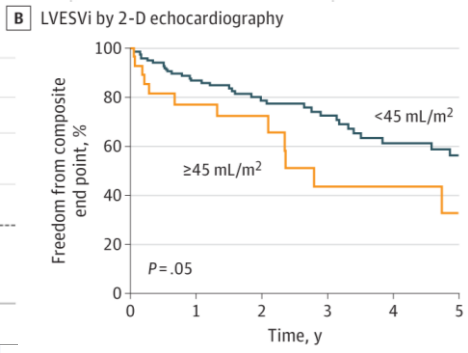

Malahfji M et al. J Am Coll Cardiol 2023;81:1885-98




Hashimoto G et al. JAMA Cardiol 2022;7:924-933



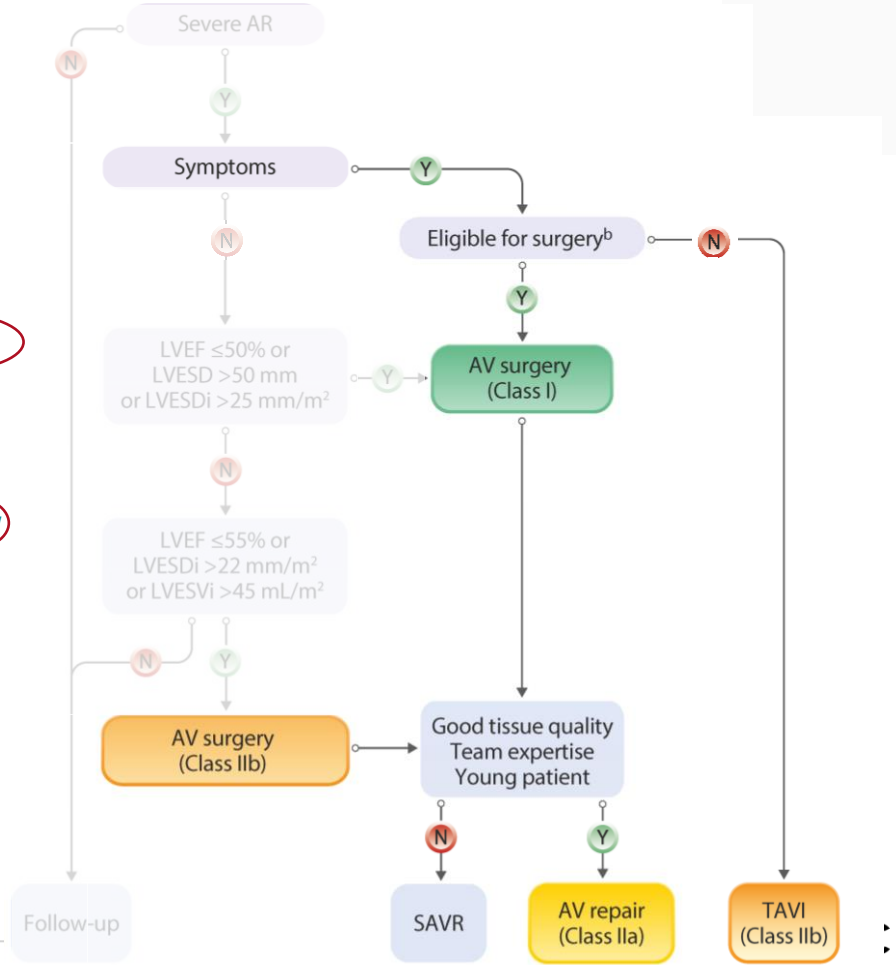

Yang et al. JAMA Cardiol 2021;6:189-98




Hashimoto G et al. JAMA Cardiol 2022;7:924-933

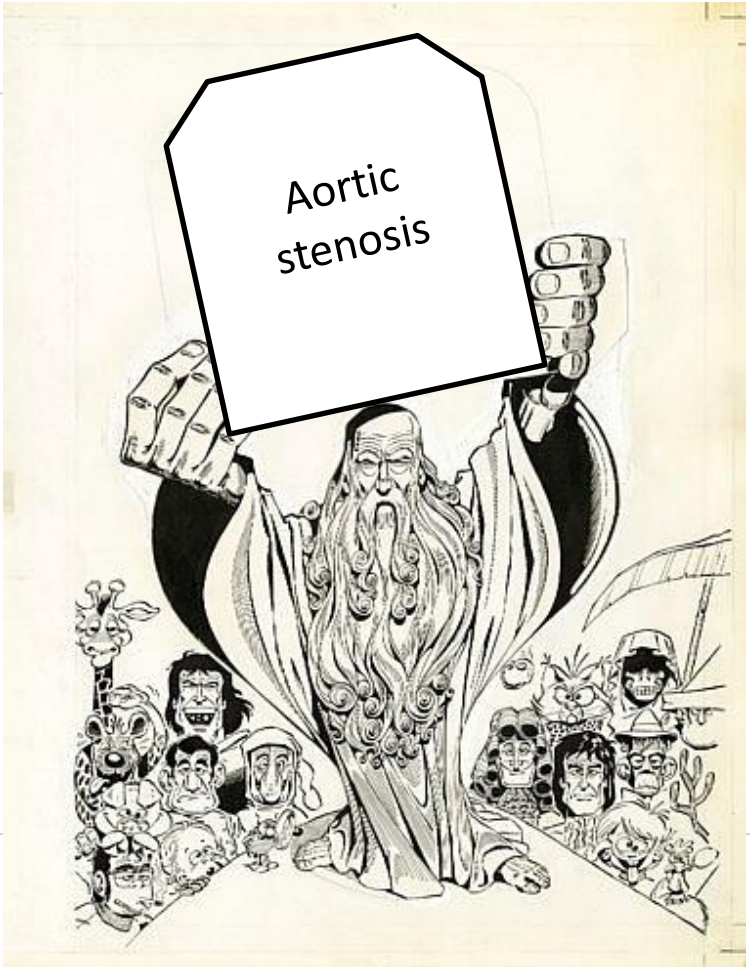
# Mode of treatment

| Recommendations | Class | Level |
|---|---|---|
| AV repair should be considered in selected patients with severe AR at experienced centres, when durable results are expected. | IIa | Revised B |
| TAVI may be considered for the treatment of severe AR in symptomatic patients ineligible for surgery according to the Heart Team, if the anatomy is suitable. | IIb | New B |




