Surveillance of Symptomatic Mitral Regurgitation

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Surveillance of Symptomatic Mitral Regurgitation

• How do we evaluate mitral regurgitation?

• How do we evaluate symptoms?

• When do we recommend intervention?

• What intervention should we recommend?
Surveillance of Symptomatic Mitral Regurgitation

- How do we evaluate mitral regurgitation?
- How do we evaluate symptoms?
- When do we recommend intervention?
- What intervention should we recommend?
## Evaluation of Mitral regurgitation: clinical

### Stages of Progression of VHD

<table>
<thead>
<tr>
<th>Stage</th>
<th>Definition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>At risk</td>
<td>Patients with risk factors for development of VHD</td>
</tr>
<tr>
<td>B</td>
<td>Progressive</td>
<td>Patients with progressive VHD (mild-to-moderate severity and asymptomatic)</td>
</tr>
<tr>
<td>C</td>
<td>Asymptomatic severe</td>
<td>Asymptomatic patients who have the criteria for severe VHD:</td>
</tr>
<tr>
<td></td>
<td>C1: Asymptomatic patients with</td>
<td>severe VHD in whom the left or right ventricle remains compensated</td>
</tr>
<tr>
<td></td>
<td>C2: Asymptomatic patients with</td>
<td>severe VHD with decompensation of the left or right ventricle</td>
</tr>
<tr>
<td>D</td>
<td>Symptomatic severe</td>
<td>Patients who have developed symptoms as a result of VHD</td>
</tr>
</tbody>
</table>

Rick A. Nishimura et al. JACC 2014;63:e57-e185
Two Guidelines for Mitral Regurgitation

- American Society of Echocardiography 2017: Evaluation of Native Regurgitation
- American College of Cardiology: 2014 and 2017 update

- MR is not aortic stenosis because it is two separate diseases: Primary and Secondary MR
Primary Severe MR

• Pathology of at least one:
  ✓ Leaflets
  ✓ Chordae tendinae
  ✓ Papillary muscles
  ✓ annulus

• No known medical therapy to change course

• Diuretics and afterload reduction improve symptoms
Primary Mitral Regurgitation

Normal

Fibroelastic Deficiency

Barlow’s Disease
Secondary Severe MR

- Normal mitral valve (all components are normal except for annular dilation)

- Caused by LV dysfunction
Mitral Regurgitation: Two Diseases

- **Primary MR**
  - MVP-myxomatous changes
  - Degenerative changes
  - Infectious
  - Inflammatory
  - Congenital

- **Secondary MR**
  - Ischemic
  - Non ischemic
  - Annular dilation
## Frequency of Monitoring Echocardiograms

<table>
<thead>
<tr>
<th>Stage</th>
<th>Valve Lesion</th>
<th>Aortic Stenosis*</th>
<th>Aortic Regurgitation</th>
<th>Mitral Stenosis</th>
<th>Mitral Regurgitation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Progressive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(stage B)</strong>*</td>
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<tr>
<td></td>
<td></td>
<td>Every 3–5 y</td>
<td>Every 3–5 y (mild</td>
<td>Every 3–5 y</td>
<td>Every 3–5 y (mild</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(mild severity</td>
<td>severity)</td>
<td>(MVA &gt;1.5 cm²)</td>
<td>severity)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vₘₚₙ 2.0–2.9 m/s</td>
<td>Every 1–2 y</td>
<td></td>
<td>Every 1–2 y</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(moderate severity)</td>
<td></td>
<td>(moderate severity)</td>
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<td>Every 1–2 y</td>
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<td></td>
<td>(moderate severity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vₘₚₙ 3.0–3.9 m/s</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Severe</strong></td>
<td></td>
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<tr>
<td><strong>(stage C)</strong>*</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Every 6–12 mo</td>
<td>Every 6–12 mo (mild</td>
<td>Every 1–2 y</td>
<td>Every 6–12 mo (mild</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Vₘₚₙ ≥4 m/s)</td>
<td>severity)</td>
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<td>severity)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Every 6–12 mo</td>
<td></td>
<td>Every 6–12 mo (mild</td>
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<tr>
<td></td>
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<td></td>
<td>(MVA 1.0–1.5 cm²)</td>
<td></td>
<td>severity)</td>
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<td></td>
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<td>Once every year</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(MVA &lt;1.0 cm²)</td>
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</tr>
</tbody>
</table>

