

ESC 2017 Guidelines for the management of aortic valve disease

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Essential questions in the evaluation of patients for valvular intervention



Questions

- How severe is VHD?
- What is the aetiology of VHD?
- Does the patient have symptoms?
- Are symptoms related to valvular disease?
- Are any signs present in asymptomatic patients that indicate a worse outcome if the intervention is delayed?
- What are the patient's life expectancy and expected quality of life?



Essential questions in the evaluation of patients for valvular intervention (continued)



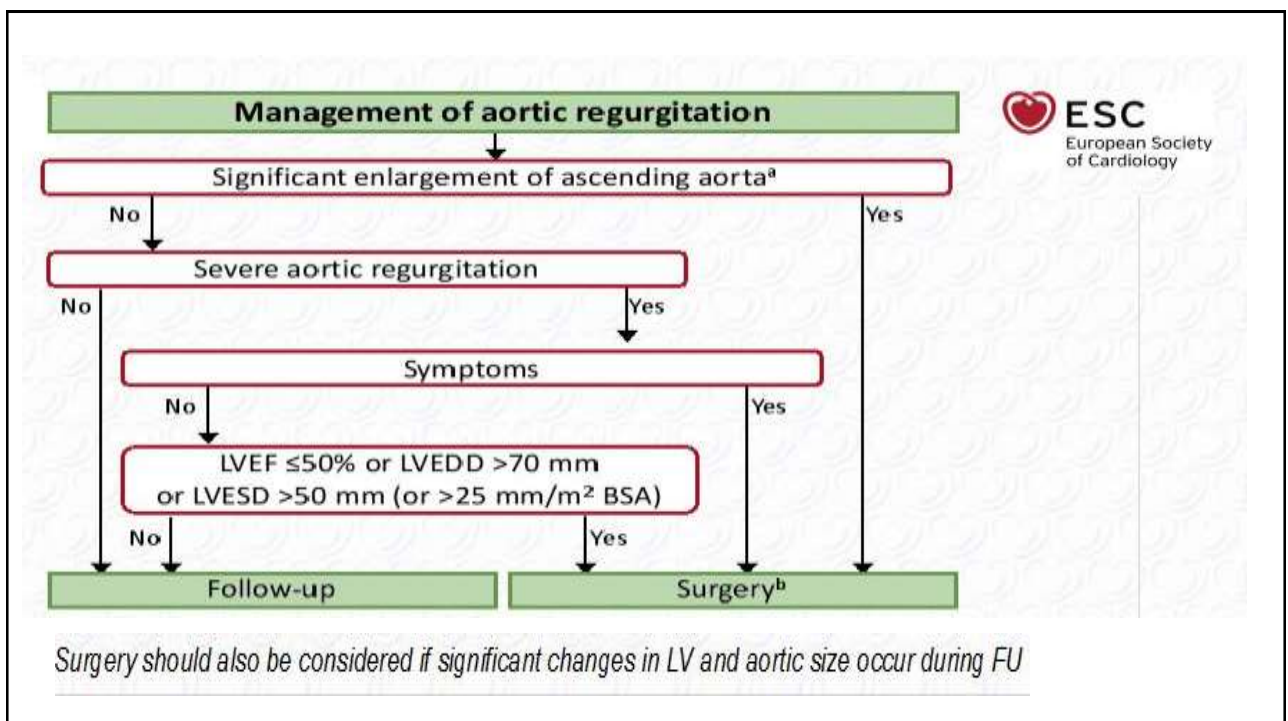
Questions (continued)

- Do the expected benefits of intervention (versus spontaneous outcome) outweigh its risks?
- What is the optimal treatment modality? Surgical valve replacement (mechanical or biological), surgical valve repair, or catheter intervention?
- Are local resources (local experience and outcome data for a given intervention) optimal for the planned intervention?
- What are the patient's wishes?

