**LOW GRADIENT SEVERE AORTIC STENOSIS: ECHO FEATURES AND CLINICAL SIGNIFICANCE**

**P.A. Pellikka**

Mayo Clinic, Rochester, MN, USA

Current practice guidelines define severe aortic stenosis (AS) as aortic valve (AV) area less than1 cm² and mean AV gradient greater than 40 mmHg. Low gradient severe AS refers to the condition of mismatch between an AV area which suggests severe AS and mean gradient which is less than 40 mm Hg. Factors which can account for this discrepancy include echocardiographic measurement error, especially underestimation of the left ventricular outflow tract diameter, and small body size. Additionally, there is inherent incongruence between mean gradient and AV area; according to the Gorlin formula, AV area of .8cm² corresponds to a mean gradient of 40 mm Hg. Because gradient is a squared function of flow, a mild reduction in flow will impact gradient. Reduced ejection fraction (EF) may account for lower gradient. Stroke volume should be assessed; low flow, defined as less than 35 mL/m², is associated with increased mortality. When this is present, the potential contribution of other cardiovascular diseases such as mitral regurgitation and constrictive pericarditis to low flow should be considered. In true low flow, low gradient severe AS, concentric hypertrophy, smaller left ventricular cavity and restrictive physiology are often present. Strain imaging may reveal systolic dysfunction despite preserved EF. Compared to high gradient severe AS, the development of low output, low gradient severe AS is associated with greater increase in valvulo-arterial impedance during progression from moderate AS. Optimal timing of intervention with AV replacement is important in severe AS; obstruction often results in adverse ventricular remodeling. Valve replacement should be considered in the patient with low gradient AS if there is compelling evidence that stenosis is severe and the patient remains symptomatic despite optimal treatment of hypertension.