

Current Management of Aortic Stenosis:

A Guideline-Based Approach



American
Heart
Association.

2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease

A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

Developed in collaboration with and endorsed by the American Association for Thoracic Surgery, American Society of Echocardiography, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Thoracic Surgeons

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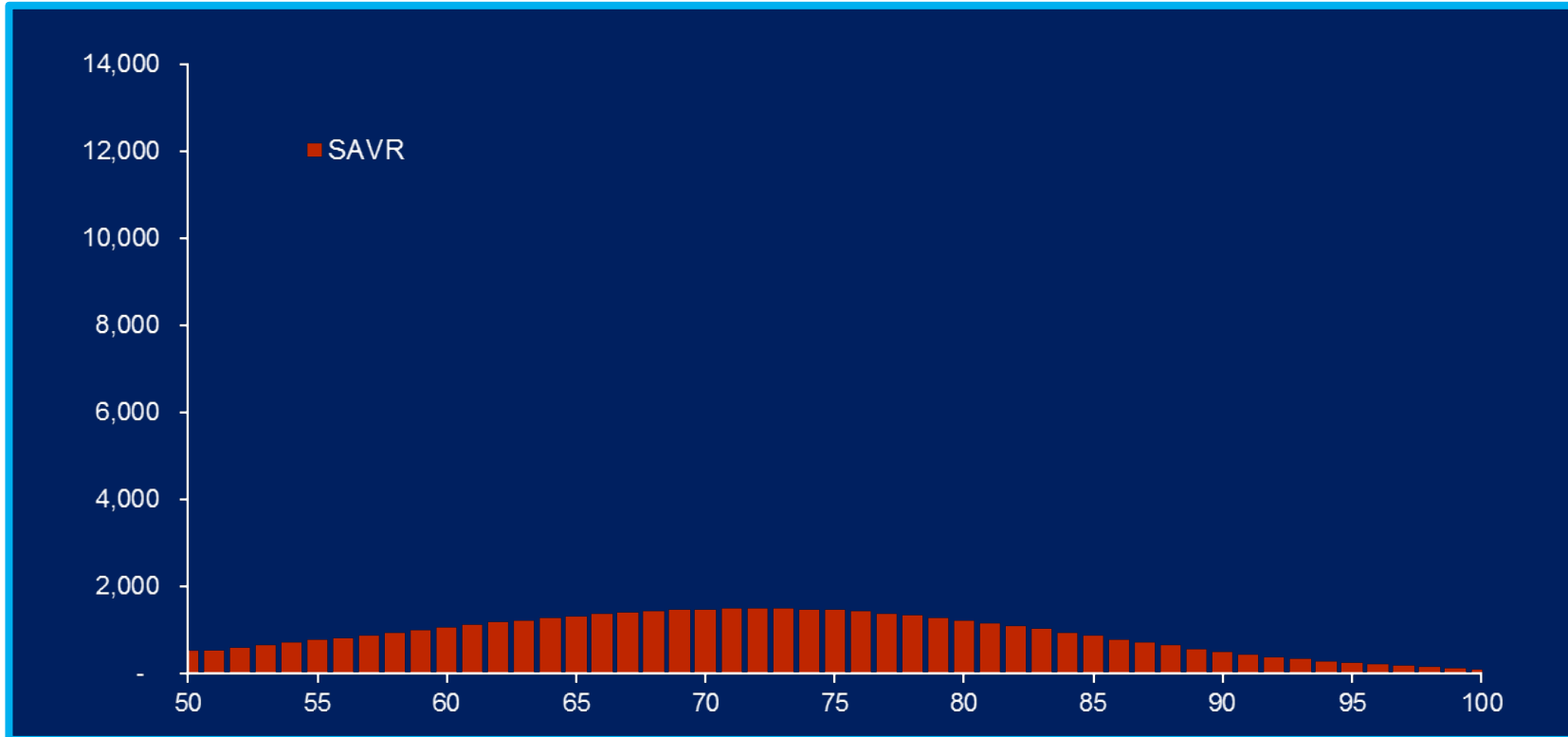
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Underdiagnosis and Undertreatment Issues

