

Aortic Valve Practice Guidelines: What Has Changed and What You Need to Know



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Disclosure

Dr. Burke has no conflicts of interest to report.



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CLINICAL PRACTICE GUIDELINE: FOCUSED UPDATE

2017 AHA/ACC Focused Update of the 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease

A Report of the American College of Cardiology/American Heart Association
Task Force on Clinical Practice Guidelines

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ESC

European Society
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ESC/EACTS GUIDELINES

2017 ESC/EACTS Guidelines for the management of valvular heart disease

**The Task Force for the Management of Valvular Heart Disease of
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Aortic Stenosis

- Aortic stenosis is the most common primary valve disease leading to surgery or catheter intervention
- Due to the aging population, prevalence is increasing



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- Valve intervention should be decided by a Valve Heart Team - integrated, multidisciplinary approach including surgeons and cardiologists



- **Severe aortic stenosis**
- Asymptomatic severe aortic stenosis
- Low flow-low gradient aortic stenosis
- Surgical aortic valve replacement (SAVR) versus transcatheter aortic valve replacement (TAVR)



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Severe Aortic Stenosis

- High gradient
 - Severe
 - Peak velocity > 4 m/s
 - Mean gradient > 40 mmHg
 - Valve area < 1 cm²



Severe Aortic Stenosis

- All symptomatic patients require aortic valve replacement
- Exceptions:
 - Severe comorbidities – intervention unlikely to improve quality of life
 - Survival less than one year
- No lower limit on left ventricular ejection fraction



Symptomatic Severe Aortic Stenosis

- **Aortic valve replacement indicated**
- No medical treatment can improve outcome
- Statins do not affect progression
- Do not exercise a patient with symptomatic severe aortic stenosis



- Severe aortic stenosis
- **Asymptomatic severe aortic stenosis**
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Asymptomatic – Severe Aortic Stenosis

- Aortic valve replacement indications:
 - Depressed left ventricular systolic function not due to other cause
 - Exercise test – symptoms clearly related to aortic stenosis
 - Exercise test – BP drop to below baseline
 - Peak velocity > 5.5 m/s (ACC > 5 m/s or mean gradient > 60 mm)
 - Severe valve calcification and rapid progression of stenosis/gradient



Asymptomatic – Severe Aortic Stenosis

Aortic valve replacement indications:

- BNP level > 3 x normal
- PA systolic > 60 mmHg

- Deleted from 2012 Guidelines
 - Increase in aortic gradient > 20 mm with exercise
 - Excessive LV hypertrophy



Asymptomatic – Severe Aortic Stenosis

- Predictors of symptom development and adverse outcomes
 - Older age
 - Atherosclerotic risk factors
 - Valve calcification
 - Peak aortic jet velocity
 - Rate of hemodynamic progression
 - Increase in > 20 mm Hg gradient with exercise
 - Excessive LV hypertrophy
 - Abnormal longitudinal LV function
 - Pulmonary hypertension
 - Elevated BNP



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Asymptomatic – Severe Aortic Stenosis

- Predictors of symptom development and adverse outcomes
 - Early elective surgery in such instances – low operative risk
 - Watchful waiting safe
 - Early surgery unlikely to be beneficial



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Asymptomatic Aortic Stenosis

- Wide variability in rate of progression
- Patient education
 - Need for regular follow-up
 - Report symptoms as soon as they develop
- Stress testing should determine recommended level of physical activity



Asymptomatic Aortic Stenosis Frequency of Echocardiography

- Severe - every 6-12 months
- Moderate - every 1-2 years
- Mild and Moderate aortic stenosis with significant calcification - yearly
- Younger patient - mild stenosis and little or no calcification – every 2-5 years



- Severe aortic stenosis
- Asymptomatic severe aortic stenosis
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Low Flow, Low Gradient Aortic Stenosis with Reduced Ejection Fraction (< 50%)

- Stroke volume index ≤ 35 ml/m²
- Mean gradient < 40 mmHg
- Peak velocity < 4 m/s
- Valve area < 1cm²



