2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American Association for Thoracic Surgery, American Society of Echocardiography, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Anesthesiologists, and Society of Thoracic Surgeons

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General Concepts
A. Multiple randomized trials or meta-analysis

B. Single randomized trial or non-randomized studies

C. Consensus, case reports, standard of care
Class I  Benefit >>> risk / Should be

Class IIa  Benefit >> risk/ Reasonable

Class IIb  Benefit ≥ risk/ Could be

Class C  No benefit / harm
Table 1. Applying Class of Recommendation and Level of Evidence to Clinical Strategies, Interventions, Treatments, or Diagnostic Testing in Patient Care* (Updated August 2015) (Used in the 2017 VHD Focused Update)

<table>
<thead>
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<th>CLASS (STRENGTH) OF RECOMMENDATION</th>
<th>Benefit &gt;&gt; Risk</th>
</tr>
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<tbody>
<tr>
<td><strong>CLASS I (STRONG)</strong></td>
<td>Benefit &gt;&gt; Risk</td>
</tr>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>Is recommended</td>
<td></td>
</tr>
<tr>
<td>Is indicated/useful/effective/beneficial</td>
<td></td>
</tr>
<tr>
<td>Should be performed/administered/other</td>
<td></td>
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<tr>
<td>Comparative-Effectiveness Phrases†:</td>
<td></td>
</tr>
<tr>
<td>Treatment/strategy A is recommended/indicated in preference to treatment B</td>
<td></td>
</tr>
<tr>
<td>Treatment A should be chosen over treatment B</td>
<td></td>
</tr>
<tr>
<td><strong>CLASS IIa (MODERATE)</strong></td>
<td>Benefit &gt;&gt; Risk</td>
</tr>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>Is reasonable</td>
<td></td>
</tr>
<tr>
<td>Can be useful/effective/beneficial</td>
<td></td>
</tr>
<tr>
<td>Comparative-Effectiveness Phrases†:</td>
<td></td>
</tr>
<tr>
<td>Treatment/strategy A is probably recommended/indicated in preference to treatment B</td>
<td></td>
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<tr>
<td>It is reasonable to choose treatment A over treatment B</td>
<td></td>
</tr>
<tr>
<td><strong>CLASS IIb (WEAK)</strong></td>
<td>Benefit &gt; Risk</td>
</tr>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>May/might be reasonable</td>
<td></td>
</tr>
<tr>
<td>May/might be considered</td>
<td></td>
</tr>
<tr>
<td>Usefulness/effectiveness is unknown/unclear/uncertain or not well established</td>
<td></td>
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<tr>
<td><strong>CLASS III: No Benefit (MODERATE)</strong></td>
<td>Benefit = Risk</td>
</tr>
<tr>
<td>(Generally, LOE A or B use only)</td>
<td>Benefit = Risk</td>
</tr>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>Is not recommended</td>
<td></td>
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<tr>
<td>Is not indicated/useful/effective/beneficial</td>
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<td>Should not be performed/administered/other</td>
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<tr>
<td><strong>CLASS III: Harm (STRONG)</strong></td>
<td>Risk &gt; Benefit</td>
</tr>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>Potentially harmful</td>
<td></td>
</tr>
<tr>
<td>Causes harm</td>
<td></td>
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<tr>
<td>Associated with excess morbidity/mortality</td>
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<tr>
<td>Should not be performed/administered/other</td>
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<th>LEVEL (QUALITY) OF EVIDENCE‡</th>
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<td><strong>LEVEL A</strong></td>
<td></td>
</tr>
<tr>
<td>High-quality evidence‡ from more than 1 RCT</td>
<td></td>
</tr>
<tr>
<td>Meta-analyses of high-quality RCTs</td>
<td></td>
</tr>
<tr>
<td>One or more RCTs corroborated by high-quality registry studies</td>
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<tr>
<td><strong>LEVEL B-R</strong></td>
<td>(Randomized)</td>
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<tr>
<td>Moderate-quality evidence‡ from 1 or more RCTs</td>
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<tr>
<td>Meta-analyses of moderate-quality RCTs</td>
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<tr>
<td><strong>LEVEL B-NR</strong></td>
<td>(Nonrandomized)</td>
</tr>
<tr>
<td>Moderate-quality evidence‡ from 1 or more well-designed, well-executed nonrandomized studies, observational studies, or registry studies</td>
<td></td>
</tr>
<tr>
<td>Meta-analyses of such studies</td>
<td></td>
</tr>
<tr>
<td><strong>LEVEL C-LD</strong></td>
<td>(Limited Data)</td>
</tr>
<tr>
<td>Randomized or nonrandomized observational or registry studies with limitations of design or execution</td>
<td></td>
</tr>
<tr>
<td>Meta-analyses of such studies</td>
<td></td>
</tr>
<tr>
<td>Physiological or mechanistic studies in human subjects</td>
<td></td>
</tr>
<tr>
<td><strong>LEVEL C-EO</strong></td>
<td>(Expert Opinion)</td>
</tr>
<tr>
<td>Consensus of expert opinion based on clinical experience</td>
<td></td>
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</table>

