HOCM: Alcohol ablation or LVOT Surgery: When and what?

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ASA/Myectomy: Common clinical indications

- Marked LVOTO usually caused by SAM with a gradient >50mmHg at rest or with physiological exercise...
- ...responsible for progressive heart failure symptoms...
- ...and functional limitation that affects quality of life...
- ...in patients refractory to a variety of largely negative inotropic drugs.
ASA versus Myectomy

- ASA better than the older, established and time-proven Myectomy operation?
- What does „better“ really mean?
- Should ASA become the primary treatment strategy with Myectomy as back-up if ASA fails?
- Or does Myectomy remain the standard for most patients with ASA serving as selective alternative?
Usually, ASA...

ASA ¹:

- "Blind" approach without anatomical visualization
- Restricted to the size and distribution of the septal perforator artery (10% of muscle mass; 30% of septum)
- Fixed anatomic relationship to the target site of SAM-septal contact
- Ineffective in substantial LV hypertrophy of more than 25mm wall thickness
- Presence of intramyocardial scarring being potentially arrhythmogenic: CAVE in patients with pre-existing HCM-related sudden death risk markers! ²,³
- Repeat intervention in up to 12% of patients associated with an increase in all-cause mortality ⁴,⁵

...whereas Myectomy...

- More complete relief of LVOT gradient...\(^1-3\)
- ...particularly in patients <65 years of age \(^4\)
- Appropriate for any degree of hypertrophy
- Less residual gradients than after ASA
- Reoperation extraordinarily rare after Myectomy \(^2\)

However, it needs more than classical Morrow!

Goal of Surgery

- Durable relief of obstruction
- Restoration of Normal Mitral Valve function
- Symptoms relief to NYHA I-II
- Reduction of the Risk for Sudden Cardiac Death
- Reduction of the Risk for Congestive Heart Failure
The Surgeon’s Task

- Recognize and Correct all morphologic abnormalities leading to obstruction...
- ... leading to SAM and Mitral Regurgitation...

- Septal hypertrophy
  - LVOT
  - Midventricular (PM hypertrophy, muscle bundle)
  - Fixed subaortic obstruction

- Papillary muscle anomalies
  - Accessory PM
  - Anterior Displacement of APM

- Pathologic chordae
  - Attached to LV free wall, septum

- Mitral valve anomalies
  - Leaflet elongation
To be resected 1: Echo guidance
Morrow versus extended resection

“Morrow myectomy,” 1968

“Mayo extended myectomy”
Surgery - Subvalvar Mobilisation
Transaortic approach
Jet lesions, fibrous endocardial tissue
Volume of muscle resected


HOCM and mitral valve

- Usually Myectomy alone works
- Concomitant mitral valve surgery rare:
  - Selective mitral valve plication
  - Anterior leaflet extension
  - Mitral valve replacement:
    - Not standard
    - Usually not indicated
- Some say never to touch the mitral valve unless there is associated organic mitral disease
Operative Risks - Mortality

- Current Operative Mortality is low!

**Operative Risks - Complications**

### TABLE 2. Postoperative Major Cardiovascular Events

<table>
<thead>
<tr>
<th>Complications</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Early (within 30 days of myectomy)</strong></td>
<td></td>
</tr>
<tr>
<td>Permanent pacemaker</td>
<td>21 (6)</td>
</tr>
<tr>
<td>Ventricular septal defect</td>
<td>6 (2)</td>
</tr>
<tr>
<td>Early postoperative AF</td>
<td>102 (30)</td>
</tr>
<tr>
<td><strong>Late (&gt;30 days after myectomy)</strong></td>
<td></td>
</tr>
<tr>
<td>Subsequent surgical procedures</td>
<td></td>
</tr>
<tr>
<td>Repeat myectomy</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Ventricular septal defect repair</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Mitral valve replacement</td>
<td>8 (2)</td>
</tr>
<tr>
<td>Pericardiectomy</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Implantable cardioverter defibrillator</td>
<td>14 (4)</td>
</tr>
<tr>
<td>Cardiac transplantation</td>
<td>5 (1.5)</td>
</tr>
<tr>
<td>Serious cardiovascular events</td>
<td></td>
</tr>
<tr>
<td>Congestive heart failure requiring hospitalization</td>
<td>44 (13)</td>
</tr>
<tr>
<td>Stroke</td>
<td>20 (6)</td>
</tr>
<tr>
<td>Arterial thromboembolic events</td>
<td>5 (1.5)</td>
</tr>
</tbody>
</table>

Long-term Effects - Survival

1. Survival after isolated Myectomy

2. Survival after Myectomy and Mitral Valve Surgery

Survival Benefit for Myectomy

- Myectomy favorably alters the Natural Course of HOCM!