Rick A. Nishimura et al. JACC 2014;63:e57-e185
# Stages of Primary MR- Imaging

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
<th>Valve Anatomy</th>
<th>Valve Hemodynamics*</th>
<th>Hemodynamic Consequences</th>
<th>Symptoms</th>
</tr>
</thead>
</table>
| A     | At risk of MR | • Mild mitral valve prolapse with normal coaptation  
• Mild valve thickening and leaflet restriction  
• Prior IE | • No MR jet or small central jet area <20% LA on Doppler  
• Small vena contracta <0.3 cm | • None | • None |
| B     | Progressive MR | • Severe mitral valve prolapse with normal coaptation  
• Rheumatic valve changes with leaflet restriction and loss of central coaptation  
• Prior IE | • Central jet MR 20%–40% LA or late systolic eccentric jet MR  
• Vena contracta <0.7 cm  
• Regurgitant volume <60 mL  
• Regurgitant fraction <50%  
• ERO <0.40 cm²  
• Angiographic grade 1–2+ | • Mild LA enlargement  
• No LV enlargement  
• Normal pulmonary pressure | • None |
| C     | Asymptomatic severe MR | • Severe mitral valve prolapse with loss of coaptation or flail leaflet  
• Rheumatic valve changes with leaflet restriction and loss of central coaptation  
• Prior IE  
• Thickening of leaflets with radiation heart disease | • Central jet MR >40% LA or holosystolic eccentric jet MR  
• Vena contracta ≥0.7 cm  
• Regurgitant volume ≥60 mL  
• Regurgitant fraction ≥50%  
• ERO ≥0.40 cm²  
• Angiographic grade 3–4+ | • Moderate or severe LA enlargement  
• LV enlargement  
• Pulmonary hypertension may be present at rest or with exercise  
• **C1:** LVEF >60% and LVESD <40 mm  
• **C2:** LVEF ≤60% and LVESD ≥40 mm | • None |
| D     | Symptomatic severe MR | • Severe mitral valve prolapse with loss of coaptation or flail leaflet  
• Rheumatic valve changes with leaflet restriction and loss of central coaptation  
• Prior IE  
• Thickening of leaflets with radiation heart disease | • Central jet MR >40% LA or holosystolic eccentric jet MR  
• Vena contracta ≥0.7 cm  
• Regurgitant volume ≥60 mL  
• Regurgitant fraction ≥50%  
• ERO ≥0.40 cm²  
• Angiographic grade 3–4+ | • Moderate or severe LA enlargement  
• LV enlargement  
• Pulmonary hypertension present  
• Decreas ed exercise tolerance  
• Exertional dyspnea | • None |
# Stages of Secondary MR-Imaging