Aortic regurgitation

Echocardiographic criteria for definition of severe AR

Aortic regurgitation	
Qualitative	
Valve morphology	Abnormal/flail/large coaptation defect
Colour flow regurgitant jet	Large in central jets, variable in eccentric jets ^a
CW signal of regurgitant jet	Dense
Other	Holodiastolic flow reversal in descending aorta (EDV >20 cm/s)
Semiquantitative	
Vena contracta width (mm)	>6
Upstream vein flow ^b	–
Inflow	–
Other	Pressure half-time <200 ms ^c
Quantitative	
EROA (mm ²)	≥30
Regurgitant volume (mL/beat)	≥60
+ enlargement of cardiac chambers/vessels	LV





Indications for surgery in severe aortic regurgitation



Recommendations	Class	Level
A. Severe aortic regurgitation		
Surgery is indicated in symptomatic patients.	I	B
Surgery is indicated in asymptomatic patients with resting LVEF $\leq 50\%$.	I	B
Surgery is indicated in patients undergoing CABG or surgery of the ascending aorta or of another valve.	I	C
Heart Team discussion is recommended in selected patients* in whom aortic valve repair may be a feasible alternative to valve replacement.	I	C
Surgery should be considered in asymptomatic patients with resting ejection fraction $>50\%$ with severe LV dilatation: LVEDD >70 mm, or LVESD >50 mm (or LVESD >25 mm/m ² BSA in patients with small body size).	IIa	B

* Patients with pliable non-calcified tricuspid or bicuspid valves who have a type I (enlargement of the aortic root with normal cusp motion) or type II (cusp prolapse) mechanism of AR.



Indications for surgery in (A) severe aortic regurgitation and (B) aortic root disease (irrespective of aortic regurgitation severity) (continued)



Recommendations	Class	Level
B. Aortic root or tubular ascending aorta aneurysm (irrespective of the severity of aortic regurgitation)		
Aortic valve repair, using the reimplantation or remodelling with aortic annuloplasty technique, is recommended in young patients with aortic root dilation and tricuspid aortic valves, when performed by experienced surgeons.	I	C
Surgery is indicated in patients with Marfan syndrome, who have aortic root disease with a maximal ascending aortic diameter ≥ 50 mm.	I	C



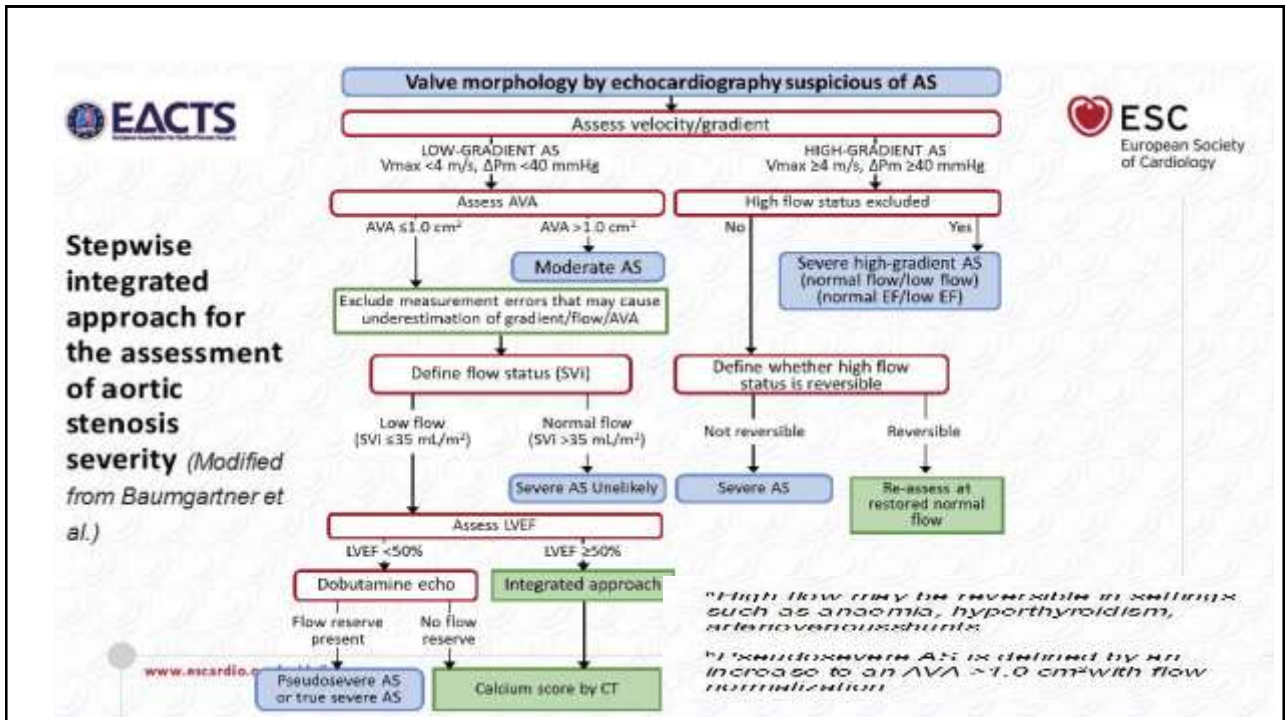
Indications for surgery in aortic root dis. (continued)