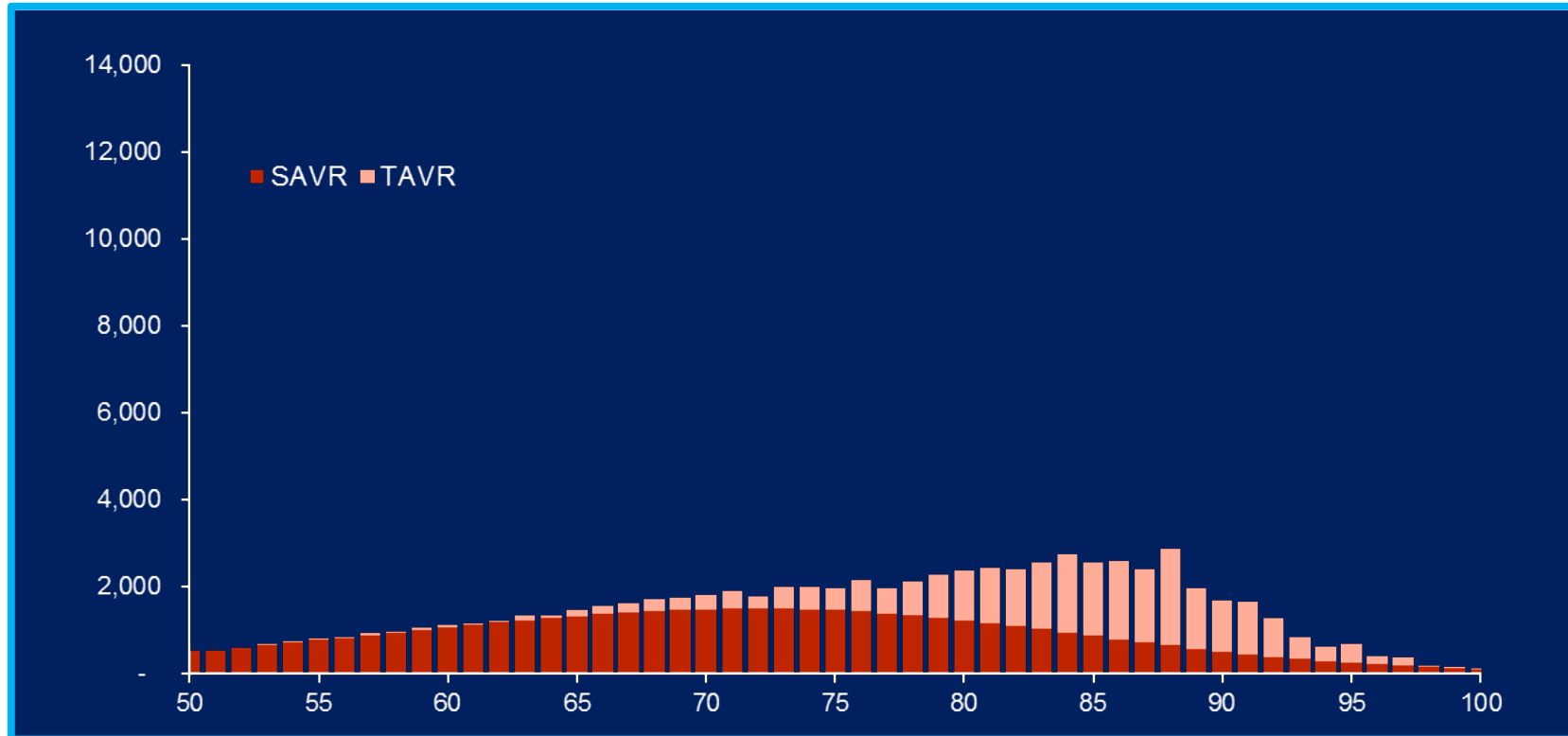
2015 Severe Symptomatic AS Patients in the U.S.