*Vahl et al. Lancet 2024;403: 1451-59*

# N°7

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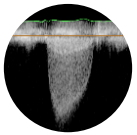
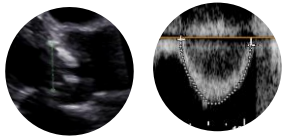
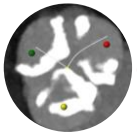
# Integrative imaging assessment of AS







Mean gradient & Vmax

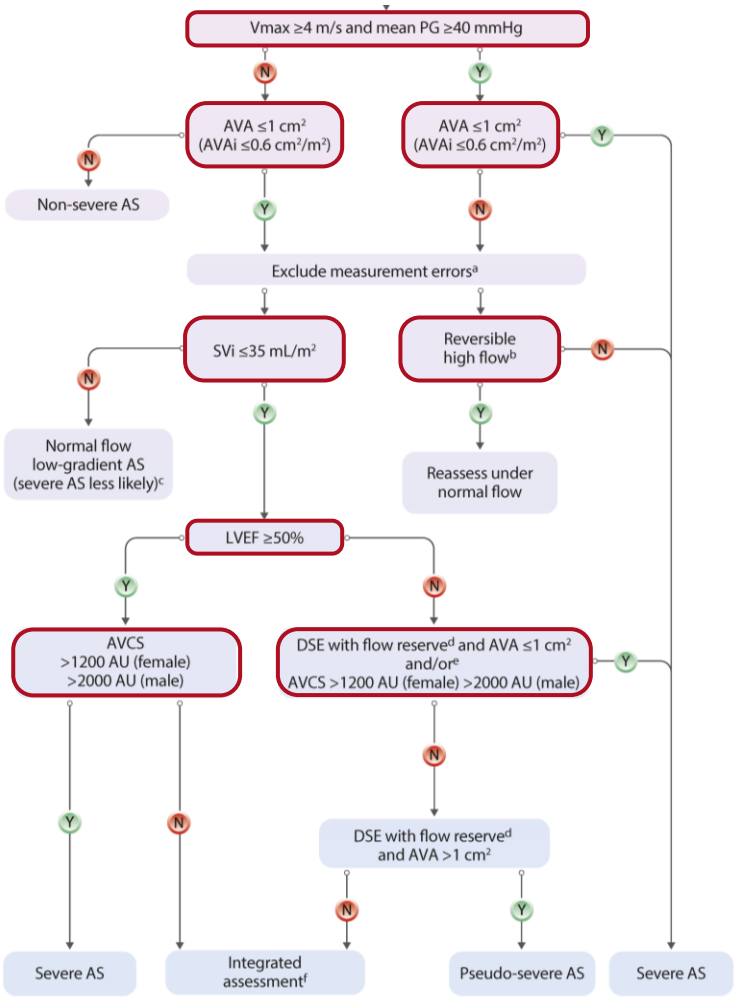
Aortic valve area

Stroke volume

LVEF

Aortic Valve Calcium Score

Dobutamine Stress Echo



# Management of symptomatic severe AS

| Recommendations | Class | Level |
|---|---|---|
| Intervention is recommended in symptomatic patients with severe, high-gradient AS [mean gradient ≥40 mmHg, $V_{max}$ ≥4.0 m/s, AVA ≤1.0 $cm^2$ (or ≤0.6 $cm^2/m^2$ BSA)]. | I | B |
| Intervention is recommended in symptomatic patients with low-flow (SVi ≤35 $mL/m^2$), low-gradient (<40 mmHg) AS with reduced LVEF (<50%) after careful confirmation that AS is severe. | I | B |
| Intervention should be considered in symptomatic patients with low-flow (SVi ≤35 $mL/m^2$), low-gradient (<40 mmHg) AS with normal LVEF (≥50%) after careful confirmation that AS is severe. | IIa | B |

Revised

irrespective of evidence of flow (contractile) reserve

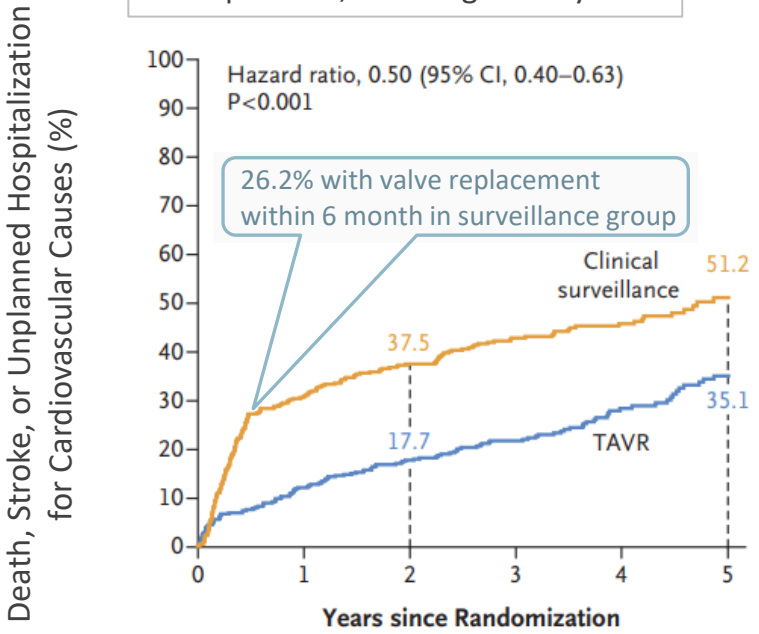
Revised

# Management asymptomatic severe AS

| Recommendations | Class | Level |
|---|---|---|
| Intervention is recommended in asymptomatic patients with severe AS and LVEF <50% without another cause. | I | B |
| Intervention should be considered in asymptomatic patients (confirmed by a normal exercise test, if feasible) with severe, high-gradient AS and LVEF ≥50% as an alternative to close active surveillance, if the procedural risk is low. | IIa | New A |
| Intervention should be considered in asymptomatic patients with severe AS and LVEF ≥50% if the procedural risk is low and one of the following parameters is present:<br>• Very severe AS (mean gradient ≥60 mmHg or $V_{max}$ >5.0 m/s)<br>• Severe valve calcification (ideally assessed by CCT) and $V_{max}$ progression ≥0.3 m/s/year.<br>• Markedly elevated BNP/NT-proBNP levels (more than three times age- and sex-corrected normal range, confirmed on repeated measurement without other explanation).<br>• LVEF <55% without another cause. | IIa | B |
| Intervention should be considered in asymptomatic patients with severe AS and a sustained fall in BP (>20 mmHg) during exercise testing. | IIa | C |