Low Flow, Low Gradient with Reduced Ejection Fraction

- Dobutamine echocardiogram separates:
 - Severe aortic stenosis
 - Pseudosevere aortic stenosis
 - No contractile reserve



Low Flow, Low Gradient Aortic Stenosis with Reduced Ejection Fraction

- Dobutamine – contractile reserve assessment results in:
 - Increase of stroke volume $> 20\%$
 - Mean gradient > 40 mmHg
 - Peak velocity > 4 m/s
 - Valve area remains $< 1\text{cm}^2$
- Diagnosis: severe aortic stenosis
- Treatment: aortic valve replacement



Low Flow, Low Gradient With Reduced Ejection Fraction

- Dobutamine results in:
 - Increase in stroke volume $> 20\%$
 - Mean gradient remains < 40 mmHg
 - Peak velocity remains < 4 m/s
 - Valve area now calculates $> 1\text{cm}^2$
- Diagnosis: Pseudosevere aortic stenosis
- Treatment: Conventional treatment for heart failure



Low Flow, Low Gradient With Reduced Ejection Fraction Without Contractile (Flow) Reserve

- Dobutamine results in:
 - Inability to increase stroke volume 20%
 - Mean gradient remains < 40 mmHg
 - Peak velocity remains < 4 m/s
 - Valve area remains $< 1\text{cm}^2$
- Diagnosis: Uncertain if severe aortic stenosis or not



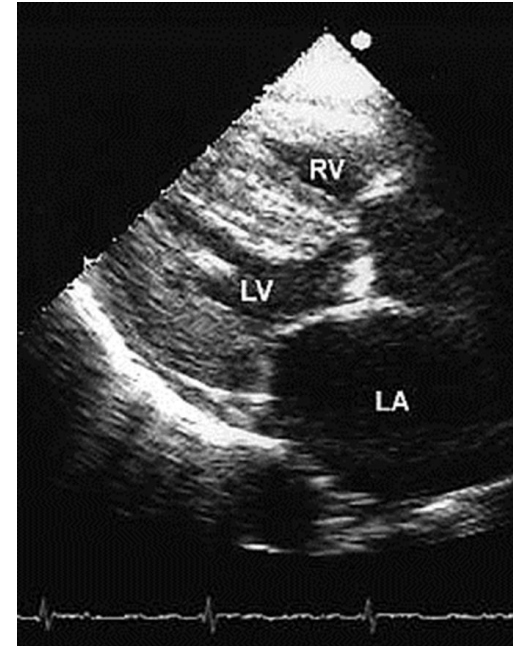
Low Flow, Low Gradient With Reduced Ejection Fraction Without Contractile (Flow) Reserve

- Further Evaluation:
 - Consider degree of valve calcification by multislice CT
 - Severe AS likely: Men > 2000 Women > 1200
 - Severe AS unlikely: Men < 1600 Women < 800
- Treatment:
 - This group does poorly with medical or surgical treatment
 - Consider aortic valve replacement if CT scans confirms severe calcification



Low Flow, Low Gradient Aortic Stenosis with Preserved Ejection Fraction (> 50%)

- Stroke volume index < 35 ml/m²
- Mean gradient < 40 mm
- Peak velocity < 4 m/s
- Valve area < 1 cm²
- Seen in elderly
 - Small LV cavity
 - Marked LV hypertrophy
 - Often with hypertension



Low Flow, Low Gradient Aortic Stenosis with Preserved Ejection Fraction (> 50%)

- Evaluation:
 - **MUST** exclude measurement errors for low stroke volume by echocardiographic findings (LVOT measurement by 3D, TEE, CT, CMR)
 - Consider degree of valve calcification by multislice CT
 - Do not perform Dobutamine infusion
- Treatment:
 - Consider aortic valve replacement if corroborative testing confirms low stroke volume and severe valve calcification



Normal flow, low gradient aortic stenosis with preserved ejection fraction (> 50%)