Nkomo 2006, Iivanainen 1996, Aronow 1991, Bach 2007, Freed 2010, Lung 2007, Pellikka 2005, Brown 2008, Thourani 2015

Underdiagnosis and Undertreatment Issues

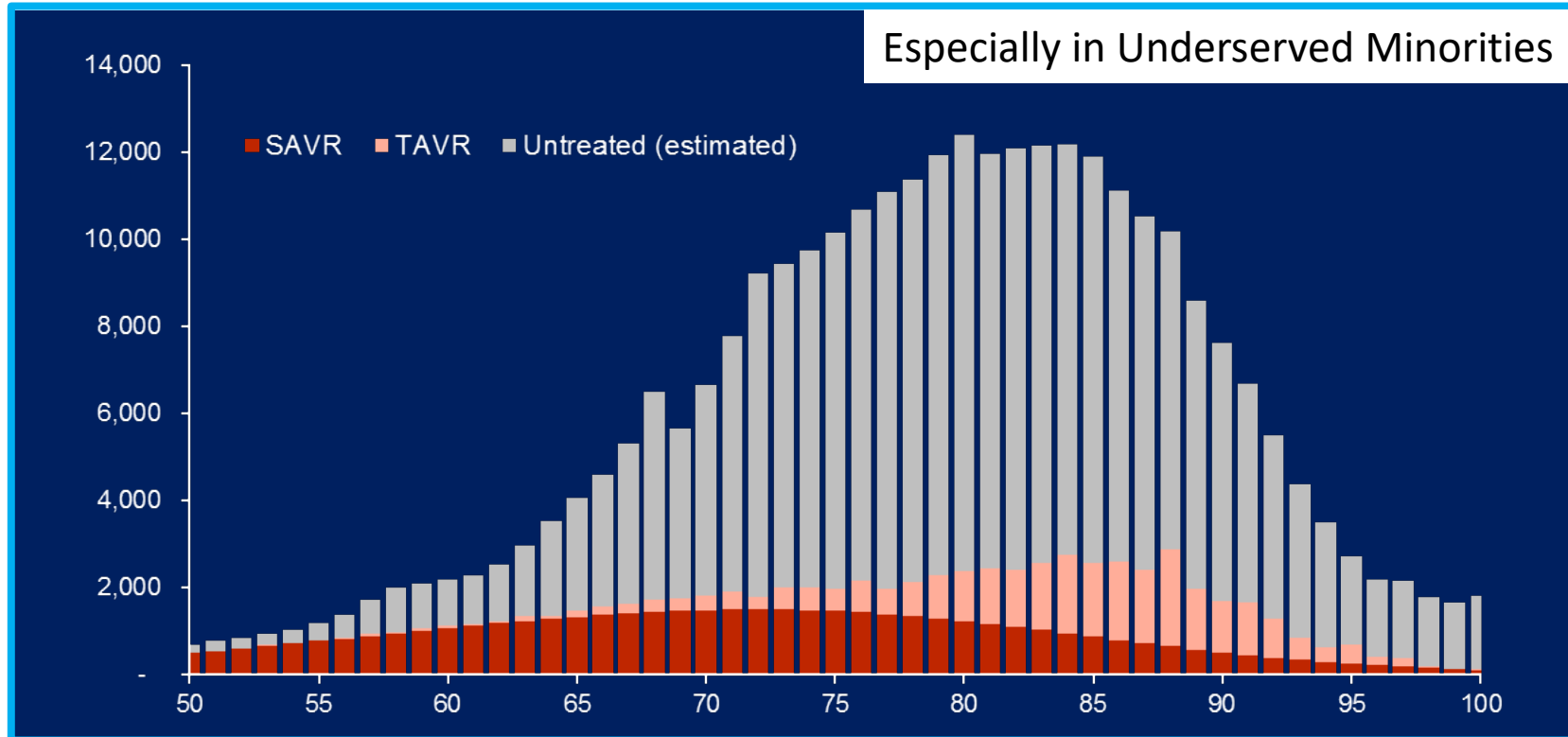
