Cases of mitral valve causing mitral regurgitation: the MV prolapse spectrum

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CASE

• Mr. M; 50 Year male presents to internist for annual physical. He feels well, no complaints
  – Hyperlipdemia
  – No tobacco; rare ETOH
  – Well childhood
  – Works as insurance broker
  – Medications: Simvistatin 20 mg
• FH: Stroke in Elderly Grandmother
• Exam: 120/78; 70 bpm; CV-normal; no murmur
10 years later:

Feels well, recently retired but maintains active lifestyle—golf, part time work at former company

Annual Exam: A new systolic murmur heard

AN ECHOCARDIOGRAM IS ORDERED

Normal MV
Summary of Echo Findings:

Mitral valve prolapse; predominantly of the posterior leaflet; Moderate MR

LVID 52 mm; 30 mm; LVEF 77% 

LA 45 mm 

RVSP= 25 mmHg (assuming RAP of 10 mmHg)

What to do?

1. Refer for mitral valve replacement
2. Refer for mitral valve repair
3. Treat with afterload reducing agents
4. Watchful waiting
5 months later……

He develops URI symptoms: cough, SOB, rhinitis; initial improvement with antibiotics;

Then dyspnea with exertion and decreased exercise tolerance returns and worsens: stairs are now a problem; can’t do yard work.
AN ECHOCARDIOGRAM IS ORDERED

August, 2010        March, 2011

March, 2011 ECHOCARDIOGRAM
Summary of Echo #2

Mitral valve prolapse; posterior leaflet prolapse with flail and ruptured chord
Severe MR

LVID 54 mm; 34 mm; LVEF 73%
RVSP= 47 mmHg (assuming RAP of 10 mmHg)

Posterior Leaflet Flail (Transesophageal Echo)
What happened to patient?

Mitral Valve Prolapse

• Systolic displacement of one or both mitral leaflet into the left atrium of greater than 2 mm beyond annular plane.
  • Occurs with or without mitral regurgitation
  • Occurs with or without leaflet thickening
  • In patients with leaflet thickening, myxomatous changes present on pathoanatomy
Flail Leaflet = significant MR

Tip of the leaflet is in left atrium due to loss of convex shape of the mitral leaflets; there is “eversion” of the normal convex shape of the leaflet scallop.

Mitral Valve Chordal Anatomy

- Provides basic structural support
- Responsible for coaptation
- aka primary chordae

aka secondary chordae
Timing of Surgical Intervention for Primary MR

Class I Indications:
- Symptomatic from severe MR
- Asymptomatic but LV dysfunction: LVSD 40 mm or greater (ESC: 45 mm or greater)
- MV repair >> MV replacement (if high chance of repair)

<table>
<thead>
<tr>
<th>Class</th>
<th>Indication</th>
<th>Ra (B)</th>
<th>Ra (B) Tail leaflet and ESD 240 mm</th>
<th>Bs (C) for LAE or exertional PASP &gt; 45 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Asymptomatic chronic severe primary MR with preserved LV function &amp; LV EF &gt;60% and LV EDV &lt; 400 ml</td>
<td>Ra (B)</td>
<td>Ra (B) Tail leaflet and ESD 240 mm</td>
<td>Bs (C) for LAE or exertional PASP &gt; 45 mm</td>
</tr>
<tr>
<td>C2</td>
<td>Asymptomatic chronic non-rheumatic primary MR and preserved LV function with high likelihood of durable repair</td>
<td>Ra (B)</td>
<td>Ra (C)</td>
<td></td>
</tr>
<tr>
<td>CLASS</td>
<td>Intervention may be considered in patients with</td>
<td>Ra (C)</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>MV surgery may be considered in symptomatic patients with chronic severe primary MR and LV EF ≤ 30%</td>
<td>Ra (C)</td>
<td>Ra (C) High likelihood repair or RA &gt; 45 mm if low</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Rheumatic mitral valve disease when surgical treatment is indicated if a durable and successful repair is likely or if the reliability of long-term antiarrhythmia management is questionable</td>
<td>Ra (C)</td>
<td>Ra (C) High likelihood repair or RA &gt; 45 mm if low</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Transcatheter MV repair for severely symptomatic chronic severe primary MR who have a reasonable life expectancy but a prohibitive surgical risk because of severe comorbidities</td>
<td>Ra (C)</td>
<td>Ra (C) High likelihood repair or RA &gt; 45 mm if low</td>
<td></td>
</tr>
<tr>
<td>CLASS</td>
<td>— MR should NOT be performed in patients with</td>
<td>Ra (B)</td>
<td>–</td>
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<td></td>
<td>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>Ra (B)</td>
<td>–</td>
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</tr>
</tbody>
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All: atrial fibrillation, ESD, end-systolic dimension; MR, mitral regurgitation; MV, mitral valve; MVr, mitral valve replacement; PASP, pulmonary artery systolic pressure.

Class I Indications:
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MV Repair for flail leaflet: Two Camps
Resect vs Respect

Resect Camp: Leaflet prolapse resection with ring annuloplasty: “The French Solution”

Respect Camp: Insertion of artificial chords with ring annuloplasty

Resect Camp: Quadrangular/Triangular resection with ring annuloplasty: “The French Solution”
Respect Camp: MV Repair for flail leaflet
Insertion of neochords; preservation of leaflet tissue

Neochord

MV Repair for flail leaflet: Alfieri

Alfieri Procedure: Stitching Leaflets Together to create a double orifice
This patient underwent MV repair with triangular resection and ring annuloplasty.

47 yr old female; murmur noted during preop evaluation for minor surgery:

Posterior leaflet flail with severe MR
Normal LV dimensions, no evidence of Afib or PHTN
Active, jogging daily until her diagnosis...
Timing of Surgical Intervention for Primary MR

Table 2  Timing of intervention for chronic MR

<table>
<thead>
<tr>
<th>Stage</th>
<th>ACC/AHA 2014</th>
<th>ESC/EACTS 2012</th>
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</thead>
<tbody>
<tr>
<td>1A</td>
<td>I (B)</td>
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<tr>
<td>1B</td>
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<td>I (B)</td>
</tr>
<tr>
<td>3</td>
<td>I (B)</td>
<td>I (B)</td>
</tr>
</tbody>
</table>

Class IIA Indications:
- Asymptomatic with preserved LV function (LVEF >60%; LVESD < 40 mm) with 95% likelihood of durable repair

Referred for surgery—highly reparable valve and patient preference (IIA Indication)

Pre repair  Post repair with neochord
The End
Mitral Valve Prolapse Spectrum

Discrete isolated segment (fibroelastic deficiency)

Diffuse involvement (Barlow’s type valve)