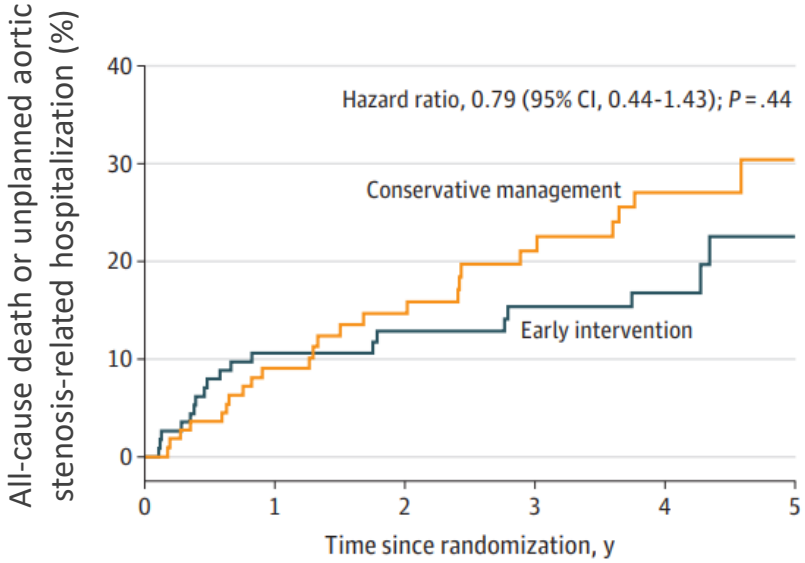
# RCTs in patients with asymptomatic severe AS

**EARLY TAVR**
901 patients, mean age 75.8 years




*Généreux et al. N Engl J Med 2025;392:217-27*

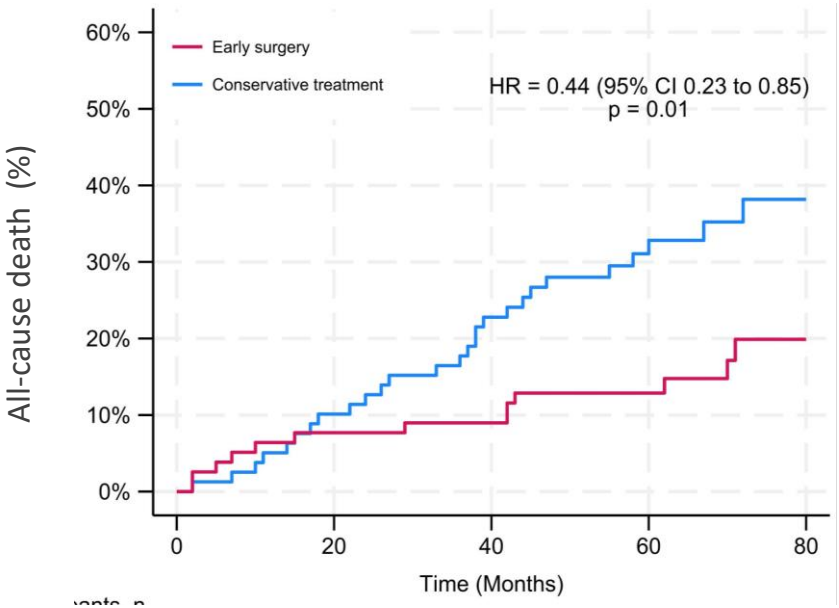
**EVOLVED**
224 patients, mean age 73 years