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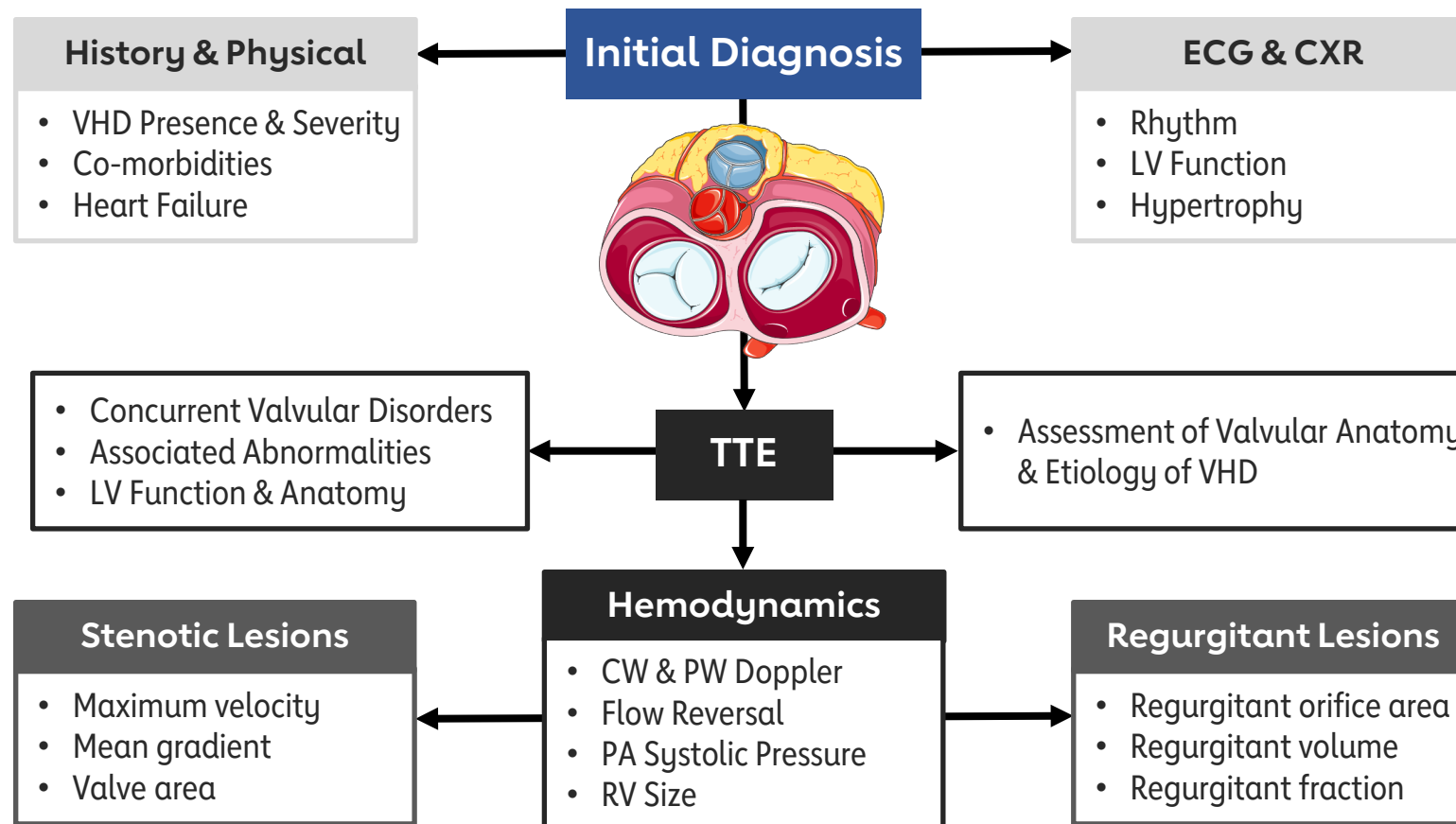
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Table 13. The Evaluation and Management of Aortic Stenosis

