Imaging and intervention

Strengthening aortic stenosis (AS) diagnoses and enabling timely intervention through echocardiography

Severe symptomatic AS is progressive and can quickly become life-threatening

Once mild, average hemodynamic rates worsen per year[1]

+ 0.3 m/s
Increase in velocity

+ 7 mmHg
Increase in mean pressure gradient

- 0.1cm²
Decrease in valve area

Considering hemodynamic parameters is essential for accurate evaluations and timely aortic valve replacement (AVR)

Severe, symptomatic patients face an increasing probability of death while waiting for treatment[2]

11.6% at 6 months post recommendation for AVR[3]

Hemodynamic parameters defined by AHA/ACC guidelines[2]

Stage	Definition	Valve hemodynamics			Hemodynamic consequences
		Aortic valve area	Aortic V_{max}	Mean pressure gradient	
C1	Asymptomatic severe AS	**Typically AVA ≤ 1.0 cm²** (or AVAi ≤ 0.6 cm²/m²)	≥ 4 m/s or	≥ 40 mm Hg	• LV diastolic dysfunction • Mild LV hypertrophy • Normal LVEF
C2	Asymptomatic severe AS with LV dysfunction				• LVEF < 50%
D1	Symptomatic severe high gradient AS				• LV diastolic dysfunction • LV hypertrophy • Pulmonary hypertension may be present
D2	Symptomatic severe low-flow/ low-gradient with reduced LVEF	**AVA ≤ 1.0 cm²**	< 4 m/s or	< 40 mm Hg	• LV diastolic dysfunction • LV hypertrophy • LVEF < 50%
D3	Symptomatic severe low-gradient with normal LVEF or paradoxical low-flow	**AVA ≤ 1.0 cm²** (AVAi ≤ 0.6 cm²/m²) **and stroke volume index < 35 ml/m² measured when patient is normotensive***			• Increased LV relative wall thickness • Small LV chamber with low stroke volume • Restrictive diastolic filling • LVEF ≥ 50%

*systolic blood pressure < 140 mmHg

Optimal imaging is crucial to determine timing of intervention for severe AS which, once symptomatic, is critical for survival.

Edwards