*Loganathan et al. JAMA 2025;333(3):213-221*

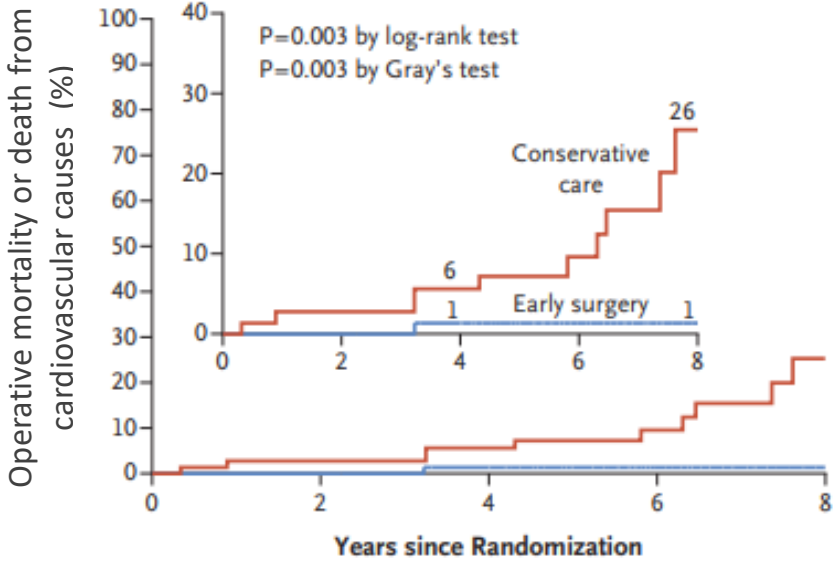
# RCTs in asymptomatic severe AS

**AVATAR** long-term follow-up
157 patients, mean age 67 years



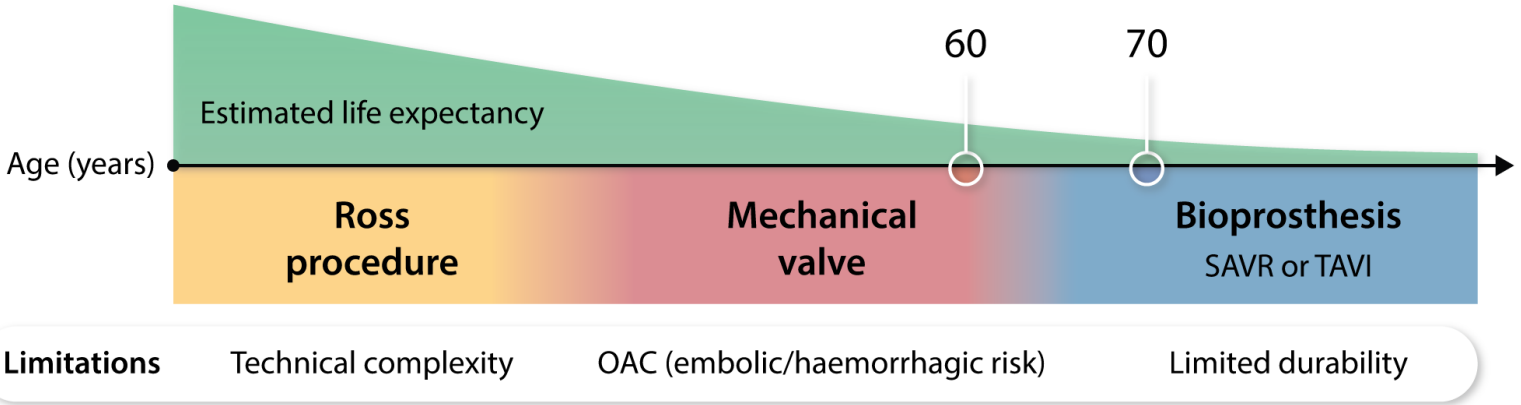

*Banovic et al. Circulation. 2022;145:648–658.*

**RECOVERY**
145 patients, mean age 64 years




*Kang et al. N Engl J Med 2020;382:111-9.*

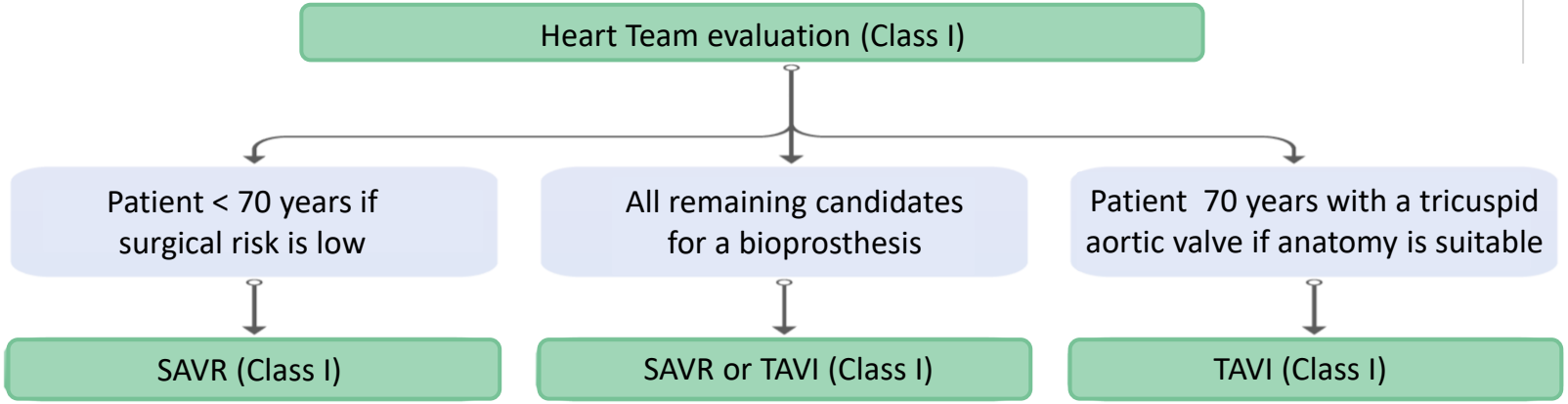
# Mode of intervention in severe AS




| Recommendations | Class | Level |
|---|---|---|
| It is recommended that AV interventions are performed in Heart Valve Centres that report their local expertise and outcome data, have on-site interventional cardiology and cardiac surgical programmes, and a structured collaborative Heart Team. | I | C |
| It is recommended that the mode of intervention is based on Heart Team assessment of individual clinical, anatomical, and procedural characteristics, incorporating lifetime management considerations and estimated life expectancy. | I | C |

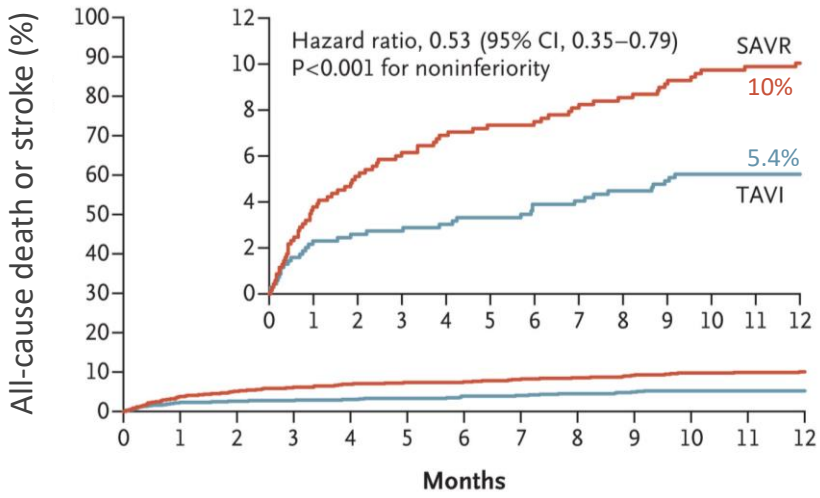
# Mode of intervention in severe AS

| Recommendations | Class | Level |
|---|---|---|
| TAVI is recommended in patients ≥70 years of age with tricuspid AV stenosis, if the anatomy is suitable. (irrespective of surgical risk score) | I | A (Revised) |
| SAVR is recommended in patients <70 years of age, if the surgical risk is low. | I | B (Revised) |
| SAVR or TAVI are recommended for all remaining candidates for an aortic BHV according to Heart Team assessment. | I | B (Revised) |



