

Aortic Regurgitation Bicuspid Aortic Valve 2020 Valvular Heart Disease Guideline

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Circulation

ACC/AHA CLINICAL PRACTICE GUIDELINE

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

AORTIC REGURGITATION

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Acute Aortic Regurgitation



• Causes:

- > Abnormalities of the valve (endocarditis)
- > Abnormalities of the aorta (aortic dissection)
- > **latrogenic** complication of a transcatheter procedure
- Blunt chest trauma
- Consequence:
 - Severe pulmonary congestion
 - Low forward cardiac output

Diagnosis of Acute AR



• TTE & TEE

- Indicators of elevated LV end-diastolic pressure
 - 1. Al pressure half-time of <300 ms
 - 2. Early closure of the mitral valve
 - 3. Degree of **holodiastolic flow reversal** in the aortic arch, in comparison with the forward systolic flow

Acute Severe AI in the context of Aortic Dissection



CT angiography

TTE (type A dissection) Sensitivity : 60-80% Specificity : 60-80% TEE (type A dissection) Sensitivity : 98-100% Specificity : 95-100%

MRI???

Intervention for Acute AR



- Medical therapy to reduce LV afterload
- Surgery should not be delayed, especially in
 - Hypotension
 - Pulmonary edema
 - Evidence of low flow





Chronic AR



- High-income countries
 - BAV disease
 - Primary diseases of the ascending aorta or the sinuses of Valsalva
- Low- to middle-income countries
 - Rheumatic heart disease
- Calcific valve disease
 - Regurgitation often accompanies AS
 - The degree of regurgitation usually is mild to moderate, not severe

Stage	Definition	Valve Anatomy	Valve Hemodynamics	Hemodynamic Consequences	Symptoms
A	At risk of AR	BAV (or other congenital valve anomaly) Aortic valve sclerosis Diseases of the aortic sinuses or ascending aorta History of rheumatic fever or known rheumatic heart disease IE	AR severity: none or trace	None	None
В	Progressive AR	Mild to moderate calcification of a trileaflet valve BAV (or other congenital valve anomaly) Dilated aortic sinuses Rheumatic valve changes Previous IE	Mild AR: Jet width <25% of LVOT Vena contracta <0.3 cm Regurgitant volume <30 mL/ beat Regurgitant fraction <30% ERO <0.10 cm ² Angiography grade 1 Moderate AR: Jet width 25%–64% of LVOT Vena contracta 0.3–0.6 cm Regurgitant volume 30–59 mL/ beat Regurgitant fraction 30% to 49% ERO 0.10–0.29 cm ² Angiography grade 2	Normal LV systolic function Normal LV volume or mild LV dilation	None

C	Asymptomatic severe AR	Calcific aortic valve disease Bicuspid valve (or other congenital abnormality) Dilated aortic sinuses or ascending aorta Rheumatic valve changes IE with abnormal leaflet closure or perforation	Severe AR: Jet width \geq 65% of LVOT Vena contracta $>$ 0.6 cm Holodiastolic flow reversal in the proximal abdominal aorta Regurgitant volume \geq 60 mL/ beat Regurgitant fraction \geq 50% ERO \geq 0.3 cm ² Angiography grade 3 to 4 In addition, diagnosis of chronic severe AR requires evidence of LV dilation	C1: Normal LVEF (>55%) and mild to moderate LV dilation (LVESD <50 mm) C2: Abnormal LV systolic function with depressed LVEF (<55%) or severe LV dilation (LVESD >50 mm or indexed LVESD >25 mm/m ²)	None; exercise testing is reasonable to confirm symptom status
D	Symptomatic severe AR	Calcific valve disease Bicuspid valve (or other congenital abnormality) Dilated aortic sinuses or ascending aorta Rheumatic valve changes Previous IE with abnormal leaflet closure or perforation	Severe AR: Doppler jet width \geq 65% of LVOT Vena contracta >0.6 cm Holodiastolic flow reversal in the proximal abdominal aorta Regurgitant volume \geq 60 mL/ beat Regurgitant fraction \geq 50% ERO \geq 0.3 cm ² Angiography grade 3 to 4 In addition, diagnosis of chronic severe AR requires evidence of LV dilation	Symptomatic severe AR may occur with normal systolic function (LVEF >55%), mild to moderate LV dysfunction (LVEF 40% to 55%), or severe LV dysfunction (LVEF <40%) Moderate to severe LV dilation is present	Exertional dyspnea or angina or more severe HF symptoms







Diagnosis of chronic Al



Recommendations for Diagnostic Testing of Chronic AR Referenced studies that support the recommendations are summarized in Online Data Supplement 14.

COR	LOE	Recommendations
1	B-NR	 In patients with signs or symptoms of <u>AR, TTE</u> is indicated for assessment of the cause and severity of regurgitation, LV size and systolic function, prognosis, and timing of valve intervention.^{1–19}
1	B-NR	 In patients with a <u>BAV</u> or with known <u>dilation</u> of the aortic sinuses or ascending aorta, <u>TTE</u> is indicated to evaluate the presence and severity of AR.¹
1	B-NR	3. In patients with moderate or severe AR and suboptimal TTE images or a discrepancy between clinical and TTE findings, TEE, CMR, or cardiac catheterization is indicated for the assessment of LV systolic function, systolic and diastolic volumes, aortic size, and AR severity. ^{20–25}

Medical Therapy



Recommendations for Medical Therapy of Chronic AR Referenced studies that support the recommendations are summarized in Online Data Supplement 14.