Recommendations	Class	Level
B. Aortic root or tubular ascending aorta aneurysm (irrespective of the severity of aortic regurgitation) (continued)		
Surgery should be considered in patients who have aortic root disease with maximal ascending aortic diameter: <ul style="list-style-type: none"> • ≥ 45 mm in the presence of Marfan syndrome and additional risk factors^a, or patients with a <i>TGFBR1</i> or <i>TGFBR2</i> mutation (including Loeys-Dietz syndrome)^b. • ≥ 50 mm in the presence of a bicuspid valve with additional risk factors^a or coarctation. • ≥ 55 mm for all other patients. 	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, particularly in the presence of a bicuspid valve.	IIa	C

^a 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 size increase >3 mm/year

^b A lower threshold of 40 mm may be considered in women with low BSA, in patients with a *TGFBR2* mutation, or in patients with severe extra-aortic features

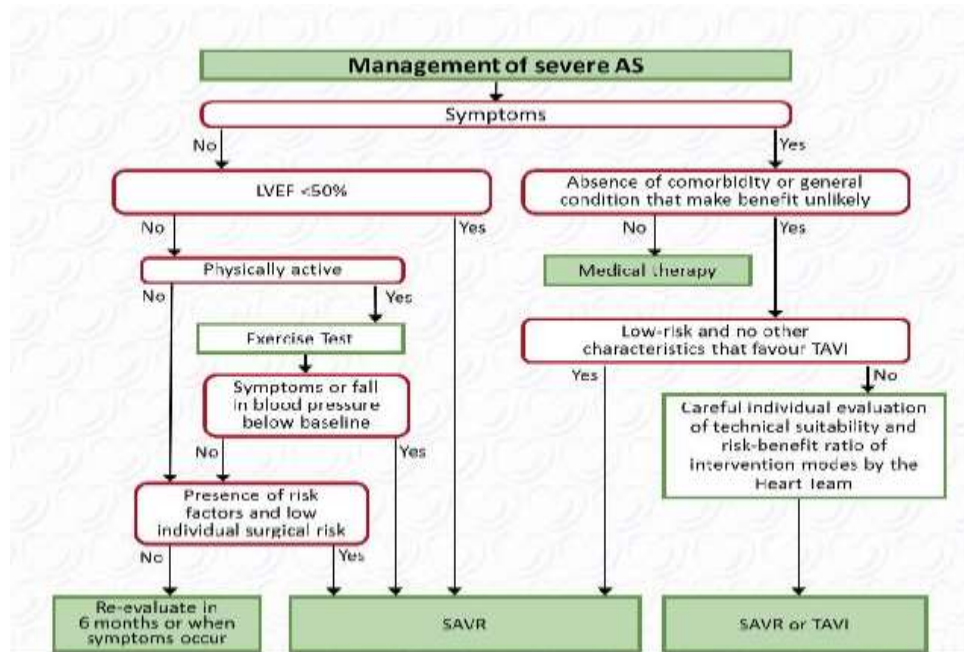
Aortic stenosis



EACTS **ESC** European Society of Cardiology

Criteria that increase the likelihood of severe AS in pts. with AVA < 1.0 cm², mean gradient < 40 mmHg and preserved EF (Baumgartner et al)

Criteria	
Clinical criteria	<ul style="list-style-type: none"> • Typical symptoms without other explanation. • Elderly patient (>70 years).
Qualitative imaging data	<ul style="list-style-type: none"> • LV hypertrophy (additional history of hypertension to be considered). • Reduced LV longitudinal function without other explanation.
Quantitative imaging data	<ul style="list-style-type: none"> • Mean gradient 30–40 mmHg. • AVA ≤ 0.8 cm².
Quantitative imaging data (continued)	<ul style="list-style-type: none"> • Low flow (SVI < 35 mL/m²) confirmed by techniques other than standard Doppler technique (LVOT measurement by 3D TOE or MSCT; CMR, invasive data). • Calcium score by MSCT: <ul style="list-style-type: none"> – Severe aortic stenosis very likely: men ≥ 3000; women ≥ 1600, – Severe aortic stenosis likely: men ≥ 2000; women ≥ 1200, – Severe aortic stenosis unlikely: men < 1600; women < 800.