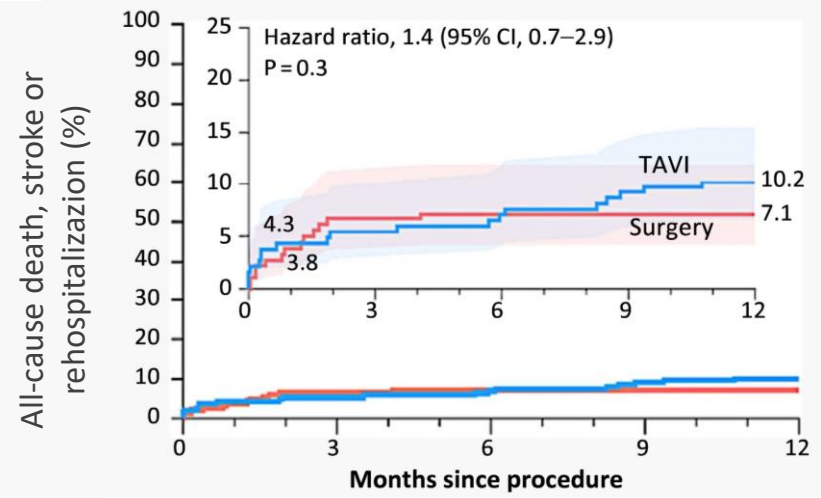
# RCTs comparing TAVI to SAVR in low risk patients

**DEDICATE**
1414 patients, mean age 74 years (50% < 75 yrs)




*Blankenberg et al. N Engl J Med 2024;390:1572-83*

**NOTION 2**
370 patients, mean age 71.1 years (all < 75)

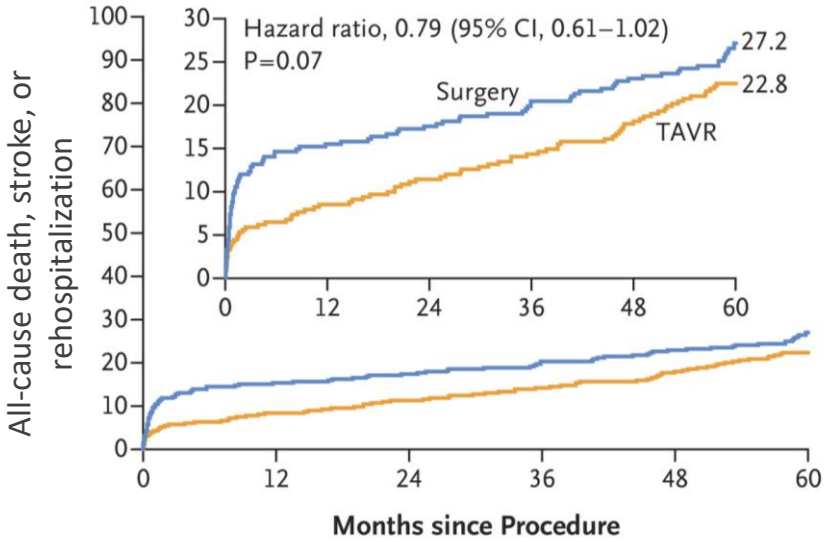



100 patients with BAV: 14.3% vs. 3.9% HR 3.8; 95% CI, 0.8 - 18.5

*Jørgensen TH et al. Eur Heart J. 2024 Oct 5;45(37):3804-3814*

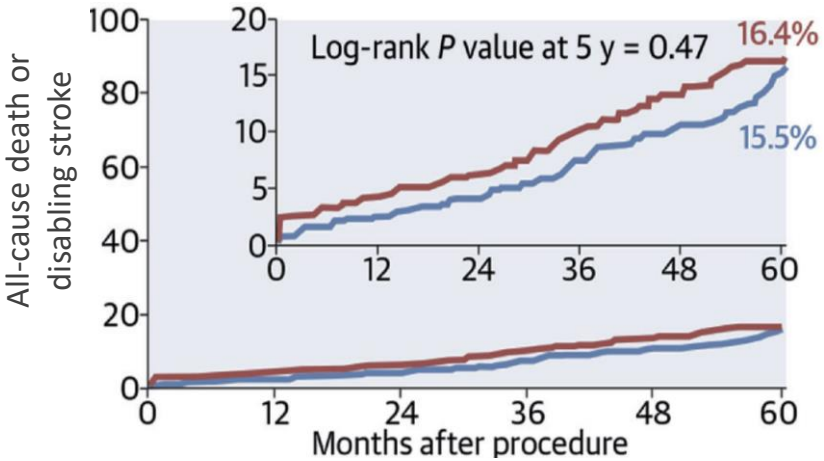
# RCTs comparing TAVI to SAVR in low risk patients

**PARTNER III** (5 years)
1000 patients, mean age 73 years (56% < 75 yrs)



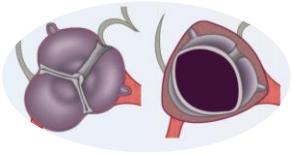

*Mack M et al. N Engl J Med 2023;389:1949-1960*

**Evolut Low Risk** (5 years)
1414 patients, mean age 74 (50% < 75)



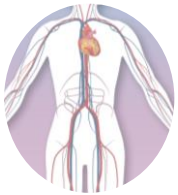

*Forrest JK et al. JACC 2025; 85:1523-1532.*

# Mode of intervention in severe AS



| Recommendations | Class | Level |
|---|---|---|
| TAVI may be considered for the treatment of severe BAV stenosis in patients at increased surgical risk, if the anatomy is suitable. | IIb | B |

