B.1.2. MVA Planimetry (Level 1 Recommendation). Theoretically, planimetry using 2D echocardiography of the mitral orifice has the advantage of being a direct measurement of MVA and, unlike other methods, does not involve any hypothesis regarding flow conditions, cardiac chamber compliance, or associated valvular lesions. In practice, planimetry has been shown to have the best correlation with anatomical valve area as assessed on explanted valves.[47] For these reasons, planimetry is considered as the reference measurement of MVA.[1,2]

Planimetry measurement is obtained by direct tracing of the mitral orifice, including opened commissures, if applicable, on a parasternal short-axis view. Careful scanning from the apex to the base of the LV is required to ensure that the CSA is measured at the leaflet tips. The measurement plane should be perpendicular to the mitral orifice, which has an elliptical shape (Figure 8).

Gain setting should be just sufficient to visualize the whole contour of the mitral orifice. Excessive gain setting may cause underestimation of valve area, in particular when leaflet tips are dense or calcified. Image magnification, using the zoom mode, is useful to better delineate the contour of the mitral orifice. The correlation data on planimetry was performed with fundamental imaging and it is unclear whether the use of harmonic imaging improves planimetry measurement.

The optimal timing of the cardiac cycle to measure planimetry is mid-diastole. This is best performed using the cineloop mode on a frozen image.

It is recommended to perform several different measurements, in particular in patients with atrial fibrillation and in those who have incomplete commissural fusion (moderate MS or after commissurotomy), in whom anatomical valve area may be subject to slight changes according to flow conditions.

Although its accuracy justifies systematic attempts to perform planimetry of MS, it may not be feasible even by experienced echocardiographers when there is a poor acoustic window or severe distortion of valve anatomy, in particular with severe valve calcifications of the leaflet tips. Although the percentage of patients in whom planimetry is not feasible has been reported as low as 5%, this number highly depends on the patient population.[48] The above-mentioned problems are more frequent in the elderly who represent a significant proportion of patients with MS now in industrialized countries.[49]

Another potential limitation is that the performance of planimetry requires technical expertise. Not all echocardiographers have the opportunity to gain the appropriate experience because of the low prevalence of MS in industrialized countries. The measurement plane must be optimally positioned on the mitral orifice. Recent reports suggested that real-time 3D echo and 3D-guided biplane imaging is useful in optimizing the positioning of the measurement plane and, therefore, improving reproducibility.[50,51] It also improves the accuracy of planimetry measurement when performed by less experienced echocardiographers.[52]

In the particular case of degenerative MS, planimetry is difficult and mostly not reliable because of the orifice geometry and calcification present.

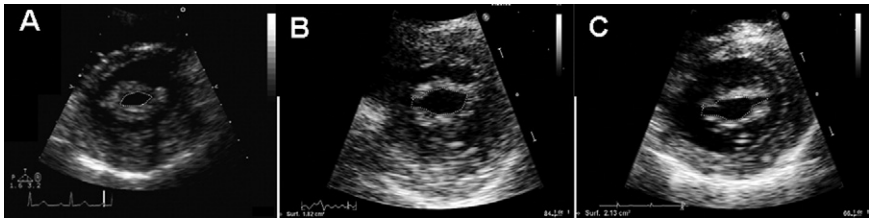

Table 9 Recommendations for classification of mitral stenosis severity

	Mild	Moderate	Severe
Specific findings			
Valve area (cm^2)	>1.5	1.0–1.5	<1.0
Supportive findings			
Mean gradient (mmHg)[a]	<5	5–10	>10
Pulmonary artery pressure (mmHg)	<30	30–50	>50

[a]At heart rates between 60 and 80 bpm and in sinus rhythm.