STAGE	VALVE ANATOMY	VALVE HEMODYNAMICS	SYMPTOMS
A At risk of AS	<ul style="list-style-type: none"> Bicuspid aortic valve or other congenital valve anomaly Aortic valve sclerosis 	<ul style="list-style-type: none"> Aortic V_{max} <2 m/s with normal leaflet motion 	None
B Progressive AS	<ul style="list-style-type: none"> Mild to moderate leaflet calcification Fibrosis of a bicuspid or trileaflet valve with reduction in systolic motion Rheumatic valve changes with commissural fusion 	<ul style="list-style-type: none"> Mild AS: V_{max} 2-2.9 m/s or mean ΔP <20 mmHg Moderate AS: V_{max} 3-3.9 m/s or mean ΔP 20-39 mmHg 	None
C Asymptomatic Severe AS	<ul style="list-style-type: none"> C1: Asymptomatic severe AS C2: Asymptomatic severe AS with left ventricular systolic dysfunction (LVEF <50%) Both C1 and C2 may show: <ul style="list-style-type: none"> Severe leaflet calcification/fibrosis Congenital stenosis with severely reduced leaflet opening 	<ul style="list-style-type: none"> C1 and C2: V_{max} \geq4 m/s or mean ΔP \geq40 mmHg, AVA typically \leq1 cm² (or AVAi 0.6 cm²/m²) but not required to define severe AS Very severe AS: V_{max} \geq5 m/s or mean ΔP \geq60 mmHg 	<p>C1: None; exercise testing reasonable to confirm symptom status</p> <p>C2: None</p>
D Symptomatic Severe AS	<ul style="list-style-type: none"> D1: Symptomatic severe high-gradient AS D2: Symptomatic severe low-flow low-gradient AS with reduced LVEF (<50%) D3: Symptomatic severe low-gradient AS with normal LVEF (>50%) or paradoxical low-flow severe AS D1, D2, and D3 may show: <ul style="list-style-type: none"> Severe leaflet calcification/fibrosis with reduced leaflet motion 	<ul style="list-style-type: none"> D1: V_{max} \geq4 m/s or mean ΔP \geq40 mmHg, AVA typically \leq1 cm² (or AVAi 0.6 cm²/m²) but may be larger with mixed AS/AR D2: AVA \leq1 cm² with V_{max} <4 m/s or mean ΔP <40 mmHg; dobutamine stress echocardiography shows AVA \leq1 cm² with V_{max} \geq4 m/s at any flow rate D3: AVA \leq1 cm² with V_{max} <4 m/s or mean ΔP <40 mmHg AND stroke volume index <35 mL/m² measured in a normotensive patient 	Exertional dyspnea, angina, syncope or presyncope, heart failure, exercise intolerance

Abbreviations: AR indicates aortic regurgitation; AS aortic stenosis; AVA, aortic valve area circulation; AVAi, aortic valve area indexed to body surface area; LVEF, left ventricular ejection fraction; ΔP , pressure gradient between the left ventricle and aorta; and V_{max} , maximum velocity.

Evaluation of the Patient With Known or Suspected Native VHD



Abbreviations: CW indicates continuous wave; LV, left ventricle; PASP, pulmonary artery systolic pressure; PW, pulsed wave; RV, right ventricle; TTE, transthoracic echocardiography; and VHD, valvular heart disease.