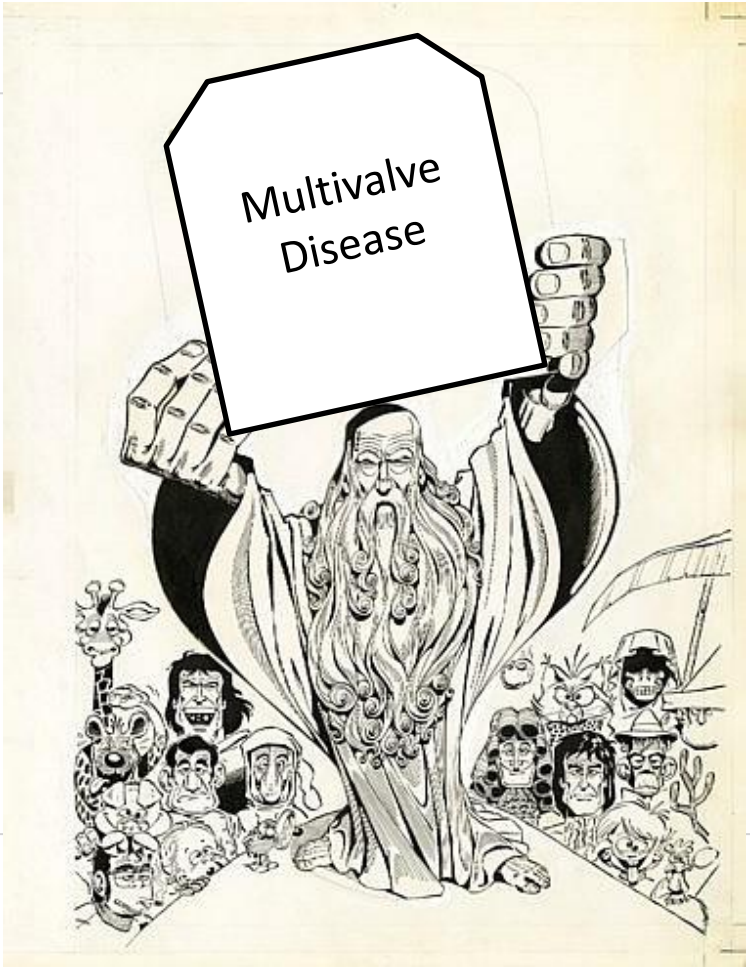
New



| Recommendations | Class | Level |
|---|---|---|
| Non-transfemoral TAVI should be considered in patients who are unsuitable for surgery and transfemoral access. | IIa | B |

Revised

# N°8

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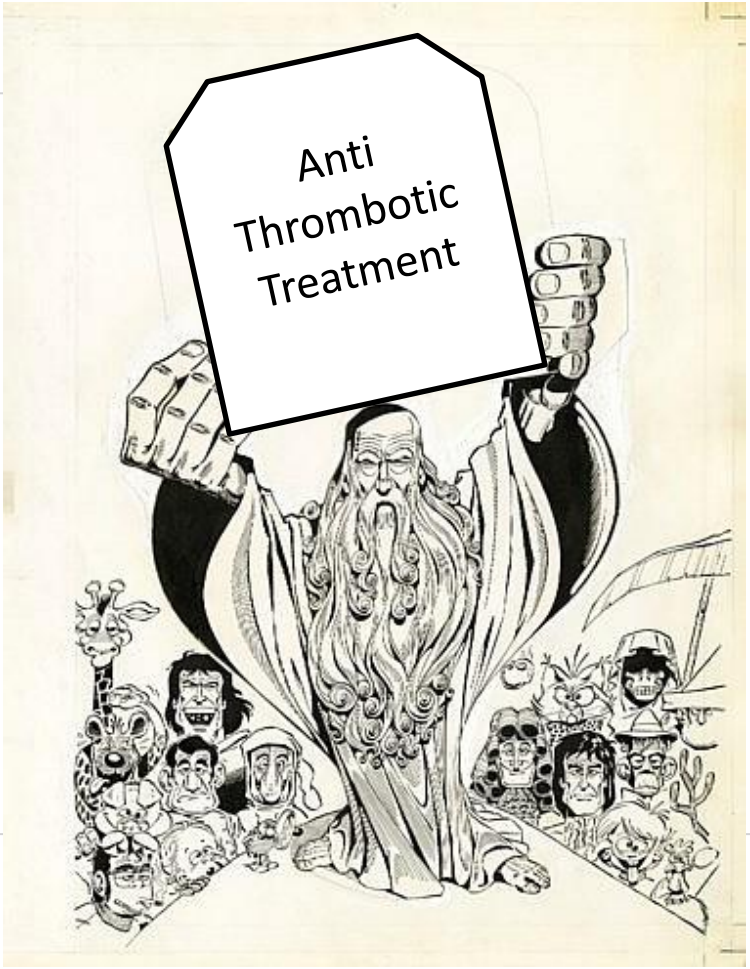
# Multivalvular disease

NEW

| | | |
|---|---|---|
| **Surgery of concomitant mitral regurgitation—*Section 13.3*** | | |
| MV surgery is recommended in patients with severe MR undergoing surgery for another valve. | I | C |
| **Indications for intervention in patients with mixed moderate aortic stenosis and moderate aortic regurgitation—*Section 13.3*** | | |
| Intervention is recommended in symptomatic patients with mixed moderate AV stenosis and moderate regurgitation, and a mean gradient ≥40 mmHg or $V_{max}$ ≥4.0 m/s. | I | B |
| Intervention is recommended in asymptomatic patients with mixed moderate AV stenosis and moderate regurgitation, with $V_{max}$ ≥4.0 m/s and LVEF <50% not attributable to other cardiac disease. | I | C |

| | Valve lesion to be assessed | | | |
|---|---|---|---|---|
| | **AS** | **AR** | **MS** | **MR** |
| **Robust echo measurements** | AVA (continuity equation), DVI *Reflection of combined burden in mixed AR and AS: $V_{max}$ and mean gradient reflect combined burden* | EROA (PISA), vena contracta | Planimetry and 3D MVA (TOE) *Reflection of combined burden in mixed MR & MS: mean gradient reflect combined burden* | EROA (PISA), vena contracta |
| **Alternative imaging modalities** | CT: AV calcium scoring | CMR: regurgitant volume and fraction | — | CMR: regurgitant volume and fraction |