- Provides for Normal or near Normal Life Expectancy!

Long-term Effects - Hemodynamics

- Long-term relief of
  - Septal Hypertrophy
  - LVOT Gradient
  - SAM

Long-term Effects - Symptoms relief

Table 2. Preoperative and Postoperative Characteristics at 3 Months and at Latest Visit in 29 Patients With HOCM Treated With Myectomy and MLE

<table>
<thead>
<tr>
<th>Clinical data</th>
<th>Preoperative</th>
<th>3-Month Follow-Up</th>
<th>Latest Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYHA class</td>
<td>2.8±0.4</td>
<td>1.4±0.5</td>
<td>1.3±0.4</td>
</tr>
<tr>
<td>No. of drugs</td>
<td>1.5±0.7</td>
<td>0.6±0.8</td>
<td>0.5±0.7</td>
</tr>
<tr>
<td>Echocardiography data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IVS, mm</td>
<td>23±4.0</td>
<td>18±2.5</td>
<td>17±2.3</td>
</tr>
<tr>
<td>LVOTG, mm Hg</td>
<td>100±20</td>
<td>19±15</td>
<td>17±14</td>
</tr>
<tr>
<td>MR grade</td>
<td>2.5±0.9</td>
<td>0.5±0.7</td>
<td>0.5±0.6</td>
</tr>
<tr>
<td>SAM grade</td>
<td>2.9±0.3</td>
<td>0.6±0.6</td>
<td>0.5±0.7</td>
</tr>
<tr>
<td>LA, mm</td>
<td>47±8</td>
<td>45±10</td>
<td>45±9</td>
</tr>
<tr>
<td>MLA, cm²</td>
<td>16.7±3.4</td>
<td></td>
<td></td>
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Long-term Effects - Arrhythmias

- Low need for PM
- Decreases ICD discharge
- Decreased Risk for SCD(?)

Heart Failure Benefit?


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<td>Congestive heart failure requiring hospitalization</td>
<td>44 (13)</td>
</tr>
<tr>
<td>Cardiovascular cause of death</td>
<td></td>
</tr>
<tr>
<td>Early postoperative death (during initial hospitalization for myectomy)</td>
<td>5 (1.5)</td>
</tr>
<tr>
<td>Sudden cardiac death</td>
<td>13 (4)</td>
</tr>
<tr>
<td>After myocardial infarction</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Associated with congestive heart failure</td>
<td>15 (4)</td>
</tr>
</tbody>
</table>

years; Table 2). The most frequent long-term serious cardiovascular complication was CHF, with the first episode of CHF that required hospitalization occurring 9.8±6.1 years after myectomy. There was no association between development of CHF and the persistence of a postoperative resting LVOT gradient. Major cardiovascular events occurred in 70 patients (21%) during long-term follow-up. The following
Summary

- Surgical treatment of HOCM offers
  - Consistent and Complete Hemodynamic Benefit
  - Consistent Restoration of functional capacity and QoL
  - Low operative risk:
    - 0-2% mortality
    - Low rate of complications
    - Low rate of re-interventions

- Myectomy appropriate for severe, diffuse, mid-ventricular and even apical types of HOCM
- Surgical resection possible even after unsuccessful ASA
Does this presentation clarify „ASA versus Myectomy“?

- NO!!
- Adequately powered randomized study necessary to address relevant questions, requiring...
  - ...35'000 HCM patients being screened, including...
  - ...500 patients in ASA and Myectomy arms...
- ...to compare primary clinical endpoints...
- ...additionally requiring years of follow-up...
- Impractical even for major institutions dedicated to HOCM

→ Interdisciplinary decision making...
EVOLUTION CONTINUES

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