Hypertrophic Cardiomyopathy: the edge-to-edge mitral valve repair secures the correction of the systolic anterior motion


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CONFLICT OF INTEREST

The authors have no conflict of interest to disclose
The leading **anatomic features** of hypertrophic cardiomyopathy (HCM) are:

- **LV wall thickness ≥ 15 mm** (septal hypertrophy)
- **MV apparatus anomalies**
- **SAM** (LVOT obstruction in 1/3 of the HCM patients)

*Eur Heart J* 2014;35:2733-79
*J Am Coll Cardiol* 2016;67:1846-58
*Nature Rev Cardiol* 2015;12:689-710
BACKGROUND

The ventricular septal myectomy using the Morrow procedure remains the gold standard and main step of any surgery for HCM. However, the surgical management of associated mitral valve lesions resulting in mitral regurgitation is still matter of debate.

AML PLICATION

AML EXTENSION

CHORDAL CUTTING

PM REORIENTATION

J Am Coll Cardiol 2015;66:1687-96
J Thorac Cardiovasc Surg 2010;140:317-24
The “edge-to-edge” technique has been introduced in the 1990’s as an attractive option in the setting of degenerative mitral valve repair with satisfactory long-term results.

Our aim is to describe the results of the edge-to-edge technique and the Morrow procedure in the management of mitral valve anomalies associated with HCM.
PATIENTS
We performed an observational analysis of our prospectively collected database.

22 patients
Mean age 48.5 years – Males 59.1%

DIAGNOSIS OF HCM
Mean IVS thickness 25.8 mm
Mean resting IVG 75.4 mmHg

SYMPTOMS
Mean NYHA class 2.5
Syncope 31.8%

MITRAL VALVE
SAM 100%
Mean MR 2.4

surgical septal myectomy rather than percutaneous septal alcohol ablation

ESC GUIDELINES
Eur Heart J 2014;35:2733-79
METHODS
RESULTS 1

Concomitant procedures in 3 (13.6%) patients:
aortic valve replacement (n=1, 4.5%)
radiofrequency pulmonary veins isolation (n=2, 9.1%)

Mean aortic cross-clamping time: 55.1 ± 9.8 (42-76) minutes
Mean cardiopulmonary bypass time: 68.2 ± 10.2 (54-88) minutes

During the postoperative course, 2 (9.1%) patients required the implantation of a pacemaker due to atrioventricular block

No deaths either in the immediate postoperative period or during the follow-up (26.3 ± 20.5 [range, 1.8-89.9] months)
## RESULTS 2

### ECHOCARDIOGRAPHIC FOLLOW-UP

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>BASELINE</th>
<th>POSTOPERATIVE</th>
<th>FOLLOW-UP</th>
<th>p-value^&amp;</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVS thickness (mm)</td>
<td>25.8 ± 5.4</td>
<td>19.4 ± 7.9</td>
<td>18.5 ± 5.7</td>
<td>&lt; 0.001&lt;sup&gt;a,b&lt;/sup&gt;</td>
</tr>
<tr>
<td>IVG gradient (mmHg)</td>
<td>75.4 ± 30.5</td>
<td>11.3 ± 9.9</td>
<td>4.8 ± 7.6</td>
<td>&lt; 0.001&lt;sup&gt;a,b&lt;/sup&gt;</td>
</tr>
<tr>
<td>SAM (%)</td>
<td>100</td>
<td>4.5</td>
<td>0</td>
<td>&lt; 0.001&lt;sup&gt;a,b&lt;/sup&gt;</td>
</tr>
<tr>
<td>MR</td>
<td>2.4 ± 0.9</td>
<td>1.1 ± 0.9</td>
<td>1.2 ± 0.6</td>
<td>&lt; 0.001&lt;sup&gt;a&lt;/sup&gt;&lt;br&gt;0.002&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*Quantitative variables are presented as mean ± standard deviation; categorical variables are presented as percentages

^&For each variable, analysis was only performed on cases with matched data (i.e. excluding cases with missing data)

<sup>a</sup>Postoperative vs. baseline
<sup>b</sup>Follow-up vs. baseline
RESULTS 3

CLINICAL FOLLOW-UP

<table>
<thead>
<tr>
<th>Preoperative</th>
<th>Latest FUP contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>n=1 (4.5%)</td>
<td>n=18 (81.8%)</td>
</tr>
<tr>
<td>II</td>
<td>II</td>
</tr>
<tr>
<td>n=9 (41%)</td>
<td>n=4 (18.2%)</td>
</tr>
<tr>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>n=11 (50%)</td>
<td>n=0</td>
</tr>
<tr>
<td>IV</td>
<td>IV</td>
</tr>
<tr>
<td>n=1 (4.5%)</td>
<td>n=0</td>
</tr>
</tbody>
</table>

*p-value < 0.001*
CONCLUSIONS

The enlarged Morrow procedure remains the first step of any surgery for HCM owing to its good clinical and echocardiographic long-term validated results.

In case of MR due to SAM, the edge-to-edge suture is helpful to secure the coaptation between the two leaflets of the mitral valve.

In complex MR mechanisms the edge-to-edge technique is simple, reproducible and fast without a more questionable direct procedure on the mitral valve requiring left atrium opening.