

Diagnostic Challenges and Undertreatment in Low-Flow, Low-Gradient (LF-LG) Aortic Stenosis (AS)

Severe aortic stenosis (SAS), also known as heart valve failure, is progressive and can quickly become life-threatening¹

Following treatment recommendation, **1 in 10 symptomatic SAS (sSAS) patients can die within 5 weeks** while awaiting AVR. Their risk of death only increases with time.²



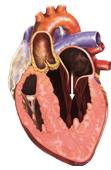

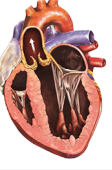
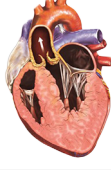
Optimizing your assessment is crucial

LF-LG AS can be especially difficult to identify, requiring further evaluation beyond standard echocardiograms.³

As many as
35%
of patients are
diagnosed with LF-LG AS³

67%
of the LF-LG AS patient
population are undertreated⁴

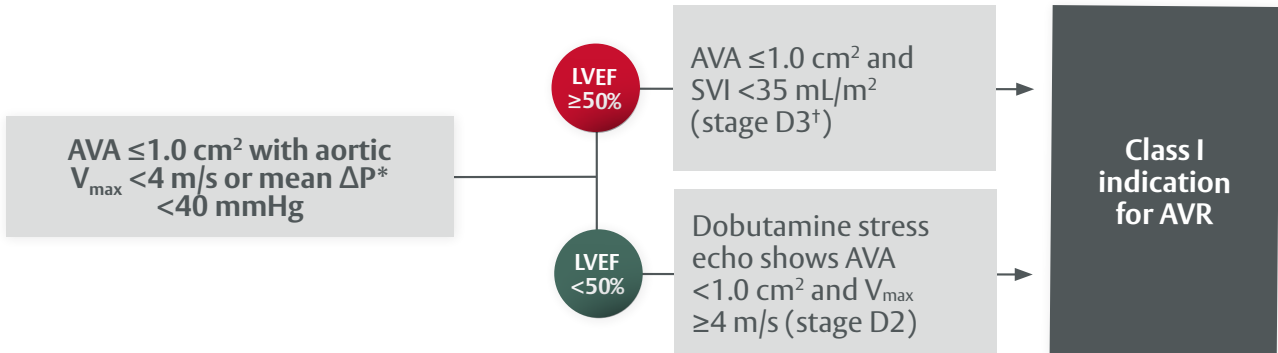
In LF-LG AS, the key parameters may be discordant^{5,6}

	D1 High-Gradient	D2 Low-Flow, Low-Gradient, Reduced LVEF	D3 Paradoxical Low-Flow, Low-Gradient, Preserved LVEF
Diastole			
Systole			
Diagnosis criteria	<ul style="list-style-type: none"> • AVA typically $\leq 1.0 \text{ cm}^2$ but may be larger with mixed AS/AR • Aortic $V_{\max} \geq 4 \text{ m/s}$ or mean $\Delta P \geq 40 \text{ mmHg}$ 	<ul style="list-style-type: none"> • AVA $\leq 1.0 \text{ cm}^2$ with resting aortic $V_{\max} < 4 \text{ m/s}$ or mean $\Delta P < 40 \text{ mmHg}$ • Dobutamine stress echo shows AVA $< 1.0 \text{ cm}^2$ with $V_{\max} \geq 4 \text{ m/s}$ at any flow rate • LVEF $< 50\%$ 	<ul style="list-style-type: none"> • AVA $\leq 1.0 \text{ cm}^2$ with aortic $V_{\max} < 4 \text{ m/s}$ or mean $\Delta P < 40 \text{ mmHg}$ AND • SVI $< 35 \text{ mL/m}^2$ • Measured when patient is normotensive (SBP $< 140 \text{ mmHg}$) • LVEF $\geq 50\%$

AR=aortic regurgitation; AVA=aortic valve area; AVR=aortic valve replacement; LVEF=left ventricular ejection fraction; SBP=systolic blood pressure; SVI=stroke volume index.