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
<th>Valve Anatomy</th>
<th>Valve Hemodynamics*</th>
<th>Associated Cardiac Findings</th>
<th>Symptoms</th>
</tr>
</thead>
</table>
| A     | At risk of MR              | • Normal valve leaflets, chords, and annulus in a patient with coronary disease or cardiomyopathy | • No MR jet or small central jet area <20\% LA on Doppler  
• Small vena contracta <0.30 cm | • Normal or mildly dilated LV size with fixed (infarction) or inducible (ischemia) regional wall motion abnormalities  
• Primary myocardial disease with LV dilation and systolic dysfunction | • Symptoms due to coronary ischemia or HF may be present that respond to revascularization and appropriate medical therapy |
| B     | Progressive MR             | • Regional wall motion abnormalities with mild tethering of mitral leaflet  
• Annular dilation with mild loss of central coaptation of the mitral leaflets | • ERO <0.20 cm²†  
• Regurgitant volume <30 mL  
• Regurgitant fraction <50% | • Regional wall motion abnormalities with reduced LV systolic function  
• LV dilation and systolic dysfunction due to primary myocardial disease | • Symptoms due to coronary ischemia or HF may be present that respond to revascularization and appropriate medical therapy |
| C     | Asymptomatic severe MR    | • Regional wall motion abnormalities and/or LV dilation with severe tethering of mitral leaflet  
• Annular dilation with severe loss of central coaptation of the mitral leaflets | • ERO ≥0.20 cm²†  
• Regurgitant volume ≥30 mL  
• Regurgitant fraction ≥50% | • Regional wall motion abnormalities with reduced LV systolic function  
• LV dilation and systolic dysfunction due to primary myocardial disease | • Symptoms due to coronary ischemia or HF may be present that respond to revascularization and appropriate medical therapy |
| D     | Symptomatic severe MR     | • Regional wall motion abnormalities and/or LV dilation with severe tethering of mitral leaflet  
• Annular dilation with severe loss of central coaptation of the mitral leaflets | • ERO ≥0.20 cm²†  
• Regurgitant volume ≥30 mL  
• Regurgitant fraction ≥50% | • Regional wall motion abnormalities with reduced LV systolic function  
• LV dilation and systolic dysfunction due to primary myocardial disease | • HF symptoms due to MR persist even after revascularization and optimization of medical therapy  
• Decreased exercise tolerance  
• Exertional dyspnea |
Echo Quantitative Methods of Regurgitation Evaluation

- Regurgitant volume = SV regurgitant valve - SV competent valve
- Regurgitant fraction = Regurgitant volume / SV regurgitant valve
- EROA = Regurgitant volume / VTI regurgitant jet
Measurement of regurgitant volume

\[
SV_{LVOT} = CSA_{LVOT} \times VTI_{LVOT} = 0.785 \times d_{LVOT}^2 \times VTI_{LVOT}
\]

\[
SV_{MV} = CSA_{MV} \times VTI_{MV} = 0.785 \times d_{MV}^2 \times VTI_{MV}
\]
EROA (Effective Regurgitant Orifice Area)

\[
\text{Reg Flow} = 2\pi r^2 \times \text{Va} \\
\text{EROA} = \frac{\text{Reg Flow}}{\text{PKV}_{\text{Reg}}} \\
\text{R Vol} = \text{EROA} \times \text{VTI}_{\text{Reg}}
\]
How does it appear on echo?
But the valve is more competent than it appears...
A Damaged Leaflet...
Physiology follows anatomy
A Flail Leaflet
3D ECHO
CMR Can Also be Used for Quantification

Diastole

Systole

LV Stroke Volume (LVSV):

LVSV = LVEDV - LVESV
LVSV = 250 mL - 100 mL
LVSV = 150 mL

Mitral Regurgitant Volume (M RVol):

M RVol = LVSV - Ao Stroke Volume
M RVol = 150 mL - 80 mL
M RVol = 70 mL

Is echo the correct tool to assess MR?

[Diagrams showing comparison of MRI and Echo in Chronic Mitral Regurgitation and Ventricular Response to Isolated Mitral Surgery]
Seth Uretsky et al. JACC 2015;65:1078-1088
### ASE Recommendations for Noninvasive Evaluation of Native Valvular Regurgitation

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

• Mixed disease- unclear which came first

• Mixed disease- unclear which is the major contributor to MR

• Degree of prolapse/tenting does not correspond to severity of MR
Chronic Mitral Regurgitation by Doppler Echocardiography

Does MR meet specific criteria for mild or severe MR?