Additional Diagnostic Evaluation in VHD

Pre-procedural Testing Required Before Valve Intervention

Dental examination

Rules out potential infection sources

CT coronary or invasive coronary angiogram

Gives an assessment of coronary anatomy

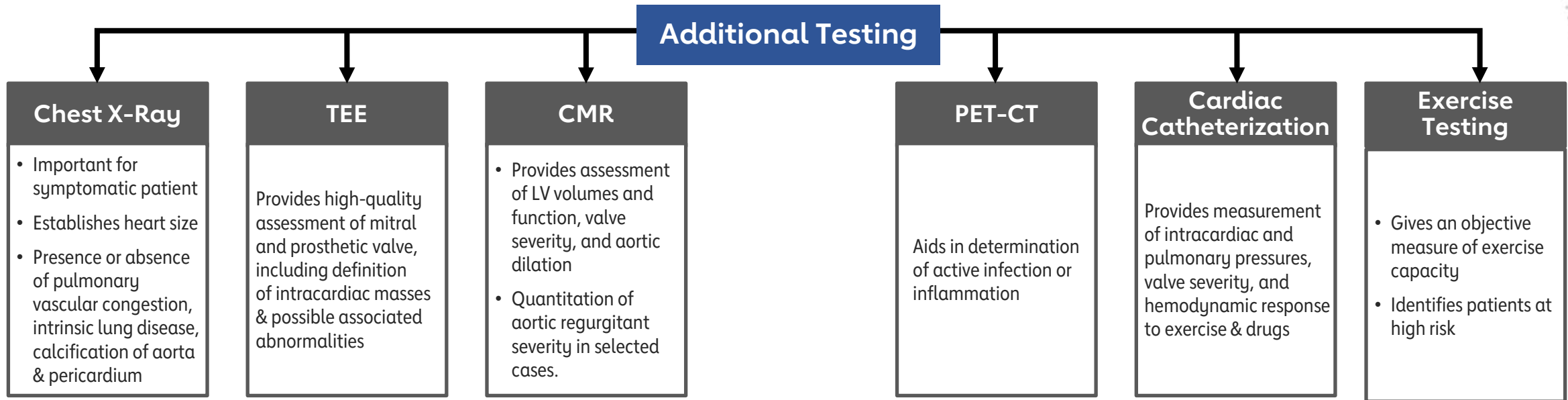
CT: Peripheral

Assesses femoral access for TAVI and other transcatheter procedures

CT: Cardiac

Assesses suitability for TAVI and other transcatheter procedures

Additional Diagnostic Evaluation in VHD



Abbreviations: CW indicates continuous wave; LV, left ventricle; PASP, pulmonary artery systolic pressure; PW, pulsed wave; RV, right ventricle; TTE, transthoracic echocardiography; and VHD, valvular heart disease.

The Multidisciplinary Heart Valve Team and Heart Valve Centers

COR	LOE	Recommendations
1	C-EO	1. Patients with severe VHD should be evaluated by a Multidisciplinary Heart Valve Team (MDT) when intervention is considered.
2a	C-LD	2. Consultation with or referral to a Primary or Comprehensive Heart Valve Center is reasonable when treatment options are being discussed for: 1) asymptomatic patients with severe VHD, 2) patients who may benefit from valve repair versus valve replacement, 3) patients with multiple comorbidities for whom valve intervention is considered.