Indications for intervention in aortic stenosis and recommendations for the choice of intervention mode

Recommendations	Class	Level
a) Symptomatic aortic stenosis		
Intervention is indicated in symptomatic patients with severe, high-gradient aortic stenosis (mean gradient ≥ 40 mmHg or peak velocity ≥ 4.0 m/s).	I	B
Intervention is indicated in symptomatic patients with severe low-flow, low-gradient (< 40 mmHg) aortic stenosis with reduced ejection fraction, and evidence of flow (contractile) reserve excluding pseudo-severe aortic stenosis.	I	C
Intervention should be considered in symptomatic patients with low flow, low-gradient (< 40 mmHg) aortic stenosis with normal ejection fraction after careful confirmation of severe aortic stenosis.	IIa	C
Intervention should be considered in symptomatic patients with low-flow, low-gradient aortic stenosis and reduced ejection fraction without flow (contractile) reserve, particularly when CT calcium scoring confirms severe aortic stenosis.	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



b) Choice of intervention in symptomatic aortic stenosis

Aortic valve interventions should only be performed in centres with both departments of cardiology and cardiac surgery on-site, and with structured collaboration between the two, including a Heart Team (heart valve centres).

I

C

The choice for intervention must be based on careful individual evaluation of technical suitability and weighing of risks and benefits of each modality (aspects to be considered are listed in the according table). In addition, the local expertise and outcomes data for the given intervention must be taken into account.

I

C

SAVR is recommended in patients at low surgical risk (STS or EuroSCORE II <4% or logistic EuroSCORE I <10% and no other risk factors not included in these scores, such as frailty, porcelain aorta, sequelae of chest radiation).

I

B

TAVI is recommended in patients who are not suitable for SAVR as assessed by the Heart Team.

I

B

Recommendations	Class	Level
In patients who are at increased surgical risk (STS or EuroSCORE II $\geq 4\%$ or logistic EuroSCORE I $\geq 10\%$ or other risk factors not included in these scores such as frailty, porcelain aorta, sequelae of chest radiation), the decision between SAVR and TAVI should be made by the Heart Team according to the individual patient characteristics (see according table), with TAVI being favoured in elderly patients suitable for transfemoral access.	I	B
Balloon aortic valvotomy may be considered as a bridge to SAVR or TAVI in haemodynamically unstable patients or in patients with symptomatic severe aortic stenosis who require urgent major non-cardiac surgery.	IIb	C
Balloon aortic valvotomy may be considered as a diagnostic means in patients with severe aortic stenosis and other potential cause for symptoms (i.e. lung disease) and in patients with severe myocardial dysfunction, pre-renal insufficiency or other organ dysfunction that maybe reversible with balloon aortic valvotomy when performed in centres that can escalate to TAVI.	IIb	C

c) Asymptomatic patients with severe aortic stenosis (refers only to patients eligible for surgical valve replacement)		
SAVR is indicated in asymptomatic patients with severe aortic stenosis and systolic LV dysfunction (LVEF <50%) not due to another cause.	I	C
SAVR is indicated in asymptomatic patients with severe aortic stenosis and abnormal exercise test showing symptoms on exercise clearly related to aortic stenosis.	I	C
SAVR should be considered in asymptomatic patients with severe aortic stenosis and abnormal exercise test showing fall in blood pressure below baseline.	IIa	C
SAVR should be considered in asymptomatic patients with normal ejection fraction and none of the above-mentioned exercise test abnormalities if the surgical risk is low and one of the following findings is present: <ul style="list-style-type: none"> - very severe aortic stenosis defined by a $V_{max} > 5.5$ m/s, - severe valve calcification and a rate of V_{max} progression ≥ 0.3 m/s/year, - markedly elevated BNP levels (>threefold age- and sex-corrected normal range) confirmed by repeated measurements without other explanations, - severe pulmonary hypertension (systolic pulmonary artery pressure at rest >60 mmHg confirmed by invasive measurement) without other explanation. 	IIa	C

Selection criteria between TAVI and SAVR

TAVI	SAVR
Patient ≥ 75 years	Patient <75 years
STS score > 4% or EURO score I > 10%	STS < 4% or EURO score I < 10%
Severe comorbidities or frailty	Suspicion of endocarditis
Previous cardiac surgery or porcelain aorta	Short distance between coronaries and ao.annulus
Sequelae of chest radiation	Thrombi in aorta or LV
Previous bypass grafts could be destroyed by sternotomy	Valve morphology unfavorable for TAVI (BCAV, severe Ca, or calcification pattern)
Severe chest deformities or scoliosis	Severe CAD requiring CABG

Antiplatelet in patient who underwent TAVI

2017 New recommendations

IIa C

- Dual antiplatelet therapy should be considered for the first 3–6 months after TAVI, followed by lifelong single antiplatelet therapy in patients who do not need oral anticoagulation for other reasons.