Intermediate Values: MR Probably Moderate

Perform quantitative methods whenever possible

Specific Criteria for Mild MR
- Small, narrow central jet
- Vcw ≤ 0.3 cm
- PISA radius absent or ≤ 0.3 cm at Nyquist 30-40 cm/s
- Mitral A wave dominant inflow
- Soft or incomplete jet by CW Doppler
- Normal LV and LA size

≥4 Criteria
Definitely mild

Mild MR

- EROA < 0.2 cm²
- RVol ≤ 30 ml
- RF < 30%
- MR Grade I

Moderate MR

- EROA 0.2-0.29 cm²
- RVol 30-44 ml
- RF 30-39%
- MR Grade II

- EROA 0.30-0.39 cm²
- RVol 45-50 ml
- RF 40-49%
- MR Grade III

Severe MR

- EROA ≥ 0.4 cm²
- RVol ≥ 60 ml
- RF ≥ 50%
- MR Grade IV

≥4 Criteria
Definitely severe

Indeterminate MR
Consider further testing: TEE or CMR for quantitation

- Poor TTE quality or low confidence in measured Doppler parameters
- Discordant quantitative and qualitative parameters and/or clinical data

* 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.
Surveillance of Symptomatic Mitral Regurgitation

• How do we evaluate mitral regurgitation?

• How do we evaluate symptoms?

• When do we recommend intervention?

• What intervention should we recommend?
Correlation of degree of MR to symptoms
1. Exercise testing is reasonable in selected patients with asymptomatic severe VHD to 1) confirm the absence of symptoms, or 2) assess the hemodynamic response to exercise, or 3) determine prognosis \((44-48)\). \((Level \ of \ Evidence: \ B)\)
Hemodynamic Characteristics in Significant Symptomatic and Asymptomatic Primary Mitral Valve Regurgitation at Rest and During Exercise.

Bakkestrom, Rine; Banke, Ann; Christensen, Nicolaj; MD, PhD; Pecini, Redi; Irmukhamedov, Akhmadjon; MD, PhD; Andersen, Mads; MD, PhD; Borlaug, Barry; Moller, Jacob; MD, PhD

DOI: 10.1161/CIRCIMAGING.117.007171

Figure 1. Resting and exercise pulmonary capillary wedge pressure (PCWP), mean pulmonary artery pressure (PAP), cardiac index (CI), and peak oxygen consumption (VO2 max) in asymptomatic (Asymp) and symptomatic (Symp) subjects. Upper limit of the confidence interval is marked.
Figure 3. Development of mean pulmonary artery pressure in relation to the corresponding cardiac index at rest and 4 levels of exercise in symptomatic and asymptomatic subjects. SE of the mean is marked.
Hemodynamic Characteristics in Significant Symptomatic and Asymptomatic Primary Mitral Valve Regurgitation at Rest and During Exercise.
Bakkestrom, Rine; Banke, Ann; Christensen, Nicolaj; MD, PhD; Pecini, Redi; Irmukhamedov, Akhmadjon; MD, PhD; Andersen, Mads; MD, PhD; Borlaug, Barry; Moller, Jacob; MD, PhD
Circulation: Cardiovascular Imaging. 11(2):e007171, February 2018. DOI: 10.1161/CIRCIMAGING.117.007171

Figure 4. Correlation between peak oxygen consumption and resting left ventricular (LV) stroke volume index.
Figure 5. Correlation between delta VO2 (change from rest to peak exercise) and delta cardiac index (CI; change from rest to peak exercise) in asymptomatic and symptomatic subjects.
If a watchful waiting approach is pursued, periodic TTE is critical to examine the patient for changes in LV function and pulmonary pressure in determining the proper timing of surgery.
ASYMPTOMATIC PATIENTS WITH SEVERE MR

Robert Zilberszac et al. JIMG 2018;11:1213-1221
Survival Free from:
- Any Event
- Symptoms
- Asymptomatic LV Dilatation or Dysfunction
- Asymptomatic PH/AF
- Endocarditis

Robert Zilberszac et al. JIMG 2018;11:1213-1221
Surveillance of Symptomatic Mitral Regurgitation

- How do we evaluate mitral regurgitation?
- How do we evaluate symptoms?
- When do we recommend intervention?
- What intervention should we recommend?
### When is intervention recommended?