# N°9

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# New recommendations

## Antithrombotic treatment

NEW

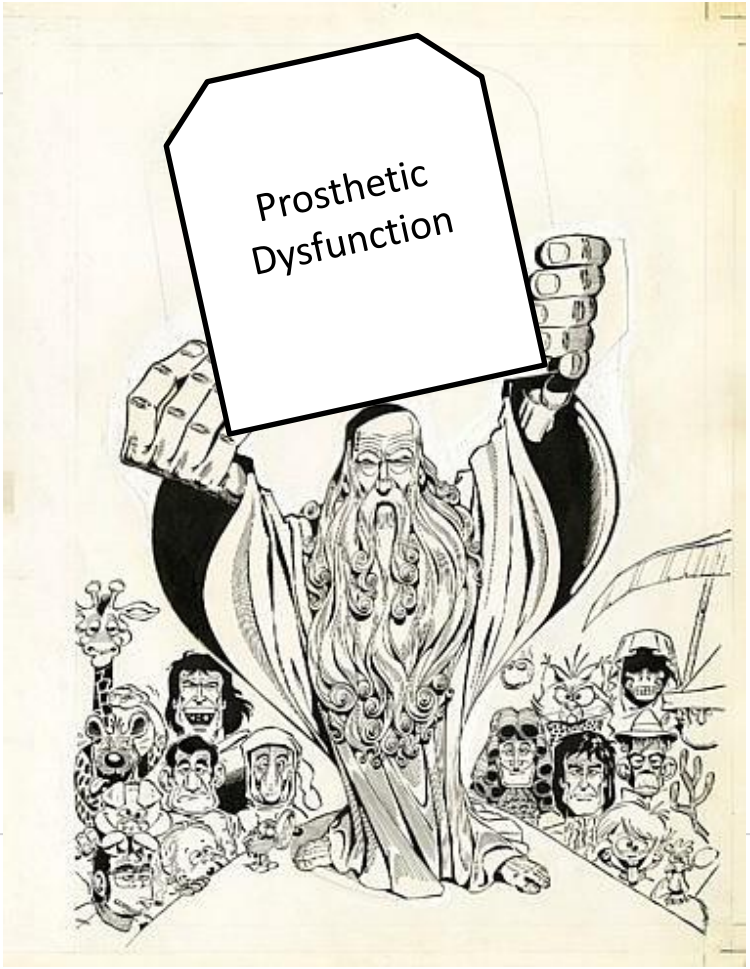
| | | |
|---|---|---|
| **Management of antithrombotic therapy in patients with a mechanical heart valve—*Section 14.3*** | | |
| It is recommended that INR targets are based on the type and position of MHV, patient's risk factors, and comorbidities. | I | A |
| Patient education is recommended to improve the quality of OAC. | I | A |
| **Management of antithrombotic therapy in patients with mechanical heart valves undergoing elective non-cardiac surgery or invasive procedures—*Section 14.3*** | | |
| Continuing VKA treatment is recommended in patients with an MHV for minor or minimally invasive interventions associated with no or minimal bleeding. | I | A |
| Interruption (3–4 days before surgery), and resumption of VKA without bridging, may be considered to reduce bleeding in patients with new-generation aortic MHV and no other thromboembolic risk factors undergoing major non-cardiac surgery or invasive procedures. | IIb | B |
| **Management of antithrombotic therapy in patients with a biological heart valve or valve repair—*Section 14.3*** | | |
| **Surgical biological heart valve without indication for oral anticoagulation** | | |
| Lifelong low-dose ASA (75–100 mg/day) may be considered 3 months after surgical implantation of an aortic or mitral BHV in patients without clear indication for OAC. | IIb | C |
| **Transcatheter aortic valve implantation without indication for oral anticoagulation** | | |
| DAPT is not recommended to prevent thrombosis after TAVI, unless there is a clear indication. | III | B |
| **Surgical repair without indication for oral anticoagulation** | | |
| Low-dose ASA (75–100 mg/day) may be considered after surgical MV or TV repair in preference to OAC in patients without clear indication for OAC and at high bleeding risk. | IIb | B |
| **Surgical biological heart valve with indication for oral anticoagulation** | | |
| OAC continuation is recommended in patients with a clear indication for OAC undergoing surgical BHV implantation. | I | B |
| DOAC continuation may be considered after surgical BHV implantation in patients with an indication for DOAC. | IIb | B |

NEW

# Antithrombotic treatment NC perioperative, invasive procedure, risk

| Low thrombo-embolic risk | | Minimally invasive procedures | | Major NCS or invasive procedures | |
|---|---|---|---|---|---|
| | | **Pre-procedure** | **Post-procedure** | **Pre-procedure** | **Post-procedure** |
| **New-generation aortic MHV and no additional risk factors** | **OAC** | No interruption of VKA | Continue VKA | Interrupt VKA at least 3–4 days prior to procedure with target INR <1.5 on the day of surgery | Resume VKA as soon as feasible, within 24 h |
| | **Bridging** | | | No bridging may be considered | No bridging may be considered, unless unable to administer OAC |
| | **Supporting measures** | | Topical antifibrinolytic or haemostatic agents may be considered to improve local haemostasis | | Mechanical and pharmacological VTE prophylaxis, if indicated |
| **Moderate-to-high thrombo-embolic risk** | | **Minimally invasive procedures** | | **Major NCS or invasive procedures** | |
| | | **Pre-procedure** | **Post-procedure** | **Pre-procedure** | **Post-procedure** |
| **MHV in mitral or tricuspid position or other thrombo-embolic risk factors** | **OAC** | No interruption of VKA | Continue VKA | Interrupt VKA at least 5 days prior to procedure with target INR <1.5 the day of the procedure | Resume VKA within 24 h |
| | **Bridging** | | | Bridging with LMWH or UFH if CKD stage IV or V, starting at INR below the therapeutic range | Bridging with UFH or LMWH post-operatively within 24 h |
| | **Supporting measures** | | Topical antifibrinolytic or haemostatic agents may be considered to improve local haemostasis | | Appropriate mechanical and pharmacological VTE prophylaxis |

