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

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Disclosure

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Task Force on Clinical Practice Guidelines

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

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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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
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)
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

• Low flow-low gradient aortic stenosis

• Surgical aortic valve replacement (SAVR) versus transcatheter aortic valve replacement (TAVR)
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
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
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
• Low flow-low gradient aortic stenosis
• Surgical aortic valve replacement (SAVR) versus transcutaneous aortic valve replacement (TAVR)
Low Flow, Low Gradient Aortic Stenosis with Reduced Ejection Fraction (< 50%)

- Stroke volume index $\leq 35 \text{ ml/m}^2$
- Mean gradient $< 40 \text{ mmHg}$
- Peak velocity $< 4 \text{ m/s}$
- Valve area $< 1\text{cm}^2$
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 < 1cm²
- 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 > 1cm²

• 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 < 1cm²

• 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/m$^2$
- Mean gradient < 40 mm
- Peak velocity < 4 m/s
- Valve area < 1 cm$^2$

• 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 corrobative 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)
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
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
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
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