**Methodology and Evidence Review**

The recommendations listed in the guideline are, whenever possible, evidence based. An extensive review was conducted through March 1, 2020. Key search words included, but were not limited to, the following: valvular heart disease, aortic stenosis, aortic regurgitation, bicuspid aortic valve, mitral stenosis, mitral regurgitation, tricuspid stenosis, tricuspid regurgitation, pulmonic stenosis, pulmonic regurgitation, prosthetic valves, anticoagulation therapy, infective endocarditis, cardiac surgery, transcatheter aortic valve replacement or implantation, and percutaneous mitra-clip.

| Author; Year Published | Study Type/Design; Study Size (N) | Patient Population | Primary Endpoint and Results (P values; OR or RR; & 95% CI) | Summary/Conclusion Comment(s) |
|------------------------|----------------------------------|--------------------|-------------------------------------------------------------|--------------------------------|
| Baragiggia et al 1991 (1) | Study type: observational Size: 52 | Inclusion criteria: Patients with MR Exclusion criteria: None | Comparison of PISA to angiographic assessment of MR | Good correlation paving the way for PISA assessment of MR severity |
| Recusani et al 1991 (2) | Study type: Observational in vitro Size: | Inclusion criteria: Varying degrees of MR Exclusion criteria: | 1° endpoint: Results: | Analyzed and validated the PISA method in vitro |
| Tribouilloy et al 1992 (3) | Study type: observational Size: 63 | Inclusion criteria: Varying degrees of MR Exclusion criteria: | 1° endpoint: Compared MR jet width to angiographic parameters Results: Found a jet width of 5.5 mm was specific and sensitive for severe MR | Helped validate quantification methods for MR |
| Tribouilloy et al 2009 (4) | Study type: observational Size: 739 | Inclusion criteria: Severe MR due to flail leaflets Exclusion criteria: | 1° endpoint: Death Results: Survival was superior if ESD /<40 mm | Helps form the basis for the class I rec re ESD and surgical timing |
| Enriquez-Sarano et al 2005 (5) | Study type: Observational Size: 456 | Inclusion criteria: Patients with varying degrees of MR Exclusion criteria: | 1° endpoint: death, heart failure, atrial fibrillation Results: regurgitant orifice area >/= 0.4 cm2 predicted a poor outcome | Helped to define the criteria for “severe” MR |
| Ozdogan et al 2009 (6) | Study type: Observational MRI Size: 21 | Inclusion criteria: Patients with varying degrees of MR Exclusion criteria: | 1° endpoint: Results: Flow area by MRI correlated well with echo measures of MR severity | helped validate MRI as an alternative method for quantifying MR severity |
| Author; Year Published | Study Type/Design; Study Size (N) | Patient Population | Primary Endpoint and Results (P values; OR or RR; & 95% CI) | Summary/Conclusion Comment(s) |
|------------------------|----------------------------------|--------------------|----------------------------------------------------------|--------------------------------|
| Pflugfelder et al 1989 (7) | **Study type:** Observational Size: 26 | **Inclusion criteria:** varying degrees of MR **Exclusion criteria:** | **1° endpoint:** compared signal loss to other measures of MR **Results:** Found that signal loss did correlate well | a study that helped define the use of MRI in quantifying MR |
| Myerson et al 2016 (8) | **Study type:** Observational Size: 109 | **Inclusion criteria:** varying degrees of MR **Exclusion criteria:** | **1° endpoint:** Survival without surgery **Results:** Survival improved when MRI determined regurgitant volume < 55 cc | supported MRI in the quantification of MR |
| Dahm et al 1987 (9) | **Study type:** observational Size: 20 | **Inclusion criteria:** Patients undergoing cardiac surgery **Exclusion criteria:** | **1° endpoint:** none **Results:** | Demonstrated the utility of intra-op TEE in evaluating pts with following MR surgery |
| Saiki et al 1998 (10) | **Study type:** Observational Size: 42 | **Inclusion criteria:** pts undergoing mitral repair **Exclusion criteria:** | **1° endpoint:** Post op MR **Results:** Interop TEE predicted post op MR | A study supporting the use of intra-op TEE to guide repair |

**Abbreviations:** 1° indicates primary; CI, confidence interval; HR, hazard ratio; N/A, not available; OR, odds ratio; and RR, relative risk. MR= Mitral regurgitation; MRI= Magnetic resonance Imaging; PISA= proximal Iso velocity surface area;
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10. Saiki Y, Kasegawa H, Kawase M, et al. Intraoperative TEE during mitral valve repair: does it predict early and late postoperative mitral valve dysfunction? Ann Thorac Surg. 1998;66:1277-81.