IIb C

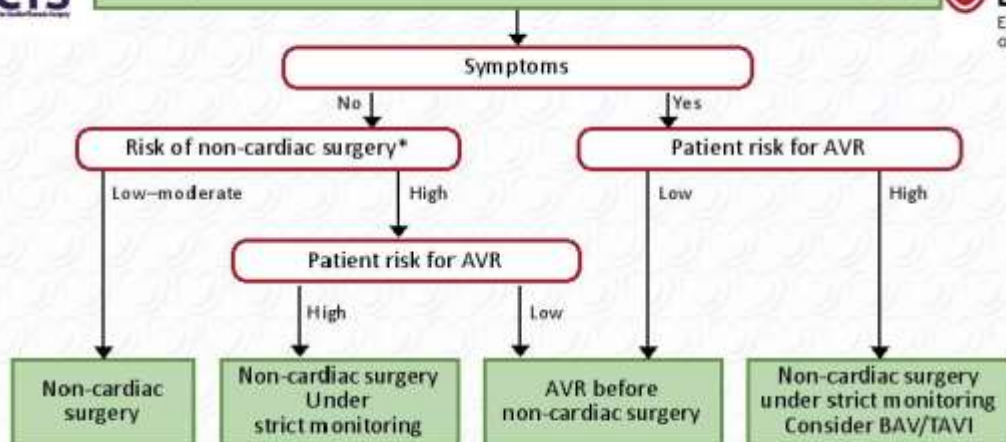
- Single antiplatelet therapy may be considered after TAVI in the case of high bleeding risk.



Management of severe AS and need for elective non-cardiac surgery



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* Classification into the three groups according to the risk of cardiac complications (30-day death and myocardial infarction) for non-cardiac surgery: high-risk > 5%; intermediate-risk 1–5%; low-risk < 1%

(Adapted from Windecker et al.)

Recommendations	Class	Level
Indications for myocardial revascularization		
CABG is recommended in patients with a primary indication for aortic/mitral valve surgery and coronary artery diameter stenosis $\geq 70\%$.	I	C
CABG should be considered in patients with a primary indication for aortic/mitral valve surgery and coronary artery diameter stenosis $\geq 50-70\%$.	IIa	C
PCI should be considered in patients with a primary indication to undergo TAVI and coronary artery diameter stenosis $>70\%$ in proximal segments.	IIa	C



Changes in recommendations	
2012	2017
Indications for intervention in symptomatic aortic stenosis	
IIb C Intervention may be considered in symptomatic patients with low-flow, low-gradient aortic stenosis and reduced ejection fraction without flow (contractile) reserve.	IIa C Intervention should be considered in symptomatic patients with low-flow, low-gradient aortic stenosis and reduced ejection fraction without flow (contractile) reserve, particularly when CT calcium scoring confirms severe aortic stenosis.
Indications for surgery in asymptomatic aortic stenosis	
IIb C Markedly elevated BNP levels.	IIa C Markedly elevated BNP levels (>threefold age- and sex-corrected normal range) confirmed by repeated measurements without other explanations.
New IIa C recommendation: Severe pulmonary hypertension (systolic pulmonary artery pressure at rest >60 mmHg confirmed by invasive measurement) without other explanation.	

2017 New recommendations
Indications for surgery in severe aortic regurgitation and aortic root disease
New I C recommendations: Heart Team discussion is recommended in selected patients in whom aortic valve repair may be a feasible alternative to valve replacement. <ul style="list-style-type: none"> • Aortic valve repair, using the reimplantation or remodelling with aortic annuloplasty technique, is recommended in young patients with aortic root dilation and tricuspid aortic valves, when performed by experienced surgeons.
New IIa C recommendation: Surgery should be considered in patients who have aortic root disease with maximal ascending aortic diameter: ≥ 45 mm in patients with a <i>TGFBR1</i> or <i>TGFBR2</i> mutation (including Loeys-Dietz syndrome)*.
<i>* A lower threshold of 40 mm may be considered in women with low BSA, in patients with a <i>TGFBR2</i> mutation, or in patients with severe extra-aortic features.</i>