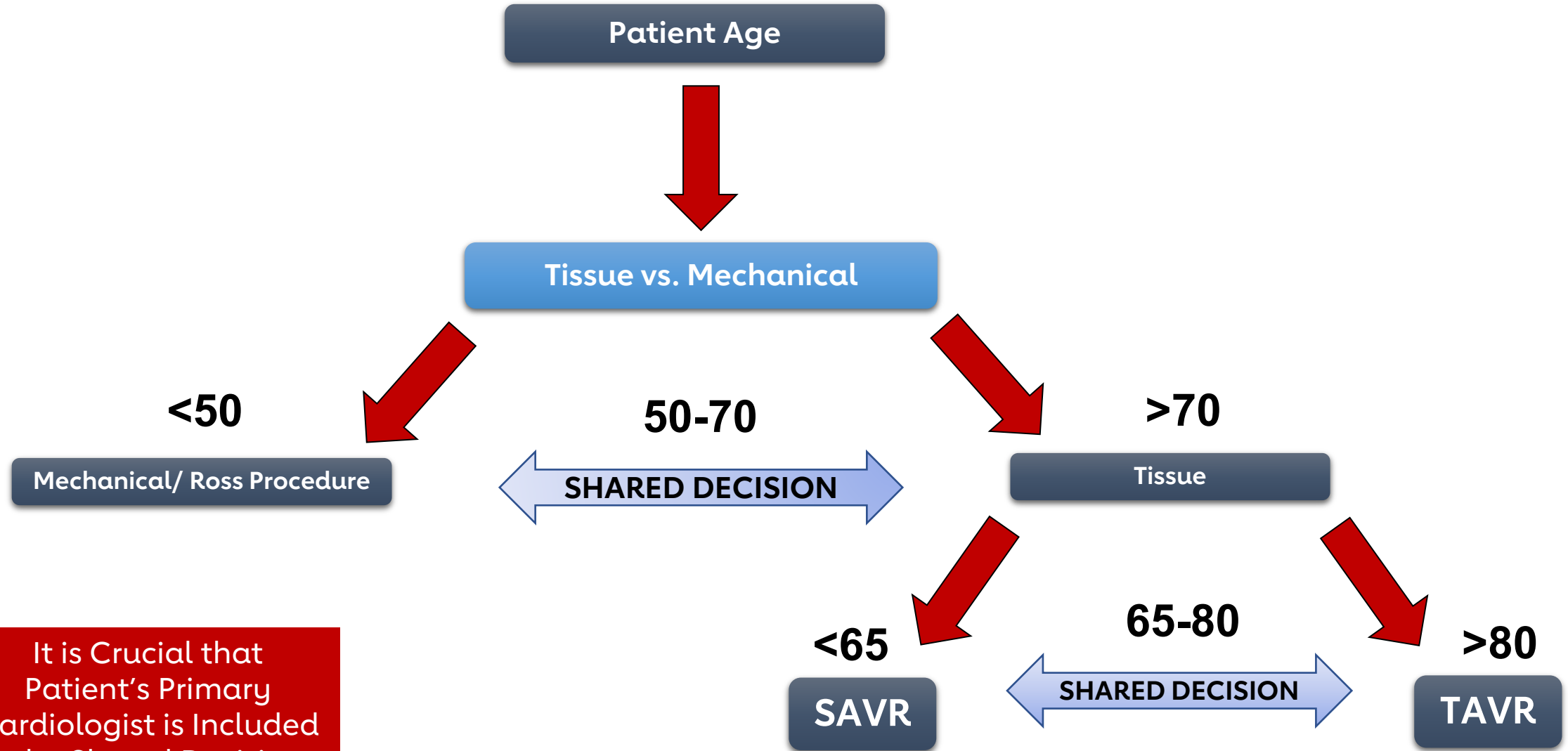
A Simplified Framework With Examples of Factors Favoring SAVR, TAVI, or Palliation Instead of Aortic Valve Intervention

	Favors SAVR	Favors TAVI	Favors Palliation
Age/life expectancy*	<ul style="list-style-type: none"> Younger age/longer life expectancy 	<ul style="list-style-type: none"> Older age/fewer expected remaining years of life 	<ul style="list-style-type: none"> Limited life expectancy
Valve anatomy	<ul style="list-style-type: none"> BAV Subaortic (LV outflow tract) calcification Rheumatic valve disease Small or large aortic annulus† 	<ul style="list-style-type: none"> Calcific AS of a trileaflet valve 	
Prosthetic valve preference	<ul style="list-style-type: none"> Mechanical or surgical bioprosthetic valve preferred Concern for patient–prosthesis mismatch (annular enlargement might be considered) 	<ul style="list-style-type: none"> Bioprosthetic valve preferred Favorable ratio of life expectancy to valve durability TAVI provides larger valve area than same size SAVR 	
Concurrent cardiac conditions	<ul style="list-style-type: none"> Aortic dilation‡ Severe primary MR Severe CAD requiring bypass grafting Septal hypertrophy requiring myectomy AF 	<ul style="list-style-type: none"> Severe calcification of the ascending aorta (“porcelain” aorta) 	<ul style="list-style-type: none"> Irreversible severe LV systolic dysfunction Severe MR attributable to annular calcification

