

**CLINICAL PRACTICE GUIDELINES:
ECHOCARDIOGRAMS FOR MITRAL REGURGITATION**

Target Audience:

These guidelines are intended for physicians and advance practice practitioners in both the outpatient and inpatient settings.

Scope/Patient Population:

The intent of these Clinical Practice Guidelines is to provide a concise summary of the recommended standardized process for conducting an echocardiogram to evaluate a patient for mitral valve disease.

Rationale:

Using a consistent, integrative approach to all echoes done to determine severity of mitral regurgitation will help to eliminate discrepancies in echo reports and will help providers make appropriate treatment decisions for patients.

Objective

Improve quality and consistency of echo data collected.

Recommendations

It is recommended that echocardiograms should follow a standardized process for patients with mitral valve regurgitation.

Recommended for Standard Clinical Practice – appropriate in all patients with MR:

1. Color Flow interrogation – PLAX/PSAX views
2. Calculate Vena Contracta – PLAX View – Narrowest portion of regurgitant flow
3. MR CW VTI – Apical 4Ch View
4. LA Volume Index – Biplane (A4C, A2C)
5. Mitral Inflow – PW Doppler
6. Pulmonary Vein Flow Reversal - PW Doppler

Recommended for Moderate or greater Mitral Regurgitation

1. PISA (Flow Convergence Method) – IF MORE THAN MILD MR
 - RADIUS – point of Doppler aliasing to the VC
 - MR VTI (CW)

Suggested Alternate Measures/Evaluation of Mitral Regurgitation severity when applicable:

1. Regurgitant Volume
2. Regurgitant Fraction
3. Color M-Mode – A4C

Reporting Recommendations:

1. MV Morphology; Regurgitation Severity; Appropriate measurements selected

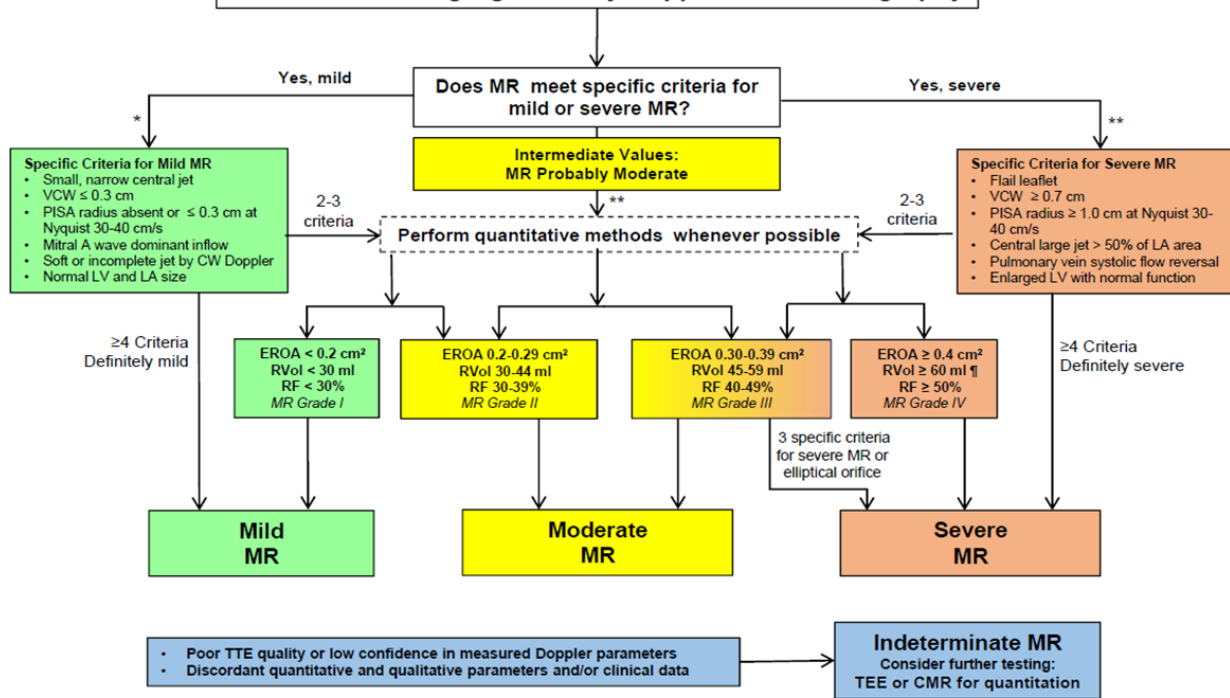
Technical Aspects, Optimization

1. Color Gain – High Color gain that eliminates color speckle from nonmoving regions
2. Nyquist Limit – Recommended 50-70 cm/sec
3. Transducer Frequency (Higher Freq = Larger Jet) - Optimize
4. Blood Pressure at time of exam

