Mitral regurgitation: Surgical Options

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Mitral Regurgitation

REPAIR!
Mitral replacement in the repair era: Indications?

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Mitral Replacement

NONE!
m-ANOVA: $F = 13.98, p = 0.0002$ (n = 10)

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$E_{max}$ (mmHg/ml)

- Intact
- Detached
- Reattached

$p = 0.001$

$p < 0.001$

$p = NS$
<table>
<thead>
<tr>
<th>Reference</th>
<th>Repair</th>
<th>Replacement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Percent</td>
</tr>
<tr>
<td>Oury et al [39]</td>
<td>34</td>
<td>0</td>
</tr>
<tr>
<td>Duran et al [40]</td>
<td>255</td>
<td>1.8</td>
</tr>
<tr>
<td>Yacoub et al [41]</td>
<td>86</td>
<td>5.0</td>
</tr>
<tr>
<td>Oliveira et al [42]</td>
<td>84</td>
<td>4.9</td>
</tr>
<tr>
<td>Adebo and Ross [43]</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>480</td>
<td>1.9</td>
</tr>
</tbody>
</table>
Operative Mortality: Repair vs. Replace

- Ischemic: Replacement 27%, Repair 13%
- Rheumatic: Replacement 10%, Repair 3%
- Degenerative: Replacement 10%, Repair 2.4%

Cosgrove, Curr Probl Cardiol 1989
Mitral Repair

Mitral Valve = Left Ventricle

The LV = The MV
MITRAL-VALVE REPLACEMENT, CONTINUED

PAPILLARY MUSCLES SEVERED AND VALVE REMOVED, TOGETHER WITH ITS CHORDAE TENDINEAE AND PORTIONS OF MUSCLES

TEMPORARY RUBBER GUIDE FOR SUTURES

HOLDER FOR INSERTION OF VALVE

PROSTHETIC CAGED BALL VALVE (STARR-EDWARDS) INSERTED AND FASTENED IN PLACE BY INTERRUPTED HORIZONTAL MATTRESS SUTURES WHICH ARE THREADED THROUGH FELTON SKIRT OF VALVE

POSSIBLE COMPLICATIONS OF CAGED MITRAL-VALVE INSTALLATION: OBSTRUCTION OF L. VENTRICULAR OUTFLOW AND/OR INJURY OF AORTIC-VALVE CUSP

ALTERNATE METHOD FOR SECURING PROSThESIS, EMPLOYING FOUR CARDINAL MATTRESS STITCHES WITH RUNNING SUTURES BETWEEN
Mitral Repair vs. Replacement

Survival (%) vs. Time (Years)

- General Population
- Repair
- Replacement

Survival rates:
- General Population: 68%
- Repair: 52%

Statistical significance:
- p = 0.0004

Mitral Valve Repair

- Simple Annuloplasty
- Quadrangular Excision
- Leaflet Plication
- Ring Annuloplasty
- Artificial Chordae
- Combination Repairs
Artificial Chordae with expanded Polytetrafluoroethylene

- CV-5
- Papillary Muscle
- Mitral Leaflet

3 ~ 4 surgeon’s knots

Kobe General Hospital
Reconstructive Mitral Surgery

Annular Dilatation

Normal

Dilated

Annuloplasty
Ring Annuloplasty

- Correct annular dilatation of the posterior mitral leaflet
- Increase leaflet coaptation
- Reinforce the annular sutures
- Prevent future annular dilatation
  - re-operation
Mitral Valve Repair

“It’s not the ring, it’s the ringer!”
Mitral Valve Replacement

BAD

Rheumatic
FIG. 4.46  A resected rheumatic mitral valve shows extensive obliteration of intercordal spaces and leaflet fibrosis—features underlying mitral stenosis.
Mitral Valve Replacement

“Heavy” calcification
Mitral Valve Replacement

Ischemia...but only ruptured Pap muscle
Mitral Valve Replacement - Results

- Mitral Stenosis (240)
- Mitral Insufficiency (352)
- Mixed Mitral Lesion (305)

P < 0.05

Percent Survival vs Years Postoperative
State of the Art - 1979
What you want to drive – 2011!
Current Valves

• Gen 4 - Tissue valves: better
  – Improved hemodynamics
  – Improved durability
    • Proven 20 years of data
    • Addition of anti-Ca
  – Improved ease of implant
Mechanical Valves

- 2% to 4% per yr risk of hemorrhage or TE
  

- Incidence of reop (mech): 25% at 12 years
  

- Mortality of reop (mech): 3 to 4 x tissue
  
What are the risks of reoperation?

<table>
<thead>
<tr>
<th></th>
<th>Repeat MVR (n = 106)</th>
<th>Primary MVR (n = 562)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death (%)</td>
<td>5 (4.7)</td>
<td>23 (4.1)</td>
<td>0.791</td>
</tr>
<tr>
<td>Neurologic insult (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>2 (1.9)</td>
<td>13 (2.3)</td>
<td>1.000</td>
</tr>
<tr>
<td>Transient deficit</td>
<td>1 (0.9)</td>
<td>5 (0.9)</td>
<td>1.000</td>
</tr>
<tr>
<td>Myocardial infarction (%)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>...</td>
</tr>
<tr>
<td>Postoperative IABP (%)</td>
<td>0 (0.0)</td>
<td>1 (0.2)</td>
<td>1.000</td>
</tr>
<tr>
<td>Intubation, &gt;48 hours (%)</td>
<td>24 (22.6)</td>
<td>117 (20.8)</td>
<td>0.700</td>
</tr>
<tr>
<td>Reexploration for bleeding (%)</td>
<td>4 (3.8)</td>
<td>32 (5.7)</td>
<td>0.638</td>
</tr>
<tr>
<td>Pneumonia (%)</td>
<td>2 (1.9)</td>
<td>24 (4.3)</td>
<td>0.408</td>
</tr>
<tr>
<td>Pacemaker (%)</td>
<td>7 (6.6)</td>
<td>20 (3.6)</td>
<td>0.174</td>
</tr>
<tr>
<td>GI complications (%)</td>
<td>4 (3.8)</td>
<td>27 (4.8)</td>
<td>0.804</td>
</tr>
<tr>
<td>Renal failure (%)</td>
<td>11 (10.4)</td>
<td>49 (8.7)</td>
<td>0.579</td>
</tr>
<tr>
<td>Dialysis requirement (%)</td>
<td>3 (2.8)</td>
<td>11 (2.0)</td>
<td>0.475</td>
</tr>
<tr>
<td>Sternal wound infection (%)</td>
<td>1 (0.9)</td>
<td>10 (1.8)</td>
<td>1.000</td>
</tr>
<tr>
<td>Postoperative stay, days</td>
<td>11.2 (0–41)</td>
<td>11.8 (0–210)</td>
<td>0.043</td>
</tr>
<tr>
<td>(range)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged stay, &gt;14 days (%)</td>
<td>17 (16.0)</td>
<td>95 (16.9)</td>
<td>0.888</td>
</tr>
</tbody>
</table>

UM = 3.8%

400 redo

JTCVS 2006!

MVR Operative Mortality Mayo Clinic

Shift in Valve Prostheses: Mechanical → Tissue
Mitral replacement: Indications?

- Prior MV replacement!
- Bad rheumatic
- Heavy calcification
- Ruptured ischemic pap muscle
- Carcinoid
- Endocarditis - rare
Mitral repair: Indications?

Degenerative
Ischemic
Functional

90% of MR – REPAIR!!
Mitral Regurgitation

If your surgeon advises replacement....

I advise you to replace your SURGEON!!