Percutaneous PVL closure in challenging anatomies

Ahmed M. ElGuindy, MD, MRCP, FACC

Case presentation

• 58 year old lady
• S/P mitral valve replacement (mechanical prosthesis) in 2009
• Minor stroke in 2014 (right-sided hemiparesis with no residual neurological deficit
• C/O SOB on mild exertion over the past year
Localizing the defect
Fluoroscopic correlation
TTE - Post
Size of the problem

Contributing Factors
- Annual calcification
- Tissue friability
- Prior endocarditis
- Other inflammatory process
- Recent initiation of corticosteroids
- Surgical technique
- Type of prosthesis (Mechanical>Biological)

5x-AVR

PVL (2%-10%)
- Non-coronary cusp is most common

5x-MVR

Overall PVL (5%-18%)

PVL (7%-17%)
- Anterolateral and Postero medial are most common

No PVL

Commonly supra-annular position in Aortic prostheses or it continues sutures in the Mitral

74% appear in 1st year post-op

26% appear late

Secondary to suture dehiscence associated with SBE and/or resorption of annular calcification

Indications

- Symptomatic congestive heart failure
- Severe symptomatic hemolysis
Percutaneous closure: Pros and cons

**Pros**
- Less invasive
- Procedural success rate 77-86% and clinical success rate 67-77%
- Redo surgery for PVL closure is associated with 7-11% mortality
- Repeat PVL after redo surgery ≈ 30%

**Cons**
- Procedural failure
- Response of hemolysis unpredictable: 30% don’t improve, up to 10% get worse*
- Complications
- Lack of long-term data

*Calvert et al. Circ, 2016*
Who is not a candidate for percutaneous closure?

- Asymptomatic PVLs
- Hemodynamically insignificant leaks (unless causing significant hemolysis)
- Large leaks (>25-30% of circumference of sewing ring)
- Rocking prosthesis
- Infective endocarditis (within 6 months)
- Bleeding diathesis if transapical access is mandatory

Planning: key considerations

- Size, number, and location of the defect(s)
- Type of device(s) to be used
- Access and support

3D TEE
CT (transapical access)
Planning: key considerations

- Size, number, and location of the defect(s)

Approaches

- Percutaneous: transfemoral (trans-septal)
- Percutaneous: transfemoral (retrograde aortic)
- Percutaneous: apical (femoro-apical rail)
- Percutaneous: apical (delivery route)
- Surgical: transapical
Percutaneous transfemoral (trans-septal)
Percutaneous transfemoral (retrograde aortic)

Percutaneous: apical (femoro-apical rail)
Transapical (percutaneous or surgical)
Toolkit

<table>
<thead>
<tr>
<th>Common Equipment</th>
<th>Mitral Procedure</th>
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<tbody>
<tr>
<td>6-8F arterial sheath</td>
<td>14F venous sheath</td>
</tr>
<tr>
<td>.032 &amp; .035 exchange length Amplatz</td>
<td>6F arterial sheath</td>
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<tr>
<td>extra stiff wire</td>
<td>Brockenbrough needle</td>
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<tr>
<td>.035 exchange length stiff angled Glidewire</td>
<td>7-8F Mullins dilator</td>
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<tr>
<td>5F 125cm multipurpose catheter</td>
<td>Inoue wire &amp; dilator</td>
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<td>6F 100cm multipurpose guide</td>
<td>8.5F small &amp; medium curl Agilis sheaths</td>
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<tr>
<td>6-8F Cook Flexor shuttle sheaths</td>
<td>6F EnSnare retrieval catheter</td>
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<tr>
<td>AVP-II plugs (4-16 mm)</td>
<td>LV puncture needle</td>
</tr>
<tr>
<td>AVP-IV plugs (4-8 mm)</td>
<td>2 Hemostats</td>
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Catheter-only Technique  Anchor Technique with 0.032 or 0.035 wire

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<tr>
<th></th>
<th>AVP II 6 or 8 mm</th>
<th>AVP III 10 or 12 mm</th>
<th>AVP III 8 or 10 mm</th>
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<tbody>
<tr>
<td>6F coronary guide</td>
<td>Yes</td>
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<td>7F coronary guide</td>
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<td>8F coronary guide</td>
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<td>6F Shuttle sheath</td>
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Closure devices

Calvert et al. Circ, 2016