Table 1 Echocardiographic parameters in the comprehensive evaluation of valvular regurgitation

Parameters	
Clinical information	Symptoms and related clinical findings
	Height/weight/body surface area
	Blood pressure and heart rate
Imaging of the valve	Motion of leaflets: prolapse, flail, restriction, tenting of atrioventricular valves, valve coaptation
	Structure: thickening, calcifications, vegetations
	Annular size/dilatation
Doppler echocardiography of the valve	Site of origin of regurgitation and its direction in the receiving chamber by color Doppler
	The three color Doppler components of the jet: flow convergence, VC, and jet area
	Density of the jet velocity signal, CW
	Contour of the jet in MR and TR, CW
	Deceleration rate or pressure half-time in AR and PR, CW
	Flow reversal in pulmonary/hepatic veins (MR, TR); in aorta/PA branches (AR, PR)
Quantitative parameters for regurgitation	LV and RV filling dynamics (MR, TR)
	PISA optimization for calculation of RVol and EROA
	Valve annular diameters and corresponding pulsed Doppler for respective SV calculations and derivation of RVol and RF
3D echocardiography*	Optimization of LV chamber quantitation (contrast when needed)
	Localization of valve pathology, particularly with TEE
	LV/RV volumes calculation
	Measured EROA
Other echocardiographic data	Automated quantitation of flow and RVol by 3D color flow Doppler [†]
	LV and RV size, function, and hypertrophy
	Left and right atrial size
	Concomitant valvular disease
	Estimation of PA pressure

Chronic Mitral Regurgitation by Doppler Echocardiography



*	Beware of underestimation of MR severity in eccentric, wall impinging jets; quantitation is advised
**	All values for EROA by PISA assume holosystolic MR; single frame EROA by PISA and VCW overestimate non-holosystolic MR
¶	Regurgitant volume for severe MR may be lower in low flow conditions.

Table 8 Grading the severity of chronic MR by echocardiography

	MR severity*			
	Mild	Moderate	Severe	
Structural				
MV morphology	None or mild leaflet abnormality (e.g., mild thickening, calcifications or prolapse, mild tenting)	Moderate leaflet abnormality or moderate tenting	Severe valve lesions (primary: flail leaflet, ruptured papillary muscle, severe retraction, large perforation; secondary: severe tenting, poor leaflet coaptation)	
LV and LA size [†]	Usually normal	Normal or mild dilated	Dilated [‡]	
Qualitative Doppler				
Color flow jet area [§]	Small, central, narrow, often brief	Variable	Large central jet (>50% of LA) or eccentric wall-impinging jet of variable size	
Flow convergence	Not visible, transient or small	Intermediate in size and duration	Large throughout systole	
CWD jet	Faint/partial/parabolic	Dense but partial or parabolic	Holosystolic/dense/triangular	
Semiquantitative				
VCW (cm)	<0.3	Intermediate	≥0.7 (>0.8 for biplane) [¶]	
Pulmonary vein flow [#]	Systolic dominance (may be blunted in LV dysfunction or AF)	Normal or systolic blunting [#]	Minimal to no systolic flow/ systolic flow reversal	
Mitral inflow**	A-wave dominant	Variable	E-wave dominant (>1.2 m/sec)	
Quantitative^{††,‡‡}				
EROA, 2D PISA (cm ²)	<0.20	0.20-0.29	0.30-0.39	≥0.40 (may be lower in secondary MR with elliptical ROA)
RVol (mL)	<30	30-44	45-59 ^{††}	≥ 60 (may be lower in low flow conditions)
RF (%)	< 30	30-39	40-49	≥50

PDCA Plan:
 This guideline will be reviewed and revised by a Cardiologist and the Manager of Cardiovascular Diagnostic Imaging every three years, or sooner if needed, based on current best practice and review of literature.

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