Table 14. A Simplified Framework With Examples of Factors Favoring SAVR, TAVI, or Palliation Instead of Aortic Valve Intervention

	Favors SAVR	Favors TAVI	Favors Palliation
Noncardiac conditions		<ul style="list-style-type: none"> Severe lung, liver, or renal disease Mobility issues (high procedural risk with sternotomy) 	<ul style="list-style-type: none"> Symptoms likely attributable to noncardiac conditions Severe dementia Moderate to severe involvement of ≥ 2 other organ systems
Frailty	<ul style="list-style-type: none"> Not frail or few frailty measures 	<ul style="list-style-type: none"> Frailty likely to improve after TAVI 	<ul style="list-style-type: none"> Severe frailty unlikely to improve after TAVI
Estimated procedural or surgical risk of SAVR or TAVI	<ul style="list-style-type: none"> SAVR risk low TAVI risk high 	<ul style="list-style-type: none"> TAVI risk low to medium SAVR risk high to prohibitive 	<ul style="list-style-type: none"> Prohibitive SAVR risk (>15%) or post-TAVI life expectancy <1 year
Procedure-specific impediments	<ul style="list-style-type: none"> Valve anatomy, annular size, or low coronary ostial height precludes TAVI Vascular access does not allow transfemoral TAVI 	<ul style="list-style-type: none"> Previous cardiac surgery with at-risk coronary grafts Previous chest irradiation 	<ul style="list-style-type: none"> Valve anatomy, annular size, or coronary ostial height precludes TAVI Vascular access does not allow transfemoral TAVI

Clinical Decision Making in Aortic Stenosis



It is Crucial that Patient's Primary Cardiologist is Included in the Shared Decision-Making Process

Recommendations for choice of SAVR versus TAVI

COR	LOE	Recommendations
1	A	1. For symptomatic and asymptomatic patients with severe AS and any indication for AVR who are <65 years of age or have a life expectancy >20 years, SAVR is recommended. ¹⁻³
1	A	2. For symptomatic patients with severe AS who are 65 to 80 years of age and have no anatomic contraindication to transfemoral TAVI, either SAVR or transfemoral TAVI is recommended after shared decision-making about the balance between expected patient longevity and valve durability. ^{1,4-8}
1	A	3. For symptomatic patients with severe AS who are >80 years of age or for younger patients with a life expectancy <10 years and no anatomic contraindication to transfemoral TAVI, transfemoral TAVI is recommended in preference to SAVR. ^{1,4-10}
1	B-NR	4. In asymptomatic patients with severe AS and an LVEF <50% who are ≤80 years of age and have no anatomic contraindication to transfemoral TAVI, the decision between TAVI and SAVR should follow the same recommendations as for symptomatic patients in Recommendations 1, 2, and 3 above. ^{1,2,4-10}

Imaging After Valve Intervention

Valve Intervention	Minimal Imaging Frequency
Bicuspid Aortic Valve Replacement	Continue monitoring if post aortic valve replacement aortic diameter ≥ 4 cm
SURGICAL	
<i>Mechanical Valve</i>	Baseline
<i>Bioprosthetic Valve</i>	Baseline, 5 & 10 years post surgery, then annually
<i>Mitral Valve Repair</i>	Baseline, 1 year, then every 2 to 3 years
TRANSCATHETER	
<i>Bioprosthetic Valve</i>	Baseline, then annually
<i>Mitral Valve Repair</i>	Baseline, then annually

Abbreviations: cm indicates centimeters; LV, left ventricle; and PA, pulmonary artery.

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