COR and LOE are determined independently (any COR may be paired with any LOE). A recommendation with LOE C does not imply that the recommendation is weak. Many important clinical questions addressed in guidelines do not lend themselves to clinical trials. Although RCTs are unavailable, there may be a very clear clinical consensus that a particular test or therapy is useful or effective.

† The outcome or result of the intervention should be specified (an improved clinical outcome or increased diagnostic accuracy or incremental prognostic information).

‡ For comparative-effectiveness recommendations (COR I and IIa; LOE A and B only), studies that support the use of comparator verbs should involve direct comparisons of the treatments or strategies being evaluated.

NEW CONCEPTS!!
Chronic Severe *Secondary* Mitral Regurgitation: Intervention

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<tr>
<th>Recommendations</th>
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<th>LOE</th>
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<tr>
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<td><strong>New:</strong> It is reasonable to choose chordal-sparing MVR over downsized annuloplasty repair if operation is considered for severely symptomatic patients (NYHA class III to IV) with chronic severe ischemic MR (stage D) and persistent symptoms despite optimal GDMT for HF</td>
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<td>B-R</td>
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<td>B</td>
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<td><strong>Modified:</strong> In patients with chronic, moderate, ischemic MR (stage B) undergoing CABG, the usefulness of mitral valve repair is uncertain</td>
<td>IIb</td>
<td>B-R</td>
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</table>
76 yo female // 2013

- S/P IWMI
- Stents to RCA LAD 2013
- LVEF 60%
- Moderate IMR
- Good medical Rx
- PAF

- 2015 NYHA IV (I was on trip)
- Afib
- Severe HF
- Diuresis
- Sinus Rhythm
- Narrow QRS
- Persistent SOB
- Echo
Echo

- LVEDD 64 mm
- LVESD 40mm
- LVEF 60%
- Severe MR
- Rvol 75 cc/beat
- LA 58 cc/m2
- Postero-inf regionals
Adult Echo
X7-2t
20Hz
10cm

2D
73%
C  50
P Off
Gen
CF
48%
6873Hz
WF 618Hz
4.4MHz

PAT T: 37.0°C
TEE T: 39.0°C
What to do?

1. Resynchronization therapy
2. Mitraclip
3. Mitral repair/ complete ring
4. Mitral replacement with chordal preservation
5. Mitral repair/ papillary muscle repositioning and incomplete ring
6. Continue Medical therapy, consider antiarrhythmic
Our patient: What was done...

**Restrictive annuloplasty with complete ring + MAZE**
Philosophic
When submitting a patient to the risk of surgery, we must guarantee*:

- Increased Survival
- Decreased morbidity
- Improvement in symptoms / QOL

Asymptomatic IMR do not treat surgically unless undergoing revascularization
Why IMR?
Echocardiographic
Mitral Valve Mechanisms

Helping Cardiovascular Professionals

Functional
Etiology and Mechanisms in MR
ORGANIC

Excess tissue / length

Triangular resection

99% repair rate
Functional Ischemic repair rate???
2 types tethering

- Posterior tethering
- Apical tethering

(Circulation. 2009;119:2606-2614.)
Myocardial infarction without MR
Normal Mitral Closure

Diagram showing normal mitral valve leaflets and chordae tendinae.
Ischemic MR
A disease of the LV

Tethering
Dyssynchrony
Ischemic MR

Tenting + Loss of Annular Contraction
What we know about IMR
Outcome After Q-MI

Impact of Quantified IMR on Survival (n=303)

Grigioni et al: Circ 103:1759, 2001
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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 $\geq 0.20$ cm$^2$
- Regurgitant volume $\geq 30$ mL
- Regurgitant fraction $\geq 50\%$
WE ASSUME THAT FIXING IMR WILL IMPROVE SURVIVAL BUT WE DO NOT REALLY KNOW!! LV vs MR?

