The Mitral Valve Surgery Volume-Outcome Relationship in the United States

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Disclosure Statement of Financial Interest

I, Vinay Badhwar DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.
Management of Primary Mitral Regurgitation

• Early surgical correction of severe primary degenerative MR is recommended provided optimal outcomes are achievable.

• Durable mitral valve repair is superior to replacement for primary MR

• The association of volume to outcome for mitral valve surgery has not been defined by contemporary national clinical data
Objectives

1. Assess volume of MV repair or replacement (MVRR)

2. Assess 30-day and 1 year outcomes following isolated MVRR for primary MR using national clinical data

3. Define the MV surgery volume-outcome relationship at the hospital level and surgeon level
Methods

55,311 patients with Primary MR

- The Society of Thoracic Surgeons (STS) Adult Cardiac Surgery Database (ACSD):
  - 1,111 hospitals, 3,137 surgeons, 50 states
  - >95% of all adult operations performed in the US
  - Routine random annual 3rd party data audits of 10%
- Linkage to Centers for Medicare and Medicaid Services (CMS) for 1-year Outcomes
Methods

Outcomes

- Primary Outcome:
  - Operative Mortality of isolated MV surgery for primary MR

- Secondary Outcomes:
  - 30-day: Composite Mortality/Morbidity (bleeding, stroke, prolonged ventilation, renal failure, wound infection)
  - Successful Repair Rate of primary MR (residual MR ≤ mild/1+)
  - 1-year: Mortality, Reoperation, Heart Failure Re-hospitalization
### Patient Characteristics
Lowest vs. Highest Volume Quartiles

<table>
<thead>
<tr>
<th></th>
<th>Lowest</th>
<th>Highest</th>
<th>(P) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Insurance</td>
<td>4.04%</td>
<td>2.35%</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Black/Hispanic Race</td>
<td>14.8%</td>
<td>10.2%</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Class III/IV Symptoms</td>
<td>31.9%</td>
<td>23.8%</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Class I Symptoms</td>
<td>1.8%</td>
<td>4.1%</td>
<td>&lt; 0.0001</td>
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</tbody>
</table>
Overall MV Repair Rate for Primary MR

81%

(44,692/55,311)
# Operative Characteristics
Lowest vs. Highest Volume Quartiles

<table>
<thead>
<tr>
<th></th>
<th>Lowest</th>
<th>Highest</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MV Repair for Primary MR</td>
<td>63.8%</td>
<td>84.5%</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Mini or Robotic</td>
<td>8.0%</td>
<td>37.0%</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>
Hospital Level Outcomes

30-day Risk Adjusted Operative Mortality

Mortality % vs Annual Volume

- Unadjusted
- Adjusted

Estimated Mortality %:
- 75

Unadjusted P: <0.001
Adjusted P: <0.001
Hospital Level Outcomes

Successful MV Repair Rate

148 hospitals (14%) performed ≥ 75 cases/year

MV Repair %

Annual Volume

Unadjusted P: <0.001
Adjusted P: <0.001

Unadjusted
Adjusted

75 cases/year
Surgeon Level Outcomes

30-day Risk Adjusted Operative Mortality

Mortality %

Annual MVRR Volume

Unadjusted P: <0.001
Adjusted P: <0.001

Association: <0.001

Estimated 35

Unadjusted P: Unadjusted
Adjusted P: Adjusted
303 surgeons (13%) performed ≥ 35 cases/year.
Conclusions

National hospital level and surgeon level inverse volume-outcome relationships were identified for:

- Successful Repair of Primary MR
- 30-day Operative Mortality
- 1-year Mortality
Implications

These findings may further inform guideline-directed efforts to define access to experienced hospitals and surgeons for primary MR or complex MV disease.