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Evidence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>MV surgery is recommended for symptomatic patients with chronic severe primary MR (stage D) and LVEF &gt;30%</td>
<td>I B</td>
</tr>
<tr>
<td>MV surgery is recommended for asymptomatic patients with chronic severe primary MR and LV dysfunction (LVEF 30%–60% and/or LVESD ≥40 mm, stage C2)</td>
<td>I B</td>
</tr>
<tr>
<td>MV repair is recommended in preference to MVR when surgical treatment is indicated for patients with chronic severe primary MR limited to the posterior leaflet</td>
<td>I B</td>
</tr>
<tr>
<td>MV repair is recommended in preference to MVR when surgical treatment is indicated for patients with chronic severe primary MR involving the anterior leaflet or both leaflets when a successful and durable repair can be accomplished</td>
<td>I B</td>
</tr>
<tr>
<td>Concomitant MV repair or replacement is indicated in patients with chronic severe primary MR undergoing cardiac surgery for other indications</td>
<td>I B</td>
</tr>
<tr>
<td>MV repair is reasonable in asymptomatic patients with chronic severe primary MR (stage C1) with preserved LV function (LVEF &gt;60% and LVESD &lt;40 mm) in whom the likelihood of a successful and durable repair without residual MR is &gt;95% with an expected mortality rate of &lt;1% when performed at a Heart Valve Center of Excellence</td>
<td>Ila B</td>
</tr>
<tr>
<td>MV repair is reasonable for asymptomatic patients with chronic severe nonrheumatic primary MR (stage C1) and preserved LV function in whom there is a high likelihood of a successful and durable repair with 1) new onset of AF or 2) resting pulmonary hypertension (PA systolic arterial pressure &gt;50 mm Hg)</td>
<td>Ila B</td>
</tr>
<tr>
<td>Concomitant MV repair is reasonable in patients with chronic moderate primary MR (stage B) undergoing cardiac surgery for other indications</td>
<td>Ila C</td>
</tr>
<tr>
<td>MV surgery may be considered in symptomatic patients with chronic severe primary MR and LVEF ≤30% (stage D)</td>
<td>IIb C</td>
</tr>
<tr>
<td>MV repair may be considered in patients with rheumatic mitral valve disease when surgical treatment is indicated if a durable and successful repair is likely or if the reliability of long-term anticoagulation management is questionable</td>
<td>IIb B</td>
</tr>
<tr>
<td>Transcatheter MV repair may be considered for severely symptomatic patients (NYHA class III/IV) with chronic severe primary MR (stage D) who have a reasonable life expectancy but a prohibitive surgical risk because of severe comorbidities</td>
<td>IIb B</td>
</tr>
<tr>
<td>MVR should not be performed for treatment of isolated severe primary MR limited to less than one half of the posterior leaflet unless MV repair has been attempted and was unsuccessful</td>
<td>B</td>
</tr>
</tbody>
</table>
Class I Indications for Surgery

- MV surgery is recommended for **symptomatic** patients with chronic severe primary MR (stage D) and LVEF >30%

- MV surgery is recommended for **asymptomatic** patients with chronic severe primary MR and LV dysfunction (LVEF 30%–60% and/or LVESD ≥40 mm, stage C2)

- Concomitant MV repair or replacement is indicated in patients with chronic severe primary MR undergoing cardiac surgery for other indications
What if you needed CABG?
Time-to-Event Curves for Major Adverse Cardiac or Cerebrovascular Events (MACCE).