COR	LOE	Recommendations
1	B-NR	 In asymptomatic patients with chronic AR (Stages B and C), <u>treatment of hypertension</u> (systolic blood pressure >140 mm Hg) is recommended.^{1–3}
1	B-NR	2. In patients with severe AR who have symptoms and/or LV systolic dysfunction (Stages C2 and D) but a prohibitive surgical risk, GDMT for reduced LVEF with <u>ACE</u> inhibitors, ARBs, and/or sacubitril/valsartan is recommended. ⁴



- Vasodilating drugs in the *absence of systemic hypertension* in patients with significant AR
 - Reduction in severity of AR
 - Alteration of the disease course



• Beta blockers:

Transaortic stroke volume increases
 Paradoxical apparent *increase in blood pressure*.

ACE inhibitors & ARBs:

Do not affect heart rate

Reduce systolic blood pressure without a substantial reduction in diastolic blood pressure



Points



- Even among symptomatic patients with a severe reduction in LVEF (<35%), AVR results in improved survival rate.
- Indexing LV size for body size is important, particularly in women or small patients.
- <u>TAVI?</u>
 - Dilation of the aortic annulus and aortic
 - Lack of sufficient leaflet calcification
 - Transcatheter valve migration
 - Significant paravalvular leak

Bicuspid Aortic Valve

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Recommendations for Diagnostic Testing: Initial Diagnosis of BAV Referenced studies that support the recommendations are summarized in Online Data Supplement 18.





Bicuspid Aortic Valve



- 0.5% to 2.0% of adults
- 3:1 <u>male-to-female</u> predominance
- <u>Aortic aneurysms</u> : **20% to 40%** of patients with BAV (independent of valve function)
- **13% to 30%** : moderate or greater <u>AR</u>
- **12% to 37%** : moderate or greater <u>AS</u>
- <u>Coarctation</u> of aorta should be evaluated
- In about 20% to 30% of patients with a BAV, other <u>family</u> members also have a BAV and/or an associated aortopathy



Recommendations for Diagnostic Testing: Routine Follow-Up of Patients With a BAV

Referenced studies that support the recommendations are summarized in Online Data Supplement 18.

COR	LOE	Recommendations
2a	C-LD	1. In patients with BAV and a diameter of the aortic sinuses or ascending aorta of \geq 4.0 cm, lifelong serial evaluation of the size and morphology of the aortic sinuses and ascending aorta by echocardiography, CMR, or CT angiography is reasonable, with the examination interval determined by the degree and rate of progression of aortic dilation and by family history. ^{1–5}
2a	B-NR	 In patients with a BAV who have undergone AVR, continued lifelong serial interval imaging of the aorta is reasonable if the diameter of the aortic sinuses or ascending aorta is ≥4.0 cm.^{6,7}

Aortic imaging in BAV



- At least **annual** imaging of aorta:
 - Aortic diameter >4.5 cm

- More frequent monitoring:
 - Rapid rate of change in aortic diameter
 - Family history of aortic dissection



Recommendations for Intervention: Replacement of the Aorta in Patients With a BAV

Referenced studies that support the recommendations are summarized in Online Data Supplement 18.

COR	LOE	Recommendations
1	B-NR	 In asymptomatic or symptomatic patients with a BAV and a diameter of the <u>aortic</u> <u>sinuses or ascending aorta >5.5 cm</u>, operative intervention to replace the aortic sinuses and/ or the ascending aorta is recommended.^{1–3}
2a	B-NR	2. In asymptomatic patients with a BAV, a diameter of the aortic sinuses or ascending aorta of 5.0 to 5.5 cm, and an additional risk factor for dissection (eg, family history of aortic dissection, aortic growth rate >0.5 cm per year, aortic coarctation), operative intervention to replace the aortic sinuses and/or the ascending aorta is reasonable if the surgery is performed at a Comprehensive Valve Center. ^{3,4}

Recommendations for Intervention: Replacement of the Aorta in Patients With a BAV (Continued)

COR	LOE	Recommendations
2a	B-NR	3. In patients with a BAV with indications for SAVR and a diameter of the aortic sinuses or ascending aorta ≥4.5 cm, replacement of the aortic sinuses and/or ascending aorta is reasonable if the surgery is performed at a Comprehensive Valve Center. ^{4–7}
2b	C-LD	4. In patients with a BAV who meet criteria for replacement of the aortic sinuses, valve-sparing surgery may be considered if the surgery is performed at a Comprehensive Valve Center. ^{8,9}
2b	B-NR	5. In asymptomatic patients with a BAV who are at low surgical risk, have a diameter of the aortic sinuses or ascending aorta of 5.0 to 5.5 cm, and have no additional risk factors for dissection, operative intervention to replace the aortic sinuses and/or the ascending aorta may be considered if the surgery is performed at a Comprehensive Valve Center. ^{4–7,10–14}







Thanks