- Stroke volume index > 35 ml/m²
- Mean gradient < 40 mmHg
- Peak velocity < 4 m/s
- Valve area > 1cm²
- Diagnosis: Moderate aortic stenosis
- Recommendation: serial follow-up



Aortic Stenosis

- Retrograde LV catheterization to assess aortic stenosis severity is no longer routinely performed
- Its use is restricted to inconclusive non-invasive investigation



- Severe aortic stenosis
- Asymptomatic severe aortic stenosis
- Low flow-low gradient aortic stenosis
- **Surgical aortic valve replacement (SAVR) versus transcatheter aortic valve replacement (TAVR)**



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SAVR vs. TAVR

- TAVR data limited
 - Patients < 75
 - Surgical low risk group
 - Bicuspid valves
 - Long-term data lacking (SAVR has shown long-term proven durability)
- TAVR may be considered for bioprosthesis failure
- SAVR not TAVR is indicated at present for:
 - Low risk patients*
 - Asymptomatic patients*

*Ongoing trials – Partner 3 and Early TAVR



TAVR vs. SAVR

Complications

- Higher with TAVR
 - Vascular complications
 - Pacemaker implantation
 - Paravalvular regurgitation
- Higher with SAVR
 - Severe bleeding
 - Acute kidney injury
 - New onset atrial fibrillation
- Equal
 - Stroke risk



SAVR vs. TAVR

- STS Score
- Risk
 - High > 8%
 - Intermediate 4-8%
 - Low < 4%
- Other Risks
 - Porcelain aorta
 - Prior chest irradiation
 - Frailty
 - Hostile chest, especially if LIMA crossing sternum



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SAVR with CABG or Aortic Root Surgery

- Moderate aortic stenosis
- Baseline peak gradient $> 20-30$ mm or peak velocity > 3 m/s in patient
 - < 70 years old
 - Average rate of progression > 5 mmHg/year



Balloon Aortic Valvuloplasty

- Bridge to SAVR or TAVR in hemodynamically unstable patients
- Patients with symptomatic severe aortic stenosis who require urgent, major non-cardiac surgery
- Severe aortic stenosis with other potential causes for symptoms, e.g. lung disease or severe myocardial dysfunction resulting in other organ dysfunction, e.g. pre-renal insufficiency, that may be reversible with valvuloplasty - can escalate to TAVR



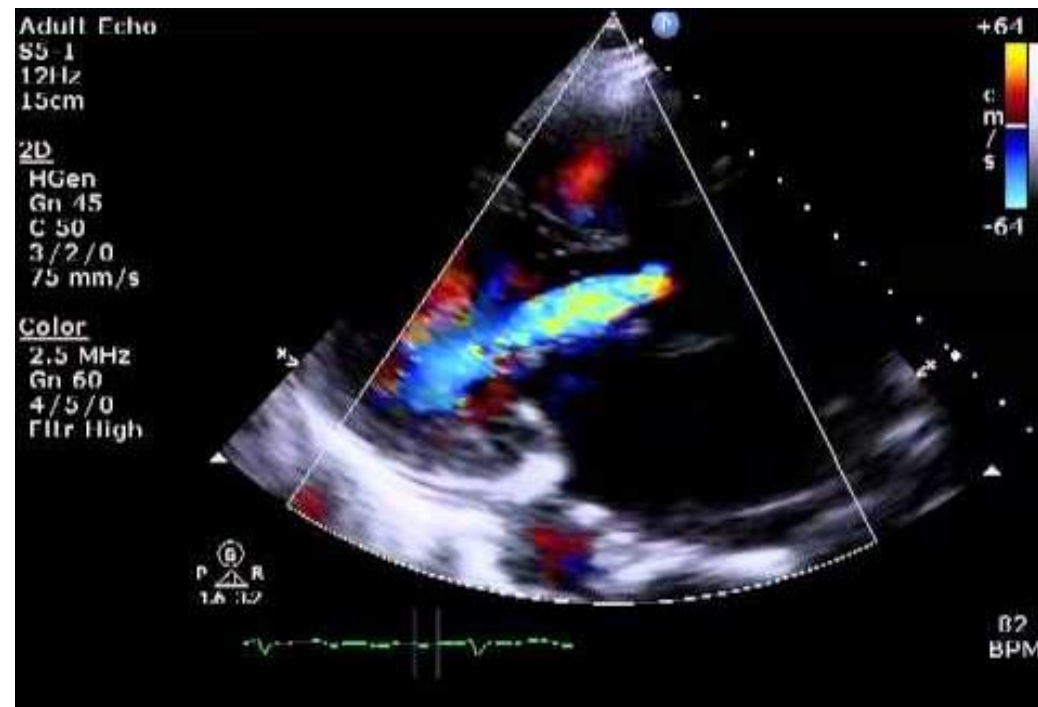
Atrial Fibrillation and Novel Oral Anticoagulants

