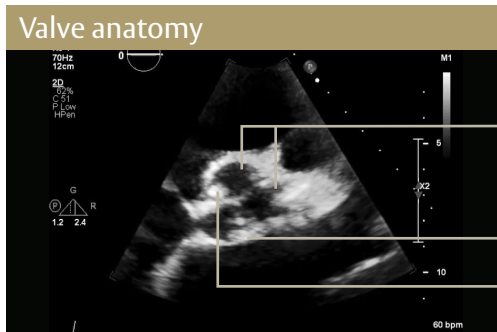


Echocardiographic assessment of the aortic valve

Recommendations for data measurements and aortic stenosis (AS) quantification^{1,2}

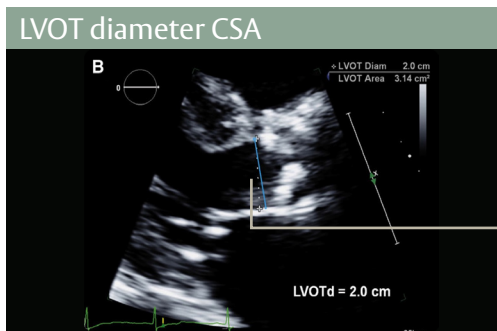
Echocardiographic images



Identify number of cusps in systole, raphe if present

Assess cusp mobility and commissural fusion

Assess valve calcification



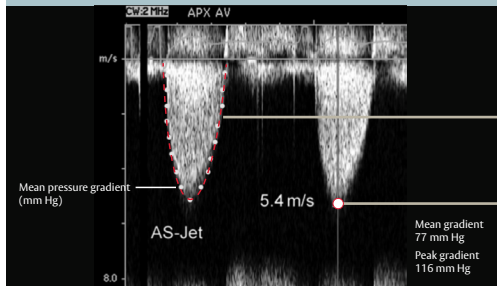
① LVOT diameter measurements should be made at the same anatomic level as the velocity recording

Diameter is used to calculate a circular cross-sectional area (CSA)

Inner edge of the septal endocardium and the anterior mitral leaflet in mid-systole

Parallel and adjacent to aortic valve or at the site of velocity measurement

AV jet velocity and VTI – CW Doppler sample

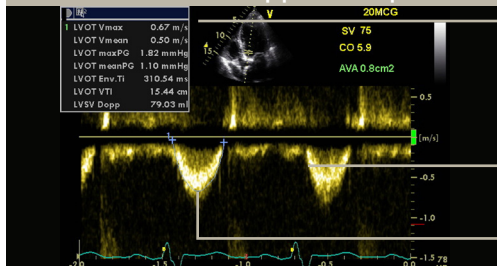


① Misalignment of the ultrasound beam with the AS jet can result in significant underestimation of the jet velocity and pressure gradient

Velocity time integral (VTI) traced from modal velocity

Maximum velocity from peak of dense velocity curve

LVOT VTI – PW – Doppler sample

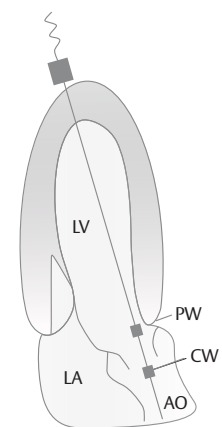
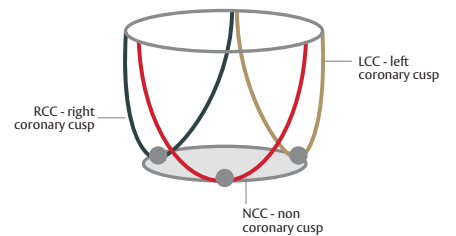
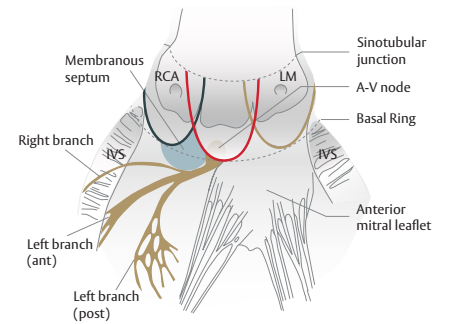


Report window where maximum velocity and mean gradient are obtained

VTI traced from outer edge of dense signal

Maximum velocity at peak of dense velocity curve. Avoid noise and fine linear signals

Anatomical reference images



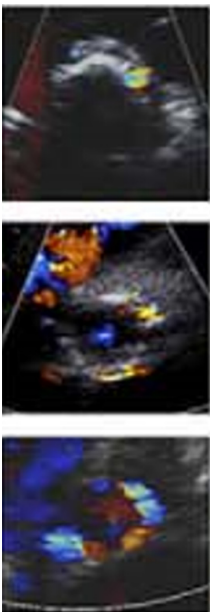
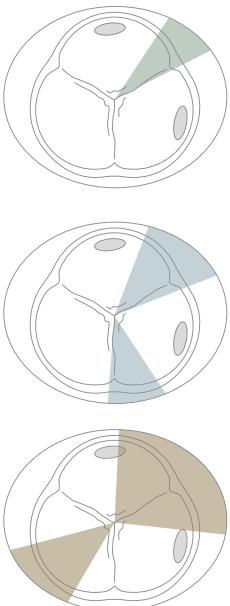
Limitations and key considerations

Additional considerations for AS diagnosis and common pitfalls during PVL assessment

Limitations often seen with key data measurements	
Measurement	Limitations and key considerations
AS jet velocity	<ul style="list-style-type: none"> Correct measurement requires parallel alignment of ultrasound beam Flow dependent
Mean gradient	<ul style="list-style-type: none"> Accurate pressure gradients depend on accurate velocity data Flow dependent
Continuity equation valve area $AVA = (CSA_{LVOT} \times VTI_{LVOT}) / VTI_{AV}$	<ul style="list-style-type: none"> Requires LVOT diameter and flow velocity data, along with aortic velocity Measurement error more likely
LVOT diameter (cross sectional area)	<ul style="list-style-type: none"> LVOT becomes progressively more elliptical (rather than circular) in many patients, which may result in underestimation of LVOT CSA In presence of calcium, measure to the native leaflet Take multiple measurements
Velocity Ratio and VTI Ratio, Dimensionless Index (DI) Velocity ratio = V_{LVOT} / V_{AV}	<ul style="list-style-type: none"> DI is another approach to reducing error related to LVOT area measurements (by removing LVOT CSA from continuity equation) Use to check AVA when there are discordant measurements Use when AV prosthetic valve in place

Post-procedural paravalvular leak (PVL) assessment and grading^{3,4}

PVL scoring

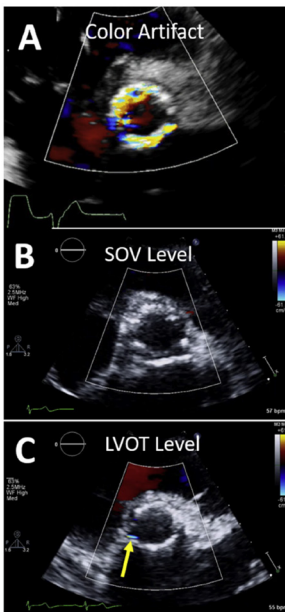



- Mild < 10%
- 10% ≤ Mod ≤ 29%
- Severe ≥ 30%

SAX: Number of jets and size at origin

LAX: Jet area and length, not used for quantification

Watchouts⁵



A Color Artifact

B SOV Level

C LVOT Level

References:

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