Asymptomatic IMR do not treat surgically unless undergoing revascularization

Isolated severe symp IMR treat surgically after Meds and resync failed—symptom relief
Surgical Principles
Mitral-Valve Repair versus Replacement for Severe Ischemic Mitral Regurgitation


Male 61%
Age 68 ±10 yo
White 80%
LVEF 41 ±10%
ERØ 0.4 ±0.1 cm²
NYHA III or IV 59%
Concom CABG 74%
ConcomTV repair 15%

MVR with sub- preservation vs Complete annuloplasty repair
Mitral-Valve Repair versus Replacement for Severe Ischemic Mitral Regurgitation


**A Death**

Hazard ratio, 0.79 (95% CI, 0.42–1.47)
P = 0.45

<table>
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<tr>
<th>No. at Risk</th>
<th>MV repair</th>
<th>MV replacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>MV repair</td>
<td>126</td>
<td>116</td>
</tr>
<tr>
<td>MV replacement</td>
<td>125</td>
<td>109</td>
</tr>
</tbody>
</table>

**B Composite Cardiac End Point**

Hazard ratio, 0.91 (95% CI, 0.58–1.42)
P = 0.68

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<tr>
<th>No. at Risk</th>
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<th>MV replacement</th>
</tr>
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<tbody>
<tr>
<td>MV repair</td>
<td>126</td>
<td>105</td>
</tr>
<tr>
<td>MV replacement</td>
<td>125</td>
<td>96</td>
</tr>
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Helping Cardiovascular Professionals
CONCLUSIONS
We observed no significant difference in left ventricular reverse remodeling or survival at 12 months between patients who underwent mitral-valve repair and those who underwent mitral-valve replacement. Replacement provided a more durable correction of mitral regurgitation, but there was no significant between-group difference in clinical outcomes. (Funded by the National Institutes of Health and the Canadian Institutes of Health; ClinicalTrials.gov number, NCT00807040.)

32% mod or severe recurrent MR vs 2% P<0.001
## Two-Year Outcomes of Surgical Treatment of Severe Ischemic Mitral Regurgitation


### Graphical Representation

- **Hazard ratio:** 0.79 (95% CI, 0.46–1.35)
- **P-value:** 0.39

### Kaplan-Meier Curve

- **No. at Risk**
  - MV repair: 126, 113, 104, 97, 64
  - MV replacement: 125, 103, 100, 92, 65

### Table: Comparison of Outcomes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Repair (N=126)</th>
<th>Replacement (N=125)</th>
<th>P Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hel, Lea Moderate or severe recurrent mitral regurgitation</td>
<td>57/97 (58.8)</td>
<td>3/79 (3.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Heart failure</td>
<td>48 (24.0)</td>
<td>29 (15.2)</td>
<td>0.05</td>
</tr>
<tr>
<td>Readmission for cardiovascular event</td>
<td>93 (48.3)</td>
<td>59 (32.2)</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Two-Year Outcomes of Surgical Treatment of Moderate Ischemic Mitral Regurgitation


A  Death

Hazard ratio, 0.90 (95% CI, 0.45–1.83)
P = 0.78

<table>
<thead>
<tr>
<th>Month</th>
<th>CABG alone</th>
<th>CABG+MV repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>151</td>
<td>150</td>
</tr>
<tr>
<td>6</td>
<td>138</td>
<td>142</td>
</tr>
<tr>
<td>12</td>
<td>132</td>
<td>136</td>
</tr>
<tr>
<td>18</td>
<td>117</td>
<td>126</td>
</tr>
<tr>
<td>24</td>
<td>66</td>
<td>80</td>
</tr>
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CONCLUSIONS
In patients with moderate ischemic mitral regurgitation undergoing CABG, the addition of mitral-valve repair did not lead to significant differences in left ventricular reverse remodeling at 2 years. Mitral-valve repair provided a more durable correction of mitral regurgitation but did not significantly improve survival or reduce overall adverse events or readmissions and was associated with an early hazard of increased neurologic events and supraventricular arrhythmias. (Funded by the National Institutes of Health and Canadian Institutes of Health Research; ClinicalTrials.gov number, NCT00806988.)
Trying to find an annular solution to a ventricular problem is destined to fail...
5 mo later SOB again
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Helping Cardiovascular Professionals
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