# N°10

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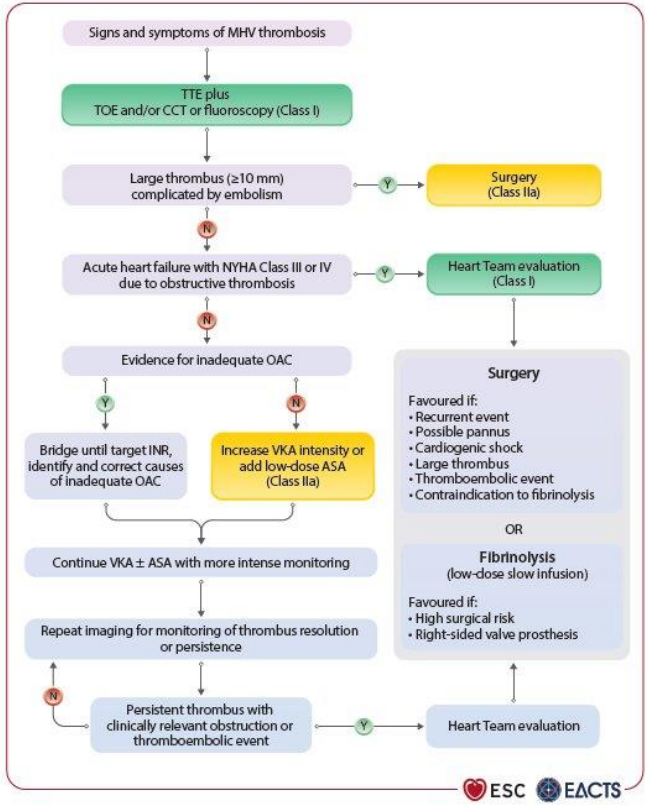
# Prosthetic valve dysfunction

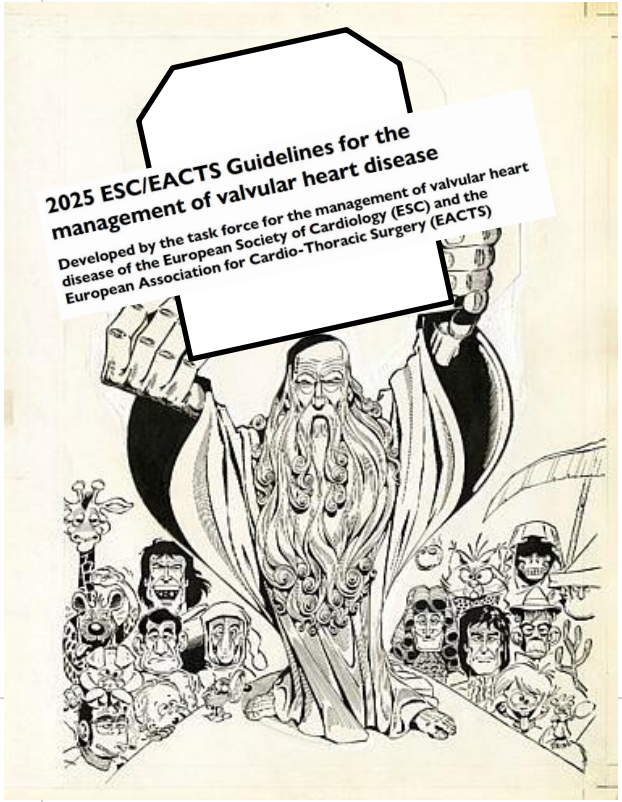
EACVI
European Association of Cardiovascular Imaging

| | Moderate | Severe |
|---|---|---|
| **Aortic BHV** SVD or non-structural valve dysfunction (except PVL or PPM), thrombosis, or endocarditis | Increase in mean transvalvular gradient ≥10 mmHg resulting in mean gradient ≥20 mmHg | Increase in mean transvalvular gradient ≥20 mmHg resulting in mean gradient ≥30 mmHg |
| | **AND** | **AND** |
| | Decrease in EOA ≥0.3 $cm^2$ or ≥25%, and/or decrease in DVI ≥0.1 or ≥20%, compared with echocardiographic assessment performed 1–3 months post-procedure | Decrease in EOA ≥0.6 $cm^2$ or ≥50%, and/or decrease in DVI ≥0.2 or ≥40%, compared with echocardiographic assessment performed 1–3 months post-procedure |
| | ***OR*** | ***OR*** |
| | New occurrence or increase of ≥1 grade of intraprosthetic AR resulting in ≥ moderate AR | New occurrence or increase of ≥2 grades of intraprosthetic AR resulting in ≥ moderate-to-severe AR |

| | Moderate | Severe |
|---|---|---|
| **Mitral BHV** SVD or non-structural valve dysfunction (except PVL or PPM), thrombosis, or endocarditis | Increase in DVI ≥0.4 or ≥20%, resulting in DVI ≥2.2, or decrease in EOA ≥0.5 $cm^2$ or ≥25%, resulting in EOA <1.5 $cm^2$, usually associated with increase of transmitral gradient ≥5 mmHg | Increase in DVI ≥0.8 or ≥40%, resulting in DVI ≥2.7, or decrease in EOA ≥1.0 $cm^2$ or ≥50%, resulting in EOA <1 $cm^2$, usually associated with increase of transmitral gradient ≥10 mmHg |
| | ***OR*** | ***OR*** |
| | New occurrence or increase of ≥1 grade of intraprosthetic MR resulting in ≥moderate MR | New occurrence or increase of ≥2 grades of intraprosthetic MR resulting in ≥moderate-to-severe MR |



# Summary:


2025 ESC/EACTS Guidelines for the management of valvular heart disease
Developed by the task force for the management of valvular heart disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)