NEW TECHNIQUE FOR MITRAL VALVE REPAIR
Towards a More Anatomic Result

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MAIN GOALS

Remove the mitral regurgitation is the main goal of any conservative surgery, to obtain a refund of physiological functioning valve.

However, given the increase in interventional cardiology percutaneous techniques which targets the same objective,

we consider as essential, when the patient is proposed for surgery, to obtain a double result:

- physiological (no residual leakage)

- anatomical (bi valvular mobility preservation), with a site of the two leaflets coaptation more distant from the posterior part of the mitral annulus, avoiding a « mono-cusp working » of the mitral valve.
3 Questions

Gore Tex sutures (W.L. Gore & Assoc, Inc) is used by many teams,
- either in addition to partial resection valve,
- either alone making a nonresectional repair approach.

However, this technique has three major problems and many publications are trying to answer:

• 1/How to determine the exact length of artificial chordae?

• 2/how easily and securely fixing the chordae?

• 3/how can we obtain a satisfactory long-term result?
Material & Methods

- May 1991 – December 2010: 652 Mitral valvuloplasty

- **92 patients** (consecutive series): nonresectional free edge technique with Gore-Tex sutures & mitral prosthetic ring (Duran, Medtronic) for Barlow disease (n=12) or fibro-elastic pathology (n=80)

- 2 key points:
  - Determination of the length of artificial chordae with TEE
  - Gore-Tex braids equipped with 4 needles, realized before CPB
Determination of the length of artificial chordae with TEE
2 Gore-Tex sutures 4/0
- braided in 2 parts (more flexibility)
- before CPB (no time consuming)

-Mean number of artificial chordae / patient: 4,6 (3-8)
- these braids are equipped with 4 needles, therefore extremely easy to install and tie.
### RESULTS

<table>
<thead>
<tr>
<th></th>
<th>PRE- OP</th>
<th>POST- OP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 4</td>
<td>87</td>
<td>0</td>
</tr>
<tr>
<td>Grade 3</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Grade 2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grade 1</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>No residual</td>
<td>0</td>
<td>81</td>
</tr>
<tr>
<td>mitral insufficiency</td>
<td></td>
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Bi leaflet mobility criteria

- **Surgical:**
  - Macroscopic
  - Water injection in the left ventricle

- **Echographic:**
  - Systolo-diastolic mobility
  - Intra ventricular course of the repaired free edge leaflet
  - Location of the point of leaflets coaptation from the center of mitral orifice
## COMPARATIVE RESULTS

<table>
<thead>
<tr>
<th>RESECTION</th>
<th>quadrangular</th>
<th>triangular</th>
<th>Partial triangular</th>
<th>No resection Artificial chordae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nb of patients</td>
<td>148</td>
<td>298</td>
<td>114</td>
<td>92</td>
</tr>
<tr>
<td>Residual mitral Insufficiency &gt;grade 1</td>
<td>4 %</td>
<td>3 %</td>
<td>2 %</td>
<td>0 %</td>
</tr>
<tr>
<td>Bi leaflet mobility</td>
<td>5 %</td>
<td>17 %</td>
<td>35 %</td>
<td>87 %</td>
</tr>
<tr>
<td>Mean size of Prosthetic ring</td>
<td>27</td>
<td>29</td>
<td>29</td>
<td>31</td>
</tr>
<tr>
<td>Mean transmital Gradient &gt;5mmHg</td>
<td>7 %</td>
<td>5 %</td>
<td>6 %</td>
<td>2 %</td>
</tr>
</tbody>
</table>
DISCUSSION

- bileaflet systolic apposition reduces leaflet and chordal stress, including basal chords
- Because of their thickness and strategic location, basal, strut and stay chordae must be spared
- the size of prosthetic ring may interfere on the immobility of the posterior leaflet, due to excessive posterior homothetic reduction

2000: Obadia & coll. (Circulation) LV geometry, LV function
2002: Miller (Annals) SAM prevention
2004: Rodriguez (Circulation) LV geometry, LV systolic function & thickening
2007: Duran & coll. (European JTS) basal chords
2008: Fedak & Bonow (Circulation)
2011: Lawrie (JTCS)
Conclusions

• The concept of an anatomic restoration of the mitral valve, based on a nonresectional approach and artificial chordae must be motivated by:

• a desire to harmoniously redistribute all the stress mechanisms of the mitral valve apparatus.

• This therefore includes the distribution of various tensions on the unit valve as far as the confrontation between the two valve leaflets in order to restore to each structure its original role.