Understanding the morphology by sSAS state is important³

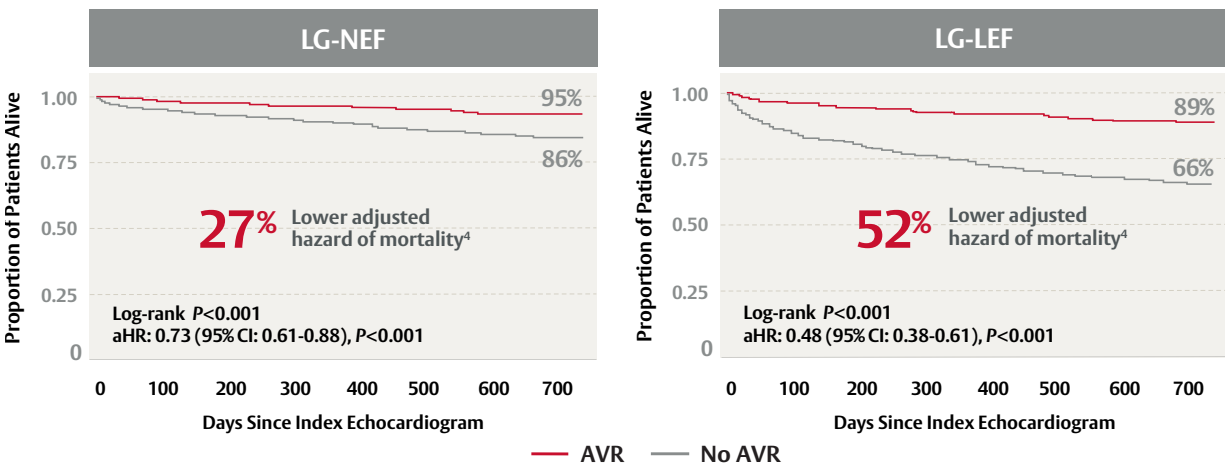
AVA and SVI are key diagnostic measurements in LF-LG AS⁵



*Pressure gradient between the left ventricle and aorta.⁵
 †Measured when patient is normotensive (systolic blood pressure <140 mmHg).⁵

One benefit of a Heart Valve Team referral is full evaluation for low-flow SAS states.⁵

Although patients with LF-LG AS are less likely to receive AVR, there is a significant survival benefit^{4,7}



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aHR=adjusted hazard ratio; CI=confidence interval; LG-LEF=low-gradient, low ejection fraction; LG-NEF=low-gradient, normal ejection fraction.

References: 1. Lancellotti P, Magne J, Dulgheru R, et al. Outcomes of patients with asymptomatic aortic stenosis followed up in heart valve clinics. *JAMA Cardiol.* 2018;3(11):1060-1068. 2. Malaisrie SC, McDonald E, Kruse J, et al. Mortality while waiting for aortic valve replacement. *Ann Thorac Surg.* 2014;98(5):1564-1571. 3. Clavel MA, Magne J, Pibarot P. Low-gradient aortic stenosis. *Eur Heart J.* 2016;37(34):2645-2657. 4. Li SX, Patel NK, Flannery LD, et al. Trends in utilization of aortic valve replacement for severe aortic stenosis. *J Am Coll Cardiol.* 2022;79(9):864-877. 5. Otto CM, Nishimura RA, Bonow RO, et al. 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. *Circulation.* 2021;143(5):e72-e227. 6. Pibarot P, Dumesnil JG. Low-flow, low-gradient aortic stenosis with normal and depressed left ventricular ejection fraction. *J Am Coll Cardiol.* 2012;60(19):1845-1853. 7. Dumesnil JG, Pibarot P, Carabello B. Paradoxical low flow and/or low gradient severe aortic stenosis despite preserved left ventricular ejection fraction: implications for diagnosis and treatment. *Eur Heart J.* 2010;31(3):281-289.

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