Hazard ratio, 0.97 (95% CI, 0.66–1.42)
P=0.88

No. at Risk

<table>
<thead>
<tr>
<th></th>
<th>Month</th>
<th>0</th>
<th>6</th>
<th>12</th>
<th>18</th>
<th>24</th>
<th>24</th>
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<tbody>
<tr>
<td>MV repair</td>
<td>126</td>
<td>96</td>
<td>84</td>
<td>77</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MV replacement</td>
<td>125</td>
<td>87</td>
<td>83</td>
<td>76</td>
<td>50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Two year outcomes of MV repair with CABG for moderate MR

• Although MR improved and wall motion scores improved, there was no difference in mortality and there were greater adverse events (neurologic and arrhythmic)
What about if you have severe AS?

Impact of Preoperative Moderate/Severe Mitral Regurgitation on 2-Year Outcome After Transcatheter and Surgical Aortic Valve Replacement: Insight From the Placement of Aortic Transcatheter Valve (PARTNER) Trial Cohort A.

Barbanti, Marco; Webb, John; Hahn, Rebecca; Feldman, Ted; Boone, Robert; Smith, Craig; Kodali, Susheel; Zajarias, Alan; Thompson, Christopher; Green, Philip; Babaliaros, Vasilis; Makkar, Raj; Szeto, Wilson; Douglas, Pamela; McAndrew, Tom; Hueter, Irene; Miller, D; Leon, Martin


DOI: 10.1161/CIRCULATIONAHA.113.003885
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• What intervention should we recommend?
Percutaneous Repair of a Mitral Valve.
MITRA-FR trial

No. at Risk
Control group  152  123  109  94  86  80  73
Intervention group  151  114  95  91  81  73  67
Among patients with severe secondary mitral regurgitation, the rate of death or unplanned hospitalization for heart failure at 1 year did not differ significantly between patients who underwent percutaneous mitral-valve repair in addition to receiving medical therapy and those who received medical therapy alone.
COAPT
• Among patients with heart failure and moderate-to-severe or severe secondary mitral regurgitation who remained symptomatic despite the use of maximal doses of guideline-directed medical therapy, transcatheter mitral-valve repair resulted in a lower rate of hospitalization for heart failure and lower all-cause mortality within 24 months of follow-up than medical therapy alone.

• The rate of freedom from device-related complications exceeded a prespecified safety threshold.
A case of mitral regurgitation:

• 79 year old woman with recent Whipple procedure for neuroendocrine tumor of the pancreas who presents for dyspnea and orthopnea.

• Told in Portugal that she had a valve problem that needed repair

• Was very active, working on a farm prior to her surgery without any symptoms
Hospital course

- Stress test showed no ischemia
- Difficulty with management of her CHF
- Furosemide 10mg caused hypotension and acute renal failure
- Unable to tolerate any afterload reducing agents due to hypotension
- Multiple episodes of pulmonary edema in the hospital
Hospital course continued

Plan was for patient to have a mitral valve procedure

- Too debilitated and only four weeks from Whipple procedure

- A Mitra clip procedure was performed
One month later...
Outpatient plan

- Patient remained debilitated
- Continued medical therapy
- Complete course of cardiac rehab
- Plan for repeat Mitra clip versus Mitral valve surgery in the future
9 months later...
Is she a success story or a Mitra clip failure?

• To the patient: Success

• In the registry: Failure
Why the discrepancy?

We’re measuring MR incorrectly

MR is a red herring and is unrelated to symptoms or the underlying disease

MR is the visual sign of the disease but not the disease

Mitra clip treatment is different than a surgical treatment
Everest I Trial – feasibility study

• 107 patients- 79% degenerative or combined disease and 21% with pure functional MR
• At 12 months, 6% patients had worsened symptoms. All had mild MR on echo.
• 23 patients with functional MR had similar success
• 80% had improvement from symptoms
• Some patients without significant change in their MR had improvement
Surveillance of Symptomatic Mitral Regurgitation

• Evaluation of mitral regurgitation is complex.

• Symptoms are difficult to elicit.

• Multiple interventions are possible.

• What intervention should we recommend remains an individual question
THANK YOU