- Aortic stenosis
 - Subgroup analysis of randomized trials support their use
- Aortic bioprosthesis
 - Guidelines (absence of data) support their use > 3 months after implantation



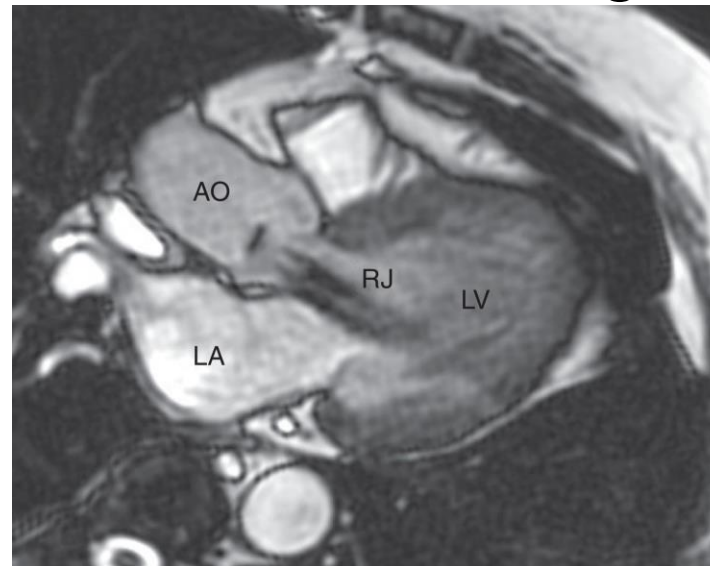
Aortic Regurgitation

- No updates in 2017 ACC/AHA document



Aortic Regurgitation

- Difficult to interpret as severe
 - Vena contracta > 6 mm
 - EROA > 30 cc
 - Regurgitant volume > 60 cc
- CMR provides accurate measures of regurgitant volume and regurgitant fraction



Aortic Regurgitation

- Chronic and severe
 - Left ventricle should be dilated
 - Holodiastolic flow reversal in descending aorta (> 20 cm/s)
 - Pressure half time < 200 ms



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Severe Chronic Aortic Regurgitation

Surgical Indications

- Symptoms
- Depressed LVEF (< 50%)
- Dilated left ventricle
 - LVEDD > 65-70 mm
 - LVESD > 50 mm (> 25 mm/m² BSA)
- Moderate or severe aortic regurgitation while undergoing other cardiac surgery



Aortic Regurgitation

Serial testing

- Mild to moderate – yearly exam
- Severe – every 6 months
- Moderate – echocardiogram every 1-2 years
- Mild – echocardiogram every 3-5 years



Conclusions

Severe Aortic Stenosis – SAVR vs TAVR

- Evaluation by a Multidisciplinary Heart Team
- SAVR for low surgical risk
- SAVR for severe aortic stenosis – asymptomatic patients who meet other criteria
- TAVR for patients with prohibitive surgical risk and life expectancy > 1 year



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Conclusions

- TAVR or SAVR for high or intermediate risk patients
- The indication for TAVR are expanding in clinical trials and clinical practice
- “Shared-Decision Making” - Patient want TAVR - determining when to withhold TAVR is difficult

