Abstract: P589

Assessment of cardiac reverse remodelling following mitral valve repair and mitral valve replacement in degenerative mitral regurgitation: a cardiovascular magnetic resonance study

Authors:
PG Chew¹, LE Dobson¹, P Garg¹, FJL Richards¹, JR Foley¹, GJ Fent¹, LAE Brown¹, CED Saunderson¹, ADas¹, AKidambi¹, E Levelt¹, PP Swoboda¹, E Dall'armellina¹, SPlein¹, JP Greenwood¹, ¹University of Leeds - Leeds - United Kingdom of Great Britain & Northern Ireland,

Topic(s):
Cardiac Magnetic Resonance: Valve Disease

Citation:
Leeds NIHR infrastructure

Background
Mitral valve (MV) repair is currently recommended over replacement(1). The guidelines suggesting this are however based on historic evidence which compared outdated techniques of MV replacement. Recent data cast doubts on its validity in the current era of chordal-preservation techniques in MV replacement.

Purpose
Using cardiovascular magnetic resonance (CMR) imaging, this study aimed to assess the impact of MV repair and MV replacement on cardiac left ventricular (LV) reverse remodelling.

Methods
65 patients with moderate-severe and severe mitral regurgitation (MR) were prospectively recruited. Of these, 37 patients (59% men, 65±15years) to date with paired CMR scans at baseline and at 6 months were evaluated. Patients either underwent MV repair (n=9), MV replacement (n=10) or watchful waiting (n=18). The CMR protocol included cines for left ventricle (LV), left atria (LA), and aortic flow assessment. The LA and LV parameters, and MR fraction were analysed.

Results
At 6 months, both the MV repair and replacement groups exhibited a reduction in LV end-diastolic volume (LVEDV) and LA volumes when compared to the control group. The indexed LVEDV decreased significantly from 129±33ml/m² to 99±37ml/m², p<0.001 in the repair group, from 118±24ml/m² to 90±26ml/m², p<0.001 in the replacement group and remained unchanged in the control group 115±25ml/m² to 113±25ml/m², p=0.53. The absolute reduction in indexed LVEDV was not significantly different between the repair and replacement groups (-30±15ml/m² vs -29±19ml/m², repair vs replacement, p=1.00). Similarly, both surgical groups also sustained an equal degree of LA size reduction (-42±26ml/m² vs -36±23ml/m², repair vs replacement; p=1.00). There was a decline in the global postoperative LV ejection fraction (Table 1). The degree of reduction in LV ejection fraction however did not differ between the repair and replacement group (-9±6% vs -6±8%, repair vs replacement; p=1.00). Those undergoing surgery experienced a significant reduction in their MR severity, although those with replacement had a more effective reduction in MR severity (MR fraction for repair: 47±9% to 15±10%, p<0.001 vs replacement: 41±13% to 5±4%, p=0.001).

Conclusion
MV surgery leads to atrial and left ventricular reverse remodelling, and a decline in global LV ejection fraction. In this small series, MV replacement with chordal preservation showed similar cardiac reverse remodelling benefits to MV repair. Although residual MR is often seen following repair, this did not lead to less favourable cardiac reverse remodelling.
Assessment of cardiac reverse remodelling following mitral valve repair and mitral valve replacement in degenerative mitral regurgitation: a cardiovascular magnetic resonance study

Authors: PG Chew, LE Dobson, P Garg, FJL Richards, JR Foley, GJ Fent, LAE Brown, CED Saunderson, A Das, A Kidambi, E Levelt, PP Swoboda, E Dall'armellina

University of Leeds - Leeds - United Kingdom of Great Britain & Northern Ireland

Topic(s): Cardiac Magnetic Resonance: Valve Disease

Background
Mitral valve (MV) repair is currently recommended over replacement (1). The guidelines suggesting this are however based on historic evidence which compared outdated techniques of MV replacement. Recent data cast doubts on its validity in the current era of chordal-preservation techniques in MV replacement.

Purpose
Using cardiovascular magnetic resonance (CMR) imaging, this study aimed to assess the impact of MV repair and MV replacement on cardiac left ventricular (LV) reverse remodelling.

Methods
65 patients with moderate-severe and severe mitral regurgitation (MR) were prospectively recruited. Of these, 37 patients (59% men, 65±15 years) with paired CMR scans at baseline and at 6 months were evaluated. Patients either underwent MV repair (n=9), MV replacement (n=10) or watchful waiting (n=18).

The CMR protocol included cines for left ventricle (LV), left atria (LA), and aortic flow assessment. The LA and LV parameters, and MR fraction were analysed.

Results
At 6 months, both the MV repair and replacement groups exhibited a reduction in LV end-diastolic volume (LVEDV) and LA volumes when compared to the control group. The indexed LVEDV decreased significantly from 129±33ml/m² to 99±37ml/m², p<0.001 in the repair group, from 118±24ml/m² to 90±26ml/m², p<0.001 in the replacement group and remained unchanged in the control group 115±25ml/m² to 113±25ml/m², p=0.53.

The absolute reduction in indexed LVEDV was not significantly different between the repair and replacement groups (­30±15ml/m² vs ­29±19ml/m², repair vs replacement, p=1.00). Similarly, both surgical groups also sustained an equal degree of LA size reduction (­42±26ml/m² vs ­36±23ml/m², repair vs replacement; p=1.00).

There was a decline in the global postoperative LV ejection fraction (Table 1). The degree of reduction in LV ejection fraction however did not differ between the repair and replacement group (­9±6% vs ­6±8%, repair vs replacement; p=1.00). Those undergoing surgery experienced a significant reduction in their MR severity, although those with replacement had a more effective reduction in MR severity (MR fraction for repair: 47±9% to 15±10%, p<0.001 vs replacement: 41±13% to 5±4%, p<0.001).

Conclusion
MV surgery leads to atrial and left ventricular reverse remodelling, and a decline in global LV ejection fraction. In this small series, MV replacement with chordal preservation showed similar cardiac reverse remodelling benefits to MV repair. Although residual MR is often seen following repair, this did not lead to less favourable cardiac reverse remodelling.

Table 1. Baseline and 6 months CMR parameters in the ‘Controls’, ‘Repair’ and ‘Replacement’ groups

<table>
<thead>
<tr>
<th>Cardiakvascular variables</th>
<th>Controls (n=18)</th>
<th>Repair (n=9)</th>
<th>Replace (n=10)</th>
<th>P value ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVEDV (indexed), ml/m²</td>
<td>115±25</td>
<td>120±33</td>
<td>118±24</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LVESV (indexed), ml/m²</td>
<td>46±12</td>
<td>61±22</td>
<td>54±14</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LVSV (indexed), ml/m²</td>
<td>65±11</td>
<td>66±14</td>
<td>64±15</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LVEF (%)</td>
<td>59±6</td>
<td>54±7</td>
<td>55±7</td>
<td>0.03</td>
</tr>
<tr>
<td>LA volume index (ml/m²)</td>
<td>81±22</td>
<td>92±22</td>
<td>98±32</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MR volume (ml)</td>
<td>30±14</td>
<td>60±13</td>
<td>50±25</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MR fraction (%)</td>
<td>33±12</td>
<td>47±19</td>
<td>41±13</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Data as mean±SD. ANOVA with Bonferroni correction for between group comparisons and paired t-test for within group comparison. LVEDV, left ventricular end-diastolic volume; LVESV, left ventricular end-systolic volume; LVSV, left ventricular stroke volume; LVEF, left ventricular ejection fraction; LV, left ventricle; LA, left atrial; MR, mitral regurgitation.